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The NUGA Journal of Scientific Studies (NJSS) is a peer-reviewed, scholarly publication of the Nigerian Universities Games Association dedicated to advancing knowledge and understanding of critical issues in sport, health, physical activity, exercise science, physical education, and related interdisciplinary fields. With a strong emphasis on empirical research and evidence-based innovations, the journal provides high-quality scientific information relevant to Nigeria, Africa, and the global community. It aims to serve as a vital resource for researchers, educators, policymakers, practitioners, sports organizations, governments, and international bodies committed to improving human well-being, educational development, and societal progress through scientific inquiry.

For the first time, the Journal is formally indexed in major academic databases and has been assigned International Standard Serial Numbers (ISSN) for both print and online versions. This edition is made of mostly peer reviewed articles emanating from the 2025 NUGA Scientific Forum/Conference held on 10<sup>th</sup> November 2025 during the Nigerian Universities Games Association (NUGA) Games at the University of Jos, Nigeria. The Journal is published biannually (twice a year) with a clear commitment to achieving and maintaining high-impact metrics. The Journal upholds rigorous international publishing standards, including double-blind peer review, strict adherence to research ethics (COPE guidelines), plagiarism checks, data transparency, and open-access options where feasible. These measures ensure the publication of only original, methodologically sound, and impactful articles that meet global best practices in scientific publishing.

The Journal welcomes high-quality empirical studies as its primary focus, while also considers strong theoretical and review papers that address contemporary challenges in sports science, health, physical activity, recreation, education and allied social sciences. Manuscripts may be submitted electronically throughout the year. The journal operates an efficient review process, with authors typically receiving an initial decision within one month of submission. Detailed author guidelines, including formatting, referencing style (APA), and ethical requirements, are available on the journal's website.

The maiden edition features twenty-one well-researched, rigorously peer-reviewed articles organized under key sub-themes: physical activity, exercise, fitness and sports science and management; knowledge, attitudes and practices on diseases and prevention; nutrition and family health; and health behaviours among adolescents and adults.

The Editorial Board expresses profound gratitude to our dedicated team of editors, reviewers, contributors, and all stakeholders whose expertise and commitment have made the successful launch of this high-quality journal possible. We look forward to your continued support as we strive for excellence and global visibility.

**Professor Joshua E. Umeifekwem, MNAE**

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The **NUGA JOURNAL OF SCIENTIFIC STUDIES (NJSS)** is a peer-reviewed Journal publication by the Nigerian Universities Games Association and publishes original research, applied, and educational articles in all areas of Human Kinetics, Sports, Recreation, Health and Education. We also welcome healthcare professionals, experts in practical and scientific fields, as well as academics, researchers and scholars to submit their work. We publish two times a year (March and November). Our publications are both in hardcopy and online platforms. **We receive submissions all through the year.**

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## Mental Resilience and Psychological Preparation for University Athletes: Pathways to Performance Excellence

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Lead Paper Presented at the Scientific Conference of the 27th NUGA Games, University of Jos, Nigeria

### **Abstract**

*University athletes in Nigeria face distinctive pressures as they strive to balance rigorous academic responsibilities with the demands of competitive sports. These dual obligations often generate psychological stress that can undermine both performance and well-being. Mental resilience, the capacity to adapt positively to adversity and recover from setbacks, and psychological preparation, the deliberate cultivation of mental skills such as focus, visualization, mindfulness, and goal-setting, are increasingly recognized as essential components of athletic success. This paper investigates the role of resilience training, coping strategies, and psychological conditioning in enhancing the performance of student-athletes within Nigerian universities. Drawing on contemporary empirical studies and case analyses, the findings reveal that athletes who engage in structured resilience-building programs and psychological skills training demonstrate superior ability to regulate stress, sustain motivation, and maintain consistent performance levels despite resource constraints and institutional challenges. The study further underscores the broader benefits of resilience, linking it not only to athletic achievement but also to academic success and personal development. Recommendations include the integration of resilience-focused interventions, mentorship initiatives, and psychological training modules into university athletic curricula, thereby fostering holistic growth, competitive excellence, and long-term adaptability among Nigerian student-athletes.*

**Keywords:** Mental resilience, psychological preparation, university athletes, mental toughness, sports psychology, performance enhancement

### **Introduction**

University athletes operate within a dual environment of academic and athletic demands, often experiencing heightened stress levels compared to non-athlete peers. The ability to withstand pressure, adapt to adversity, and maintain focus is essential for success both on and off the field. Mental resilience, defined as the ability to withstand, adapt to, and recover from adversity while maintaining optimal psychological functioning, has emerged as a cornerstone of sports performance (Fletcher & Sarkar, 2012; Gucciardi et al., 2015).

Psychological preparation encompasses a range of mental skills, including visualization, goal-setting, emotional regulation, and mindfulness. These strategies enable athletes to optimize performance under competitive conditions by enhancing focus, confidence, and emotional regulation (Weinberg & Gould, 2019; Rice et al., 2016; Samuel Marciano Rice et al., 2016). In the Nigerian university context, where student-athletes contend with academic demands, limited resources, and inadequate psychological support systems, the development of mental resilience becomes particularly critical for sustaining performance and well-being (Rice et al., 2016; Stambulova et al., 2015).

This paper situates mental resilience within the broader discourse of sports psychology, emphasizing its role in preparing athletes for competition, academic success, and personal growth.

### **Mental Toughness**

Mental toughness is one of the most frequently studied constructs in sports psychology. It is often described as the psychological edge that enables athletes to cope effectively with pressure, adversity, and challenges while maintaining optimal performance. Jones, Hanton, and Connaughton (2007) conceptualized mental toughness as a multifaceted construct encompassing mindset, training behaviors, competitive performance, and post-competition responses. These dimensions enable athletes to maintain focus, regulate emotions, and perform effectively under high-pressure conditions. Similarly, the widely cited 4Cs model—control, commitment, challenge, and confidence—explains how mentally tough athletes remain resilient and consistent in high-stakes environments (Clough et al., 2002).

Mental toughness among university athletes is increasingly viewed not as an innate trait but as a psychological capacity that can be developed through structured training, mentorship, and lived sporting experiences (Gucciardi et al., 2015; Fletcher & Sarkar, 2012). Empirical evidence suggests that athletes who actively engage in psychological skills training demonstrate a greater ability to cope with pressure, navigate challenges, and maintain performance consistency under competitive conditions (Weinberg & Gould, 2019). Mental toughness is also closely linked to motivation and self-regulation; athletes with higher mental toughness scores are more likely to set challenging goals, persist in training, and recover quickly from setbacks (Gucciardi et al., 2015). In the university context, where athletes balance academics and sports, mental toughness becomes a critical determinant of both athletic and academic success.

### **Psychological Resilience**

Resilience is commonly defined as the capacity to adapt positively to adversity, recover from setbacks, and maintain psychological functioning. In the sporting context, resilience plays a key role in protecting athletes against burnout, stress, and performance decline (Gupta & McCarthy, 2022; Sarkar & Fletcher, 2014). Recent perspectives emphasize that resilience involves dynamic adaptation and growth following stressors, where athletes learn from challenges and develop enhanced coping capabilities over time (Gupta & McCarthy, 2022).

Mei et al. (2025) conducted a narrative review of athlete resilience research, highlighting that resilience is associated with both physical and mental health outcomes in sport. Their synthesis shows that resilient athletes are better able to evaluate and regulate thoughts, emotions, and behaviors in response to adversity, supporting sustained performance under stress (Mei et al., 2025).

In the Nigerian university context, resilience is particularly important given the dual pressures of academics and athletics. Student-athletes often face resource constraints, inadequate psychological support, and high expectations from both academic and athletic domains (Ochor & Amasiatu, 2025). Resilience training is therefore essential for sustaining motivation and performance. Fletcher and Sarkar (2012) further noted that resilient athletes often rely on strong social support networks—including coaches, teammates, and family—to navigate adversity, underscoring the importance of institutional structures that foster community and psychological support.

### **Preparation Strategies: Visualization, Mindfulness, and Goal-Setting**

Psychological preparation involves the systematic development of mental skills to enhance athletes' readiness for competition. Common techniques include visualization, self-talk, mindfulness, and goal-setting.

**Visualization** or mental imagery enables athletes to mentally rehearse successful performance scenarios, enhancing confidence, focus, and skill execution under pressure (Cumming et al., 2025; Decety, 1996; *Frontiers in Psychology*, 2025).

**Self-talk**, whether instructional or motivational, improves motor performance, emotional control, and cognitive processing during competition (Hatzigeorgiadis et al., 2014; Tod et al., 2023).

**Mindfulness training**, including meditation and controlled breathing, reduces performance anxiety, enhances concentration, and strengthens emotional regulation (Rogowska & Tataruch, 2024; Bordo et al., 2025). Combined interventions (mindfulness + breathing exercises) also improve self-confidence and stress management.

**Goal-setting** remains a critical preparation strategy. Locke and Latham's (2002) goal-setting theory emphasizes that specific, measurable, and challenging goals enhance motivation and performance. Structured goal-setting has been linked to improved consistency and resilience, enabling athletes to balance academic and athletic responsibilities (Pop et al., 2021).

Together, these strategies form a comprehensive toolkit for psychological preparation, enabling athletes to thrive in competitive environments and highlighting the importance of integrating mental skills training into university athletic programs.

### **University Athlete Context (Nigeria)**

The Nigerian university context presents unique challenges for student-athletes. Empirical research shows that competitive stressors, such as performance anxiety and reduced self-confidence, are significant issues affecting athletes' participation and performance (Ochor & Amasiatu, 2025). Psychological factors such as confidence, motivation, and coping resources influence athletic outcomes in Nigerian settings.

Sport development stakeholders in Nigeria have increasingly recognized the importance of resilience and structured psychological support. The Sports Psychologists Association of Nigeria (SPAN, 2025) recommends resilience education, mindfulness training, and mentorship initiatives across university sports programs. Such support systems help athletes balance academic and athletic responsibilities, promoting both performance excellence and psychological well-being.

### **Mental Resilience: Definition and Components**

Mental resilience, often used interchangeably with psychological resilience in sport psychology, refers to an athlete's ability to withstand, adapt to, and recover from stress and adversity while maintaining effective functioning under pressure (Fletcher & Sarkar, 2012). It is a multidimensional construct encompassing cognitive, emotional, and behavioral elements.

#### **Core components include:**

- **Confidence** – belief in one's ability to succeed
- **Emotional control** – regulation of stress and anxiety
- **Commitment and persistence** – sustained effort despite challenges
- **Control** – perceived influence over performance outcomes
- **Adaptability** – flexibility in coping with changing demands

These align with the 4Cs model (control, commitment, challenge, confidence), which explains how resilient athletes interpret pressure as an opportunity rather than a threat (Clough et al., 2002). Athletes with high mental resilience demonstrate better stress management, consistent performance, and improved well-being (Gucciardi et al., 2015).

### **Psychological Preparation: Meaning and Scope**

Psychological preparation involves the systematic development of mental skills to enhance performance and well-being (Weinberg & Gould, 2019). This is operationalized through Psychological Skills Training (PST), which includes:

- Goal setting
- Imagery and visualization
- Self-talk
- Relaxation and arousal regulation
- Attention control

These techniques are **planned, evidence-based, and repetitive**, aimed at improving focus, confidence, and coping ability in competitive environments (Weinberg & Gould, 2019; Hardy et al.,

2001). The scope extends beyond performance to include mental health support, stress management, and long-term athlete development (Rice et al., 2016).

### **Performance Excellence in Sports**

Performance excellence refers to the consistent achievement of optimal performance levels under pressure, going beyond winning to sustaining peak performance (Williams & Krane, 2021). Key psychological attributes include:

- Mental toughness and resilience
- Concentration and attentional control
- Confidence and intrinsic motivation
- Effective anxiety management

Research shows that mentally tough athletes demonstrate greater performance stability, lower anxiety, and superior coping strategies (Gucciardi et al., 2015; Williams & Krane, 2021).

### **University Athletes: Characteristics and Challenges**

University athletes are unique due to the dual demands of academic and athletic responsibilities (Stambulova et al., 2015).

#### **Characteristics:**

- High performance expectations
- Structured training and competition schedules
- Exposure to competitive stress
- Developing autonomy and self-regulation

#### **Challenges:**

- Academic–athletic conflict
- Performance anxiety and stress
- Injury and rehabilitation pressures
- Burnout and fatigue
- Limited access to sport psychology services (Rice et al., 2016; Stambulova et al., 2015)

Integrated psychological support systems are essential to enhance resilience, sustain performance, and promote holistic development.

### **Summary**

This paper examined the critical roles of mental resilience and psychological preparation in supporting university athletes to achieve performance excellence. Mental resilience is a multidimensional capacity encompassing cognitive, emotional, and behavioural components (Fletcher & Sarkar, 2012; Gucciardi et al., 2015). Psychological preparation, including goal-setting, visualization, self-talk, and mindfulness, equips athletes to manage stress, enhance focus, and maintain performance consistency.

In the Nigerian university context, academic pressures, limited resources, and inadequate psychological support challenge student-athletes' ability to perform optimally (Ochor & Amasiatu, 2025; SPAN, 2025). Structured resilience-building programs and psychological skills training enhance coping strategies, motivation, and confidence, forming an integrated framework for performance and well-being.

### **Conclusion**

Mental resilience and psychological preparation are indispensable components of athletic performance, particularly in environments where student-athletes face multiple stressors. Athletes who cultivate resilience and employ structured psychological strategies demonstrate greater adaptability, emotional regulation, and performance consistency. In the Nigerian university context, where athletes must balance academic and sporting commitments, these capacities are especially critical. Mental skills training should be recognized as essential for promoting both performance excellence and psychological well-being.

## Recommendations

1. **Integrate Structured Mental Skills Training in University Sports Programs**  
Include resilience-building, mindfulness, goal-setting, visualization, and self-talk modules in athletic curricula.
2. **Develop Tailored Psychological Support Services**  
Counselling centres and sports psychologists should provide interventions for stress, performance anxiety, and motivation.
3. **Provide Mentorship and Peer Support Systems**  
Experienced athletes and coaches should mentor younger athletes to foster resilience, confidence, and coping strategies.
4. **Promote Research on Nigerian University Athletes**  
Encourage studies exploring resilience and psychological preparation outcomes within Nigerian universities.
5. **Institutionalize Performance and Well-being Monitoring**  
Conduct regular assessments of athletes' psychological states and coping mechanisms to provide timely support.
6. **Capacity-Building for Coaches and Administrators**  
Train coaches in sport psychology principles to ensure sustainable integration of mental skills training.

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# Integrating Sport Psychologists into University Athletes' Support Staff for National and Global Excellence: A Position Paper on Nigerian Systems

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## Abstract

*University sport systems serve as key developmental platforms for elite athletic performance worldwide. Countries that consistently excel in international competitions, including the National Collegiate Athletic Association system in the United States and similar university sport structures in the United Kingdom, China, Australia, and Canada, rely on multidisciplinary support teams that include sport psychologists to optimize athlete preparation. Sport psychology research has demonstrated that psychological interventions enhance athletes' ability to manage competitive pressure, maintain motivation, and sustain performance. In Nigeria, however, despite the presence of trained sport psychologists within university Human Kinetics and Sport Science departments, their expertise is rarely integrated into coaching and athlete support structures. Drawing on a narrative review of literature published between 2015 and 2024 and recent insights from the 2024 Summer Olympics, this position paper argues that Nigerian universities underutilize existing sport psychology expertise within their institutional systems. The paper highlights the psychological, academic, and personal challenges faced by university athletes and proposes practical modalities for integrating sport psychologists into university coaching structures through formal collaboration between Sport Directorates and Human Kinetics departments. It concludes by recommending policy-driven frameworks to institutionalize psychological support within Nigerian university sports systems in order to strengthen athlete development and enhance national and global sporting competitiveness.*

**Keywords:** National and global sports development, Performance excellence, psychological support systems, Sport psychology integration, University Athlete's Support Staff

## Introduction

University sport systems are critical pipelines for developing elite athletes globally. In countries such as the United States, the United Kingdom, Canada, and Australia, universities play a central role in identifying, nurturing, and scientifically supporting athletic talent. Structured systems such as the National Collegiate Athletic Association (NCAA), British Universities and Colleges Sport (BUCS), and U SPORTS demonstrate that elite performance emerges when academic institutions integrate sports science expertise with athlete development programmes (NCAA, 2024; U SPORTS, 2024). Post-competition analyses from the Paris 2024 Olympic Games highlighted the strong contribution of university-affiliated athletes to national teams, emphasizing that elite performance depends not only on physical training but also on psychological readiness, resilience, and cognitive preparation (Weston, 2024). In Nigeria, the integration of sport psychology within university athlete support remains limited, despite the presence of trained specialists in academic departments. Consequently, many athletes balance academic obligations, training, and competitive pressures without structured psychological support, representing a missed opportunity to strengthen athlete development and international competitiveness (Adeleke & Ugwueze, 2023).

Globally, university-based sports programmes have evolved beyond recreation to become structured development pathways producing world-class athletes. Historical and empirical evidence shows that nations dominating Olympic medal tables maintain highly functional institutional sports systems (De Bosscher et al., 2015; Green & Oakley, 2001). For example, over 1,300 athletes on Team USA at the Paris 2024 Olympics were current or former NCAA athletes, illustrating the synergy between higher education and national sports excellence (NCAA, 2024). Similarly, BUCS in the United Kingdom and UniSport in Australia underpin sustained athletic success through integrated development systems (Duffy et al., 2020).

Institutional sports frameworks provide not only facilities and structured training but also academic, psychological, and social support essential for holistic athlete growth (Ryba et al., 2017). Integrating sports science professionals, nutritionists, physiologists, and sport psychologists enhances preparation quality. Psychological factors such as anxiety, motivation, confidence, and concentration significantly influence performance (Gould & Maynard, 2009; Weinberg & Gould, 2019). Consequently, sport psychologists have expanded from clinical intervention to proactive performance optimization, emotional regulation, and resilience training, all vital for elite competition.

Despite these global practices, Nigerian universities underutilize the expertise of trained sport psychologists within their Human Kinetics and Health Education departments, creating a gap between academic knowledge and applied athlete development (Omoriegbe & Osagie, 2020). This position paper argues that institutional sports serve as foundational platforms for national and global excellence, and sport psychologists must be operationally integrated into Nigerian university coaching and athlete management systems. Integration could take the form of contract-based appointments, cross-departmental consultancy, or embedded psychological service units, ensuring psychological training and real-time performance interventions become standard, mirroring practices in NCAA, BUCS, and UniSport. Subsequent sections will present empirical evidence, comparative global insights, and practical recommendations to reposition Nigerian university sports for national and international success.

### **Theoretical Framework**

This paper is grounded in Ecological Systems Theory and the Holistic Athlete Career Model, which together provide a conceptual basis for understanding athlete development within university sport environments.

Ecological Systems Theory, developed by Urie Bronfenbrenner, explains that human development is shaped through interactions between individuals and the environmental systems in which they function (Bronfenbrenner, 1979). Within university sport contexts, athletes develop not only through physical training but also through engagement with interconnected institutional structures such as academic programmes, coaching systems, peer networks, and sport science support services. These environmental systems collectively influence athletes' psychological readiness, motivation, coping strategies, and performance outcomes. When these systems function collaboratively, through cooperation among coaches, sport psychologists, and academic advisors, they create supportive environments that enhance both athlete well-being and competitive performance (Henriksen et al., 2020).

From this ecological perspective, the integration of multidisciplinary expertise within athlete support systems becomes essential. Sport psychologists, in particular, contribute by developing mental skills such as goal setting, attentional control, emotional regulation, and resilience under competitive pressure (Gould & Maynard, 2009). In well-established university sport systems, psychological services are integrated alongside physiological conditioning and technical training as part of comprehensive athlete preparation (Reardon et al., 2021).

Complementing this perspective, the Holistic Athlete Career Model emphasizes that athlete development occurs across multiple life domains rather than within sport alone. Athletic performance interacts with psychological development, academic progress, psychosocial relationships, and career planning (Stambulova & Wylleman, 2019). University athletes therefore face dual-career demands that require balancing academic responsibilities with intensive training and competition schedules. Without structured institutional support, these demands may lead to stress, role conflict, and reduced performance.

Within this framework, sport psychologists support athletes by providing cognitive and behavioural strategies for stress management, motivation, and self-regulation while also facilitating identity development and career transition planning (Stambulova et al., 2021). Applied within university sport systems, this model highlights the need for integrated support structures that address athletes' psychological, academic, and social needs alongside physical training.

Ecological Systems Theory and the Holistic Athlete Career Model provide a strong theoretical justification for integrating sport psychologists into university sport structures. These frameworks demonstrate that athlete performance emerges from the interaction between individuals and institutional environments. In the Nigerian university context, embedding sport psychologists within sport directorates would strengthen institutional support systems, enhance athletes' capacity to manage academic and competitive pressures, and contribute to the development of resilient athletes capable of succeeding at national and international levels.

### Methods

A narrative review methodology was adopted to synthesize research on university sport systems and sport psychology integration. Peer-reviewed literature published between 2015 and 2024 was searched across Google Scholar, Scopus, Web of Science, and SPORTDiscus. Keywords included university sports systems, sport psychology support, and studentathlete mental health. To enhance methodological transparency, the literature identification process followed principles aligned with the PRISMA Framework for systematic evidence reporting (Welch et al., 2016). Studies were screened based on relevance to three criteria: university-based athlete development systems, psychological support interventions in sport, athlete performance and well-being outcomes. A total of 52 sources were initially identified, of which 28 peer-reviewed studies and institutional reports were retained for conceptual synthesis.



Figure 1. PRISMA-inspired literature screening process for studies on university sports systems and sport psychology integration (2015–2024).

**Global Institutional Sports Systems and Olympic Representation Evidence**

A strong empirical basis supports the argument for the institutional foundation of global sports dominance. Data from recent Olympic Games show that countries leading the medal tables consistently rely on institutional athletes trained within university sports systems.

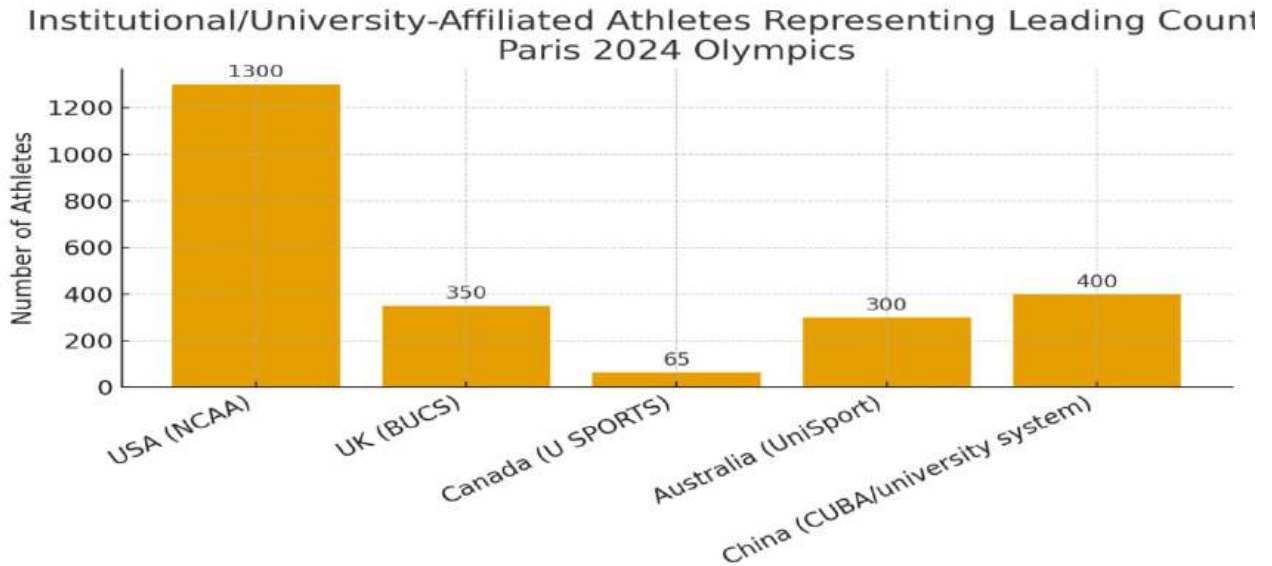


Figure 2: Institutional/University-Affiliated Athletes Representing Leading Countries (Paris 2024 Olympics)

As shown in Figure 1, the United States, through the NCAA, had over 1,300 university-affiliated athletes at the 2024 Paris Olympics (NCAA, 2024). Similarly, the United Kingdom, under BUCS, had approximately 350 athletes, while Australia’s UniSport and China’s university system (CUBA) contributed hundreds more. Canada’s U SPORTS produced 65 Olympic athletes and alumni (U SPORTS, 2024). These patterns affirm that institutional sports systems form the cornerstone of national athletic representation and global sporting excellence. Such data reinforce the position that institutional integration of sport psychologists contributes meaningfully to these nations’ sustained athletic performance. Their systems recognize psychological readiness as integral to physical conditioning, athlete motivation, and competitive resilience (Vealey & Garner-Holman, 2020).

Across Africa the role of universities in producing Olympic athletes is **uneven**. South Africa shows the clearest institutional links between universities and Olympic representation (several universities publicly list current students or alumni on national teams). In Nigeria a number of Olympians have university or overseas collegiate (chiefly U.S.) affiliations but consolidated institutional counts are not publicly reported. Kenya and Ethiopia remain largely club-, training-camp- and national-team driven (especially in middle/long distance running), with fewer publicly listed university affiliation tallies. Egypt shows some university-level reporting (e.g., AUC student/alumni media reports), but national consolidated figures for university-affiliated Olympians are typically not published.

Below is a table of country-by-country notes with the best available published evidence for institutional/university affiliations at Paris 2024 (or the most recent international competitions), (world Athletics, 2024).

Country	Best available public indicator (Paris 2024 or federation note)	What it reveals about institutional contribution
South Africa	Team SA ≈ 150 athletes; multiple universities (e.g., UJ) publicly listed current student-athletes on national team rosters. <a href="#">Olympics+1</a>	Strong, visible university involvement; universities publish affiliated athlete lists.
Nigeria	AFN athletics list (35 athletics entrants) and many athletes with U.S. NCAA college links; no single public consolidated count of Nigerian university-affiliated Olympians. <a href="#">athleticsnigeria.org+1</a>	Institutional contribution exists but is fragmented; notable diaspora/collegiate pathways.
Kenya	Athletics Kenya announced 45 athletes for Paris 2024; public sources emphasise clubs/training groups rather than universities. <a href="#">athletics.africa+1</a>	Development pipeline primarily club/training-group based; universities less central.
Ethiopia	World Athletics team announcements for Paris 2024; athlete bios emphasise clubs/national groups, not universities. <a href="#">worldathletics.org+1</a>	University role in elite pathway limited or not publicly emphasized.
Egypt	University press (AUC) highlighted student/alumni Olympians; national media covered Team Egypt's athletes but consolidated institutional counts are not available. <a href="#">American University in Cairo+1</a>	University contributions exist but data fragmented across institutions.

**Table 1. Evidence from Literature on Sport Psychology Integration**

Study	Country	Key Focus	Major Finding
Gould & Maynard (2009)	UK	Psychological preparation	Mental skills training improves performance consistency
Birrer & Morgan (2010)	Switzerland	Psychological skills training	Enhances focus and emotional regulation
Simons et al. (2017)	USA	NCAA athletes	Psychological services improve motivation and retention
Henriksen et al. (2020)	Denmark	Talent development environments	Multidisciplinary support improves athlete development
Reardon et al. (2025)	Global	Mental health in elite sport	Integrated psychological support essential for athlete welfare

These findings consistently indicate that multidisciplinary support structures including sport psychologists, enhance athlete development and performance outcomes.

### **Challenges of University Athletes and the Need for Psychological Integration in Nigeria**

University athletes in Nigeria navigate a complex intersection of academic, personal, and athletic demands that collectively strain their psychological, emotional, and physical well-being. These pressures often manifest as mental fatigue, performance anxiety, burnout, and diminished concentration (Weinberg & Gould, 2023). Unlike athletes in advanced institutional sports systems, most Nigerian university athletes operate without structured psychosocial support. The absence of sport psychologists within university sports directorates leaves athletes vulnerable to anxiety, stress, burnout, and motivational decline, factors that significantly undermine performance and consistency (Awopetu, 2016; Okonkwo & Okonkwo, 2020).

A significant challenge is the dual career stress, whereby student-athletes must excel academically and athletically, leading to role conflict, time pressure, and emotional exhaustion (Adebayo & Omoregie, 2019). Many universities lack flexible academic policies for athletes, compelling them to manage demanding lecture schedules alongside rigorous training and competition. This often results in poor concentration, reduced motivation, and psychological fatigue, undermining both academic and athletic outcomes (Eke, 2020). Evidence from developed contexts demonstrates that sport psychologists equip athletes with coping mechanisms and cognitive-behavioural strategies that enhance focus, emotional regulation, and academic resilience (Birrer & Morgan, 2010; Gross et al., 2018).

Inadequate recognition and motivation further exacerbate these challenges. Institutional support is minimal, with limited scholarships, poor training infrastructure, and inconsistent national competition participation, contributing to low morale and declining engagement (Omoregie & Osagie, 2020). Conversely, athletes in systems such as the NCAA or BUCS benefit from structured motivational reinforcement, mentoring, and goal-setting, sustaining engagement and performance (Simons et al., 2017). Integration of sport psychologists in Nigerian universities would provide continuous motivation, athlete identity formation, and performance evaluation grounded in psychological principles.

Performance anxiety is prevalent among Nigerian athletes facing competitive pressures without adequate coping strategies. Pre-competition anxiety predicts poor performance, especially among young athletes (Afolabi et al., 2022). Without professional support, anxiety can escalate into avoidance behaviours, reduced self-efficacy, and premature withdrawal. Sport psychologists can deliver evidence-based interventions such as relaxation training, biofeedback, mindfulness, and cognitive restructuring to regulate arousal and enhance focus (Hanton et al., 2015; Raglin, 2017).

Furthermore, career transition challenges post-graduation often leaves athletes unprepared for life after sport, heightening identity loss and emotional adjustment difficulties (Stambulova et al., 2021). Embedding sport psychologists within university sports systems could address these gaps through pre-competition counselling, real-time monitoring, and structured transition support. Ultimately, psychological integration is essential to bridge physical training with mental readiness, transform athlete development into a holistic process, and strengthen Nigeria's university sports as a pipeline for globally competitive athletes. Leveraging existing expertise in Human Kinetics departments offers a strategic pathway toward national and international sporting excellence.

### Modalities for Integration of Sport Psychologists into Nigerian Universities Sports Management Crew

For Nigerian universities, integrating sport psychologists into coaching systems requires administrative innovation rather than new staffing. Since these experts are already employed as academic staff, universities can adopt the following modalities:

1. **Contract-Based Engagement:** Sport psychologists may be attached to university teams on a competitive-season basis, functioning as part of the technical crew.
2. **Interdepartmental Deployment:** Collaborative frameworks between Sport Directorates and Human Kinetics Departments can formally assign psychologists to athlete development programmes.
3. **Performance Monitoring:** Universities can implement psychological assessment and readiness profiling as part of athlete evaluation protocols.
4. **Budgetary Allocation:** Regular budget provisions for psychological services should be established within sports development plans.

These modalities would mirror global best practices and enable Nigerian university athletes to benefit from evidence-based psychological interventions, enhancing their confidence, motivation, and resilience.

### Nigerian University Sport Psychology Integration Model

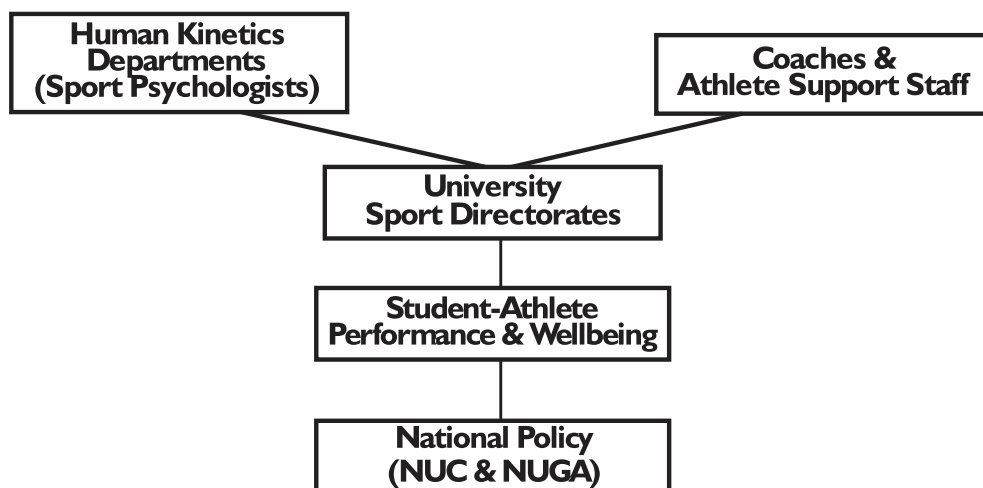


Figure 3. Proposed model for integrating sport psychologists into Nigerian university athlete support systems.

### Educational Significance of Integrating Sport Psychology in University Sports

The integration of sport psychology services within university sports programmes has important educational implications for student-athletes. Universities are not only platforms for athletic development but also environments that promote intellectual growth, personal development, and psychosocial adjustment. Embedding sport psychology within university sport systems therefore contributes to resilience development, improved academic performance, and enhanced student-athlete well-being.

**Resilience Development:** Resilience refers to the capacity to adapt positively to stress, adversity, and performance-related challenges. University athletes frequently face psychological pressures associated with intense competition, injury risks, academic responsibilities, and institutional expectations.

Developing resilience is therefore essential for sustaining both performance and personal development. Psychological skills such as goal setting, emotional regulation, self-confidence, and self-regulation have been shown to strengthen athletes' ability to cope with stress and recover from setbacks (Weinberg & Gould, 2019).

From the perspective of Ecological Systems Theory proposed by Urie Bronfenbrenner (1979), human development occurs through interactions between individuals and their surrounding environmental systems. In university sport contexts, athletes function within interconnected systems that include coaching structures, academic environments, peer networks, and sport science support services. Integrating sport psychologists into these systems can help create supportive environments that enhance psychological coping and adaptability. Similarly, the Holistic Athlete Career Model developed by Natalia Stambulova and Paul Wylleman (2019) emphasizes that athlete development occurs simultaneously across psychological, athletic, academic, and social domains. Through structured psychological training and counselling, sport psychologists help student-athletes develop resilience needed to navigate competitive demands and life transitions.

**Academic Performance:** Balancing academic responsibilities with competitive sport is a major challenge for university athletes. Training schedules, competition travel, and physical fatigue may interfere with academic engagement and learning outcomes. Psychological interventions can assist athletes in managing these competing demands. Techniques such as concentration control, time management, stress regulation, and performance routines not only enhance athletic performance but also improve cognitive functioning relevant to academic tasks (Weinberg & Gould, 2019).

The Holistic Athlete Career Model further emphasizes dual career development, where athletes pursue both educational and athletic goals simultaneously (Stambulova & Wylleman, 2019). Within university settings, sport psychologists can collaborate with coaches and academic advisors to support student-athletes in maintaining motivation, managing academic stress, and developing effective study habits. Such collaboration helps ensure that athletes achieve academic success alongside their sporting pursuits.

**Student-Athlete Well-being:** Student-athlete well-being is central to the educational mission of universities and includes psychological health, emotional stability, social adjustment, and life satisfaction. University athletes often experience stressors related to performance anxiety, injury recovery, academic pressure, and uncertainty about future careers. When these challenges are not adequately addressed, they may contribute to burnout, psychological distress, and reduced motivation (Rice et al., 2016).

Sport psychologists support athlete well-being through counselling, mental skills training, and mental health education. Within the framework of Ecological Systems Theory, well-being is shaped by interactions among environmental factors such as coaching practices, institutional policies, peer relationships, and academic expectations (Bronfenbrenner, 1979). Integrating sport psychologists into university sport directorates can therefore foster supportive environments that prioritize athlete welfare while sustaining competitive excellence. Consistent with the Holistic Athlete Career Model, supporting athletes across psychological, academic, social, and athletic domains promotes balanced development and long-term career sustainability (Stambulova & Wylleman, 2019).

The integration of sport psychology services within university sports systems has important educational benefits. Sport psychologists contribute to the holistic development of student-athletes by strengthening resilience, supporting academic achievement, and promoting psychological well-being. Such integration aligns with the broader mission of universities to produce well-rounded graduates who excel both academically and athletically.

### **Policy Recommendations for Integration of Sport Psychologists in Nigerian Universities Sport Management Crew**

To institutionalize this practice nationwide, the following actions are recommended:

1. **University Policy Inclusion:** The National Universities Commission (NUC) and the Nigeria University Games Association (NUGA) should mandate the inclusion of sport psychologists in all university coaching teams.
2. **Strategic Collaboration:** Universities should establish formal cooperation between Human Kinetics departments and Sport Directorates.
3. **Training and Workshops:** Regular capacity-building workshops should be organized for coaches and psychologists to promote interdisciplinary synergy.
4. **Monitoring and Evaluation:** Sport Directorates should periodically assess the psychological readiness and performance stability of university athletes.

These measures would reposition Nigerian university sports for national and international excellence, ensuring that athletes are mentally and emotionally prepared for the global stage.

### **Conclusion**

University sport systems represent a strategic platform for developing elite athletes and preparing them for national and international competition. Evidence from global sport systems demonstrates that integrating sport psychologists within athlete support teams enhances performance outcomes and promotes athlete wellbeing. Nigeria possesses the institutional capacity to adopt similar models through the integration of sport psychologists already present within university Human Kinetics departments. Establishing structured collaboration between academic departments and university sport directorates would strengthen athlete psychological preparation while also enhancing educational outcomes. Institutionalizing this integration through national policy frameworks led by the National Universities Commission and the Nigeria University Games Association would position Nigerian university sports as a stronger pipeline for elite athlete development and international competitiveness.

### **Recommendations**

To reposition Nigerian university sports for national and international excellence, the following strategic actions are strongly recommended:

1. Nigerian universities should emulate global best practices from systems such as the NCAA (USA), BUCS (UK), and UniSport (Australia), which successfully link academic expertise with athlete development. Learning exchanges, staff training, and collaborative research with these systems will strengthen Nigeria's institutional sports architecture.
2. Every university sports directorate in Nigeria should formally integrate qualified sport psychologists; preferably those already lecturing in Human Kinetics or Sport Science departments, into their coaching and athlete support staff. This integration should be institutionalized through policy directives from the National Universities Commission (NUC) and the Nigeria University Games Association (NUGA).
3. Given that sport psychologists are already university employees, their engagement can be structured through contract-based roles, designated sport psychology service units, or joint appointments within sports directorates. This approach ensures cost-effectiveness while promoting applied practice within existing institutional structures.
4. A national framework should be established between NUGA and the NUC that mandates collaboration between Human Kinetics departments and university sports directorates. This framework should outline standardized psychological support services, ensuring uniform athlete welfare across institutions.

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# Coaches' Efficiency, Technology Adoption, and Sustainable Sports Funding as Catalysts of University Sports Success in Nigeria

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## Abstract

*University sports systems serve as critical platforms for talent development, human capital formation, and national sporting success. Despite Nigeria's large youth population and strong sporting culture, university sports have not consistently translated participation into sustained competitive excellence. This paper examines coaches' efficiency, technology adoption, and sustainable sports funding as interrelated catalysts for improving university sports performance and institutional effectiveness in Nigeria, viewing these elements as mutually reinforcing components within an integrated sports development system. Drawing on a systems-based perspective and relevant sport management literature, the paper argues that competent coaching enhances athlete development, psychological wellbeing, and programme stability; technology integration, particularly artificial intelligence and data-driven tools, strengthens performance monitoring and evidence-based decision-making; while diversified and transparent funding models ensure long-term planning, infrastructure development, and equitable resource allocation. The interaction among these factors is emphasized, demonstrating that isolated interventions are insufficient and that coordinated institutional alignment is necessary for long-term university sports development. The paper further highlights the implications of these catalysts for inclusion, athlete welfare, and national development, while acknowledging implementation constraints such as financial limitations, capacity gaps, and cultural resistance. It concludes that university sports excellence in Nigeria requires strategic investment in human resources, innovation, and governance reforms. By aligning competence, technology, and funding within an integrated framework, universities can reposition sports as viable engines for athlete success, institutional growth, and broader national development.*

**Keywords:** Coaches' efficiency; Technology adoption; Sustainable sports funding; University sports success; Nigeria

## Introduction

University sports systems play a critical role in the development of human capital, national identity, and international sporting competitiveness. In many countries, universities function as structured environments for talent identification, athlete development, coaching education, and sports innovation, thereby serving as strategic contributors to national and economic development (Green & Houlihan, 2005; Houlihan & Zheng, 2013). Through organized competitions, research-informed training, and institutional support, university sports create pathways that link grassroots participation to elite performance and professional sports.

In Nigeria, however, the contribution of university sports to national sporting excellence remains inconsistent and underdeveloped. Despite a large youth population and strong cultural affinity for sports, Nigerian universities have not consistently produced athletes or sports systems capable of sustaining success at continental and global levels. This gap has been attributed to weak institutional frameworks, limited investment, and insufficient alignment between sports development policies and university sports administration (Adesoye & Adeyemi, 2018; Akindes & Kirwin, 2009). Consequently,

university sports are often treated as auxiliary student activities rather than as strategic instruments for national development and international competitiveness.

Existing scholarship suggests that sporting excellence is not driven solely by talent availability but by the effectiveness of the systems that nurture, manage, and sustain such talent. Central to these systems are the competence of coaches, the adoption of appropriate technologies, and the availability of sustainable funding mechanisms (Côté & Gilbert, 2009; Lyle & Cushion, 2017). In university sports environments where athletes must balance academic responsibilities with competitive demands, these factors operate as critical catalysts that shape performance outcomes, athlete wellbeing, and institutional effectiveness.

Coaches, in particular, represent the most influential human resource in university sports systems. Beyond technical instruction, competent coaches provide pedagogical guidance, psychological support, ethical leadership, and workload management, all of which are essential for long-term athlete development (Gould & Carson, 2008). In cases where coaching competence is weak or inconsistently regulated, athlete performance, gender inclusion, and mental health outcomes are often compromised. This challenge is especially pronounced in Nigerian university sports, where structured professional development opportunities for coaches remain limited (Aibueku & Omo-Osagie, 2016).

Simultaneously, the global sports industry is undergoing rapid transformation through technological innovation, particularly the application of artificial intelligence (AI) and data analytics in performance monitoring and decision-making. AI-driven tools such as wearable sensors, video analysis systems, and predictive injury models have become integral to athlete development in advanced university sports systems (Claudino et al., 2019; Davenport & Harris, 2017; Ratten, 2023; Pena & Navarro, 2022). The limited adoption of such technologies within Nigerian universities further constrains performance optimization and widens the competitive gap between local institutions and global counterparts.

Financial sustainability also remains a persistent constraint on university sports development in Nigeria. Heavy reliance on institutional subventions and irregular financial support has undermined long-term planning, infrastructure development, and athlete support services. Studies indicate that diversified funding models that incorporate sponsorship, partnerships, and transparent financial governance, are essential for maintaining competitive university sports programs (Andreff, 2017; Chadwick & Thwaites, 2005). Without financial sustainability, investments in coaching competence and technology adoption are unlikely to yield lasting impact.

Conceptually, the arguments presented in this paper are informed by Systems Theory, which emphasizes the interdependence of components within an organizational system. Systems theory suggests that the effectiveness of any institutional framework depends not on isolated elements but on the coordinated interaction of multiple subsystems that collectively influence outcomes. Within university sports environments, coaching competence, technological capacity, and financial resources represent critical subsystems that shape programme effectiveness and athlete development. When these components operate in alignment, they create conditions that support performance optimization, organizational stability, and long-term institutional success. Conversely, weaknesses in any of these subsystems can undermine the overall effectiveness of the university sports system.

This paper therefore takes the position that coaches' competence, technology adoption, and sustainable funding function as interdependent catalysts for university sports excellence in Nigeria. By synthesizing these three dimensions within a single analytical framework, the paper highlights how coordinated investments in human capacity, innovation, and financial governance can strengthen university sports systems and enhance their developmental impact. Rather than treating these elements in isolation, the paper argues for a systems-based approach in which competent human resources, innovation-driven practices, and stable financial structures collectively drive performance, inclusion, and athlete wellbeing. By advancing this perspective, the paper seeks to contribute to ongoing policy discourse and institutional reforms aimed at positioning Nigerian university sports as a viable engine of national development and global sporting relevance.

## **University Sports Excellence and National Development Imperatives**

University sports excellence is increasingly recognized as a critical component of national development strategies, extending beyond athletic success to encompass human capital formation, social cohesion, and economic productivity. In well-structured systems, universities serve as transitional spaces where young athletes acquire not only sport-specific skills but also leadership capacity, discipline, teamwork, and employability competencies that contribute to broader societal development (Coakley, 2015; Green & Houlihan, 2005). As such, the effectiveness of university sports systems has implications that extend far beyond the sports sector.

From an economic perspective, university sports contribute to national development through job creation, sports-related services, event hosting, and institutional branding. Successful university sports programs enhance institutional visibility, attract student enrolment, and stimulate partnerships with corporate and community stakeholders (Andreff, 2017). Countries that have effectively leveraged university sports such as the United States and the United Kingdom, demonstrate how structured collegiate sports systems can function as sustainable pipelines for elite sports and sports industry development (Houlihan & Zheng, 2013; Grix & Carmichael, 2021).

In Nigeria, the national development potential of university sports remains largely unrealized. While inter-university competitions such as the Nigerian University Games Association (NUGA) provide platforms for participation and talent exposure, these initiatives have not consistently translated into sustained elite performance or structured athlete development pathways. The disconnect between university sports and national sports federations further weakens the contribution of universities to national sporting success (Akindes & Kirwin, 2009). As a result, many talented university athletes exit the system without adequate progression opportunities or post-university career support.

University sports also play a vital role in advancing public health and social inclusion objectives. Regular participation in organized sports has been associated with improved physical health, reduced stress, enhanced academic engagement, and positive mental wellbeing among students (Eime et al., 2013). In contexts where youth unemployment and social vulnerability are prevalent, effective university sports programs can serve as stabilizing social structures that promote discipline, resilience, and civic engagement. However, these benefits are contingent upon competent management, inclusive policies, and athlete-centred practices.

Despite these potentials, structural weaknesses continue to constrain university sports effectiveness in Nigeria. Inadequate coaching capacity limited technological integration, and unstable funding frameworks have restricted the ability of universities to plan strategically, monitor performance, and safeguard athlete welfare. These challenges underscore the need to move beyond event-focused participation models toward system-oriented approaches that prioritize quality, sustainability, and accountability.

This paper contends that achieving university sports excellence as a driver of national development requires targeted attention to the core catalysts that shape system performance. Coaches' competence, technology adoption, and sustainable funding are not peripheral concerns but central determinants of whether university sports can fulfil their developmental mandate. The sections that follow examine these catalysts in detail, highlighting their interconnections and implications for policy and practice within Nigerian university sports.

### **Coaches' Efficiency as a Catalyst for University Sports Excellence**

Coaches constitute the central operational force within university sports systems, translating institutional policies, resources, and objectives into practical athlete development outcomes. In high-performing sports environments, coaching efficiency is widely regarded as a critical determinant of athlete performance, programme effectiveness, and long-term system sustainability. Coaching efficiency encompasses a multidimensional set of capabilities, including technical expertise,

pedagogical skill, psychological awareness, ethical leadership, and the ability to adapt training to diverse athlete needs (Côté & Gilbert, 2009).

Within university sports settings, the importance of coaching efficiency is amplified by the dual demands placed on student-athletes. Unlike full-time professional athletes, university athletes must balance academic responsibilities, social adjustment, and competitive sports. Coaches who possess strong competencies in workload management, communication, and athlete-centred planning are better positioned to support this balance, thereby enhancing performance outcomes and reducing attrition rates (Gould & Carson, 2008). Conversely, deficiencies in coaching competence often manifest in poor training design, ineffective motivation strategies, and heightened injury risk.

Empirical evidence from sports development literature indicates that coaching quality has a direct and indirect influence on athletes' achievement, motivation, and psychological wellbeing. Lyle and Cushion (2017; Nash et al., 2021) argue that competent coaches operate as reflective practitioners, continuously adapting their methods based on athlete feedback, performance data, and contextual constraints. In university sports systems, where coaching development is systematic and continuous, athletes demonstrate higher levels of engagement, confidence, and competitive consistency.

In the Nigerian university sports context, coaching competence remains uneven and insufficiently institutionalized. While some coaches possess substantial experiential knowledge, opportunities for structured professional development, certification, and performance evaluation are limited. The absence of standardized competency frameworks has resulted in variations in coaching quality across institutions, undermining the consistency and credibility of university sports programmes (Aibueku & Omo-Osagie, 2016). This challenge is compounded by limited access to contemporary coaching tools and sports science support.

Coaching competence also has significant implications for inclusion and athlete welfare. Coaches play a pivotal role in shaping training environments, influencing participation opportunities for female athletes, and responding to athletes' mental and physical health needs. Research indicates that coaches with psychological literacy and ethical awareness are better equipped to recognize signs of stress, burnout, and emotional distress among athletes (Reardon et al., 2019). In contrast, coercive or poorly informed coaching practices may exacerbate mental health challenges and undermine athlete trust.

This paper argues that coaches' competence functions as a primary catalyst for university sports excellence, mediating the effectiveness of both technological innovation and financial investment. Without competent coaches, investments in facilities, performance technology, or sponsorship are unlikely to translate into sustained performance gains. Consequently, advancing university sports excellence in Nigeria requires deliberate institutional investment in competency-based coaching education, continuous professional development, and accountability mechanisms tailored to the unique demands of university sports environments.

### **Technology Adoption and AI-Driven Performance Systems in University Sports**

Technological innovation has become a defining feature of contemporary sports systems, reshaping how athletes are trained, monitored, and supported. In university sports environments, the adoption of digital technologies and artificial intelligence (AI) offers significant potential to enhance performance outcomes, improve athlete welfare, and support evidence-based decision-making. Universities in advanced sporting contexts increasingly deploy wearable sensors, video-analysis platforms, and data analytics systems to optimize training efficiency and reduce uncertainty in coaching practice (Davenport & Harris, 2017).

AI-driven performance systems enable the systematic collection and analysis of large volumes of athlete data, including training load, movement patterns, recovery indicators, and competition performance metrics. Research shows that such technologies enhance coaches' capacity to individualize training programmes, manage fatigue, and identify early signs of injury risk (Claudino et

al., 2019; Rossi et al., 2018; Kettunen & Sampson, 2024). Within university sports, where athletes face overlapping academic and athletic pressures, these capabilities are particularly valuable for maintaining performance while safeguarding mental and physical wellbeing.

Despite these advantages, technology adoption within Nigerian university sports remains limited. Many institutions rely predominantly on traditional coaching methods and subjective performance assessment, with minimal integration of digital monitoring or analytical tools. This constraint is not solely financial but also relates to limited institutional awareness, technical capacity, and data literacy among sports personnel (McLean et al., 2019; Ratten, 2023). As a result, performance management often lacks precision, continuity, and accountability.

It is important to emphasize that technology alone does not guarantee performance improvement. The effectiveness of AI-driven systems is closely tied to the competence of coaches and sports administrators to interpret and apply performance data meaningfully. Groom et al. (2019) note that without adequate data literacy and contextual understanding, performance technologies risk being underutilized or misapplied. This reinforces the argument that technology adoption must be integrated with competency-based coaching development rather than implemented as a standalone intervention.

From a systems perspective, AI also offers opportunities for cost-effective performance enhancement in resource-constrained university environments. Scalable technologies such as mobile-based monitoring applications, cloud-based analytics platforms, and basic wearable devices provide feasible entry points for gradual adoption (Bunker & Thabtah, 2019). Strategic collaborations between university sports units, academic departments, and technology partners can further reduce costs while strengthening research and innovation capacity.

This paper contends that technology adoption functions as a critical catalyst for university sports excellence when embedded within a coherent institutional framework. AI-driven performance systems enhance transparency, support athlete-centred decision-making, and strengthen the link between coaching competence and performance outcomes. However, without complementary investments in human capacity and stable financial support, technological innovation risks remaining symbolic rather than transformative within Nigerian university sports.

### **Sustainable Funding and Sponsorship Models for University Sports Development**

Consistent and diversified funding remains one of the most critical determinants of the effectiveness and longevity of university sports systems. Adequate and stable financial resources are essential for supporting coaching development, technology adoption, athlete welfare, facility maintenance, and competitive participation. In well-established university sports systems, diversified funding structures enable long-term planning, accountability, and performance continuity (Andreff, 2017; Chadwick & Thwaites, 2005).

In Nigeria, university sports funding is largely characterized by dependence on institutional subventions and irregular budgetary allocations. This funding model often prioritizes short-term event participation over long-term development objectives, resulting in inadequate investment in coaching education, performance technology, and athlete support services. The absence of predictable funding streams limits strategic planning and undermines the sustainability of university sports programmes (Akindes & Kirwin, 2009).

Sponsorship represents a viable pathway for diversifying funding and enhancing the financial sustainability of university sports (Cornwell, 2019; Winand & Anagnostopoulos, 2021). Contemporary sports sponsorship has evolved beyond logo placement to emphasize activation strategies that create mutual value for sponsors and sports organizations. Effective sponsorship activation enhances brand visibility, audience engagement, and community impact, making university sports attractive platforms for corporate investment (Cornwell, 2019; Parganas, Anagnostopoulos, & Chadwick, 2022). However, the sponsorship potential of Nigerian university sports remains underexploited due to weak marketing capacity, limited data on audience reach, and insufficient governance transparency.

From a systems perspective, sustainable funding is closely linked to institutional credibility and performance outcomes. Sponsors and partners are more likely to invest in sports programmes that demonstrate competent management, ethical governance, and measurable impact. This underscores the interdependence between funding, coaching competence, and technology adoption. For instance, performance data generated through digital monitoring systems can strengthen accountability and provide evidence of value to prospective sponsors, thereby reinforcing funding sustainability (Chadwick & Thwaites, 2005).

Furthermore, sustainable funding has important implications for equity and athlete welfare. Financial instability often leads to unequal resource distribution, disproportionately affecting female athletes and non-revenue sports. Stable and transparent funding frameworks enable universities to invest equitably across sports programmes, support athlete health services, and reduce reliance on exploitative practices or excessive athlete workloads (Coakley, 2015).

This paper argues that advancing university sports excellence in Nigeria requires a deliberate shift from ad hoc funding approaches to structured, diversified, and transparent financial models. Universities must reposition sports as strategic institutional assets capable of attracting partnerships, enhancing institutional reputation, and contributing to student development. Without sustainable funding, investments in coaching competence and technology adoption are unlikely to generate lasting impact, thereby constraining the pursuit of national and global sporting excellence.

### **Inclusion, Athlete Wellbeing, and System Sustainability**

Inclusion and athlete wellbeing are increasingly recognized as central indicators of the quality and sustainability of sports systems. Within university sports environments, inclusive practices and attention to mental and physical wellbeing not only enhance athlete performance but also contribute to positive educational outcomes and long-term engagement in sports. Universities, by their nature, are expected to promote equity, holistic development, and ethical practice, making athlete-centred sports management a core institutional responsibility (Coakley, 2015).

Gender inclusion remains a persistent challenge within Nigerian university sports. Female athletes often experience disparities in access to quality coaching, training resources, and competitive opportunities. These inequities are frequently reinforced by cultural norms, administrative priorities, and funding constraints rather than by differences in ability or commitment (Akindes & Kirwin, 2009; Nwachukwu & Onifade, 2020). Inclusive university sports systems require deliberate policy choices that ensure equitable allocation of resources, visibility, and leadership opportunities across genders.

Coaches play a pivotal role in fostering inclusive environments and safeguarding athlete wellbeing (Norman, 2016; Fasting & Sand, 2022). Competent coaches who demonstrate gender sensitivity, ethical awareness, and psychological literacy are more likely to create supportive training climates that enhance confidence, motivation, and athlete retention. Conversely, exclusionary coaching practices and excessive performance demands may contribute to psychological distress, burnout, and premature withdrawal from sports, particularly among female and academically vulnerable athletes.

The mental and physical wellbeing of university athletes has emerged as a growing concern globally. Student-athletes are exposed to unique stressors arising from academic pressures, performance expectations, injury risk, and identity management (Reardon et al., 2019; Rice et al., 2021). Research indicates that structured sports participation can enhance mental health and physical fitness when supported by appropriate management and recovery practices (Eime et al., 2013). However, poorly managed training regimes and weak support systems can exacerbate anxiety, fatigue, and injury prevalence.

Technology adoption and sustainable funding further influence inclusion and wellbeing outcomes. AI-driven monitoring systems can help identify excessive training loads and early signs of psychological or physical strain, enabling timely interventions. Similarly, stable funding frameworks allow universities to

invest in medical support, counselling services, and inclusive programme design. Without these supports, wellbeing initiatives risk remaining aspirational rather than operational.

This paper contends that inclusion and athlete wellbeing are not peripheral social concerns but foundational elements of system sustainability. University sports excellence cannot be achieved through performance outcomes alone; it must be underpinned by ethical governance, equitable practices, and a commitment to holistic athlete development. Integrating inclusion and wellbeing into university sports policy strengthens institutional legitimacy and contributes to sustainable national sports development.

### **Counter-Arguments and Implementation Constraints**

While the case for enhancing university sports through coaches' competence, technology adoption, and sustainable funding is compelling, several practical constraints challenge the feasibility of these reforms within the Nigerian context. A commonly cited counterargument is the limited financial capacity of universities, many of which already struggle to meet core academic and infrastructural obligations. From this perspective, investments in coaching development, performance technology, and expanded athlete support may be viewed as secondary priorities rather than strategic necessities.

Closely related to this concern is the issue of institutional capacity. Critics argue that even where funding is available, universities may lack the technical expertise and administrative structures required to implement and sustain innovation-driven sports programmes. Limited data literacy among sports personnel and weak digital capacity continue to constrain the effective implementation of innovation-driven sports programmes (Houlihan & Zheng, 2013; Glebova & Desbordes, 2023). There are also cultural and attitudinal barriers to change. Traditional coaching philosophies that prioritize experiential knowledge over evidence-based practice may resist the integration of technology and performance analytics. Similarly, deeply ingrained gender norms and hierarchical decision-making structures can slow progress toward inclusion and athlete-centred management (Norman, 2016). These barriers are not easily overcome through policy directives alone.

However, these counter-arguments, while valid, do not negate the necessity of reform. Rather, they underscore the need for context-sensitive and incremental implementation strategies. Gradual capacity-building initiatives, pilot technology programmes, and targeted professional development for coaches offer practical entry points for change. Partnerships with academic departments, private-sector technology firms, and sports' governing bodies can further reduce costs and strengthen institutional capability (Bunker & Thabtah, 2019).

Importantly, the long-term costs of inaction must also be considered. Continued neglect of university sports undermines athlete development, exacerbates inequities, and weakens the national sports pipeline. From a policy perspective, incremental investment in competence, innovation, and funding sustainability represents a more viable and responsible approach than maintaining systems that yield limited developmental returns.

### **Conclusion**

University sports systems represent an important but underutilized platform for talent development, youth empowerment, and national sporting progress in Nigeria. This paper has argued that achieving enduring university sports success requires a coordinated integration of three critical catalysts: coaches' competence, technology adoption, and sustainable sports funding.

Competent coaches remain the central drivers of athlete development within university environments, providing the technical guidance, psychological support, and ethical leadership required to balance academic and athletic demands. At the same time, the adoption of digital technologies and artificial intelligence-driven performance systems offer new opportunities to enhance training precision, monitor athlete wellbeing, and support evidence-based decision-making. However, these innovations can only

achieve lasting impact when supported by stable and diversified funding structures that enable long-term planning, infrastructure development, and equitable athlete support services.

The analysis presented in this paper highlights the interdependence among these three catalysts. Investments in technology or facilities alone cannot compensate for weak coaching competence, just as well-trained coaches cannot sustain competitive programmes without adequate financial and institutional support. Sustainable university sports excellence therefore requires a systems-based approach in which human resources, technological innovation, and financial governance operate in a coordinated and mutually reinforcing manner.

For Nigerian universities and policy makers, this implies the need for strategic reforms that prioritize competency-based coaching development, gradual integration of performance technologies, and diversified funding models through partnerships and transparent governance. By aligning these elements within an integrated institutional framework, university sports can evolve from peripheral student activities into dynamic engines of athlete development, institutional reputation, and national sporting advancement.

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## Role of Autocratic Leadership Style of Sport Managers on Sports Promotion in Universities of Northwest States Nigeria

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### Abstract

*This study investigated the role of autocratic leadership style of sport managers on sports promotion in universities of Northwest States, Nigeria. To achieve the purpose of this study, one research questions was raised, and one hypothesis was formulated and tested. A descriptive design of survey type was adopted for this study. The target population of this study comprises all NUGA athletes and coaches in the universities that registered with NUGA in Northwest States of Nigeria, with the estimated population of two thousand one hundred and eight (2,108). Source: Establishment department of the selected universities in Northwest States Nigeria, (2023). The sample of three hundred and seventy-four (374) respondents was used for this study. The sample was determined using Slovin's formula. Researchers developed a questionnaire on four points Likert scale and used for data collection. The questionnaire consists of two (2) sections A – B and was validated and standardized with a reliability index of 0.79 using split-half method. Three hundred and seventy-four (374) copies of questionnaire were distributed to the respondents and 335 questionnaires were fully completed, returned and used for data analysis. Frequency count and percentage was used to organized and describe the demographic variables of the respondents; one sample t-test was used to analysed hypotheses at 0.05 level of significance. The findings showed that autocratic leadership style of sport managers play significant role in sports promotion in the universities of Northwest States, Nigeria ( $t = 3.3057$ ,  $df = 334$ ,  $P < 0.005$ ). Workshop and symposium should be organized among sport managers and athletes most especially during sports week, so as to engage students during sports lecture free periods for them to be more educated about the benefits of sports participation.*

**Keywords:** Autocratic, Leadership Style, Sport Managers, Sports Promotion, Universities

### Introduction

Leader is a person who directs the affairs of other people in the university and other sport organization (Teshome, 2023). Leadership is a personal relationship in which one person directs, coordinates and supervises others in their performance of common task, and it is a matter of aligning people towards common goals and empowering them to take actions needed to reach them, and the ability to influence individual and group towards achievement of common goal (Mohammed, et al., 2015). Leadership according to Alimi et al., (2011), is the art of influencing others to work enthusiastically towards the achievement of the organizational goals.

Leadership style is the way or manner in which administrators coordinate the human and material resources to achieve the organization's goals in providing direction in implementing the plans and motivating people and various types of leadership style abound for used in an organization (Kabido, et al., 2016). According Adeyemi and Bolarin (2023), there are several leadership styles which are commonly used in sport organization and universities inclusive, these are autocratic, democratic leadership style.

According to Chelladurai (2023), leadership offers sport managers, the flexibility required to understand and solve complexities associated with various sports. It is imperative to note that sports managers use varieties of leadership style such as autocratic, to solve eminent problems as well as encourage athletes to tailor their efforts towards achieving success in sports competitions.

The autocratic leader is the leader that is authoritarian in nature (West, 2016). Autocratic coach is victory focused and features inflexible training structure. They impose their will, and no one is allowing

to challenge them. Autocratic leader is described as a leader that asserts absolute authority and control over subordinates and demand unquestionable obedience from subordinates (Cruz and Kim, 2017). In addition, such a leader has full control of the team, leaving low autonomy within the athletes. The athletes are expected to complete the tasks under very close supervision, while unlimited authority is self-bestowed by the leader.

The autocratic style of leadership tends to make all the decisions and is motivated to complete the task as quickly and effectively as possible (West, 2016). Autocratic sports managers are more oriented towards task accomplishment and outcome than towards athletes; they are highly oriented towards results and winning. They are less supportive, less instructive and less rewarding (Reimer and Toon, 2016). They are more directives and use a more controlling leadership style, not allowing athletes' participation in decision-making. These sports managers usually do not explain their actions; they solve problems and make decisions alone.

The word sports promotion covers range of interrelated activities. All these activities are design to attract attention, stimulate the interest and awareness of consumers and of course encourage them to purchase sports product (Ogundari, 2020). The Federal government of Nigeria realizes these potentials of sports towards contribution to national development in which Nigerian universities are veritable place where these youths will engage in sports to invest human resources in area of sport promotion, whereas innovation and change is an essential element in most of the industries but when it comes to sport industry it is the most important factor with the rapid growth in this industry there is need to have a significant leadership style that would be effective in managing sport in the university (Teshome, 2023).

University sports managers are individuals who can determine the success or failure of sports in the university (Bass and Bass, 2018). According to Arthur and Bastardoz (2020), sports managers play a crucial role in the promotion of sports in the university. Universities in Northwest Nigeria are expected to provide the avenue for obvious expression of sport's potential where students deepen their interest and zeal to participate in sporting activities in the universities (Kabido et al., 2016).

It is worthy to mention that each and every sport activity in the university has its own diverse indices that are central to the promotion of sports. These indices include (1) organization of intramural and extramural sports competitions, (2) provision of fund (3) provision of standard sports facilities (4) athletes' recruitment (5) motivation (6) sponsorship (7) students' participation (8) publicity. However, university sports managers are advised to incorporate different leadership style to handle different circumstances associated with the sports (Kabido et al., 2016). In addition, a good sports manager has to possess leadership traits in adjusting to the demands of various athletes in the management of sport (Kabido et al., 2016). It is based on this background that the researchers investigated the role of autocratic leadership style of sports managers on sports promotion in universities of Northwest States, Nigeria.

### **Statement of the Problem**

Sports activities aimed at developing students' physical, emotional, mental and social wellbeing, it is builds upon psychosocial and motor skills of the individuals (Mars, 2023). More so, sports by their nature are social activities that build up team spirit, cooperation, competitiveness, good behaviour and morale including compliance to moral and societal norms as a social institutional factor has over time assumed an influential status (Mars, 2023). Vankateswalu (2000) stated that university sports constitute an important and in separable stage in the pursuits of long-term developmental objectives of sports, particularly when it involves promotion of sports in various universities.

Leadership style of sports managers may be considered as a behavioural process that influences athletes towards set goals. As such, a leader has the dual function of ensuring athletes satisfaction while steering them to success. There are three traditional types of leadership used in sports varying from an amateur level up to the elite level. Many sport managers across team or individual sports will have characteristics from one of these styles if not all. These styles are autocratic, democratic leadership style (Jowett and Arthur, 2019). Emoghene (2015) stated that sports managers are therefore

responsible organizing sports activities for university students to participate within the university environment as it provides students the opportunities of developing necessary motor skills through formal learning.

It's therefore convincing that leadership style of university sport managers has important role to play in the promotion of sports in the next millennium. Jowett and Arthur (2019) claimed that leadership style of sports managers play a significant role on athletes' performance. Berry and Fowler (2021) revealed that leadership style of sport managers play a vital role on sports promotion in the university.

The researchers observed that sports promotion in Nigeria tertiary institutions is declining day by day, these might be attributed to leadership style of university sports managers because the style of leadership of sports managers may have direct and indirect role on sports promotion. It is against this background that the researchers investigated the role of autocratic leadership style of sport managers on sports promotion in universities of Northwest States, Nigeria.

The study addressed the following research question:

1. Will autocratic leadership style of male and female sport managers play any role in sports promotion (students' participation) in the universities of Northwest States Nigeria?

### **Hypotheses**

**Ho<sub>1</sub>:** Autocratic leadership style of male and female sport managers will not significantly play any role in sports promotion (students' participation) in the universities of Northwest States, Nigeria.

### **Methods**

A descriptive design of survey type was adopted for this study, Marilyn (2018) explained that descriptive survey attempts to establish the range and distribution of some social characteristics, such as education or training, occupation, and location, and to discover how these characteristics may be related to certain behaviour patterns or attitudes. The design was suitable for this study since the study investigated the role of autocratic leadership of sport managers on sports promotion in universities of Northwest States Nigeria.

The target population of this study comprises all NUGA athletes and coaches in the universities that registered with NUGA in northwest States of Nigeria, with the estimated population of two thousand one hundred and eight (2,108). Source: Establishment department of the selected universities in Northwest States Nigeria, (2023).

The sample of three hundred and seventy-four (374) respondents was used for this study. The sample was determined using Slovin's formula. Twenty-two respondents were selected from seventeen (17) selected universities that registered with NUGA in Northwest States, Nigeria. The researchers used a multistage sampling procedure to select the sample for this study. However, the stages for sample selection in this study are as follows:

**Stage I:** Purposive sampling technique was used to select universities that registered with NUGA in Northwest States, Nigeria. The universities are as follows (1) Sule Lamidu University Kafin Hausa, Jigawa State (2) Fedral University Dutse (3) Air force Institute of Technology Kaduna (4) Kaduna State University Kaduna (5) Ahmadu Bello University Zaria, Kaduna state (6) Federal University Dutsin-Ma, Katsina State (7) Umar Musa Yar Adu'a University, Katsina State (8) Alqalam University, Katsina (9) Federal University Kebbi, Birnin Kebbi, Kebbi State (10) Kebbi State University of Science and Technology Aleiro, Kebbi State (11) Usman Danfodio University Sokoto, Sokoto State (12) Sokoto, Sokoto State University (13) Federal University Gusau, Zamfara State (14) Bayero University Kano, Kano State (15) Aliko Dangote University of Science and Technology, Wudil, Kano State (16) Yusuf Maitama Sule University Kano (17) Skyline University, Kano.

**Stage II:** Purposive sampling technique was also used to select the respondents from the selected universities in Northwest States, Nigeria. The respondents comprised NUGA athletes and coaches in the seventeenth (17) universities that registered with NUGA, in northwest States, Nigeria.

**Stage III:** proportionate sampling technique to determine the sample for the study. Thus, arrived at 374 sample for the study.

**Stage IV:** Simple random sampling technique was used to administered questionnaire to the respondents.

The instrument used for data collection in this study was researchers' developed questionnaire. The questionnaire comprises of two (2) sections A-B. Section "A" contained demographic characteristics of the respondents. Section B: contained information on the role of autocratic leadership style of sport managers on students' participation, sponsorship, publicity and organization of competitions, for the promotion of sports in the universities of Northwest Nigeria. Content validity of the questionnaire was done by the 5 lecturers in the Department of Human Kinetics and Health Education, Bayero University, Kano. Their observations and corrections were incorporated in the final draft of the questionnaire to the satisfaction of the supervisor before administration for a pilot study.

To ascertain the reliability of the instrument, a pilot test was conducted in University of Jos. A split-half reliability test was used to determine the reliability of the research instrument. The administered and filled questionnaire was pooled and split out into odd and even number items. The scores obtained from odd and even number items collected was subjected to a statistical test using Spearman-Brown Prophecy Formula, and the reliability index of 0.79 was obtained which confirmed the questionnaire reliable for usage.

The questionnaire was structured on four (4) points Likert-scale, and the rating scale is as follows Strongly Agree (SA) = 4 points, Agree (A) = 3 points, Strongly Disagree (SD) = 2 points, and Disagree (D) = 1 point. For the purpose of analysis, 2.5 will be the middle point, therefore, any participant score above 2.5 points is regarded as agreed while 2.5 and below is regarded as disagreed with the items in question.

Paired sample t-test was used to analyse the hypotheses at 0.05 level of significance, using SPSS version 25.

## Results

Out of three hundred and seventy-four (374) copies of questionnaire administered to the respondents, 335 were duly filled, returned and analysed as presented on the tables below:

### Hypothesis testing

**Ho<sub>1</sub>:** Autocratic leadership style of male and female sport managers will not significantly play any role in sports promotion (students' participation) in the universities of Northwest States, Nigeria.

**Table 2:** Paired sample t-test summary autocratic leadership style of male and female sport managers on sports promotion (students' participation) in the universities of Northwest States, Nigeria.

Variables	Mean	N	SD	SE	t-value	df	P-value
Autocratic	3.3057	335	.41085	.02245	35.892	334	.001
Fixed mean	2.50	335					

t = 3.3057, df= 334, (P<0.005).

The table indicated that the mean score was 3.3057, standard deviation was .41085 and the number of the respondents were 335. One sample t-test analysis indicated the t-value of 35.892, df = 334, (P<0.005). The null hypotheses which stated that autocratic leadership style of sport managers will not significantly play any role in sports promotion (students' participation) in the universities of Northwest States, Nigeria is hereby rejected on the basis that autocratic leadership style of male and female sport

managers play significant role in sports promotion (students' participation) in the universities of Northwest States, Nigeria.

### Discussion

This study investigated the role of autocratic leadership style of sports managers on sports promotion in universities of Northwest States, Nigeria. The outcomes of this study revealed that autocratic leadership style of sport managers play a significant role in sports promotion (students' participation) in the universities of Northwest States, Nigeria. One sample t-test analysis indicated the t-value of 47.097,  $df = 334$ , ( $P < 0.005$ ). The mean score 3.358, standard deviation was .3325 and the number of the respondent were 335 which signified that democratic leadership style of sport managers play significant role in sports promotion (students' participation) in the universities of Northwest States, Nigeria. The finding is in line with the finding of Mologade (2021) who conducted a study on the Role of democratic Leaders in Fostering Leadership Skills in Sporting Code Club Executives: A Case of University of Limpopo. The finding of the study showed that athletes having acquired leadership skills through autocratic means, being able to lead, perform their duties as leaders and also mentor their successors for the promotion of sports. The finding also supported that of Ali (2019) who conducted a study on the Assessment of Coaches Leadership Behaviour and Preference by Athletes in Individual and Team Sports in Nigeria. The finding of the study revealed that athletes in sporting team has higher preferences for coaches with autocratic instructional dispositions and were significantly performing better than their counterparts in individual sports.

### Conclusion

Based on the finding of this study, it was concluded that autocratic leadership style of sport managers play role in sports promotion (students' participation) in the universities of Northwest States, Nigeria.

### Recommendation

Workshop and symposium should be organized among sports managers and athletes most especially during sports week, so as to engage students during sports lecture free periods for them to be more educated about the benefits of sports participation.

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## The Perception of Students in Tertiary Institutions in Osun State on Impact of Sports on Physical and Mental Well-Being.

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### Abstract

*The study assessed the perception of students in Tertiary institutions in Osun State on impact of sports on physical and mental well-being. Two (2) research questions were raised with their corresponding hypotheses. Data were collected from One thousand and four hundred respondents in the randomly selected Tertiary Institutions in the three (3) Senatorial Districts in Osun State. A self-designed and validated questionnaire was used for the study. Descriptive research design was used to describe the physical and mental well-being variables used in the study. Data were analysed using frequency counts, percentages while the formulated hypotheses were tested using inferential statistics of Chi-Square. Test-retest method of reliability was used with the reliability coefficient of 0.89 obtained using Spearman Brown's method of reliability at 0.05 Alpha level of significance. Findings revealed that regular participation in sports have great positive impact on the cardiovascular health, metabolic outcomes, musculoskeletal health, immune function, depression, anxiety, cognitive function, and social-psychological outcomes. Based on the findings the following recommendations were made. Sports facilities and equipment should be made readily available and accessible by students and that University authorities should make participation in at least one sport compulsory for students.*

**Key words:** Cardiovascular health, metabolic outcomes, musculoskeletal health, immune function, depression, anxiety,

### Introduction

Globally today, people are generally exposed to stressful conditions caused by societal changes, changing circumstances of life, environmental pollution, socio-economic and cultural environment, unemployment, stigmatization which can lead to many physical, psychological, emotional, physiological and mental issues (Adekunle 2025).

Physical activity according to Gatorade Sports Science Institute (2024) is an essential aspect of health promotion and effectively linked to elimination of disease causative factors. Engagement in sport and planned physical activity is a near-global cultural practice. Sports is an integral part of an efficient living in man. Sport according to Scholar Research Library (2022) is made up of a vibrant set of social organization, showing a unique form of social activity, provides a basis of social identity and acts as an agent of social control. Major sport events can help promote social development, economic growth, improves community health, education, environmental protection, reduces medical expenses and imbibes discipline

Using sports as a fulcrum for improvement, United States Centre for Disease Control (2023) expressed that exercise helps decrease chances of developing cardiovascular disease, depression and anxiety. Exercise induces cardiac metabolic adaptations and chronic inflammation. Kelsey, Pinckard, Kedryn Baskin, Kristinl & Stanford (2019) noted that exercise is an important tool to combat obesity and its co-morbidities. Exercise prevents both the onset and development of cardiovascular diseases. Physical activity reduces the risk of cardiovascular disease.

WHO (2019) asserted that sports enhance healthy strong bone, cognitive function, immune function and social-psychological outcomes. Participation in active sports significantly stabilizes the state of mind of individual, aids escape from anxiety, stress, depressing and imbalance state of mind, statistically leading many people to commits suicide every 40 seconds of the day.

World Health Organization, Gatorade Sports Science Institute (2024) affirmed that people who engage in moderately active lifestyle such as Bicycling a few times a week, taking daily 20-30 minutes walks, going to Gym every other day or playing Golf regularly feels healthier and more energetic. Also, a few laps around the track could help to cope better with stress, depression, or anxiety. Physical activity distracts the mind from its troubles, develops a sense of master, release anger and anxiety.

Recirculation of key immune cells and mediation of anti-inflammatory antioxidant states through multiple pathways are promoted by regular exercise. David, Nieman, Laural & Wentz (2018) National Institute of Health (2024) stated that participating in sports improves immune regulation, defence activity, metabolic health and delays the onset of age-related dysfunction. Harvard Medical School (2023), Science Direct (2024), Grushko, Kernas, Maksymchuk, Halaidiuk, Zavhorodnia, Sirenko (2025) equally affirmed that regular participation in sports have positive impact on immune system, reduce inflammation, reduce the incidence of disease.

National Institute of Health (2021), Medline Plus Medical Encyclopedia (2024) stressed that exercise leads to changes in antibodies and white blood cells (WBCs) which are the body's immune system cells that fight disease circulate more rapidly and detects illnesses earlier. They affirmed that regular exercise is associated with 31% lower risk of infectious disease and 37% compared to a sedentary lifestyle.

Metabolism according to Better Health Channel (2024) is the countless chemical processes in the body which allows life and normal functioning. Orthoinfo AAOS (2020), United State Centre for Disease Control (2023) affirmed that physical activity increases the rate of caloric expenditure which creates a calorie deficit resulting in weight loss, coordination and flexibility which also help prevent injury. Exercise can equally prevent or slow loss, maintain muscle mass to preserve and strengthen surrounding bone, and decrease the risk of falling. Regular exercise helps build and maintain healthy bones.

National Institute of Health (2024) stressed that Age, gender, muscle-to-fat ratio amount of physical activity and hormone function are some of the factors influencing metabolism. Taking active part in sports increases muscle mass and aids the body to rapidly burn kilojoules. It was concluded that the number of kilojoules the body burns at any given time depends on the level of active involvement in sports.

MedlinePlus Medical Encyclopaedia (2024), Adekunle (2025), affirmed that active involvement in sports work in the same way as other forms of psychiatric treatment. A very close relationship exists between exercise and psychoactive drugs. Exercise equally produces chemical and physiological changes in the body and the brain. Actively participating in sport enhances the release of "feel good" chemicals like endorphins and serotine from the brain, which improves the mood and helps in managing mental health. Improved mood is also linked to how physically fit a person is when engaged in sports, the feeling of loneliness and isolation is reduced as one interact with other people.

Moderate intensity exercise according to Health Direct, Institute of Mental Health (2023) produce chemical and physiological changes in the body and the brain leading to increase in blood flow and oxygenation of the central nervous system leading to positive change in the mood. Participating in sport aids the production of Endorphins "happy chemical" in the brain which relieves pain and stress. Physical, emotional, social and psychological balance are equally enhanced.

United States Centre for Diseases Control (2023), Adekunle (2025) maintained that mental health is the persons' ability to attain fullest potentials in social skills to love, be loved, work effectively and play. The basic indicators of mental health include but not limited to understanding and acceptance of self and

world around them, relationship with people, ability to handle problematic and stressful situations. High level of satisfaction in self-fulfilment and contributing meaningfully to societal happiness are achieved in good mental health. Regular participation in sports enhances easy acquisition and management of all the aforementioned skills.

Mental health according to Centre for the Study of Economics Africa (2021), Grushko et al (2025) is one's ability to perceive reality as it is, respond to challenges and develop rational strategies for living. Stress relief is one of the best roles of participating through the production of increased concentration of norepinephrine, a stress-moderating chemical in the body that improves cognitive function. Mental health according to Adekunle (2024), is the ability to live up to one's fullness of potentials as a creative human being with the social skills to love and be loved, to work and play. The main focus of this study, therefore, is to assess the perception of Students in Tertiary institutions in Osun State on impact of sports on physical and mental well-being.

### **Methods**

The study employed a descriptive research design. A self-designed and validated questionnaire was used for the study. Test-retest method of reliability was used and a reliability coefficient of 0.89 was obtained using Spearman Brown's method of reliability at 0.05 Alpha level of significance. The instrument was made up of three sections. Section A dealt with personal information of the respondents while section B presented five structured items on impact of sports on Physical Health. Section C consisted of five structured items of impact of sports on Mental Health. Data were collected from One thousand and two hundred respondents selected from the three Senatorial Districts in the State. A multi-stage random sampling techniques were adopted in the selection process. Two research questions were raised while two hypotheses were equally formulated for the study. Data collected were analysed using frequency count and percentages while Chi-Square was used to test the formulated Hypotheses at 0.05 Alpha level of significance.

### **Research Questions**

1. Does participation in sports have any impact on the Physical well-being of students in Tertiary Institutions in Osun State?
2. Could involvement in sporting activities affect the Mental well-being of students in Tertiary Institutions in Osun State?

### **Research Hypotheses**

- H01: There is no significant relationship between participating in sports and Physical Well-being of Students in Tertiary Institutions in Osun State.
- H02: There is no significant relationship between participating in sports and Mental Well-being of Students in Tertiary Institutions in Osun State.

**Results**

**Table 1: Respondent’s responses on impact of sports on Physical well-being**

S/N	Items	Agreed	Disagreed
1	Physical, psychological, physiological and emotional well-being are rapidly enhanced by actively participating in sports. 111	1,148 (95.7%)	52 (4.3%)
2	Physical health in form of weight control, motor skill coordination, and increased flexibility are increased through sports.	1,137 (94.8%)	26 (5.2%)
3	Engaging in sports may not necessarily eliminate depression, stress, anxiety and imbalanced state of mind.	55 (4.6%)	1,145 (95.4%)
4	Healthy lifestyle, better eating habit, social and interpersonal relationship are some of the benefits of sports.	1,149 (95.8%)	51 (4.2%)
5	People’s ability to enjoy full potentials in social skills to love, cooperation, and handling problematic conditions may not necessarily be enhanced by sporting activities.	58 (4.8%)	1,142 (95.2%)

From the table above, majority (95.7%) of the students agreed that physical, psychological, physiological and emotional well-being are rapidly enhanced by actively participating in sports while majority (94.8%) equally agreed that sport improves physical health such as weight control, coordination, motor skills, increased flexibility and cardiovascular health. On the minority (4.6%) are those that disagreed with the statement that engaging in sports may not necessarily eliminate depression, stress, anxiety and imbalanced state of mind. Also (95.8%) of the students agreed healthy lifestyle, better eating habit, social and interpersonal relationship are some of the benefits of sports while only 4.8% agreed that people’s ability to enjoy full potentials in social skills to love, cooperation, and handling problematic conditions may not necessarily be enhanced by sporting activities.

**Table 2: Respondent’s responses on impact of sports on Mental well-being**

S/N	Items	Agreed	Disagreed
1	Cardiovascular health is greatly enhanced by active participating in sports.	1,182 (98.5%)	18 (1.5%)
2	Musculoskeletal health is highly impacted by one’s level involvement in sports.	1,174 (97.8%)	26 (2.2%)
3	Taking part in sports may not necessarily have marked effect on Metabolic outcomes	47 (4%)	1,153 (96%)
4	The immune function is greatly enhanced by participating sports.	1,145 (95.4%)	15 (4.6%)
5	Participation in sport may not necessarily enhance cognitive function, and social-psychological outcomes.	18 (1.5%)	1,182 (98.5%)

From the table above, majority (98.5%) the students agreed that cardiovascular health is greatly enhanced by actively participating in sports while 97.8% equally agreed that musculoskeletal health is highly impacted by one’s level of involvement in sports.

On the minority (4%) however, disagreed with the statement that taking part in sports may not necessarily have marked effect on metabolic outcomes while 95.4% agreed that the immune function is greatly enhanced by participating in sports. Also, 1.5% of the students disagreed with the statement that participation in sport may not necessarily enhance cognitive function, and social-psychological

outcomes.**H01:** There is no significant relationship between participating in sports and Physical well-being of Students in Tertiary Institutions in Osun State.

**Table 3: X<sup>2</sup> Calculation on the Impact of Sports on Physical well-being**

Table Value	Level Significance	Df	Critical Value	Decision
5,290.22	0.05	4	9.488	Rejected

The table above showed a Table Value of 5,290.22 which is higher than Critical Value of 9.488 under 4 as the Degree of Freedom, this implies that a significant relationship exists between participating in Sports and Physical well-being.

**H01:** There is no significant relationship between participating in sports and Physical Well-being of Students in Tertiary Institutions in Osun State.

**Table 4: X<sup>2</sup> Calculation on the Impact of Sports on Mental well-being**

Table Value	Level Significance	Df	Critical Value	Decision
5,341.84	0.05	4	9.488	Rejected

The table above presented a higher 5,341.84 as the Table Value with the Critical Value of 9.488 under 4 as the Degree of Freedom was recorded. This means that a significant relationship exists between participating in Sports and Physical well-being.

### Discussion

Majority (95.7%) of the students agreed that physical, psychological, physiological and emotional well-being are rapidly enhanced by actively participating in sports. This response was in consonance with that of Adekunle (2025) who expressed that involvement in sports can help escape from stressful conditions caused by societal changes, changing circumstances of life, environmental pollution, socio-economic and cultural environment, unemployment, stigmatization which can lead to many physical, psychological, emotional, physiological and mental issues.

Majority (94.8%) equally agreed that sport improves physical well-being such as weight control, coordination, motor skills, increased flexibility and cardiovascular health. This was in agreement with the affirmations made by United State Centre for Disease Control (2023) that physical activity increases the rate of caloric expenditure which creates a calorie deficit resulting in weight loss, increases coordination and flexibility which also help prevent injury. Taking active part in sports increases muscle mass and aids the body to rapidly burn kilojoules. It was concluded that the number of kilojoules the body burns at any given time depends on the level of active involvement in sports.

On the minority (4.6%) are those that disagreed with the statement that engaging in sports may not necessarily eliminate depression, stress, anxiety and imbalanced state of mind. This submission corroborates that of National Centre for Biotechnology Information (2024) who expressed that moderate and severe depression cannot be cured or treated by engaging in sport activities, as they cannot replace psychotherapy or antidepressant. However, World Health Organization, Gatorade Sports Science Institute (2024) equally affirmed that people who engage in moderately active lifestyle such as Bicycling a few times a week, taking daily 20-30 minutes walks, going to Gym every other day or playing Golf regularly feels healthier and more energetic and that a few laps around the track could help to cope better with stress, depression, or anxiety.

Also 95.8% of the students agreed that healthy lifestyle, better eating habit, social and interpersonal relationship are some of the benefits of sports. Majority (4.8%) of the students disagreed

with the statement that people's ability to enjoy full potentials in social skills to love, cooperation, and handling problematic conditions may not necessarily be enhanced by sporting activities. The above responses are in consonance with that of MedlinePlus Medical Encyclopaedia (2024) Adekunle (2025), affirming that active involvement in sports work in the same way as other forms of psychiatric treatment and that exercise equally produces chemical and physiological changes in the body and the brain. Actively participating in sport enhances the release of "feel good" chemicals like endorphins and serotonin from the brain, which improves the mood, the feeling of loneliness and isolation is reduced as one interact with other people. It equally enhances physical, emotional, social and psychological balance.

Majority (98.5%) the students agreed that cardiovascular health is greatly enhanced by actively participating in sports. This was in line with the claims made by United State Centre for Disease Control (2023) that exercise helps decrease chances of developing cardiovascular disease, depression, anxiety and that physical activity reduces the risk of cardiovascular disease. In the same vein, Kelsey, Pinckard, Kedryn Baskin, Kristinl & Stanford (2019) noted that exercise induces cardiac metabolic adaptations and chronic inflammation. They equally expressed that exercise is an important tool to combat obesity and its co-morbidities and that exercise prevents both the onset and development of cardiovascular diseases.

In the same vein, 97.8% equally agreed that musculoskeletal health is highly impacted by one's level of involvement in sports. This claim was in agreement with the affirmations made by Orthoinfo AAOS (2020), United State Centre for Disease Control (2023), The Centre Foundation (2024) that physical activity increases the rate of caloric expenditure which creates a calorie deficit resulting in weight loss, coordination and flexibility which also help prevent injury. Exercise can equally prevent or slow loss, maintain muscle mass to preserve and strengthen surrounding bone, and decrease the risk of falling. Regular exercise helps build and maintain healthy bones.

On the minority (4%) however, disagreed with the statement that taking part in sports may not necessarily have marked effect on metabolic outcomes which was in consonance with the claims made by United State Centre for Disease Control (2023), Better Health Channel, Orthoinfo AAOS (2020) that physical activity increases the rate of caloric expenditure which creates a calorie deficit resulting in weight loss, coordination and flexibility which also help prevent injury. Age, gender, muscle-to-fat ratio, amount of physical activity and hormone function are some of the factors influencing metabolism. They further claimed that taking active part in sports increases muscle mass and aids the body to rapidly burn kilojoules. They concluded that the number of kilojoules the body burns at any given time depends on the level of active involvement in sports.

Majority (95.4%) agreed that the immune function is greatly enhanced by participating in sports. This finding was in agreement with that of David, Nieman, Laural & Wentz (2018) Harvard Medical School (2023), Grushko et al (2025), Science Direct (2024) National Institute of Health (2024) who stated that participating in sports improves immune regulation, defence activity, metabolic health and delays the onset of age-related dysfunction and that regular participation in sports have positive impact on immune system, reduce inflammation and reduce the incidence of disease. Institute of Health (2021), MedlinePlus Medical Encyclopaedia (2024) equally stressed that exercise leads to changes in antibodies and white blood cells (WBCs) which are the body's immune system cells that fight disease to circulate more rapidly and detects illnesses earlier.

Also, 1.5% of the students disagreed with the statement that participation in sport may not necessarily enhance cognitive function, and social-psychological outcomes. This was equally in line with the affirmations made by Centre for the Study of Economies of Africa (2021), Grushko et al (2025) that mental health is one's ability to perceive reality as it is, respond to challenges and develop rational strategies for living and that stress relief is one of the best outcome of actively participating in sports aiding the production of increased concentration of norepinephrine, a stress-moderating chemical in the body that improves cognitive function.

## Conclusion

Based on the findings of this study, it was concluded that:

Physical, psychological, physiological and emotional well-being are rapidly enhanced by actively participating in sports. Sport improves physical health such as weight control, coordination, motor skills, increased flexibility and cardiovascular health. Engaging in sports could eliminate depression, stress, anxiety and imbalanced state of mind. Healthy lifestyle, better eating habit, social and interpersonal relationship are some of the benefits of sports. People's ability to enjoy full potentials in social skills to love, cooperation, and handling problematic conditions may be enhanced by sporting activities.

Cardiovascular health, metabolic outcomes are greatly enhanced by actively participating in sports. Musculoskeletal health is highly impacted by one's level of involvement in sports. The immune function cognitive function and social-psychological outcome are greatly enhanced by participating in sports.

## Recommendations

Based on the findings of this study, the following recommendations were made:

1. Sports facilities and equipment should be made readily available and accessible by students
2. University authorities should make participation in at least one sport compulsory for students.
3. Government and non-governmental organizations should be involved in the provision of updated sports facilities in Tertiary institutions in the State.
4. Parents should encourage their children to be actively involved in sports in their various schools.
5. Students should see sports as another avenue to showcase their talents.
6. Philanthropists should equally play active role in sponsoring sporting activities.

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# Impact of Sports and Physical Activity on Well-being and Mental Health of Senior Staff in Higher Education Institutions in Borno State, Nigeria

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## Abstract

*This study examined the impact of sports and physical activity on the well-being and mental health of senior staff in higher education institutions in Borno State, Nigeria. The study was guided by three research questions and three corresponding null hypotheses. A mixed-methods research design was adopted. The population comprised all senior staff in selected higher education institutions in Borno State, while a sample of 236 respondents was selected using appropriate sampling techniques. Data were collected using a structured, self-administered questionnaire covering demographic characteristics, physical activity participation, and mental health indicators. The instrument demonstrated high reliability with an overall Cronbach's alpha coefficient of 0.899. Data were analysed using mean and standard deviation to answer the research questions, while Pearson's correlation, independent samples t-test, and Analysis of Variance (ANOVA) were used to test the hypotheses at a 0.05 level of significance. Findings revealed that the mean scores for anxiety, depression, and perceived stress were  $5.2 \pm 2.1$ ,  $8.5 \pm 3.5$ , and  $16.8 \pm 4.2$ , respectively. A substantial proportion of participants reported elevated mental health concerns, with 44.9% above the anxiety cut-off, 30.1% above the depression cut-off, and 55.1% experiencing high perceived stress. Results further indicated significant negative relationships between physical activity and mental health measures: anxiety ( $r = -0.25$ ,  $p < 0.01$ ), depression ( $r = -0.30$ ,  $p < 0.001$ ), and stress ( $r = -0.20$ ,  $p < 0.05$ ). Participants engaging in higher levels of physical activity (>3 times per week) had significantly lower anxiety, depression, and stress scores compared to those with low activity levels. Additionally, female participants reported significantly higher levels of anxiety, depression, and stress compared to their male counterparts ( $p < 0.05$ ). The study concluded that regular participation in sports and physical activity significantly improves mental health and overall well-being among senior staff. It was recommended that higher education institutions should promote structured physical activity programs, provide accessible recreational facilities, and implement workplace wellness policies to enhance staff mental health and productivity.*

**Keywords:** Sport s participation, Physical activity, Mental health, Well-being, Anxiety, Depression, Stress, Higher education staff

## Introduction

The mental health and well-being of senior staff in higher education institutions have become increasingly important concerns in contemporary academic environments. The growing demands associated with leadership roles, teaching, research productivity, and administrative responsibilities place significant psychological and physical strain on staff. Recent studies indicate that a substantial proportion of higher education personnel experience work-related stress, with many reporting symptoms of anxiety, depression, and burnout (Kinman & Johnson, 2023; Winefield et al., 2021). These challenges have been further intensified by evolving workplace expectations and global disruptions, thereby underscoring the urgent need for effective strategies to support staff well-being and productivity.

Research in recent years continues to affirm that participation in sports and physical activity plays a significant role in improving mental health and overall well-being. Regular engagement in physical activity has been linked to reduced stress, lower levels of anxiety and depression, improved mood, enhanced cognitive functioning, and better quality of life (World Health Organization, 2022; Rodríguez-Ayllón et al., 2019; Chekroud et al., 2018). More recent evidence emphasizes that even moderate levels of physical activity can produce meaningful psychological benefits, particularly among working adults facing occupational stress (Bull et al., 2020; Guthold et al., 2020). Despite these well-established benefits, there remains limited research focusing specifically on senior staff in higher education institutions, particularly within developing regions such as Nigeria.

Engagement in regular physical activity is widely recognised as a key component of maintaining both physical and psychological health (World Health Organization, 2022). Beyond its physical benefits, physical activity contributes significantly to mental well-being by improving emotional regulation and resilience to stress (Stubbs et al., 2021). However, senior staff in higher education institutions often experience high occupational stress due to heavy workloads, role conflicts, and institutional pressures, which may negatively affect their mental health (Kinman & Johnson, 2023). Additionally, the sedentary nature of academic work, combined with time constraints, limits opportunities for consistent participation in physical activity.

In the context of Borno State, Nigeria, mental health concerns among higher education staff are further shaped by socio-economic and security-related challenges. The prolonged effects of insurgency, displacement, and institutional disruptions have had lasting psychological impacts on individuals and communities (United Nations Development Programme [UNDP], 2023). Higher education institutions in the region have faced disruptions including insecurity, infrastructural damage, and workforce instability. Although there have been improvements in security in recent years, the residual effects of stress, trauma, and increased workload remain significant concerns for staff. Within this context, participation in sports and physical activity can serve as an effective coping mechanism by reducing stress, improving concentration, and enhancing overall job performance. Furthermore, group-based physical activities can promote social interaction, strengthen collegial relationships, and foster a sense of community within the workplace.

The importance of promoting mental health among senior staff cannot be overstated. Mental health conditions such as anxiety and depression remain prevalent among academic staff and can significantly affect productivity and institutional effectiveness (Gillespie et al., 2019; Kinman & Johnson, 2023). Leadership roles and performance expectations may further exacerbate stress levels (Bamberger et al., 2017). Regular physical activity has been identified as a practical, accessible, and cost-effective strategy for mitigating these challenges. However, competing responsibilities and time constraints continue to limit participation among senior staff.

Recent empirical studies have shown that regular physical activity significantly reduces stress levels and improves mental health outcomes among working populations (Stubbs et al., 2021; Kandola et al., 2020). Additionally, research indicates that engagement in physical activity is associated with lower levels of anxiety and depression, with some studies highlighting stronger benefits among female participants (McDowell et al., 2019). Furthermore, evidence suggests that the frequency of physical activity, rather than intensity alone, plays a critical role in improving mental health outcomes (Bull et al., 2020). These findings highlight the need for further investigation into how physical activity influences mental health within specific populations and contexts.

Therefore, this study aims to examine the impact of sports and physical activity on the well-being and mental health of senior staff in higher education institutions in Borno State, Nigeria. By exploring the relationship between physical activity and mental health outcomes, the study seeks to contribute to the development of evidence-based strategies for improving staff well-being and fostering a healthier and more productive academic environment.

## Methods

This study adopted a mixed-methods research design, integrating both quantitative and qualitative approaches to provide a comprehensive understanding of the impact of sports and physical activity on the mental health and well-being of senior staff in higher education institutions in Borno State, Nigeria. The quantitative component involved the collection and analysis of numerical data, while the qualitative aspect provided supporting insights into participants' experiences.

### Population of the Study

The population of the study comprised all senior staff in selected higher education institutions in Borno State, Nigeria. These included academic and administrative staff occupying senior positions across the institutions.

### Sample Size and Sampling Technique

A total of 236 respondents participated in the study. The sample was selected using a stratified random sampling technique to ensure adequate representation of different categories of senior staff. The demographic distribution indicated that 158 (66.9%) were male, while 78 (33.1%) were female.

### Instrument for Data Collection

Data were collected using a structured, self-administered questionnaire. The instrument consisted of sections covering demographic characteristics, level of participation in sports and physical activity, and mental health indicators. Standardized scales were adopted to measure mental health variables, including:

- Generalized Anxiety Disorder Scale (GAD-7) for anxiety
- Patient Health Questionnaire (PHQ-9) for depression
- Perceived Stress Scale (PSS) for stress

### Validity and Reliability of the Instrument

The instrument was subjected to expert validation to ensure content and construct validity. Reliability analysis using Cronbach's alpha indicated a high level of internal consistency, with an overall reliability coefficient of 0.899, confirming the suitability of the instrument for the study.

### Method of Data Collection

The questionnaires were administered directly to the respondents across the selected institutions. Participation was voluntary, and respondents were assured of confidentiality and anonymity. Completed questionnaires were retrieved and screened for completeness before analysis.

### Method of Data Analysis

Data collected were analysed using both descriptive and inferential statistical techniques.

- Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and mental health measures.
- Pearson's correlation coefficient ( $r$ ) was used to examine the relationship between physical activity and mental health variables (anxiety, depression, and stress).
- Independent samples t-test was employed to compare mental health outcomes between groups based on physical activity frequency (low vs high participation).
- The level of significance for all statistical tests was set at 0.05.

**Results and Discussion**

**Research Question 1:** What is the level of anxiety, depression, and perceived stress among senior staff in higher education institutions in Borno State?

**Table 1: Demographic Characteristics of Participants**

Variable	Frequency (n)	Percentage (%)
Male	158	66.9
Female	78	33.1
<b>Total</b>	<b>236</b>	<b>100</b>

**Table 2: Mean and Standard Deviation of Mental Health Measures**

Variable	Mean	Standard Deviation
GAD-7 (Anxiety)	5.2	2.1
PHQ-9 (Depression)	8.5	3.5
Perceived Stress Scale (PSS)	16.8	4.2

**Table 3: Frequency of Participants above Cut-off Scores**

Measure	Frequency (n)	Percentage (%)
GAD-7 (Anxiety)	106	44.9
PHQ-9 (Depression)	71	30.1
Perceived Stress (PSS)	130	55.1
<b>Total</b>	<b>236</b>	<b>100</b>

The results indicate moderate levels of anxiety, depression, and perceived stress among senior staff. The mean scores show that stress (M = 16.8) is particularly high compared to anxiety (M = 5.2) and depression (M = 8.5). Furthermore, a considerable proportion of respondents reported mental health concerns above clinical cut-off points, especially for perceived stress (55.1%) and anxiety (44.9%). This suggests that mental health challenges are prevalent among senior staff in higher education institutions in Borno State

**Research Question 2:** What is the relationship between physical activity and mental health (anxiety, depression, and stress) among senior staff?

**Hypothesis 1:** There is no significant relationship between physical activity and mental health measures among senior staff.

**Table 4: Correlation between Physical Activity and Mental Health Measures**

Measures	r-value	p-value
GAD-7 (Anxiety)	-0.25	<0.01
PHQ-9 (Depression)	-0.30	<0.001
Perceived Stress (PSS)	-0.20	<0.05

The results show significant negative correlations between physical activity and all mental health variables. This implies that increased participation in physical activity is associated with lower levels of anxiety, depression, and stress. Since all p-values are less than 0.05, the null hypothesis is **rejected**. Therefore, there is a significant relationship between physical activity and mental health among senior staff.

**Research Question 3:** Is there a difference in mental health outcomes between senior staff who engage in low and high levels of physical activity?

**Hypothesis 2:** There is no significant difference in mental health outcomes between senior staff with low and high physical activity levels.

**Table 5: Comparison of Mental Health by Physical Activity Frequency**

Measure	Low Physical Activity (<3/week) Mean ± SD	High Physical Activity (>3/week) Mean ± SD	t-value	p-value
GAD-7 (Anxiety)	6.1 ± 2.5	4.2 ± 1.9	3.2	<0.01
PHQ-9 (Depression)	10.5 ± 4.2	6.8 ± 3.1	4.1	<0.01
Perceived Stress (PSS)	18.5 ± 4.5	14.5 ± 3.8	3.5	<0.01

The findings reveal that participants who engage in high levels of physical activity have significantly lower anxiety, depression, and stress scores compared to those with low activity levels. Since all p-values are less than 0.05, the null hypothesis is **rejected**. This indicates that physical activity frequency significantly influences mental health outcomes.

**Research Question 4:** Is there a gender difference in mental health outcomes among senior staff?

**Hypothesis 3:** There is no significant difference in mental health outcomes between male and female senior staff.

**Table 6: Comparison of Mental Health Measures by Gender**

Measure	Male Mean ± SD	Female Mean ± SD	t-value	p-value
GAD-7 (Anxiety)	4.5 ± 1.9	6.1 ± 2.5	2.5	<0.05
PHQ-9 (Depression)	7.5 ± 3.1	10.2 ± 4.1	3.1	<0.05
Perceived Stress (PSS)	15.8 ± 4.0	18.2 ± 4.5	2.2	<0.05

The results indicate that female participants reported significantly higher levels of anxiety, depression, and perceived stress compared to their male counterparts. Since the p-values are less than 0.05, the null hypothesis is **rejected**. This suggests that gender plays a significant role in mental health outcomes among senior staff.

## Discussion of Findings

The findings of this study provide strong evidence on the relationship between sports and physical activity and the mental health and well-being of senior staff in higher education institutions in Borno State, Nigeria.

The results revealed moderate levels of anxiety, depression, and perceived stress among senior staff, with perceived stress having the highest mean score ( $M = 16.8$ ). Additionally, a considerable proportion of participants reported mental health concerns above clinical cut-off points, particularly for stress (55.1%) and anxiety (44.9%). These findings align with earlier studies indicating that academic staff experience high levels of occupational stress due to the demands of teaching, research, and administrative responsibilities (Kinman & Johnson, 2023; Winefield et al., 2021). The elevated stress levels observed in this study may also be linked to contextual challenges in Borno State, including the lingering psychological effects of insecurity and institutional disruptions (United Nations Development Programme [UNDP], 2023). This supports the assertion that environmental and occupational stressors significantly influence mental health outcomes among higher education staff.

The study further revealed a significant negative relationship between physical activity and mental health variables, including anxiety ( $r = -0.25$ ), depression ( $r = -0.30$ ), and perceived stress ( $r = -0.20$ ). This implies that increased participation in physical activity is associated with improved mental health outcomes. This finding is consistent with previous research, which demonstrates that regular physical activity reduces symptoms of anxiety and depression while enhancing emotional well-being (Stubbs et al., 2021; Kandola et al., 2020). Similarly, the World Health Organization (2022) emphasized that physical activity plays a crucial role in promoting mental health by improving mood and reducing stress levels. The negative correlations observed in this study reinforce the protective role of physical activity against psychological distress.

In addition, the comparison based on physical activity frequency showed that participants who engaged in higher levels of physical activity (more than three times per week) had significantly lower levels of anxiety, depression, and stress compared to those with low participation. This finding supports the argument that not only participation but also the frequency of physical activity is important in achieving mental health benefits (Bull et al., 2020). It further aligns with the findings of Stubbs et al. (2021), who reported that consistent engagement in physical activity significantly improves psychological resilience and reduces stress levels. The implication is that regular participation in sports and physical activities can serve as an effective intervention strategy for improving mental health among senior staff.

The study also found significant gender differences in mental health outcomes, with female participants reporting higher levels of anxiety, depression, and perceived stress than their male counterparts. This finding is consistent with existing literature indicating that females are more likely to experience higher levels of internalizing disorders such as anxiety and depression (McDowell et al., 2019). The result also supports earlier work by Nolen-Hoeksema (2001), which highlighted gender differences in emotional processing and vulnerability to stress. These differences may be attributed to a combination of biological, psychological, and social factors, including role expectations and work-life balance challenges.

Overall, the findings of this study corroborate existing evidence that sports and physical activity are essential for promoting mental health and well-being. As highlighted in the introduction, physical activity contributes to improved emotional regulation, reduced stress, and enhanced cognitive functioning (World Health Organization, 2022; Harris et al., 2017). The present study extends this understanding by providing empirical evidence within the specific context of senior staff in higher education institutions in Borno State.

Furthermore, the findings highlight the importance of integrating structured physical activity programs into institutional policies. Given the demanding nature of academic work and the environmental challenges within the study area, promoting physical activity can serve as a practical and cost-effective

strategy for enhancing staff well-being, improving productivity, and fostering a healthier work environment

### Summary

This study investigated the impact of sports and physical activity on the well-being and mental health of senior staff in higher education institutions in Borno State, Nigeria. The following questions guided the research:

1. What is the level of anxiety, depression, and perceived stress among senior staff?
2. What is the relationship between physical activity and mental health outcomes?
3. Are there differences in mental health outcomes between staff with low and high levels of physical activity?
4. Are there gender differences in mental health outcomes among senior staff?

Corresponding hypotheses were tested to examine whether these relationships were statistically significant.

A mixed-methods research design was employed. Quantitative data were collected using a structured self-administered questionnaire distributed to 236 senior staff across selected higher education institutions. Mental health was measured using the GAD-7 (anxiety), PHQ-9 (depression), and Perceived Stress Scale (PSS). Data analysis included descriptive statistics (means, standard deviations, frequencies), Pearson correlation, independent samples t-tests, and ANOVA to test differences across groups.

Key findings include:

- Moderate levels of anxiety ( $M = 5.2$ ) and depression ( $M = 8.5$ ), and high perceived stress ( $M = 16.8$ ) were observed among senior staff, with over half exceeding clinical cut-offs for stress.
- Physical activity was significantly negatively correlated with anxiety ( $r = -0.25$ ), depression ( $r = -0.30$ ), and stress ( $r = -0.20$ ), indicating that participation in sports and exercise reduces mental health symptoms.
- Staff engaging in high-frequency physical activity ( $>3$  times/week) had significantly lower anxiety, depression, and stress than those with low-frequency participation.
- Female staff reported higher anxiety, depression, and stress compared to male staff, highlighting gender-specific vulnerabilities.
- Contextual factors, such as Borno State's post-conflict environment, exacerbated stress, emphasizing the importance of structured wellness interventions.

### Conclusion

The study concludes that regular sports and physical activity significantly enhance the mental health and well-being of senior staff in higher education institutions in Borno State, with higher frequency yielding greater benefits, female staff being more vulnerable to stress, and structured programs being particularly vital in post-conflict contexts.

### Recommendations

1. Higher education institutions should integrate structured sports and physical activity programs into staff wellness initiatives.
2. Staff should be encouraged to engage in physical activity frequently, ideally more than three times per week, to maximize mental health benefits.
3. Wellness programs should be **gender-sensitive**, providing flexible options to address the unique needs of female staff.
4. Mental health support, such as counselling and stress management workshops, should complement physical activity initiatives.
5. In post-conflict regions like Borno State, physical activity programs should be prioritized as a coping strategy to enhance resilience and well-being.

6. Institutions should monitor and evaluate participation and outcomes to ensure the effectiveness of wellness programs.

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# The Evidence-Based Impact of Sports Participation on Mental and Physical Well-Being: A Narrative Review And Policy Recommendations

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## **Abstract**

*Participation in sports has been linked to improvements in physical and mental well-being, with a growing body of empirical research highlighting especially strong benefits for mental health outcomes. The paper synthesizes between period of 2013-2025 of empirical evidence demonstrating how engagement in sports and structured physical activities contributes to physical health outcomes, psychological wellbeing, and social functioning. This shows that structured and inclusive sports participation is a powerful, cost-effective, and scalable intervention for enhancing both mental and physical wellbeing across lifespan. Findings indicate that sports participation enhances physical fitness and reduces risk factors for chronic disease, while also promoting positive mental health outcomes such as reduced anxiety and improved self-esteem. Beyond direct health effects, social and emotional benefits are also benefited, this highlighting the role of sports in holistic wellbeing. The implications that regular sports participation is associated with reduced risks of chronic diseases, improved mental health outcomes such as reduced anxiety and depression, well enhanced quality of life, which indicates that policy recommendations should aimed at integrating sports participation into health promotion strategies, education systems, and community development initiatives for public health policies and community interventions. The paper concludes with a call to action urging policymakers, educators and health professionals to integrate safe, inclusive, and evidence-based sports participation programmes into health promotion strategies to maximize population wellbeing.*

**Keywords:** sports participation, mental health, physical well-being, exercise psychology, quality of life, public health intervention

## **Introduction**

Inactive lifestyles, mental health disorders, and non-communicable diseases has been global public health challenges. With non-communicable diseases such as cardiovascular diseases and depression noted as rising, that the World Health Organization recommended physical activity as a public health strategy to reduce such cases (World Health Organization (WHO, 2022). Sports participation has increasingly been recognized as a powerful public health, educational, and social development strategy that can contribute directly to the achievement of Sustainable Development Goals (SDGs) established by the United Nations. Thus, sport and physical activity play an essential role in promoting overall health and well-being.

In contemporary global health discourse, sport is no longer viewed merely as recreation but as a multidimensional intervention capable of improving mental well-being, physical health, social inclusion, and community resilience. Over the past few decades, increasing scientific evidence has demonstrated that regular participation in sports contributes significantly to both physical and mental health outcomes (Warburton & Bredin, 2006).

The global burden of non-communicable diseases such as cardiovascular disease, obesity, diabetes, and mental health disorders has intensified the need for effective preventive health strategies (World Health Organization (WHO, 2024). Sport is recognized as an avenue for improving health outcomes and quality of life. Within this context, sport participation has emerged as an accessible and powerful

tool for promoting population health. Sports participation encompasses structured and unstructured forms of physical activity that involve skill development, physical exertion, competition, and social interaction. These activities range from recreational community sports to organized competitive athletics. Research has consistently shown that individuals who regularly engage in sports demonstrate improved cardiovascular fitness, enhanced metabolic health, and better psychological well-being compared to sedentary individuals (Pedersen & Saltin, 2015).

Emerging research continues to reinforce the role of sports participation as a protective factor against psychological stress and mental health disorders. Study of activity and stress by Martin-Rodríguez, et al. (2025) highlights that regular physical activity participation is associated with improved stress modulation mechanisms. Sport distinct from generic physical activity offers structured engagement, social interaction, and competitive elements that may amplify health outcomes (Campillo-Sánchez et al. 2025). Thus, sports combine movement with social interaction, goal-setting, identity formation, and emotional regulation. Despite these advantages, sports participation is sometimes criticized for contributing to injury, burnout, and psychological stress, particularly in high-performance environments. These competing perspectives necessitate a balanced, evidence-based examination of sport's overall impact on mental and physical wellbeing.

Beyond physical health benefits, sport participation contributes significantly to psychological development and emotional resilience. Participation in sports has been associated with improved self-esteem, reduced stress levels, and better coping mechanisms for dealing with life challenges (Biddle et al. 2019). The multidimensional benefits of sports participation make it a powerful public health intervention capable of addressing multiple global health challenges, including mental health disorders and sedentary lifestyles.

Additionally, sport environments often foster social interaction, teamwork, leadership skills, and community engagement. However, despite the well-documented benefits of sport participation, several barriers continue to limit access to sporting opportunities. These barriers include socioeconomic constraints, inadequate sports infrastructure, cultural limitations, and gender inequalities (Eime, et al. 2013). Such disparities are particularly evident in developing areas where access to organized sport systems remains limited.

Thus, this narrative review aims to synthesize between 2013-2025 current evidence on the impact of sports participation on mental and physical well-being. Specifically, the study examines physiological health outcomes, psychological benefits, and social impacts associated with sport participation, while proposing policy recommendations that can promote and enhance access to participation at all levels, which contribute to good health in advancing SDG 3, which aims to ensure healthy lives and promote well-being for all. Thus, emphasizes on regular engagement in sport and physical activity helps to reduces the risk of non-communicable diseases (NCDs) such as cardiovascular disease, obesity, and type 2 diabetes, enhances cardiorespiratory fitness, muscular strength, and metabolic health, improves mental health outcomes, including reductions in anxiety, depression, and stress, as well as promotes psychological resilience and emotional regulation. Highlighting, evidence from the World Health Organization indicates that insufficient physical activity remains a major global health risk, reinforcing the urgency of promoting sport participation as a preventive health strategy.

The general objective of this narrative review is to synthesize current scientific evidence (2013–2025) on the impact of sports participation on mental and physical well-being across different populations and settings.

### **Specific Objectives**

1. To examine the effects of sports participation on physical health outcomes, including cardiovascular fitness, muscular strength, body composition, metabolic health, and prevention of non-communicable diseases.
2. To analyse the role of sports participation in promoting psychological, mental and social well-being and quality of life.
3. To compare the health benefits of organised sport participation with general physical activity or exercise programmes.
4. To explore the implications of sports participation for public health promotion, education policy, and sustainable development frameworks.

### **Methodological Approach**

This study employs a narrative review methodology, synthesizing peer-reviewed literature published between 2013-2025 in journals related to sports science, psychology, and public health. This allowed the use of search strategy with relevant literature identified using databases such as: PubMed, Scopus, Web of Science and Google Scholar which allowed to search terms that included: “sports participation”; “mental health and sport”; “physical activity and well-being”; “exercise and psychological health” as well as “sport and public health outcomes”. To maintain good balance of identified literature criteria was set out for studies which included if they:

### **Inclusion Criteria**

1. Were published between 2013-2025
2. Examined sports participation or structured physical activity
3. Reported mental, physical, or social health outcomes
4. Included empirical studies, systematic reviews, or meta-analyses

### **Exclusion Criteria**

1. Non-peer-reviewed sources
2. Studies focusing solely on elite athletic performance without health outcomes
3. Non-English publications

Approximately 80 relevant studies and reviews were examined and synthesized to identify major themes. This is shown in the Appendix (Table column) and Prisma literature review 2013-2025.

### **Physical Health Benefits of Sports Participation**

Sports participation substantially influences physical health by improving cardiovascular function, muscular strength, and overall fitness. Sports engagement has been linked to reduced risk of chronic diseases such as obesity, diabetes, and hypertension due to increased energy expenditure and regular activity levels (Campillo-Sánchez et al. 2025). Different club and organised sports promote sustained participation, contributing to healthier behaviour patterns, self-perceived strength and health status among adults (Jo et al. 2025).

Beyond general population benefits, regular sports involvement during childhood and adolescence leads to lasting effects, with youth sport participation associated with greater lifetime physical activity levels and healthier body composition (Eime et al. 2025). These outcomes are consistent with global sustainable development goals related to health and wellbeing, emphasizing the preventive potential of sports against physical disease (Campillo-Sánchez et al. 2025).

Large-scale epidemiological studies indicate that individuals who regularly participate in sports exhibit superior physical health outcomes compared to non-participants. According to Lee et al. (2012), in a global analysis involving data from multiple countries, reported that regular physical activity, including organized sports, significantly reduces the risk of cardiovascular disease, type 2 diabetes, breast and colon cancers, and premature mortality. In addition, sports participation has also been associated with improved aerobic capacity, muscular strength, and body composition (Warburton & Bredin, 2017).

Longitudinal studies provide further support of findings. A 10-year cohort study of Oja et al. (2015) found that adults engaged in regular sports activities demonstrated lower incidence of metabolic syndrome and better functional mobility in later life. Among children and adolescents, empirical evidence shows that participation in school and community sports programs enhances motor skill development, bone mineral density, and physical literacy, contributing to sustained physical activity into adulthood (Lloyd et al. 2014).

### **Mental Health and Psychological Well-Being**

Engagement in sports activities has been associated with reduced levels of depression, anxiety, and stress, as well as improved psychological well-being, including life satisfaction and self-esteem (Smith & Jones, 2023). Numerous studies indicate that sports participation positively impacts mental health across the lifespan. Systematic reviews confirm these associations, particularly highlighting benefits in adult populations participating in organized sports (Smith & Jones, 2023). The psychological benefits of sports extend to increased production of mood-enhancing neurochemicals (endorphins & dopamine), contributing to reduced stress, improved mood regulation, and enhanced emotional relaxation (Yahi et al. 2025).

In addition, sports also foster social interaction and inclusion, which buffer against loneliness and social isolation, further strengthening mental health (Yahi et al. 2025). Social-emotional skills cultivated through sports participation, such as teamwork and communication, mediate improvements in emotional well-being across demographics (Qian et al. 2025). Importantly, evidence suggests that early sports participation can offer a protective effect against the onset of psychiatric conditions. Longitudinal research has linked physical activity in preadolescence with lower rates of mental health diagnoses in later adolescence (Lundgren et al. 2025). Furthermore, emerging research reinforces the role of sports participation as a protective factor against psychological stress and mental health disorders. Martín-Rodríguez et al. (2025) highlights that regular physical activity participation is associated with improved stress modulation mechanisms, including: reduced cortisol reactivity to psychosocial stressors, improved autonomic nervous system balance, enhanced emotional self-regulation and coping capacity and better sleep quality, which mediates stress recovery. These findings underscore the value of sports not only for current well-being but also for long-term mental health resilience.

### **Physiological Benefits of Sports and Physical Well-being**

Extensive research confirms that regular participation in sports improves cardiovascular fitness, muscular strength, flexibility, bone density, and metabolic health (Warburton & Bredin, 2017). However, sports such as football, basketball, athletics, and swimming involve moderate-to-vigorous physical activity that meets or exceeds international physical activity guidelines. Participation in sports has been associated with reduced risk of obesity, type 2 diabetes, hypertension, cardiovascular disease, and certain cancers (Lee et al. 2012). Unlike unstructured exercise, sports often promote long-term adherence due to enjoyment, competition, and social accountability. Thus, the functional and lifelong health outcomes impact children and adolescents, enhance motor skill development, coordination, and neuromuscular control, laying the foundation for lifelong physical literacy (Lloyd et al. 2014). Among adults and older populations, sports participation contributes to functional independence, balance, and reduced fall risk, thereby improving quality of life and healthy aging outcomes.

A substantial body of empirical research supports the positive relationship between sports participation and improved mental and physical well-being. Evidence drawn from cross-sectional studies, longitudinal analyses, randomized controlled trials, and systematic reviews consistently demonstrates that engagement in sport yields significant health benefits across diverse populations and age groups

### **Psychological and Emotional Benefits of Sports and Mental Well-being**

Neurobiological mechanisms such as increased endorphin release, regulation of cortisol, and enhanced neuroplasticity contribute to improved mood and emotional stability. Sports participation has been

consistently linked to lower levels of depression, anxiety, and psychological distress (Biddle et al. 2019). Beyond biological effects, sports foster psychological skills including self-esteem, self-efficacy, resilience, and emotional regulation. Achievement of goals, mastery of skills, and constructive feedback reinforce positive self-concept and confidence.

Longitudinal studies demonstrate that individuals who participate in sports report higher life satisfaction and lower psychological distress compared to non-participants (Downward & Rasciute, 2011). A meta-analysis by Rebar et al. (2015) found that physical activity interventions, including sports, had moderate to large effects on reducing depressive symptoms. Furthermore, evidence suggests that team-based sports may yield stronger mental health benefits than individual exercise due to their social and cooperative nature (Eime et al. 2013).

School-based and community sports programmes have also been shown to improve academic performance, behavioural outcomes, and emotional well-being among youth. Empirical research strongly supports the mental health benefits of sports participation. A meta-analysis by Rebar et al. (2015) revealed that physical activity interventions, including organized sports, produced moderate to large reductions in symptoms of depression and anxiety. These effects were observed across clinical and non-clinical populations, suggesting that sport functions both as a preventive and therapeutic tool for mental health.

Team sports appear to offer particularly robust psychological benefits. Eime et al. (2013) demonstrated that adults engaged in team sports reported higher levels of self-esteem, social functioning, and life satisfaction compared to individuals participating in individual physical activities. Similarly, a longitudinal study by Doré et al. (2016) found that adolescents involved in organized sports had significantly lower rates of psychological distress and depressive symptoms over time.

### **Social Connectedness, Identity and Emotional Benefits**

In addition to physical and psychological gains, sports participation enhances social well-being. Team sports create environments that foster belonging, social support, and improved interpersonal skills. Adult participants in team sports often report higher life satisfaction and social cohesion compared to those engaging in individual physical activities (Smith & Jones, 2023). Moreover, engagement in sports clubs is linked with healthier social behaviours and more supportive community networks a factor that further supports mental health.

Sports provide a unique social environment that promotes belonging, teamwork, and social support. Social connectedness is a well-established protective factor against mental illness and loneliness (Eime et al. 2013). Team sports, in particular, facilitate peer bonding, communication skills, and shared identity, which are critical for adolescents and young adults navigating psychosocial development. For marginalized populations, including individuals with disabilities, women, and underserved communities, inclusive sports programs can enhance empowerment, social inclusion, and mental resilience.

Empirical studies also highlight the social mechanisms through which sports enhance well-being. Downward and Rasciute (2011), using data from a nationally representative survey, found that sports participation was positively associated with subjective well-being and happiness, independent of income, employment status, and health conditions. Social integration, peer support, and a sense of belonging were identified as key mediating factors. In youth populations, sports participation has been linked to improved behavioural outcomes, academic engagement, and emotional regulation. A randomized controlled trial by Fraser-Thomas et al., (2005) demonstrated that structured youth sports programs foster positive youth development, including leadership skills, resilience, and prosocial behaviour. In addition, study from Luo (2025) demonstrate that team sport environments enhance social support networks, which act as buffer the effects of psychological stress, improve sense of belonging and identity formation, reduce loneliness and social isolation and strengthen collective coping strategies

### **Public Health Implications and Implementation**

Given the mounting evidence supporting the benefits of sports, policies that increase access to sports facilities, encourage organized sports programs, and integrate sports into educational and community health strategies are vital. Public health initiatives should emphasize inclusive, accessible sports opportunities to maximize population health benefits, particularly in youth and underserved communities. According to public health perspective, sports-based interventions have been successfully implemented to address mental health challenges at the community level.

A systematic review by Biddle et al. (2019) confirmed that sport and physical activity interventions significantly improve mental health outcomes among children and adolescents, particularly when programs emphasize enjoyment, inclusion, and skill development rather than performance pressure. Evidence from community and workplace settings further supports the role of sport in stress reduction and psychological well-being. Individuals participating in recreational sports programs report lower perceived stress levels, improved sleep quality, and enhanced cognitive functioning (Penedo & Dahn, 2005).

Collectively, empirical studies provide strong and consistent evidence that sports participation positively influences both mental and physical well-being. The convergence of findings across methodologies and populations underscores the robustness of the relationship between sport and health outcomes. While variations exist based on sport type, intensity, and context, the empirical literature overwhelmingly supports sports participation as a valuable and evidence-based strategy for enhancing holistic well-being. Thus synthesizes findings from peer-reviewed empirical studies examining the relationship between sports participation, mental and physical well-being evidence identified across observational studies, longitudinal cohorts, randomized controlled trials, and systematic reviews conducted in diverse populations and settings.

Across multiple systematic reviews and large-scale observational studies, sports participation has been consistently associated with favourable physical health outcomes. Epidemiological evidence indicates that individuals engaging in regular sport demonstrate lower incidence of non-communicable diseases, including cardiovascular disease, type 2 diabetes, and obesity, compared with inactive populations (Lee et al. 2012). These associations have been observed across age groups and geographic regions.

Longitudinal cohort studies provide evidence of temporal relationships between sports participation and physical health indicators. Oja et al. (2015) reported that sustained engagement in sport-based physical activity was associated with improved cardiorespiratory fitness, musculoskeletal function, and reduced risk of metabolic syndrome over time. In paediatric populations, evidence from longitudinal and quasi-experimental studies suggests that participation in organized sports contributes to improved motor competence, bone health, and physical literacy (Lloyd et al. 2014).

Systematic reviews examining exercise and sport interventions further indicate that sport-based activities meeting moderate-to-vigorous intensity thresholds are associated with clinically meaningful improvements in physiological health markers, including blood pressure, lipid profiles, and insulin sensitivity (Warburton & Bredin, 2017).

Evidence from meta-analyses and systematic reviews indicates a consistent inverse association between sports participation and symptoms of depression and anxiety. Rebar et al. (2015), synthesizing data from randomized and non-randomized trials, reported moderate effect sizes for reductions in depressive and anxiety symptoms following physical activity interventions, including organized sports.

Observational and longitudinal studies suggest that participation in sport is associated with lower psychological distress and improved emotional well-being. Doré et al. (2016) found that adolescents engaged in organized sports exhibited lower levels of depressive symptoms over time compared with

non-participants. Although causality cannot be conclusively established in observational designs, the consistency of findings across study types supports a protective association.

Systematic reviews focusing on youth populations further indicate that sport participation is associated with improved self-esteem, emotional regulation, and psychological resilience, particularly when programs emphasize supportive environments rather than performance outcomes (Biddle et al. 2019). Evidence synthesized from cross-sectional and longitudinal studies indicates that social factors may mediate the relationship between sports participation and mental well-being. Eime et al. (2013), in a systematic review, reported that team-based sports were more strongly associated with positive psychosocial outcomes than individual activities, potentially due to increased opportunities for social interaction and perceived social support. Population-based studies have also identified positive associations between sports participation and subjective well-being indicators, including life satisfaction and happiness (Downward & Rasciute, 2011). These associations persisted after controlling for sociodemographic variables, suggesting an independent relationship between sport engagement and well-being outcomes.

Evidence from community-based and school-based intervention studies suggests that sport-based programmes can contribute to improvements in mental and physical well-being when appropriately designed and implemented. Systematic reviews of intervention studies indicate that programs emphasizing inclusivity, skill development, and enjoyment demonstrate more consistent positive outcomes than highly competitive models (Biddle et al., 2019). Public health-oriented reviews further suggest that sport-based interventions may serve as scalable and cost-effective strategies for health promotion, particularly in youth and community settings (Penedo & Dahn, 2005). However, heterogeneity in study design, intervention duration, and outcome measures limits direct comparability across studies.

Overall, the synthesized empirical evidence indicates a consistent association between sports participation and improved mental and physical well-being. While effect sizes vary and causal inference is constrained by methodological limitations in some study designs, the convergence of findings across systematic reviews, longitudinal cohorts, and intervention studies supports the role of sports participation as a contributor to holistic health outcomes. Future research employing standardized measures and rigorous experimental designs is warranted to further clarify causal pathways and contextual moderators.

### **Conclusion**

Evidence published between 2013-2025 clearly demonstrates that sports participation plays an important role in promoting both physical and mental well-being. Regular engagement in sports promote and enhances cardiovascular health, improves body composition, and reduces the risk of chronic diseases. Simultaneously, it contributes to psychological resilience, emotional regulation, and social connectedness. The multidimensional benefits of sports participation make it a powerful public health intervention capable of addressing multiple global health challenges, including mental health disorders and inactive lifestyles. However, to fully realize these benefits, policymakers must address barriers to participation and implement inclusive sport promotion strategies. Future research should focus on longitudinal and intervention studies to better understand the mechanisms underlying the sport–well-being relationship and to develop evidence-based policies that maximize the societal benefits of sports participation.

### **Recommendations**

To fully harness the mental and physical well-being benefits of sports, it is required that:

1. Policymakers should promote the integration of sports participation into national public health and mental health strategies policy plan, with sustained funding for community and school-based programmes.

2. Educational institutions should maintain and promote quality physical education and inclusive sports opportunities that serve the same purpose of strengthening physical education activity for school programmes to improve physical and mental wellbeing.
3. Health professionals should actively promote sports participation as a complementary intervention for mental and physical health management.
4. Interdisciplinary investigations into context-specific, culturally relevant sports interventions, particularly in low- and middle-income countries should be investigated by researchers.

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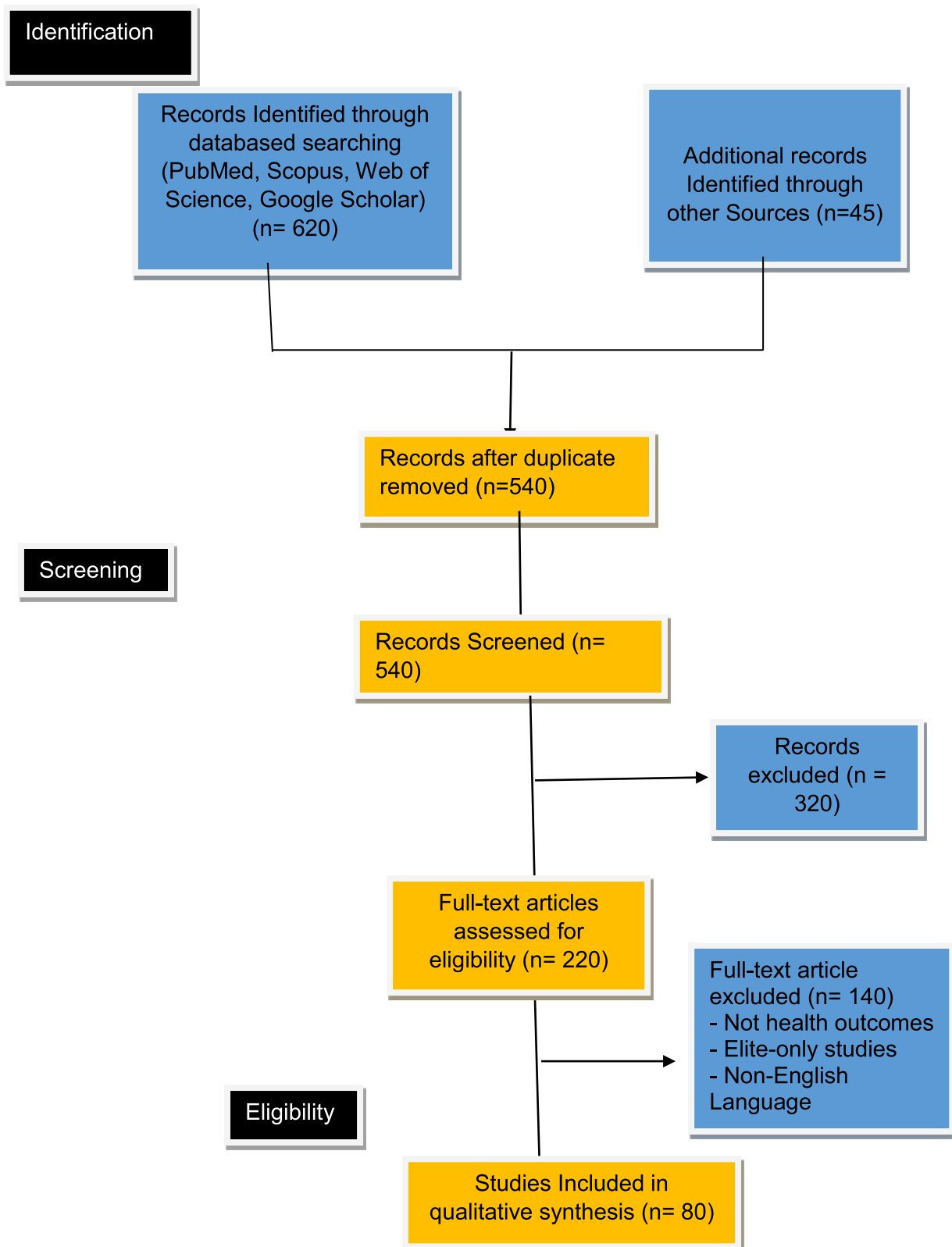
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APPENDIX

Table 1: Summary of Key Empirical Studies Examining Sports Participation and Well-Being

Author	Year	Country	Sample	Study Design	Key Findings
Warburton et al.	2006	Canada	Adults	Review	Physical activity reduces chronic disease risk
Eime et al.	2013	Australia	Youth	Systematic review	Sport improves psychological and social health
Pedersen & Saltin	2015	Denmark	Clinical populations	Review	Exercise effective in preventing 26 chronic diseases
Biddle et al.	2019	UK	Adolescents	Review	Physical activity linked to improved mental health
Schuch et al.	2018	Global	Adults	Meta-analysis	Exercise reduces depression symptoms
Hillman et al.	2008	USA	Children	Experimental	Exercise improves cognition
Guthold et al.	2018	Global	1.9 million	Epidemiological	Physical inactivity remains global concern
Ekelund et al.	2019	Global	Adults	Cohort	Physical activity lowers mortality risk
Bailey et al.	2013	UK	Youth	Review	Sport improves social development
Janssen & LeBlanc	2010	Canada	Children	Review	Physical activity benefits physical health
Bull et al.	2020	Global	Adults	WHO analysis	Physical activity essential for global health
DiFiori et al.	2014	USA	Youth athletes	Review	Sport promotes healthy development
Smith et al.	2020	USA	Adults	Longitudinal	Exercise linked to mental resilience
Chekroud et al.	2018	USA	Adults	Epidemiological	Exercise improves mental health
Reiner et al.	2013	Europe	Adults	Review	Physical activity reduces cardiovascular risk
Stodden et al.	2021	USA	Children	Longitudinal	Motor competence predicts activity participation
Guthold et al.	2022	Global	Adolescents	Global survey	Physical inactivity still high
Ding et al.	2023	Global	Adults	Public health analysis	Physical inactivity linked to economic burden
Rhodes et al.	2022	Canada	Adults	Review	Behavioural factors influence activity participation
Silva et al.	2024	Europe	Adults	Cohort	Sport participation linked to life satisfaction
Martín-Rodríguez et al.	2025	Europe	Young Adults	Physical Activity and Stress Regulation	Sport participation linked to activity-stress

PRISMA Literature Studies Diagram (2013-2025)



This paper is a conceptual and narrative review based on the synthesis of existing peer-reviewed literature in the fields of sports science, psychology, and public health. As such, it did not involve the collection of primary data, experimentation, or direct interaction with human participants. Therefore, ethical approval from an institutional review board or ethics committee was not required. All sources cited in this manuscript were obtained from publicly accessible academic publications and have been appropriately acknowledged in accordance with the principles of academic integrity and the American Psychological Association (APA) referencing guidelines. The authors declare that this manuscript was prepared in compliance with ethical standards for scholarly research and publication. The discussion of mental and physical well-being was conducted with sensitivity and respect for individuals and populations affected by mental health challenges. The paper avoids stigmatizing language and promotes inclusive, equitable, and evidence-based approaches to sports participation.

# Psychological Predictors of Sports Competition Anxiety among University Athletes in Southeast Nigeria: A Correlational Survey Study

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## Abstract

*This study investigated predictors of sports competition anxiety among university athletes in Southeast, Nigeria. Two specific objectives, 2 corresponding research questions and two null hypotheses guided the study. The correlational survey research design was adopted for the study. The population for this study consisted of 336 athletes that represented various universities in Southeast Nigeria in the last NUGA finals hosted by University of Lagos in 2022. All the population was used, hence there was no sampling. The instrument for data collection was a structured questionnaire named Psychological Predictors of Sports Competition Anxiety Questionnaire (PPSCAQ). Frequency counts and percentages were used to answer the research questions, while multiple regression was used to test the hypotheses at 0.05 level of significance. The results of the study showed that overall, 36.9 per cent of the athletes reported moderate level of sports competition anxiety, 33.9 per cent reported low anxiety while 29.2 per cent reported high competition anxiety. Almost half of the athletes reported low level of social support. The findings of the study also showed that social support ( $p=.000$ ), self-efficacy ( $p=.000$ ) are significant predictor of sports competition anxiety among university athletes in Southeast, Nigeria. The study was recommended among others that universities should introduce structured sports anxiety-management programmes such as relaxation training, mindfulness, mental imagery, and cognitive restructuring to help athletes cope with moderate to high levels of competition anxiety. The study was conducted only among university athletes in South-East Nigeria, hence findings may not be generalizable to athletes in other geopolitical zones or countries where cultural, environmental, or competitive conditions differ significantly.*

**Keywords:** Psychological predictors, Sports competition anxiety, University, Athletes.

## Introduction

Competition anxiety is a topical issue in psychology of sports regarding its influence on sports performance during competition, especially among university athletes. Participation in competitive sports at the university level has increased significantly over the years. It is estimated that 52 million youngsters including university students take part in sports (Iwuagwu et al., 2021) and many of these student-athletes struggle with some form of anxiety disorders. Sports competition can be considered a source of threat to the university athlete as their image is usually associated with their performance. Their performance exposes them to public opinion and judgment, by others. Consequently, the increase in sports competitive demands placed on these university student-athletes, anxiety has become a more significant concern. Thus, anxiety seems to be a common diagnosis among young student-athletes (Patterson-Brown, 2021).

Anxiety as a concept has been defined by various authors. Stegall (2016) defined anxiety as an unpleasant psychological state in reaction to perceived stress concerning the performance of a task under pressure. In other words, it places one under pressure for results or achievement, which in this case has to do with performance in sports. In another conceptualization, Ford et al. (2017) defined anxiety as a state of waiting which distresses and bothers the person about the future, an excitement state mixed with feeling of insecurity. In this case the individual is worried because his/her performance may influence what the future holds for him/her. Also, Permadi and Nurwianti (2018) conceptualized

anxiety as a disruption in thoughts (unrealistic thoughts, unpleasant thoughts) and emotional reactions (passion, tension), when faced with competitive situations appearing difficult. It is interpreted in two ways, namely anxiety felt by athletes at a certain time, for example before the match (state anxiety), or anxiety felt because athletes are classified as anxious (trait anxiety). In the context of this study, the researcher adopts the definition of anxiety by Permadi and Nurwianti (2018). That is to say that it is the disruption in thoughts and emotional reactions exhibited by university athletes when faced with perceived difficult competition in sports situations.

Competitive anxiety is a complex psychological phenomenon. In the views of Permadi and Nurwianti (2018) competitive anxiety is the specific negative emotion of an individual as a response to competitive stressors. Competitive anxiety according to Hasanah and Refanthira (2020) is an athlete's negative emotional reaction when his self-esteem is felt threatened because he considers the match to be a formidable challenge, and will always remember his performance abilities, which have an impact on competitive behaviour. From the above one can deduce that competitive anxiety is an athlete's behaviour towards negative emotional reactions, which may include anxiety, worry, uneasiness, tension, and fear when his pride is threatened. As such the athlete may consider the match as something dangerous that may result in defeat. In the context of this study competition anxiety is an emotional state with feeling of worry and nervousness during competition experienced by university athletes.

A range of factors have been adduced to be associated with sports competition anxiety. These factors are referred to as predictors in this study. In this study, predictors are psychological variables that can influence sports competition anxiety among university athletes. These include social support and self-efficacy.

Social support is a multidimensional construct known as emotional and practical assistance underpinning good social relations. According to Mayo et al. (2012) Social support refers to an individual's belief that help is available from other people in different situations. Social support may enable sports competition uptake and maintenance through encouragement, resources, and companionship. Oliveira et al. (2014) stated that the cognitive and emotional dimensions of social support are related to the participation of girls in physical activity. Social support is more important for adolescents due to the prevention of various risks and the removal of constraints to their goals (Traş & Arslan, 2013).

Self-efficacy plays major role in competitive sports. Self-efficacy refers to individual's belief in his/her ability to perform particular behaviors for gaining desired outcomes (Bandura, 1997). Self-efficacy in sports is defined as the athlete's belief in the ability to perform a successful operation to achieve a specific outcome in athletic performance (Alves et al., 2021). Self-efficacy (SE) plays a key role in terms of understanding the dynamics and performance of sport teams, in that it influences athletes' decision-making, motivation, sport engagement, as well as collective performance and the way in which they will deal with sport failures.

Socio-demographic factors could be implicated in sports competition anxiety. Athlete-specific factors such age and gender may precipitate or exacerbate sports competition anxiety. A recent meta-analysis found that female gender, younger age, and lower athletic experience were associated with higher competitive anxiety in athletes (Rocha & Osório FdeL, 2018). Also, the variables gender and age were not independent predictors of the state anxiety scores among student-athletes (Patterson-Brown, 2021); while a linear predictable relationship was found between the demographic factors gender, age, and the trait anxiety score among student athletes. Also, age of the student-athletes was independently related to the trait anxiety scores among student-athletes.

The word university has been variously defined. Collins (2023) defined university as an institution of higher education having authority to award bachelor's and higher degrees, usually having research

facilities. Justin (2021) conceptualized an athlete is a person who competes in one or more sports that involve physical strength, speed or endurance.

University athletes experience a lot of stress and anxiety more than other students generally because of the added workload of engaging in training and representing the university during sports competitions. According to Hasni et al. (2021) student-athletes (university athletes inclusive), are known to come across specific stress factors that are not often encountered by the general student population. They could also be at a greater risk of anxiety and depression. It is important to note that as a result of the requests and expectations placed upon student-athletes, there is a great level of anxiety that exists. This study aims to explore the competitive anxiety among university student-athletes.

### **Statement of the Problem**

Participation in competitive sports is expected to provide athletes with enriching physical, psychological, and social benefits. Ideally, university athletes should experience performance optimization, improved self-esteem, enhanced skill development, injury prevention and recovery, and overall psychological well-being. The university sports system through programmes such as SEUGA and NUGA serves as a developmental platform for nurturing young talents, grooming future national representatives, and promoting positive mental health practices. In an ideal context, athletes should possess adequate psychological resources such as social support and self-efficacy that enable them to manage competitive pressure effectively and maintain stable mental health.

However, in actual practice, participation in competitive sports often elicits varying degrees of anxiety, fear, and psychological distress that negatively affect performance. Evidence shows that high levels of competition anxiety are strongly associated with poor sport performance, impaired concentration, diminished confidence, and increased risk of injury. In Southeast Nigeria, university athletes have consistently shown lower performance in competitive events such as SEUGA and NUGA when compared to their counterparts from other regions. Reports indicate that these poor outcomes may be influenced by a combination of psychological, physiological, and environmental factors.

Although several studies have explored competition anxiety among university athletes globally and within Nigeria, there remains limited empirical evidence on the specific psychological predictors such as social support and self-efficacy that influence sports competition anxiety among university athletes in Southeast Nigeria. This study therefore investigated the predictors of sports competition anxiety among university athletes in Southeast Nigeria.

### **Purpose of the Study**

The purpose of this study was to investigate the predictors of sports competition anxiety among university athletes in Southeast, Nigeria. Specifically, the study sought to determine the:

1. university athletes' level of sports competition anxiety in Southeast, Nigeria;
2. university athletes' level of sports competition anxiety in Southeast Nigeria, based on demographic variables of gender and age;
- 3.

### **Research Questions**

The following research questions were formulated to guide the study:

1. What are the university athletes' level of sports competition anxiety in Southeast, Nigeria?
2. What are the university athletes' level of sports competition anxiety in Southeast, Nigeria based on demographic variables of gender and age?
- 3.

### **Hypotheses**

The following null hypotheses were formulated and tested at 0.05 level of significance:

1. Social support is not a significant predictor of Sports competition anxiety among university athletes in Southeast, Nigeria.
2. Self-Efficacy is not a significant predictor of Sports competition anxiety among university athletes in Southeast, Nigeria.

**Methods**

The study adopted a correlational research design. The population for this study consisted of 336 athletes that represented various universities in Southeast Nigeria in the last NUGA finals hosted by University of Lagos in 2022. All the population was used, hence there was no sampling. The instrument for data collection was a structured questionnaire titled Psychological Predictors of Sports Competition Anxiety Questionnaire (PPSCAQ). The instrument was validated by five experts from the Department of Human Kinetics and Health Education, Faculty of Education, University of Nigeria, Nsukka. Frequency counts and percentages were used to answer the research questions, while multiple regression was used to test the hypotheses at 0.05 level of significance.

**Results**

**Research question one.**

What are the university athletes' level of sports competition anxiety in Southeast, Nigeria?

Results of this research question are presented in Table 1 below:

**Table 1: University athletes' level of sports competition anxiety (n = 336)**

Level of Anxiety	f	%
Low Anxiety	114	33.9
Moderate Anxiety	124	36.9
High Anxiety	98	29.2
<b>Total</b>	<b>336</b>	<b>100</b>

Key:

Low anxiety: Mean score  $\leq$  1.80

Moderate anxiety: Mean score = 1.81-2.40

High anxiety: Mean score  $\geq$  2.41

Results in Table 1 show that 98 (29.2 %) of university athletes in Southeast Nigeria has high level of sports competition anxiety. The results also indicated that most of the university athletes 124 (36.9 %) has moderate level of sports competition anxiety. However, 114 (33.9 %) has low anxiety.

**Research question two.**

What are the university athletes' level of sports competition anxiety in Southeast, Nigeria, based on demographic variables of gender and age? Results of this research question are presented in Table 2 below:

**Table 2: University athletes' level of sports competition anxiety based on gender and age**

Key:

Level of Anxiety	Gender				Age					
	Male		Female		16-18 yrs		19-21 yrs		22 yrs+	
	f	%	f	%	f	%	f	%	f	%
Low Anxiety	59	39.5	55	29.5	17	38.6	53	30.3	44	37.6
Moderate Anxiety	55	37.2	69	36.7	18	40.9	64	36.6	42	35.9
High Anxiety	34	23.0	64	34.0	9	20.5	58	33.1	31	26.5
<b>Total</b>	<b>148</b>	<b>100</b>	<b>185</b>	<b>100</b>	<b>44</b>	<b>100</b>	<b>175</b>	<b>100</b>	<b>117</b>	<b>100</b>

Low Anxiety: Mean score  $\leq$  1.80

Moderate anxiety: Mean score = 1.81-2.40

High anxiety: Mean score  $\geq$  2.41

Results in Table 2 show that 59 (39.9 %) of male university athletes has low level of sports competition anxiety. Meanwhile, 34 (23.0 %) and 55 (37.2 %) reported high and moderate levels of sports competition anxiety respectively. Table 2 also reveal that 64 (34.0 %) and 69 (36.7 %) of female university athletes in Southeast Nigeria has high and moderate levels of sports competition anxiety.

Table 2 also show that 20.5 per cent and 40.9 per cent of university athletes aged 16 - 18 years has high and moderate levels of sports competition anxiety. Also, 36.6 per cent and 33.1 per cent of university athletes in Southeast Nigeria aged 19 - 21 years, has moderate and high level of sports competition anxiety. Furthermore, 26.5 per cent and 35.9 per cent of the athletes aged 22 years and above reported high and moderate level of sports competition anxiety.

**Hypotheses one.**

Social support is not a significant predictor of Sports competition anxiety among university athletes in Southeast, Nigeria. Data testing the hypothesis is contained in Table 13.

**Table 3: Summary of Regression showing social support as predictor of sports competition anxiety among university athletes in South East Nigeria**

Model	R	R <sup>2</sup>	Adj.R <sup>2</sup>	F	β	t	95% C.I		
							P	LB	UB
(Constant)	.12	.01	.00	.987	-----	20.48	.00	2.01	2.44
Emotional Suppc					.19	1.12	.26	-.08	.29
Esteem support					.13	.66	.51	-.14	.28
Information support					.07	.37	.70	-.18	.26
Tangible support					.00	.00	.99	-.28	.28

Interpretations:

R = Correlation coefficient value  
 R<sup>2</sup> = Coefficient of determination  
 Adj.R<sup>2</sup> = Adjusted R square  
 F = f-ratio value  
 β = Standardized beta coefficients  
 \*\*Significant at p ≤ 0.05

t = t-test values  
 P = p- value  
 C. I = Confidence interval  
 Lower boundary  
 Upper boundary

Result in Table 3 show that the joint relationship between the predictor variables (emotional support, esteem support, information support, tangible support and the overall social support) with sports competition anxiety among university athletes was significant (F = .987; R = .121; R<sup>2</sup> = .015; Adjusted R<sup>2</sup> = .000; t = 20.487; p = .000). Also, about 1.5 per cent of the variance in sports competition anxiety is accounted for by the predicting variables. The table further shows the relative contributions of each of the predictor variables on sports competition anxiety. With regards to the most potent contributions, the table shows that emotional support (β = .192; t = 1.122; p = .263) was the highest, while esteem support (β = .134; t = .660; p = .510), information support ((β = .077; t = .377; p = .706), and tangible support (β = .000; t = .004; p = .997) had less contributions. Since the p = values for emotional, esteem, information and tangible supports are greater than 0.05 level of significance, they are not significant predictors of sports competition anxiety among university athletes in South East Nigeria. Furthermore, since the p - value for the entire model is less than 0.05 level of significance, the null hypothesis was rejected.

**Hypothesis two**

Self-efficacy is not a significant predictor of sports competition anxiety among university athletes in Southeast, Nigeria. Data testing the hypothesis is contained in Table 14.

**Table 4: Summary of Regression showing Self-Efficacy as predictor of sports competition anxiety among university athletes in South East Nigeria**

Model	R	R <sup>2</sup>	Adj.R	F	B	t	95% C.I		
							P	LB	UB
(Constant)	.368	.136	.123	10.369	---	15.947	.000	2.63	3.37
Sport self efficacy					-.475	-3.007	.003	-.69	-.14
Psychological efficacy					-.262	-1.718	.087	-.52	.03
Professional thought efficacy					.126	.813	.417	-.41	.17
Personality Efficacy					-.162	-1.417	.157	-.38	.06

**Interpretations:**

R = Correlation coefficient value  
 R<sup>2</sup> = Coefficient of determination  
 Adj.R<sup>2</sup> = Adjusted R square  
 F = f-ratio value  
 β = Standardized beta coefficients  
 \*\*Significant at p ≤ 0.05

t = t-test values  
 P = p- value  
 C. I = Confidence interval  
 Lower boundary  
 Upper boundary

Table 4 show that the joint relationship between the predictor variables (sports self-efficacy, psychological efficacy, professional thought efficacy, and personality efficacy) with sports competition anxiety among university athletes was significant (F = 10.369; R = .368; R<sup>2</sup> = .136; Adjusted R<sup>2</sup> = .123; t = 15.947; p = .000). Also, about 1.4 per cent of the variance in sports competition anxiety is accounted for by the predicting variables. The table further shows the contributions of each of the predictor variables on sports competition anxiety. With regards to their contributions, the table shows that sports self-efficacy (β = -.475; t = -3.007; p = .003), psychological efficacy (β = -.262; t = -1.718; p = .087) and personality efficacy (β = -.162; t = -1.417; p = .157) was the highest, while professional thought efficacy (β = .126; t = .813; p = .417), had less contribution. Since the p = values for psychological efficacy, personality efficacy and professional thought efficacy are greater than 0.05 level of significance, they are not significant predictors of sports competition anxiety among university athletes in Southeast Nigeria. While since the p = value of sports self-efficacy is less than 0.05 level of significance, it is a significant predictor of sports competition anxiety. Furthermore, since the p - value for the entire model is less than 0.05 level of significance, the null hypothesis was rejected.

**Discussion**

Findings in Table 1 showed that 36.9 per cent and 29. 2 per cent of the university athletes reported moderate and high levels of sports competition anxiety. This report rate sums to around 66 per cent of the university athletes experiencing notable competitive anxiety. Though on the high side, may not be unusual in a developing country like Nigeria where stress levels tend to be higher with less available psychological support. This finding is not surprising but expected. This is because most university athletes are still young and mostly inexperienced. Moreover, research in sports psychology repeatedly show that 20–45 per cent of competitive athletes report moderate to high levels of anxiety before or during sports competition. This finding is in line with Iwuagwu et al. (2021) who reported a Mean Sport Competition Anxiety Test score of 20.79 ± 3.776, which they interpreted as an average anxiety level, among secondary school students. Also, Kruger (2025) in a study among university

student-athletes in South African, reported that 15 per cent of athletes had extremely severe anxiety, 6.5 per cent had severe anxiety, and 23.5 per cent had moderate anxiety.

Findings in Table 2 indicated that 34 per cent of female university athletes reported high levels of sports competition anxiety, while 23 per cent of their male counterparts reported same. This finding is not surprising because gender difference is well-established in sport psychology. Female athletes consistently report higher levels of sports competition anxiety than male athletes in many empirical studies, including African and Nigerian populations. For example, Correia and Rosado (2019) found that among 601 Portuguese athletes, female participants exhibited significantly greater general sports anxiety than males.

Hypothesis one revealed that social support is a significant predictor of sports competition anxiety among university athletes in Southeast, Nigeria. The role of social support in promoting vitality among student-athletes has been highlighted in recent empirical work. Findings by Adelusi and Oguntuase (2025) suggest that, in a Nigerian university context, social support does not merely buffer stress, it actively contributes to athletes' energy, resilience, and life force. They reported that examined Nigerian student-athletes and found that social support, significantly predicts subjective vitality among Nigerian student-athletes.

Hypothesis two revealed that self-efficacy is a significant predictor of sports competition anxiety among university athletes in Southeast Nigeria. This finding aligns with both theoretical expectations and prior empirical research. Theoretically, the social cognitive theory by Bandura (1997) posits that self-efficacy influences how individuals perceive and cope with challenges. Empirically, this study agrees with Oladele and Akintoye (2021) among collegiate athletes in Nigeria, similarly found that higher self-efficacy predicts lower sports-related anxiety.

### **Recommendations**

Based on the findings of the study, the following recommendations are made.

1. Universities should introduce structured sports anxiety-management programmes such as relaxation training, mindfulness, mental imagery, and cognitive restructuring to help athletes cope with moderate to high levels of competition anxiety.
2. Universities should strengthen social support systems for athletes by creating peer-support groups, improving coach-athlete communication, and ensuring athletes receive adequate emotional, esteem, informational, and tangible support.

### **Limitation of the Study**

1. The study was conducted only among university athletes in South-East Nigeria. Therefore, the findings may not be generalizable to athletes in other geopolitical zones or countries where cultural, environmental, or competitive conditions differ significantly.

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## Perceived Knowledge, Attitudes, and Behavioural Intentions Toward Exercise for Managing Menstrual Cramps Among Female University Students in Nigeria: A Cross-Sectional Study

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### Abstract

*Menstrual cramps (dysmenorrhea) are a common gynaecological concern among female university students, often impacting their academic and social activities. Exercise is a recommended non-pharmacological management strategy, yet its adoption may be influenced by students' knowledge, attitudes, and perceived barriers. This study assessed the perceived knowledge, attitudes, and behavioural intentions toward exercise as a management strategy for menstrual cramps among female university students in Lagos State, Nigeria. It also examined the relationship between these factors and the actual use of exercise for cramp relief. A cross-sectional survey was conducted among 220 female undergraduates recruited via convenience sampling from two universities. Data were collected using a structured, self-administered online questionnaire. Statistical analysis involved descriptive statistics, Spearman's rank-order correlation, Mann-Whitney U test, point-biserial correlation, and binary logistic regression, with significance set at  $p < 0.05$ . Participants were predominantly aged 18–20 years (51.4%) and in their first year of study (65.9%). A significant positive correlation was found between perceived knowledge and attitude toward exercise ( $r = .381, p < .001$ ). Students who exercised during their period reported significantly higher perceived effectiveness of exercise than those who did not ( $U = 2935.50, p < .001$ ). Cramp severity was not associated with perceived effectiveness ( $r = .033, p = .645$ ). "Fear that exercise will make cramps worse" was the most significant barrier, independently predicting a 30% reduction in the odds of currently using exercise ( $p = .002$ ). Perceived knowledge and positive attitudes are associated with the use of exercise for menstrual cramp management. Addressing the fear that exercise exacerbates pain is crucial for promoting this strategy among university students.*

**Keywords:** Menstrual cramps, dysmenorrhea, exercise, perceived knowledge, attitude, barriers.

### Introduction

Menstrual health is an essential aspect of women's reproductive well-being, yet it remains insufficiently addressed, particularly among young women in higher institutions. One of the most common menstrual-related conditions is dysmenorrhea, commonly known as menstrual cramps. It is characterized by painful uterine contractions that occur before or during menstruation and may present as either primary (without an identifiable medical cause) or secondary (linked to underlying reproductive conditions). Recent global evidence shows that dysmenorrhea affects a large proportion of menstruating women, with prevalence rates ranging from 50% to as high as 90%, especially among adolescents and university students (Armour et al., 2020; Chen et al., 2022). This highlights its significance as a major public health concern.

Beyond the physical discomfort, menstrual cramps can have far-reaching effects on the daily lives of female students. Many experience difficulty concentrating, reduced participation in academic and social activities, and, in some cases, absenteeism from lectures. Studies conducted in recent years

indicate that dysmenorrhea remains one of the leading causes of short-term academic disruption among female students globally (Iacovides et al., 2021; Schoep et al., 2021). In developing countries such as Nigeria, these challenges are often worsened by limited access to accurate menstrual health information, cultural silence around menstruation, and reliance on self-care practices that may not always be effective (Olorunfemi et al., 2023).

Traditionally, the management of menstrual cramps has relied heavily on pharmacological approaches, particularly the use of non-steroidal anti-inflammatory drugs (NSAIDs). While these medications can be effective, their frequent use raises concerns about possible side effects and long-term health implications. As a result, attention has increasingly shifted toward non-pharmacological strategies that are safer, more sustainable, and easily accessible. Among these, physical exercise has gained considerable recognition as a viable option for managing menstrual pain.

Exercise is believed to relieve menstrual cramps through several physiological and psychological mechanisms. It enhances blood circulation, promotes the release of endorphins (natural pain-relieving hormones), reduces levels of prostaglandins responsible for uterine contractions, and improves overall mood. Recent studies, including systematic reviews and controlled trials published between 2020 and 2025, provide strong evidence that activities such as aerobic exercise, stretching, and yoga can significantly reduce both the intensity and duration of menstrual pain (Gordon et al., 2021; Kannan & Claydon, 2022; Armour et al., 2023). These findings suggest that exercise could serve as a practical and low-cost intervention, particularly within university environments where young adults can easily incorporate physical activity into their routines.

Perceived knowledge refers to how much individuals believe they understand a particular issue—in this case, the role of exercise in managing menstrual cramps. Evidence suggests that many young women have limited awareness of non-drug approaches to pain management, which may explain the low adoption of exercise as a coping strategy (Alharbi et al., 2021; Okafor & Adebayo, 2024). In many cases, this lack of knowledge is linked to gaps in health education and insufficient dissemination of evidence-based information within school settings. Attitudes toward exercise during menstruation also significantly influence behaviour. Some female students hold positive views and recognize the benefits of physical activity, while others believe that exercising during menstruation may worsen pain or pose health risks. These misconceptions, often shaped by cultural beliefs and social norms, can discourage participation in physical activity during menstrual periods (Burnett & Lemyre, 2021; Patel et al., 2023). In societies where menstruation is still surrounded by stigma or limited discussion, negative attitudes may be further reinforced.

In Nigeria, existing research on menstrual health has largely focused on prevalence, hygiene practices, and medication use, with relatively little attention given to exercise as a management strategy. Recent studies conducted between 2022 and 2025 indicate that dysmenorrhea is highly prevalent among Nigerian female undergraduates; however, only a small proportion actively engage in exercise for pain relief (Akinola et al., 2023; Eze et al., 2024). This suggests a clear gap between awareness of menstrual pain and the adoption of effective, non-pharmacological coping strategies. Furthermore, the increasing trend toward sedentary lifestyles among university students adds another layer of concern. With growing academic demands and increased screen time, many students engage in minimal physical activity, which may further worsen menstrual symptoms. Encouraging regular exercise not only helps in managing dysmenorrhea but also contributes to overall physical and mental health, aligning with global health recommendations that emphasize lifestyle-based approaches to well-being (World Health Organization, 2022).

Given these considerations, there is a clear need for research that examines the interplay between perceived knowledge, attitudes, and behavioural intentions toward exercise for managing menstrual cramps, particularly within the Nigerian university context. A cross-sectional study design provides an appropriate means of assessing these variables and identifying patterns that can inform future interventions. Therefore, this study seeks to examine the perceived knowledge, attitudes, and behavioural intentions toward exercise for managing menstrual cramps among female university

students in Nigeria. The findings are expected to provide valuable insights that can guide health education programs, inform policy decisions, and promote the integration of exercise into menstrual health management practices.

### **Hypotheses**

The following null hypotheses were tested in this study:

1. There is no significant relationship between perceived knowledge about exercise for menstrual cramps and attitude toward using exercise as a management strategy.
2. There is no significant difference in perceived effectiveness of exercise for menstrual cramps between those who regularly exercise during their period and those who do not.
3. There is no significant association between the severity of menstrual cramps and the likelihood of using exercise as a management strategy.
4. There is no significant relationship between identified barriers to exercising during menstruation and actual use of exercise for cramp relief.

### **Methods**

A cross-sectional survey design was used in this study. This design was suitable because it enabled the researchers to collect data at one point in time to determine the correlations between perceived knowledge, attitudes, and barriers, and the application of exercise as a management tool of menstrual cramps in menstrual cramps management among female university students.

#### **Population**

The study population included university students, specifically female undergraduates at universities in Lagos State, Nigeria.

#### **Sample and Sampling Method**

The number of female university students who participated in the study was 220. A convenience sampling method was used to recruit the participants. Two institutions (Lagos State University of Education,  $n = 212$ , 96.4% and University of Lagos,  $n = 8$ , 3.6% were used to draw the sample. It used students of any undergraduate level of study (100 Level -400 Level).

#### **Research Instrument**

The researchers used a structured, self-administered questionnaire to collect the data, as it was developed by the researchers relying on the aims of the study and reading the literature on the topic. The questionnaire had seven sections:

Section A covers demographics and Menstrual History (age, institution, year of study, age at menarche, cycle regularity, bleeding duration, severity of cramps, cramps duration, related symptoms, current coping mechanisms). Section B was on Exercise Habits (frequency, type, duration of exercise, exercise during menstruation). Section C covers Perceived Knowledge about exercise for cramps (four items on a 5-point scale ranging from 1 = Not at all knowledgeable to 5 = Extremely knowledgeable). Section D covers Perception of cramps related to exercise, beliefs, feelings, and intentions (eight items on a 5-point Likert scale). One of the items (Exercise makes menstrual cramps worse) was inverted to analyse it. Section E covers Behaviour and Experience with exercise in relation to cramps. Section F was on Interferences with exercising due to menstruation (seven items rated on a 5-point scale, 1 = Not a barrier at all to 5 = A major barrier). Section G cover Sources of information regarding Management of Menstrual Cramps.

#### **Procedure for Data Collection**

The questionnaire was created through Google Forms, and the link was shared electronically with the potential participants through the student platforms of the university, which included class WhatsApp groups and email lists. On the first page of the online questionnaire, there was an informed consent statement, which stated the purpose of the study, anonymity and confidentiality, and that participation was voluntary. Students who passed through the next page could only complete the survey on condition that their consent was obtained.

**Procedure for Data Analysis**

Exporting of data into IBM SPSS Statistics (Version 26) was done to clean and analyse data. The analysis was done in a number of steps. Raw data were identified to be complete and consistent. Categorical questions (e.g. Yes, regularly, moderate, etc.) were converted into numerical values to be analysed. The mean of the four perceived items of knowledge was calculated as the composite knowledge score. The mean of the eight attitude items was calculated to give a composite attitude score, which included a reverse-scored item. To describe the sample, frequencies and percentages were obtained for all variables of the socio-demographic and menstrual history. For hypothesis 1, the relationship between the composite knowledge score and the composite attitude score was analysed by hypothesising Spearman's rank-order correlation. The Mann-Whitney U test was used to test Hypothesis 2, which compares the perceived effectiveness of exercise when the participants continued exercising during their period (Always or Sometimes) and those who were not exercising (Never). The rank-order correlation was employed to test Hypothesis 3, which evaluated the relationship among the perceived effectiveness of exercise on cramps with self-reported cramp severity (Mild=1, Moderate=2, Severe=3). The statistical significance level was set at p less than 0.05.

**Results**

**Socio-Demographic and Menstrual Characteristics of Participants**

A total of 220 female university students participated in the study. The socio-demographic and menstrual characteristics of the sample are presented in Table 1.

**Table 1: Socio-Demographic and Menstrual Characteristics of Participants (N = 220)**

Characteristic	Category	Frequency (n	Percentage (%)
Age (years)	Below 18	26	11.8
	18 – 20	113	51.4
	21 – 23	61	27.7
	24 and above	20	9.1
Institution	Lagos State University of Education	212	96.4
	University of Lagos	8	3.6
Year of Study	100 Level	145	65.9
	200 Level	17	7.7
	300 Level	44	20
	400 Level	14	6.4
Age at Menarche (years)	Below 10	5	2.3
	10 – 12	69	31.4
	13 – 15	106	48.2
	Above 15	40	18.2
Menstrual Cycle Regularity	Yes	152	69.1
	No	45	20.5
	Not sure	23	10.5
Duration of Bleeding	1 – 3 days	60	27.3
	4 – 5 days	134	60.9
	More than 5 days	26	11.8

**Hypothesis One: Relationship between Perceived Knowledge and Attitude**

A Spearman's rank-order correlation was conducted to determine the relationship between participants' perceived knowledge about using exercise for menstrual cramps and their attitude toward this management strategy. The results are presented in Table 2.

**Table 2: Spearman's Rho Correlation between Perceived Knowledge and Attitude (N = 220)**

Variable	Perceived Knowledge Score	Attitude Score
<b>Perceived Knowledge Score</b>		
Correlation Coefficient	1.000	.381
Sig. (2-tailed)	.	<.001
<b>Attitude Score</b>		
Correlation Coefficient	.381	1.000
Sig. (2-tailed)	<.001	.

Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 2, there was a moderate, positive, and statistically significant correlation between perceived knowledge and attitude ( $r = .381, p < .001$ ). Therefore, the null hypothesis ( $H_0$ ) is rejected. This indicates that there is a significant relationship between perceived knowledge about exercise for menstrual cramps and attitude toward using exercise as a management strategy.

**Hypothesis Two: Difference in Perceived Effectiveness based on Exercise During the Period**

A Mann-Whitney U test was conducted to compare the perceived effectiveness of exercise for menstrual cramps between participants who continued exercising during their period (Group 1,  $n = 128$ ) and those who did not (Group 2,  $n = 92$ ). The mean ranks and test statistics are presented in Tables 3 and 4.

**Table 3: Mean Ranks for Perceived Effectiveness by Exercise- During-Period Group**

Exercise During Period Group	n	Mean Rank	Sum of Ranks
Yes (Always/Sometimes)	128	133.57	17096.50
No (Never)	92	78.41	7213.50

**Table 4: Mann-Whitney U Test Statistics for Perceived Effectiveness by Group**

	Perceived Effectiveness
Mann-Whitney U	2935.500
Wilcoxon W	7213.500
Z	-6.576
Asymp. Sig. (2-tailed)	<.001

The results of the Mann-Whitney U test (Table 4) indicate a statistically significant difference in perceived effectiveness between the two groups ( $U = 2935.50, p < .001$ ). Participants who exercised during their period had a significantly higher mean rank (133.57) compared to those who did not (78.41). Therefore, the null hypothesis ( $H_0$ ) is rejected. This suggests that students who continue to exercise during menstruation perceive exercise to be more effective for managing their cramps than those who do not.

**Hypothesis Three: Association between Cramp Severity and Perceived Effectiveness of Exercise**

A Spearman's rank-order correlation was conducted to examine the relationship between the severity of menstrual cramps and the perceived effectiveness of exercise. Participants who reported having "No cramps" were excluded from this analysis ( n = 24), resulting in a sample of 196. The results are presented in Table 5.

**Table 5: Spearman's Rho Correlation between Cramp Severity and Perceived Effectiveness (n = 196)**

Variable	Cramp Severity	Perceived Effectiveness
<b>Cramp Severity</b>		
Correlation Coefficient	1.000	-.033
Sig. (2-tailed)	.	.645
<b>Perceived Effectiveness</b>		
Correlation Coefficient	-.033	1.000
Sig. (2-tailed)	.645	.

As shown in Table 5, there was a very weak, negative, and non-significant correlation between cramp severity and the perceived effectiveness of exercise (r = -.033, p = .645). Therefore, the null hypothesis (H) is accepted. This indicates that the perceived effectiveness of exercise for managing menstrual cramps does not vary significantly with the self-reported severity of those cramps.

**Hypothesis Four: Relationship between Barriers and Actual Use of Exercise**

The relationship between seven identified barriers and the actual use of exercise for cramp relief was analysed in two ways. First, point-biserial correlations were calculated to examine bivariate relationships. Second, a binary logistic regression was performed to assess the combined predictive power of all barriers. The outcome variable was a binary indicator of current exercise use (1 = Uses exercise, 0 = Does not use).

**Point-Biserial Correlations**

**Table 6: Point-Biserial Correlations between Barriers and Current Use of Exercise (N = 220)**

Barrier	Correlation with Exercise Use ( r )	p-value
Lack of motivation during my period.	-.051	.450
<b>Feeling too fatigued or low on energy during my period.</b>	<b>-.166</b>	<b>.014</b>
<b>Fear that exercise will make my cramps worse.</b>	<b>-.260</b>	<b>&lt;.001</b>
Lack of time	-.004	.950
Lack of access to facilities or a suitable space	-.050	.459
Lack of knowledge about what exercises to do...	-.131	.052
Embarrassment or self-consciousness about exercising...	-.122	.070

Note. pb = point-biserial correlation coefficient. p < .05, p < .01.

As shown in Table 6, at the bivariate level, two barriers were significantly and negatively correlated with the actual use of exercise:

"Feeling too fatigued or low on energy during my period" (r = -.166, p = .014)

"Fear that exercise will make my cramps worse" (r = -.260, p < .001)

This indicates that higher levels of these barriers are associated with a lower likelihood of currently using exercise for cramp relief. The remaining five barriers were not significantly correlated with exercise use.

**Binary Logistic Regression**

A binary logistic regression was conducted with all seven barriers entered as predictors and current exercise use as the outcome. The full model containing all predictors was statistically significant,  $\chi^2(7, N = 220) = 19.46, p = .007$ , indicating that the model was able to distinguish between participants who used exercise and those who did not. The model as a whole explained between 8.5% (Cox and Snell  $R^2$ ) and 11.3% (Nagelkerke  $R^2$ ) of the variance in exercise use, and correctly classified 61.4% of cases. The results for each predictor are presented in Table 7.

**Table 7: Binary Logistic Regression Analysis of Barriers as Predictors of Current Exercise Use (N = 220)**

Predictor (Barrier)	B	S.I	Wal	d	P	Odds (Exp(B))	Rati	95% C.I. for Odds Ratio
Lack of motivation	.149	.13	1.27	1	.25	1.160		[0.90, 1.50]
Feeling fatigued/low energy	-.151	.11	1.78	1	.18	0.860		[0.69, 1.07]
<b>Fear exercise will make cramps worse</b>	<b>-.355</b>	<b>.11</b>	<b>9.16</b>	<b>1</b>	<b>.00</b>	<b>0.701</b>		<b>[0.56, 0.88]</b>
Lack of time	.111	.12	0.82	1	.36	1.118		[0.88, 1.42]
Lack of access to facilities	.019	.12	0.02	1	.87	1.019		[0.80, 1.30]
Lack of knowledge	-.095	.12	0.62	1	.42	0.910		[0.72, 1.15]
Embarrassment/self-consciousness	-.015	.12	0.01	1	.90	0.985		[0.77, 1.26]
<b>Constant</b>	<b>.954</b>	<b>.44</b>	<b>4.62</b>	<b>1</b>	<b>.03</b>	<b>2.597</b>		

Note. CI = Confidence Interval.

In the multivariate logistic regression model (Table 7), only "Fear that exercise will make my cramps worse" emerged as a significant independent predictor of current exercise use (B = -0.36, Wald = 9.17, p = .002). The odds ratio of 0.701 indicates that for every one-unit increase in this barrier (on the 5-point scale), the odds of a participant currently using exercise for cramps decreased by approximately 30%, holding all other barriers constant. No other barrier made a statistically significant unique contribution to the model. Based on these results, the null hypothesis ( $H_0$ ) is partially rejected, as a significant relationship was found for the "fear" barrier both bivariate and multivariate.

**Discussion**

The finding of this study established a positive but moderate relationship between perceived knowledge and attitude ( $r_s = .381, p < .001$ ) and, therefore, rejected  $H_{01}$ . This implies that the more information students have about exercise as a managerial strategy, the more positive their attitude towards the use of this management strategy. This is reinforced by Ghiasi, Keramat, and Mollaahmadi (2018), who revealed that the attitude towards menstruation and its management is largely influenced by the factors of personal knowledge and social learning. Moreover, Morse, Hearn, Holmes, and Kolić (2024) established that insufficient education is a common cause of a negative attitude towards menstruation, which is a pre-determiner of shunning physical activity. The fact that you have confirmed that closing the gap in knowledge is the critical initial step in changing the psychological readiness of students towards non-pharmacological treatment, such as exercise.

The Hypothesis Two finding indicated that the participants who continued exercising during their time felt that the strategy was much more effective than those who did not (U = 2935.50, p < .001). This experiential gap implies that the non-practitioners of the behaviour might not sufficiently recognise its therapeutic value, as found that both aerobic exercise and yoga are effective in lowering the severity of primary dysmenorrhea, but the perceived efficacy is the greatest among those who exercise on a

regular basis. These results are aligned with a systematic review by Millares and Corrales (2021), who report that both aerobic exercise and yoga are effective in reducing the severity of primary dysmenorrhea, but perceived efficacy in this study indicate that, the No group (Mean Rank = 78.41) could be in a loop of avoiding the stressor; in that, since they do not exercise during their time, they do not get the physiological release of beta-endorphins that makes them less sensitive to the pain. Millares and Corrales (2021) reported that exercise is a natural analgesic, and it enhances the pelvic circulation and decreases the levels of prostaglandins. As such, the increased perception of effectiveness of the Yes group can be explained by the fact that they derive the much-needed physical relief, and this supports their positive attitude towards the management strategy.

The results were analysed by finding the non-significant relationship between the severity of cramps and the perceived efficacy of exercise ( $r_s = -.033$ ,  $p = .645$ ), which made it possible to accept the  $H_{03}$ . It means that despite the fact that the student experiences mild or severe cramps, their confidence in the ability of exercise to do so is not going to change significantly (Triwahyuningsih, Rahfiludin, Sulistiyani, & Widjanarko, 2024). This implies that the perception of the pain barrier does not always determine how effective one believes exercise to be; instead, perception is probably controlled by other elements such as self-efficacy or prior exposure. The physiological advantages of exercising (reduced prostaglandins) do not depend on the pain at the baseline, but those students with intense pain might fail to notice the advantages, as Millares and Corrales (2021) observed, as they avoid physical activity due to the severity of their symptoms.

The logistic regression indicated that the only significant independent predictor of exercise use was Fear that exercise will make my cramps worse ( $B = -0.36$ ,  $p = .002$ ), which partially rejected  $H_{04}$ . Also, Ronca et al. (2024) identified a perceptual-performance paradox in which women think their physical performance is worse during the menstrual period, which drives them to avoid even when objective results indicate that their performance (as well as symptom relief) may actually be improved by exercise. The findings of this study support the idea that the major obstacle is a psychological (fear-related) one, not the structural one (time or access).

### **Conclusion and Recommendations**

This paper has evaluated the perceived knowledge, attitude, and behavioural intention with regard to exercise as a management approach to menstrual cramps in a group of 220 female undergraduates. The results showed that there is a positive significant relationship between perceived knowledge and attitude towards exercise in managing cramps and this means that more knowledgeable the student is regarding the strategy, the more the student will be positively inclined towards the strategy. Perceived effectiveness of exercise was significantly greater in students who exercised during their menstrual period than it was in students who did not, which also emphasizes that personal experience is important when forming perceptions. It was discovered that perceived effectiveness did not correlate with the severity of cramps, meaning that the perceived effectiveness of exercise as an intervention management tool is not dependent on pain severity. Of seven barriers discussed, it was found that fear that exercise will cause cramps to become worse is the strongest predictor of the current exercise use and this factor lowers the odds of exercise use by 30% independent of other factors. This mental force was much stronger than structural factors like insufficient time or facilities, which highlights how misconceptions based on fear are the most important factors influencing behaviour.

Universities ought to prepare and execute evidence based educational programmes specifically to combat the fear that exercise increases menstrual cramps. Through these programmes, the actual information concerning the physiological value of exercise during menstruation, such as the effect of exercise on prostaglandin levels and liberation of painkilling endorphins, should be shared. Student support services and health centres need to arrange supervised exercise or workshops wherein students would be allowed to safely exercise during menstruation under supervision in mild to moderate intensity which would then translate abstract knowledge to personal positive experiences. Education regarding non-pharmacological management of menstrual pain such as exercise needs to be incorporated in general health education courses, orientation programmes as well as peer health

educator training to normalise exercising in relation to menstruation. Peer educators can use the provision of testimonies and factual information to dispel existing myths with the help of social networks and use the influence of the network to rework cultural concepts about menstruation and exercise. Future research ought to examine the most agreeable and effective forms, intensity, and duration of exercise in this population and determine the effects of interventions aimed at reducing fear in the variables on the actual exercise adoption rate.

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## Cardiovascular Fitness Profile of Nigerian University Freshmen after a 12-Week Jogging

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### Abstract

*The purpose of this study was to measure the BMI, systolic, and diastolic blood pressure of freshmen at Michael Okpara University of Agriculture in Umudike, Abia State, Nigeria, in the 2024–2025 academic year following a 12-week, 50-minute jogging exercise. Methods: Quasi experimental groups- two pretest post-test experimental groups for comparison were used in this study. Male university freshmen (MUF) and female university freshmen (FUF) are the two experimental groups. A total of 49 of the university freshmen that attended the first research meeting formed the population of this study. The 33 of the freshmen that met the inclusion criteria formed the sample of this study. Volunteered participants recruited were 18- to 24-year-old male and female university freshmen, of which 4 female university freshmen (FUF) were overweight and 3 were obese. Prior to and following the activity, their blood pressure, body mass index, and resting heart rate were measured. Results: In the obese/overweight FUF and MUF, the 12-week jogging intervention significantly reduced weight, BMI, heart rate, systolic blood pressure, and diastolic blood pressure. Conclusions: This study shown that a 12-week jogging intervention may help lower systolic and diastolic blood pressure, change weight and BMI, and lower resting heart rate. As a result, our study suggested that young individuals who are obese improve their physical health by participating in a 50-minute daily jogging and running exercise regimen.*

**Keywords:** University freshmen, Cardiovascular Fitness, jogging, BMI, heart rate, blood pressure.

### Introduction

Unfortunately, in recent trends, the prevalence of non-communicable diseases (NCDs), specifically cardiovascular diseases (CVDs), has increased at a rate never seen before. In sub-Saharan Africa (SSA), cardiovascular disease (CVD) overtook HIV/AIDS, malaria, and other intestinal diseases as the top 10 causes of death between 1990 and 2019 (Minja et al., 2022; Institute of Health and Metric Evaluation, 2020). Over the past ten years, SSA's risk factors for CVD have increased due in large part to rapid urbanisation (Sacco et al., 2016; Teo & Rafiq, 2021). Half of the world's disease burden is caused by four primary cardiovascular risk factors: excessive blood glucose, obesity, hypertension, and tobacco use (Murray et al., 2020). The heart, lungs, and blood vessels' ability to operate is hampered by these variables.

The degree to which the heart, lungs, and muscles cooperate during prolonged exercise is known as cardiovascular fitness. This is a measure of the participant's physical fitness and overall health as well as how well their cardiorespiratory system works (Luo, 2018; Hepler, & Dance-Schissel, 2023). CF include the resting heart rate (RHT), blood pressure (BP). According to Heart Foundation, New Zealand, 2023; American Heart Association, 2021), a normal resting heart rate is defined as a person's heart rate when they are not exercising, which is typically between 60 and 100 beats per minute (American Heart Association, 2021). Long-term activity helps the body's muscles absorb oxygen. Two values make up blood pressure readings: Systolic blood pressure is the pressure experienced during a heartbeat, during which the heart muscle contracts (squeezes) and pumps blood that is rich in oxygen into the blood vessels. The pressure on the blood arteries when the heart muscle relaxes is known as diastolic blood pressure (Institute for Quality and Efficiency in Health Care, 2024). Cardiovascular workouts can enhance cardiovascular fitness (Irwin, 2023). Any action that makes use of aerobic

metabolism is considered cardiovascular exercise. In other words, oxygen plays a significant role in the cellular processes that generate the energy required to maintain the activity. In order to maximise the amount of oxygen in the blood and enable him to use it more effectively, the person's heart rate rises, and his breathing becomes deeper (Diabetes Australia, 2021).

In the West African region, childhood obesity rates are rising, and young adult morbidity rates are rising primarily due to low levels of physical activity. In 2020, the World Health Organization recommends healthy adults partake in an equivalent combination of moderate and vigorous physical activities, or 150 minutes per week of moderate aerobic physical activity or 75 minutes per week of vigorous aerobic physical activity. Females in African communities were more likely than males to not follow recommendations regarding physical activity. The most populous nation in Africa is Nigeria, where there is a reported rise in NCDs linked to physical inactivity (Olayinka, Soyibo, & Atinmo, 2009). The pooled crude prevalence of physically inactive individuals in Nigeria was 52.0% (95% CI: 33.7–70.4) across fifteen studies involving 13,814 adults; the prevalence was higher in women, at 55.8% (95% CI: 20.9%) (Adeloye et al., 2021). The transition from young adulthood to midlife is a critical time to encourage physical activity because of recent trends in physical activity declining with age and associated premature CVD events, even among young adults' population who are non-athletes.

Athletes exhibit healthier outcomes compared to age-matched non-athletes by maintaining high levels of physical activity through high training volumes and intensities (Ganse et al., 2018). It is recommended that obese young adults engage in regular aerobic exercise to enhance their cardiovascular fitness, maximal oxygen consumption, skeletal muscle mass, and body composition (Chiu et al., 2017; Pinckard, Baskin, et al., 2019). Walking, jogging, running, and cycling are examples of aerobic exercise. Decreased blood triglyceride levels during jogging exercise indicate a reduced likelihood of comorbidity conditions linked to the disorders in the cardiovascular fitness of the participants (Odo, Okeke, & Ede, 2022; Odo & Ogu, 2020). Hence, the university freshmen who are non-athletes need self-efficacy in order to perceive jogging as a challenge and necessary and not with fear of injury and as a threat to their health. Albert Bandura's self-efficacy construct refers to confidence in one's abilities to successfully perform a particular behavior (Pekmezi, Jennings, & Marcus, 2018). In the context of our study, if the university freshmen are sure that they can jog 1 mile without any difficulty, then their self-efficacy for the 12-week jogging is high.

Hence, more research is required to determine the significance of jogging as an exercise program for cardiovascular health. For example, little is known about the impact of jogging as an exercise regimen on CVD events in young adults. There are still significant gaps in our knowledge regarding the appropriate duration of jogging exercise programs for young adults. Young adulthood is a crucial time of transition that establishes patterns of physical activity for the remainder of adulthood and may be a crucial window for intervention (Nagata et al., 2022). Physical activity in young adulthood implies a healthier outcome in adulthood. Therefore, improving fitness to do more activities at a productive age is necessary (Soumya, Lohitashwa, & Nadiger, 2022; Subekti, Subekti, & Alzaid, 2022).

There has been a paucity of studies on jogging, as well as university freshmen in Nigerian universities. Meanwhile, Agus & Sari's (2019) study on jogging and university students focused on the population of all students who enrolled in the Sport Fitness course and hemoglobin level. A few other recent studies on young adults and cardiovascular disease were intended to target prevalence and knowledge. Therefore, it is essential to assess the cardiovascular fitness profile of Nigerian university freshmen after a 12-week jogging program.

### **Hypotheses**

1. There would be no significant difference in body mass index, blood pressure, heart rate of the male university freshmen after 12 weeks of jogging.

2. There would be no significant difference in body mass index, blood pressure, heart rate of the female university freshmen after 12 weeks of jogging.

### **Methods**

Quasi-experiment study was used in this study, with two pretest post-test experimental groups and no control were used in the study.

### **Area of the study**

The study took place at Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria, in 2025.

### **Participants**

The researchers invited all the freshmen of the 2024/2025 session of the university to what they called an 'Exercise and Health Awareness' meeting on Saturday, 11th January 2025. Forty-nine (49) freshmen of the university (aged 18–24 years) in the 2024/2025 session were the total population of the university freshmen that attended the research meeting on Saturday, 11th January 2025, for the study. The purpose and importance of the research were well explained, and the researchers' requested volunteers among them. The volunteered participants were assigned into two experimental groups, Male University Freshmen (MUF) and Female University Freshmen (FUF), based on gender.

### **Inclusion criteria and Exclusion Criteria**

The inclusion criteria for this study include the following: must be a university freshman of Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria; no underweight management drug therapy; not taking any hypertensive drugs; no medical advice not to engage in an exercise training programme; without cardiovascular disease, chest pain, under medication, dehydration, physical impairment, and smoking habit, and non-athlete.

The inclusion criteria and the questionnaire were well explained to the volunteers during the second research meeting that was held on 18th January 2025. Out of the total population (49) of this study, 16 participants were excluded from this study; they did not meet the study inclusion criteria, and the remaining 33 were classified into the two experimental groups, MUF and FUF, respectively.

### **Instruments for Data Collection**

Health History and Fitness Questionnaire (HHFQ) that contains 12 items. Part A – Bio and Demographic Data with 4 items (age, gender, name of school, and admission year) and Part B – Health and Fitness History with 7 items (physically inactive, cardiovascular disease, chest pain, diabetes, under medication, dehydration, physical impairment, and smoking habit) were administered to the participants to elicit information that enabled the researchers to select the final participants for this study. Hence, part B of the HHFQ was meant to elicit information for the inclusion and exclusion of the volunteered participants. During our data collection process, we gave participants the consent form. The 33 participants that qualified for this study were measured for pre-exercise BMI, systolic blood pressure, diastolic blood pressure, and resting heart rate. Out of the 33 participants that finally qualified for this study, eighteen (18) MUF groups and fifteen (15) FUF groups (4 overweight and 3 obese) aged 18 to 24 years old were recruited in this study. The participants' pre-exercise systolic blood pressure, diastolic blood pressure, body mass index (BMI), and resting heart rate were evaluated. According to the WHO cut-off recommendation for this population, young adults with a BMI  $\geq 31$  were considered to be obese, those with a BMI of 25-30 were considered overweight, and those with a BMI of 18.9-24.9 were considered normal weight. The baseline characteristics and health history of the participants are shown in Table 1. Each participant provided written informed consent after receiving full information about the study.

**Exercise intervention**

The 12-week jogging exercise programmes started on 22nd February 2025. Pre-exercise assessments were completed prior to participants engaging in any of the jogging exercise interventions. The exercise protocol was performed as described in the literature, with slight modifications. Both groups performed a regular moderate-intensity 50-minute jogging exercise (with 5 minutes warm-up and 5 minutes cool-down), 3 times per week, for 12 successive weeks. From week 5 to week 12 actual training sessions were extended from 30 minutes in week 4 to 50 minutes of no-break jogging exercise, with 5 minutes of warm-up and another 5 minutes for cool-down. All exercise sessions were verified by researchers' direct supervision. The participants were asked to not change their normal activities during the 12-week intervention.

**Characteristics, body composition, and anthropometric measures**

After 12 weeks of jogging, measurements and records of height, weight, BMI, systolic and diastolic blood pressure were made. The measurements of physiological variables and body composition were conducted in compliance with the International Biological Programme guidelines. With no shoes on, the height was measured with a metric measuring tape to the nearest 0.1 cm. Using a digital scale, the body weight in light indoor clothing was determined to the nearest 0.01 kg. The weight (kg) was divided by the height (m) squared to get the BMI.

The resting heart rate, systolic and diastolic blood pressures of the participants at jogging exercise programme were measured twice from the right arm following a minimum of five minutes of rest at post exercise training programme. The automated sphygmomanometer (HEM-7320, Omron, and Kyoto, Japan) was used, and its cuff was placed on the right brachial artery to provide a relative measurement. There was a 2-minute rest period following the initial measurements before the second measurements of the systolic and diastolic blood pressure and resting heart rate were made. Blood pressure measurements at resting heart rate, systolic and diastolic, were calculated using the average of the two assessments. Furthermore, it was communicated to every participant that they were not allowed to alter their usual daily exercise and diet while the study was underway.

**Statistical analysis**

The mean ± standard deviation of the data was displayed. The Kolmogorov-Smirnov test was employed to assess the normality of the continuous random variable distributions. Prior to hypothesis testing, variables with non-normal distributions were transformed. The baseline variables between groups were compared using the independent-sample t-test. The differences in each dependent variable and group before and after the exercise training course were evaluated using a two-way repeated analysis of variance (ANOVA), which was followed by a Bonferroni post hoc comparison analysis. To investigate the differences between MUF and FUF at baseline, an independent t-test was used. The P-values were regarded as statistically significant at 95% confidence interval at alpha value of less than 0.05.

**Results**

**Table1: Pre and Post Jogging Cardiovascular Parameters**

Parameters	Pre-Exercise	Post-Exercise	t-value	P-Value
<b>BMI(kg/m<sup>2</sup>)</b>	24.62	23.64	1.148	0.255
<b>Heart Rate(beat/min)</b>	82.73	76.13	3.911	0.000
<b>SBP(mmHg)</b>	118.203.85	115.50	2.767	0.008
<b>DBP(mmHg)</b>	79.80	77.802.58	2.208	0.032

**Keys**

BMI= body mass index; SBP= systolic blood pressure; DBP= diastolic blood pressure

The table 1 presents a comparative analysis of cardiovascular parameters measured before and after a jogging intervention. The mean BMI decreased slightly from 24.62 kg/m<sup>2</sup> to 23.64 kg/m<sup>2</sup>. However, this change was not statistically significant ( $t = 1.148, p = 0.255$ ), indicating that the jogging intervention did not have a significant impact on BMI within the study period. There was a notable decrease in heart rate from 82.73 beats/min pre-jogging to 76.13 beats/min post-jogging. This change was statistically significant ( $t = 3.911, p = 0.000$ ), suggesting a positive cardiovascular adaptation as a result of jogging. The systolic blood pressure decreased from 118.20 mmHg to 115.50 mmHg, and this reduction was statistically significant ( $t = 2.767, p = 0.008$ ). This implies that regular jogging had a beneficial effect in lowering SBP. Similarly, the diastolic blood pressure reduced from 79.80 mmHg to 77.80 mmHg, with the difference being statistically significant ( $t = 2.208, p = 0.032$ ). This further supports the effectiveness of jogging in improving blood pressure parameters. The findings indicate that regular jogging significantly improves cardiovascular health by lowering heart rate, systolic, and diastolic blood pressures. However, the impact on BMI was not statistically significant, possibly due to the short duration of the intervention or other individual factors influencing weight and body composition.

**Table2: Pre and Post Jogging Cardiovascular Parameters Based on Gender**

Parameters	MUF	FUF	t-value	P-Value
<b>BMI(kg/m2)</b>	23.30	24.97	-1.996	0.051
<b>Heart Rate(beat/min)</b>	77.436.48	81.43	-2.194	0.032
<b>SBP(mmHg)</b>	116.032.99	117.67	-1.608	0.113
<b>DBP(mmHg)</b>	78.20	79.40.45	-1.291	0.202

**Keys**

BMI= body mass index; SBP=systolic blood pressure; DBP=diastolic blood pressure

Table 2 presents a comparative analysis of pre- and post-jogging cardiovascular parameters between male and female participants. The mean BMI for males was 23.30 kg/m<sup>2</sup>, while females had a higher mean of 24.97 kg/m<sup>2</sup>. The  $t$ -value of -1.996 yielded a  $p$ -value of 0.051, which is marginally above the 0.05 threshold. This suggests that the difference in BMI between males and females approached statistical significance but was not statistically significant at the conventional 5% level. Males had a lower mean heart rate (77.43 bpm) compared to females (81.43 bpm). The difference was statistically significant ( $t = -2.194, p = 0.032$ ), indicating a significant gender-based variation in heart rate response to jogging, with females exhibiting a higher average heart rate. The mean SBP for males was 116.03 mmHg, slightly lower than that of females (117.67 mmHg). However, this difference was not statistically significant ( $t = -1.608, p = 0.113$ ), implying no substantial variation in systolic pressure between genders post-jogging. Males recorded a mean DBP of 78.20 mmHg, compared to 79.40 mmHg in females. This difference was also not statistically significant ( $t = -1.291, p = 0.202$ ), suggesting comparable diastolic pressure readings across genders after jogging. Among the cardiovascular parameters assessed, only heart rate showed a statistically significant difference between males and females, with females demonstrating a higher mean rate. Although BMI differences were close to significance, SBP and DBP did not differ significantly across gender. This indicates that gender may influence heart rate response to jogging more prominently than other cardiovascular parameters.

**Discussions**

Our study assessed the Cardiovascular Fitness Profile of a Nigerian University Freshmen after a 12 Week jogging. Chiu, et al., (2023) study demonstrated that by lowering resting heart rate, modifying blood lipid profiles, and causing adipokine changes in obese people, a 12-week walking intervention may help enhance cardiorespiratory fitness and obesity-associated cardio metabolic risk.

In consonance with findings of our study are Yang, and Zainuddin, (2024), Hashemi, (2023), and Suman (2016). Yang, and Zainuddin, (2024) study of the effects of Aerobics Exercise on Body Mass Index (BMI) among 60 obese college students with a BMI  $\geq 28$  were selected and divided into two groups. Each group consisted of 30 students, 15 boys and 15 girls. The experimental group received

aerobic exercise training three times a week for 12 weeks, while the control group received prescribed aerobic training. Data before and after the experiment were recorded. By Implication, aerobic exercise such as jogging reduces body fat, body weight and improves BMI.

Also, the findings of our study aligned with Pepania, (2025) study that aerobic exercise significantly lowers resting heart rate, improves heart function, and reduces systolic and diastolic blood pressure. The findings implies that regular jogging significantly improves cardiovascular health. Though, difference in methodology, our study is in consonance with Leeyio, Katto, Juma, Mkassy, Liwa, Matuja, Byamungu, Ayieko, Bintabara, & Konje, (2025) that aerobic activity significantly reduces blood pressure among adults in Africa. In Leeyio, et al (2025), 6 to 16 weeks, with different aerobic modalities such as brisk walking, dance, and bicycle ergometer. These activities were performed either continuously or at different time intervals (three times per week), lasting between 30 and 60 min. The main findings suggest a significant pooled reduction in systolic blood pressure, with a mean difference (MD) of 5.40 mmHg [95% CI: -9.05 to -1.75], and a modest reduction in diastolic blood pressure, with an MD of 1.90 mmHg [95% CI: -3.81 – 0.01]. Subgroup analysis revealed that interventions lasting for at least 8 weeks produced stronger effects than those implemented for more than 8 weeks.

### **Conclusions**

This study partially illustrated three possible ways that a 12-week jogging intervention could enhance cardiorespiratory fitness and reduce the cardio metabolic risk associated with obesity. At first, the intervention improved the inadequate cardiorespiratory endurance of obese people and reduced their resting heart rates. Second, the intervention effectively increased systolic blood pressure and further improved DBP and SBP in obese patients. Third, as a result of the intervention, participants who were overweight or obese had a drop in both their weight and BMI. Jogging is an example of aerobic activity that lowers blood pressure, heart rate, and BMI. However, compared to overweight and obese individuals, the 12-week jogging intervention had less of an effect on improving cardiorespiratory fitness in the normal-weight group.

### **Recommendations**

Thus, our study recommends young adults who are obese enhance their physical well-being by engaging in a 12-week walking regimen that involves 10,000 steps each day. The study recommends the promotion of regular aerobic exercise in both clinical and public health settings to enhance cardiovascular outcomes.

### **Limitations**

Despite the significance of our findings, a number of limitations might make it more difficult to generalize them. First off, our study's sample size of 33 participants—18 men and 15 women—may not be substantial enough to meet the requirements for generalizing the results. Second, there is no control group in our study. A more thorough comparison of our study's findings between the experimental groups and the control group has not been impacted by any of the control group's uses.

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None.

### **Conflict of interest statement**

The authors report there are no competing interests.

### **Informed consent form**

The consent of the participants was sought by explaining in writing the essence of the study and giving them the opportunity to quit the study if they so desired and how it may assist to more improve cardiovascular health.

### Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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# Salivary Biomarkers and the Real-time Anxiety Cues Intervention Model (RACIM) for Enhancing Performance among University Athletes

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## Abstract

*Advancing university sports for national and global excellence requires a scientific understanding of the psychophysiological processes underlying athletes' pre-event anxiety. Traditional assessment methods in sport psychology often rely on self-report measures that may not provide immediate information for rapid intervention shortly before competition. This study therefore examined salivary biomarkers as predictors of pre-event anxiety among elite university athletes and explored their implications for the development of the Real-Time Anxiety Cues Intervention Model (RACIM), a biomarker-informed framework intended to support timely and individualized anxiety management. Nineteen athletes (10 males and 9 females) drawn from football (n = 8), boxing (n = 5), and judo (n = 6) participated in a repeated-measures predictive research design. Saliva samples were collected eight weeks before the competition to establish baseline levels and one hour before the main event to capture anticipatory anxiety responses. Salivary cortisol and alpha-amylase were studied using standard Enzyme-Linked Immunosorbent Assay (ELISA) procedures. Data were analysed using analysis of variance (ANOVA) and t-tests at the 0.05 significance level. The findings revealed that both biomarkers significantly predicted pre-event anxiety responses among the athletes [ $f(3, 72) = 54.08; p < .05$ ], with differences in the predictive strength of cortisol and salivary alpha-amylase [ $t(36) = 9.67; p < .05$ ]. Significant gender differences [ $f(3, 34) = 32.06; p < .05$ ] and variations across sport types [ $f(5, 32) = 18.39; p < .05$ ]. Drawing from these findings, the study advances the Real-Time Anxiety Cues Intervention Model (RACIM) as a framework for interpreting athletes' anxiety-related behaviours through physiological stress pathways, enabling sport psychologists to implement timely, evidence-informed interventions that enhance mental readiness and performance in university sports. The study recommends the inclusion of certified sport psychologists within teams participating in competitions organized by the Nigerian University Games Association to ensure performance optimization for university athletes for global excellence.*

**Keywords:** Alpha-amylase, Cortisol, Global sports performance, Pre-event anxiety, Real-time intervention model, Salivary Biomarkers

## Introduction

Pre-competition anxiety remains a persistent challenge among university athletes who must navigate complex intersections of academic, social, and athletic demands. Elevated anticipatory anxiety can compromise performance potential on national and international stages by impairing motor coordination, attentional focus, and tactical decision-making, whereas optimal levels of arousal enhance alertness and competitive readiness (Craft et al., 2003; Raglin & Hanin, 2020). Despite these well-documented effects, institutional sport programmes in many universities continue to prioritise physical conditioning and technical preparation over individualised psychological readiness (Weinberg & Gould, 2019). Consequently, university athletes often enter competition without adequate psychophysiological coping mechanisms, leaving them vulnerable to performance-debilitating anxiety. Addressing this gap requires scientific approaches that integrate psychological insight with real-time biological indicators of stress reactivity to optimize athlete preparation and performance.

Traditional tools for assessing pre-competition anxiety, such as self-report questionnaires and post-event interviews, offer valuable but retrospective perspectives, often affected by recall errors, situational bias, and limited temporal precision (Mellalieu et al., 2009). Recent advances in psychophysiology, however, have positioned salivary biomarkers as reliable, non-invasive, and temporally sensitive indicators of stress-related activation patterns. Cortisol and salivary alpha-amylase (sAA) reflect distinct but interconnected physiological pathways corresponding to the cognitive and somatic domains of anxiety (Hellhammer et al., 2009; Nater & Rohleder, 2009; Yamakawa et al., 2018).

Cortisol serves as a critical biomarker in psychophysiological research, representing the activity of the hypothalamic–pituitary–adrenal (HPA) axis, which is primarily responsible for regulating the body's long-term stress response indexing cognitive appraisal and perceived stress (Gatti & De Palo, 2011; Honawon et al., 2025). During pre-competition periods, elevated cortisol levels indicate heightened cognitive appraisal of stress and anticipation of threat, processes closely associated with anxiety and attentional shifts (Rimmele et al., 2007; Filaire et al., 2009). Sustained elevations in cortisol can impair concentration, decision-making, and working memory, thereby undermining optimal performance (van Paridon et al., 2017). Conversely, moderate cortisol activation supports adaptive alertness and energy mobilization, suggesting that its role in anxiety is not inherently detrimental but depends on contextual interpretation and regulation (Kivlighan & Granger, 2006). This duality underscores cortisol's diagnostic significance as a psychobiological indicator of pre-event readiness and stress coping capacity among athletes.

In parallel, salivary alpha-amylase (sAA) reflects the rapid activation of the sympathetic–adrenal–medullary (SAM) system, indexing the body's immediate physiological arousal response to perceived challenge (Nater & Rohleder, 2009; Rohleder et al., 2004). As a marker of sympathetic nervous system activity, sAA levels rise sharply under acute stress or anxiety, mirroring fluctuations in heart rate, respiration, and muscular tension that often accompany pre-competition arousal (Allgrove et al., 2008). Research has shown that sAA offers a dynamic, non-invasive means of tracking athletes' somatic stress responses in real time, complementing cortisol's slower, cognitive stress signaling (Strahler et al., 2017; Honawon et al., 2025; Yamakawa et al., 2018). The combined interpretation of both biomarkers, therefore, provides a comprehensive view of the cognitive, somatic interaction in anxiety regulation, making them invaluable tools for sport psychologists seeking to anticipate, interpret, and manage pre-event anxiety (Honawon et al., 2025).

This bi-axial interpretation of anxiety is theoretically underpinned by three complementary frameworks. The Transactional Model of Stress and Coping (Lazarus & Folkman, 1984) emphasizes the role of cognitive appraisal in shaping stress outcomes, directly aligning with cortisol's representation of mental evaluation processes. The Biopsychosocial Model (Engel, 1977) situates biomarker data within the broader social and psychological context, highlighting the necessity of interpreting physiological indicators alongside behavioural and emotional responses. The Stress Response Model (McEwen, 2007) offers a mechanistic explanation of how the HPA, SNS, and SAM axes interact to produce individualized stress profiles. Collectively, these frameworks underscore the importance of developing an integrative, real-time interpretive system that links physiological signals to actionable psychological interventions. Together, cortisol and salivary alpha-amylase provide complementary insights into the dual pathways of anxiety expression, the cognitive appraisal mediated by the HPA axis and the somatic arousal driven by the SAM system. Recognizing this dual activation pattern forms the scientific foundation for the Real-time Anxiety Cues Intervention Model (RACIM) proposed in this study.

Despite the established utility of cortisol and salivary alpha-amylase in tracking stress responses, existing pre-competition anxiety assessments remain largely retrospective and indirect, relying on self-report questionnaires, interviews, or behavioural observations that are subject to recall bias, situational distortions, and delayed feedback (Mellalieu et al., 2009; Laborde et al., 2022). Consequently, sport psychologists often lack real-time, individualized data to guide immediate interventions when anxiety escalates moments before or during competition. Furthermore, prior studies have typically examined

biomarker responses in isolation, focusing either on cognitive (cortisol) or somatic (sAA) pathways, without integrating the dual-axis interpretation necessary for nuanced, actionable insights (Honawon et al., 2025; Yamakawa et al., 2018). This gap underscores the need for a biomarker-based, real-time interpretive framework that can translate physiological signals into timely, context-sensitive psychological interventions. Unlike previous research, this study simultaneously profiles cortisol and sAA in elite university athletes across gender, sport type, and competitive experience, providing empirical evidence for the **Real-Time Anxiety Cues Intervention Model (RACIM)**, which operationalizes immediate, evidence-informed strategies to manage pre-event anxiety at the field level rather than solely in laboratory settings.

The Real-time Anxiety Cues Intervention Model (RACIM) is proposed as such an innovative framework. RACIM conceptualizes how measurable biological cues, such as cortisol-linked cognitive stress and sAA-linked somatic activation, can guide sport psychologists in decoding athletes' pre-event anxiety states and applying timely, evidence-based interventions. RACIM bridges laboratory-based biomarker analysis and field-based athlete management by translating physiological cues, cortisol for cognitive tension and sAA for somatic activation, into observable behavioural indicators. This empowers sport psychologists to deliver context-specific, evidence-based interventions before or during competition without waiting for laboratory confirmations. The practical advantage of this approach lies in its immediacy: it allows for rapid recognition and management of anxiety states in high-pressure situations where minor emotional imbalances can significantly affect performance outcomes (Laborde et al., 2022; Jones & Lane, 2023).

Within the context of advancing university sports for national and global excellence, the present study employs salivary biomarkers to profile pre-event anxiety among elite university athletes, comparing variations across gender and sport type. The goal is to establish empirical evidence that will serve as the scientific foundation for the future operationalization of RACIM. This research contributes to developing a sustainable model for enhancing competitive performance, resilience, and psychological well-being among university athletes by linking psychobiological mechanisms to real-time sport psychology practice.

### Research Hypotheses

The following null hypotheses were formulated for drawing inferences.

1. Salivary biomarkers are not significant predictors of pre-event anxiety among elite university athletes.
2. There is no significant variation in the predictions of pre-event anxiety among the biomarkers.
3. There is no significant difference in salivary biomarkers' predictions of pre-event anxiety among elite university athletes by gender.
4. There is no significant difference in salivary biomarkers' predictions of pre-event anxiety among elite university athletes by sports.

### Methods

This study adopted a repeated measures predictive design to examine how salivary biomarkers predict pre-event anxiety of elite university athletes. The design enabled direct comparison of anxiety-related biomarker changes between baseline and pre-competition phases.

**Participants:** Nineteen (N = 19) elite university athletes, comprising 10 males and 9 females, participated voluntarily. The athletes were drawn from football (n = 8), boxing (n = 5), and judo (n = 6) because they are sports that are prone to salivary reactions before and during play. Inclusion criteria required participants to be those who qualified and represented their institution in the last 2024 Federation of Africa University Sports (FASU) held in Lagos State University, Nigeria.

**Sampling Procedure and Ethical Considerations:** Participants were purposively selected based on their availability, consistent training status, and engagement in physically demanding, saliva-producing sports. Ethical approval was obtained from the host university’s Research Ethics Committee, and all procedures adhered to the Declaration of Helsinki (World Medical Association, 2013).

**Data Collection Procedure:** Saliva samples were collected at two intervals: baseline (eight weeks before competition) and one hour before the main event. Each participant provided a 2 mL sample using sterile collection tubes between 9:00 a.m. and 10:00 a.m. to minimize diurnal variation. Samples were centrifuged and stored at -20°C until biochemical analysis.

**Biochemical Analysis:** Salivary cortisol and alpha-amylase (sAA) concentrations were quantified using commercially available enzyme-linked immunosorbent assay (ELISA) kits, following the manufacturer’s standard protocol. Cortisol served as an indicator of hypothalamic–pituitary–adrenal (HPA) axis activation, representing cognitive anxiety, while sAA reflected sympathetic nervous system (SNS) activity, representing somatic anxiety responses.

**Data Analysis:** Descriptive statistics (mean and standard deviation) were computed for each biomarker. Inferential analyses, including t-tests, and one-way ANOVA analysis at a 0.05 significance threshold, were used to compare biomarker responses across gender and sport type. Findings were interpreted to explain the biological bases of pre-event anxiety, serving as empirical foundations for the conceptual development of the Real-time Anxiety Cues Intervention Model (RACIM).

**Results**

**Table 1:** ANOVA Summary Table on Pre-test post-test Salivary Biomarkers as Significant Predictors of Pre-event Anxiety

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	8073.478	3	2691.159	54.077	.000
Within Groups	3583.088	72	49.765		
Total	11656.565	75			

Table 1 discloses the ANOVA results of the significant variation in the pre-test and post test scores of salivary biomarkers’ (cortisol and alpha amylase) predictions of pre-event anxiety among the participants. The result obtained in the table denotes that salivary biomarkers are significant predictors of pre-event anxiety among elite university athletes [ $f(3, 72) = 54.08; p < 0.05$ ]. The p-value (0.000) is below the 0.05 threshold, leading to the rejection of the null hypothesis. Therefore, salivary biomarkers are significant predictors of pre-event anxiety among elite university athletes.

**Demographic Details**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
					Pre Cortisol	17.9768		
Post Cortisol	35.8421	4.81875	1.10550	33.5195	38.1647	28.00	45.20	
Pre sAA	8.7895	8.22043	1.88590	4.8274	12.7516	1.00	38.20	
Post sAA	13.0000	9.09310	2.08610	8.6173	17.3827	4.20	35.40	
Total	18.9021	12.46679	1.43004	16.0533	21.7509	1.00	45.20	

**Post hoc**

Tukey HSD

(I) PREPOSTVV (J) PREPOST		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Pre Cortisol	Post Cortisol	-17.86526*	2.28876	.000	-23.8848	-11.8457
	Pre sAA	9.18737*	2.28876	.001	3.1678	15.2070
	Post sAA	4.97684	2.28876	.140	-1.0427	10.9964
Post Cortisol	Pre Cortisol	17.86526*	2.28876	.000	11.8457	23.8848
	Pre sAA	27.05263*	2.28876	.000	21.0330	33.0722
	Post sAA	22.84211*	2.28876	.000	16.8225	28.8617
Pre sAA	Pre Cortisol	-9.18737*	2.28876	.001	-15.2070	-3.1678
	Post Cortisol	-27.05263*	2.28876	.000	-33.0722	-21.0330
	Post sAA	-4.21053	2.28876	.264	-10.2301	1.8091
Post sAA	Pre Cortisol	-4.97684	2.28876	.140	-10.9964	1.0427
	Post Cortisol	-22.84211*	2.28876	.000	-28.8617	-16.8225
	Pre sAA	4.21053	2.28876	.264	-1.8091	10.2301

\*. The mean difference is significant at the 0.05 level.

The post hoc analysis revealed that the salivary biomarkers (cortisol and alpha amylase) predicts pre-event anxiety at the pre-test and post-test instances. However, the demographic mean showed that the post-test scores of the biomarkers were higher than the pre-test scores indicating that at about an hour to a competition, pre-event anxiety levels are always higher.

**Table 2:** t-test Summary Table on Difference in Salivary Biomarkers' Predictions of Pre-event Anxiety

Biomarkers	N	Mean	S.D	SEM	t	df	sig
Cortisol	19	35.84	4.82	1.11	9.67	36	0.00
sAA	19	13.00	9.09	2.09			

Table 2 designates the *t-test* results on the difference in the salivary biomarkers as predictors of pre-event anxiety among elite university athletes [ $t(36) = 9.67; p < 0.05$ ]. The p-value (0.00) is below the 0.05 threshold, leading to the rejection of the null hypothesis. Therefore, there is a significant difference in the salivary biomarkers' predictions of pre-event anxiety among elite university athletes, with cortisol showing the greater prediction.

**Table 3:** ANOVA Summary Table on Salivary Biomarkers as Predictors of Pre-event Anxiety by Gender

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5070.376	3	1690.125	32.056	.000
Within Groups	1792.648	34	52.725		
Total	6863.023	37			

Table 3 shows the ANOVA results on salivary biomarkers as predictors of pre-event anxiety among elite university athletes by gender [ $F(3, 34) = 32.06; p < 0.05$ ]. The p-value (0.00) is below the 0.05 threshold, leading to the rejection of the null hypothesis. Therefore, there is significant gender difference in the salivary biomarkers' predictions of pre-event anxiety among elite university athletes.

**Post hoc**

Tukey HSD (Dependent Variable: Gender )

(I) Gender	(J) Gender	Mean Differen (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Boun	Upper Boun
Cortisol Female	Cortisol Male	.04667	3.33629	1.000	-8.9640	9.0573
	SA Female	20.28889*	3.42296	.000	11.0442	29.5336
	SA Male	25.18667*	3.33629	.000	16.1760	34.1973
Cortisol Male	Cortisol Female	-.04667	3.33629	1.000	-9.0573	8.9640
	SA Female	20.24222*	3.33629	.000	11.2316	29.2529
	SA Male	25.14000*	3.24730	.000	16.3697	33.9103
SA Female	Cortisol Female	-20.28889*	3.42296	.000	-29.5336	-11.0442
	Cortisol Male	-20.24222*	3.33629	.000	-29.2529	-11.2316
	SA Male	4.89778	3.33629	.467	-4.1129	13.9084
SA Male	Cortisol Female	-25.18667*	3.33629	.000	-34.1973	-16.1760
	Cortisol Male	-25.14000*	3.24730	.000	-33.9103	-16.3697
	SA Female	-4.89778	3.33629	.467	-13.9084	4.1129

\*. The mean difference is significant at the 0.05 level.

The post hoc analysis revealed that the female gender salivary biomarkers' data (cortisol and alpha amylase) were higher than those of the males which is the indicator of the significance reported.

**Table 4:** ANOVA Summary Table on Salivary Biomarkers as Predictors of Pre-event Anxiety by Sports.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5091.773	5	1018.355	18.398	.000
Within Groups	1771.250	32	55.352		
Total	6863.023	37			

Table 4 reveals the ANOVA results of the test of significance on significant variation in the predictions of pre-event anxiety among the sports, [ $f(5, 32) = 18.39; p < 0.05$ ]. The p-value (0.00) is above the 0.05 threshold, leading to the rejection of the null hypothesis. Therefore, there is significant variation in the biomarkers' predictions of pre-event anxiety among elite university athletes by sports

**Post hoc**

Tukey HSD (Dependent Variable: Sports0)

(I) Sport	(J) Sport	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Cortisol F. ball	sAA F. ball	26.12500*	3.71993	.000	14.8567	37.3933
	Cortisol Box	6.27500	4.24137	.679	-6.5728	19.1228
	sAA box	25.99500*	4.24137	.000	13.1472	38.8428
	Cortisol Judo	3.74167	4.01798	.935	-8.4295	15.9128
sAA F. ball	sAA judo	24.80833*	4.01798	.000	12.6372	36.9795
	Cortisol F. ball	-26.12500*	3.71993	.000	-37.3933	-14.8567
	Cortisol Box	-19.85000*	4.24137	.001	-32.6978	-7.0022
	sAA box	-.13000	4.24137	1.000	-12.9778	12.7178
Cortisol Box	Cortisol Judo	-22.38333*	4.01798	.000	-34.5545	-10.2122
	sAA judo	-1.31667	4.01798	.999	-13.4878	10.8545
	Cortisol F. ball	-6.27500	4.24137	.679	-19.1228	6.5728
	sAA F. ball	19.85000*	4.24137	.001	7.0022	32.6978
sAA box	sAA box	19.72000*	4.70538	.003	5.4666	33.9734
	Cortisol Judo	-2.53333	4.50506	.993	-16.1799	11.1132
	sAA judo	18.53333*	4.50506	.003	4.8868	32.1799
	Cortisol F. ball	-25.99500*	4.24137	.000	-38.8428	-13.1472
Cortisol Judo	sAA F. ball	13000	4.24137	1.000	-12.7178	12.9778
	Cortisol Box	-19.72000*	4.70538	.003	-33.9734	-5.4666
	Cortisol Judo	-22.25333*	4.50506	.000	-35.8999	-8.6068
	sAA judo	-1.18667	4.50506	1.000	-14.8332	12.4599
sAA judo	Cortisol F. ball	-3.74167	4.01798	.935	-15.9128	8.4295
	sAA F. ball	22.38333*	4.01798	.000	10.2122	34.5545
	Cortisol Box	2.53333	4.50506	.993	-11.1132	16.1799
	sAA box	22.25333*	4.50506	.000	8.6068	35.8999
Cortisol F. ball	sAA judo	21.06667*	4.29541	.000	8.0552	34.0781
	Cortisol F. ball	-24.80833*	4.01798	.000	-36.9795	-12.6372
	sAA F. ball	1.31667	4.01798	.999	-10.8545	13.4878
	Cortisol Box	-18.53333*	4.50506	.003	-32.1799	-4.8868
sAA judo	sAA box	1.18667	4.50506	1.000	-12.4599	14.8332
	Cortisol Judo	-21.06667*	4.29541	.000	-34.0781	-8.0552

\*. The mean difference is significant at the 0.05 level.

The post hoc analysis revealed that the salivary biomarkers' (cortisol and alpha amylase) data on the sports (football, Boxing and judo) varied with football having the highest significance followed by Boxing and later the judo sports.

**Discussion**

The first finding revealed that salivary biomarkers are significant predictors of pre-event anxiety among elite university athletes. This suggests that pre-event anxiety is not purely subjective or psychological but is reflected in measurable biological responses, specifically through cortisol and alpha-amylase. These biomarkers capture activation of the hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic nervous system, which are critical pathways in stress and anxiety regulation (Aydemir et al., 2025).

The ability of salivary biomarkers to predict anxiety indicates that sport psychologists can identify athletes at risk of heightened pre-event anxiety before performance begins. This is particularly valuable in competitive university sports, where rapid, real-time interventions are needed to maintain mental readiness and optimize performance outcomes (Honawon et al., 2025). Previous research has

demonstrated that cortisol increases in response to psychological stressors associated with competition, reflecting HPA axis activation and heightened cognitive appraisal of performance demands (Filaire et al., 2009). Similarly, salivary alpha-amylase has been widely recognized as a marker of sympathetic nervous system activation during stress, providing a rapid indicator of physiological arousal in performance settings (Nater & Rohleder, 2009).

These biomarkers can inform personalized strategies to manage anxiety because they provide objective indicators of physiological stress. For example, athletes showing elevated cortisol or alpha-amylase can be guided through targeted cognitive or relaxation interventions, enhancing the precision of the proposed Real-Time Anxiety Cues Intervention Model (RACIM). Studies on stress reactivity in athletes have shown that pre-competition periods are characterized by significant physiological arousal, which may influence concentration, emotional regulation, and overall performance readiness (Crewther et al., 2011). The result supports the use of non-invasive saliva sampling as a practical tool for real-time assessment of anxiety, bridging the gap between traditional self-report measures and the need for immediate, biologically informed interventions. In essence, this result validates the utility of salivary biomarkers as reliable, objective predictors of pre-event anxiety, providing a strong foundation for evidence-based, rapid-response interventions in elite university athletes.

The second finding showed that there is a significant difference in the salivary biomarkers' predictions of pre-event anxiety among elite university athletes, with cortisol showing the greater prediction. This suggests that **cognitive stress processes**, mediated through the **hypothalamic–pituitary–adrenal (HPA) axis**, play a more dominant role in athletes' anticipatory responses immediately before competition. Cortisol is a primary hormonal indicator of psychological stress and has been consistently linked with evaluative threat and performance appraisal in competitive settings. Research involving elite athletes has shown that salivary cortisol levels rise significantly closer to competition, reflecting anticipatory anxiety associated with worry about performance outcomes, self-evaluation, and perceived pressure to perform well (Aydemir et al., 2025).

Although both salivary cortisol and alpha-amylase increase in response to competitive stress, cortisol is often found to be more sensitive to the psychological aspects of anxiety such as cognitive appraisal and mental tension, whereas alpha-amylase primarily reflects sympathetic nervous system arousal related to physiological activation (Honawon et al., 2025). This pattern suggests from the sample of elite university athletes, cognitive components of pre-event anxiety (e.g., worry, self-doubt, performance concern) have been particularly prominent, leading to a stronger relationship between cortisol and anxiety indicators compared with alpha-amylase.

The result further indicates that different physiological stress systems may contribute unequally to pre-event anxiety, highlighting the complexity of athletes' psychophysiological responses to competition. Although both biomarkers are associated with stress responses, their differing predictive strengths suggest that the HPA axis provide a more stable indicator of anticipatory anxiety in this population. Similar findings have been reported in sport psychology research where cortisol responses were found to be more strongly related to psychological stress and competitive anticipation than other stress-related biomarkers (Crewther et al., 2011).

This finding provides further support for the proposed **Real-Time Anxiety Cues Intervention Model (RACIM)**. The stronger predictive role of cortisol suggests that sport psychologists need to pay particular attention to indicators of cognitive anxiety, such as worry, self-doubt, and negative performance expectations. Within the RACIM framework, elevated cortisol levels serve as a biological cue indicating the need for interventions that target cognitive processes, including attentional refocusing, cognitive restructuring, and confidence-enhancing strategies. Recognizing which biomarker dominates in predicting anxiety responses will therefore help sport psychologists implement more precise and individualized interventions shortly before competition.

Another finding discovered a significant gender difference in the salivary biomarkers' predictions of pre-event anxiety among elite university athletes. The post hoc analysis revealed that the female gender salivary biomarkers' data (cortisol and alpha amylase) were higher than those of the males which is the indicator of the significance reported. This indicates that gender influences the psychophysiological response to pre-event anxiety. Elevated cortisol and alpha-amylase in females suggest stronger activation of both the **hypothalamic–pituitary–adrenal (HPA) axis** and the **sympathetic nervous system**, reflecting heightened cognitive and somatic anxiety during the anticipatory phase of competition (Aydemir et al., 2025). This aligns with recent research showing that female athletes often demonstrate higher pre-competition physiological stress responses than males, potentially due to hormonal influences, increased emotional reactivity, and heightened performance-related evaluation (Honawon et al., 2025). Cortisol responses in females may also be modulated by sex hormones such as estrogen and progesterone, which can enhance HPA axis sensitivity to stressors, thereby amplifying anxiety-related physiological activation (Kudielka et al., 2021).

The gender differences observed also have implications for the **Real-Time Anxiety Cues Intervention Model (RACIM)**. Sport psychologists can use elevated biomarker signals in female athletes as an indicator of heightened cognitive and somatic anxiety, prompting interventions that are tailored to sex-specific stress responses. For instance, cognitive regulation strategies such as attentional refocusing, imagery rehearsal, and pre-performance routines may be emphasized for female athletes, while interventions for males may focus more on physiological arousal modulation if indicated by biomarker levels. Overall, the results demonstrate that pre-event anxiety is influenced by gender, reinforcing the need for individualized, sex-sensitive approaches in real-time anxiety management for elite university athletes.

Furthermore, a significant variation in the biomarkers' predictions of pre-event anxiety among elite university athletes by sports was reported. The post hoc analysis revealed that the salivary biomarkers' (cortisol and alpha amylase) data on the sports (football, Boxing and judo) varied with football having the highest significance followed by Boxing and later the judo sports. This highlights the influence of sport-specific competitive demands on psychophysiological stress responses. The elevated biomarker levels in football athletes suggest greater activation of both the **hypothalamic–pituitary–adrenal (HPA) axis** and the **sympathetic nervous system**, likely due to the high-paced, team-based nature of the sport, continuous decision-making, and heightened social evaluation inherent in team performance contexts (Aydemir et al., 2025).

The variation across sports indicates that **pre-event anxiety is not uniform across athletic disciplines**. Team sports like football may elicit greater anticipatory anxiety due to collective responsibility, complex coordination demands, and unpredictable game dynamics, whereas individual combat sports such as boxing and judo, while physically intense, offer athletes more control over pacing and tactical execution, which may moderate stress responses (Honawon et al., 2025). These findings reinforce the importance of **sport-specific considerations within the Real-Time Anxiety Cues Intervention Model (RACIM)**. Recognizing that football players may experience higher physiological anxiety cues, sport psychologists can tailor interventions to the **unique cognitive and somatic demands** of each sport. Interventions may include attentional control, pre-performance routines, and imagery for football players, while strategies for boxing and judo athletes may emphasize individualized regulation of arousal and focus (Aydemir et al., 2025; Honawon et al., 2025). Overall, the results underscore the value of context-sensitive, individualized interventions in managing pre-event anxiety and optimizing athlete performance across different university sports.

In summary the study found that salivary biomarkers (cortisol and alpha-amylase) are significant predictors of pre-event anxiety among elite university athletes. Cortisol was the stronger predictor compared with alpha-amylase, suggesting a dominant role of cognitive anticipatory anxiety. Gender differences were observed, with female athletes exhibiting higher biomarker levels than males, indicating greater physiological stress responses. Additionally, sport-specific differences emerged:

football athletes showed the highest biomarker levels, followed by boxing and then judo, reflecting the influence of sport type on pre-event anxiety intensity.

### Conclusion

This study highlights the diagnostic and predictive relevance of salivary cortisol and alpha-amylase in assessing pre-event anxiety among elite university athletes. Both biomarkers significantly predicted anxiety responses, independent of gender and sport type, affirming the joint influence of the HPA and SAM systems in shaping pre-competition emotional states. The findings collectively support the use of **salivary biomarkers for real-time, individualized assessment of anxiety**, forming the empirical basis for the proposed **Real-Time Anxiety Cues Intervention Model (RACIM)**, a practical framework for interpreting biomarker data and guiding individualized psychological interventions. RACIM offers sport psychologists a structured approach to enhance athletes' emotional regulation, resilience, and performance readiness. The study reinforces the importance of integrating sport psychology within university athletic programmes as a foundation for national and global sporting excellence.

### Recommendations

This article recommends that

1. There should be research grants established to support scientific research and enhance athlete performance thereby elevating Nigeria University sports to global standards and facilitate medal-winning performances.
2. The Nigerian University Games Association (NUGA) should mandate the inclusion of certified sport psychologists in every university's athlete support staff to ensure psychological support and performance optimization for athletes during competitions.
3. Universities should promote collaborative research and capacity building among sport psychologists, coaches, and physiologists to advance evidence-based interventions such as the Real-time Anxiety Cues Intervention Model (RACIM) for athlete development.

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## Body Mass Index and Fasting Blood Sugar Profiles of Older Adults in Umueze Community, Osisioma LGA, Abia State, Nigeria: A Descriptive Study

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### Abstract

*Finding the body mass index and fasting blood sugar profiles of older persons 60 years of age and older in the Umueze community in Osisioma LGA of Abia State, Nigeria, was the aim of this study. Older adult volunteers from Umueze Community in Osisioma LGA, Abia State, Nigeria, participated in the study. The study comprised elderly persons who were 60 years of age or older. In this study, a descriptive research design was employed. 46 Umueze community members made up the study's population. The 28 older adult volunteers who satisfied the inclusion requirements made up the study's sample size. The number of elderly adult participants determined the study's sample. The method of purposive sampling was applied. For the health awareness campaign, we measured blood sugar and BMI. The volunteers were invited to a research conference where we explained the goal of the study and gave them assurances regarding their safety and the confidentiality of the data they submitted. Both the male and female participants' BMIs indicated that they were 70% overweight. Additionally, the fasting blood sugar level indicated that older female adults had a higher prevalence of prediabetes. The study suggests that elderly persons should engage in more physical activity. There is positive correlation between BMI and FBS prediabetic Older adults. The tiny sample size was one of its drawbacks. This could have an impact on how broadly the study's conclusions can be applied.*

**Keywords:** BMI, older adults, blood sugar, obese, prediabetes

### Introduction

The global epidemic of obesity and the rising global prevalence of prediabetes are of major concern. These trends do not bode well for the future outlook of diabetes and its complications across the world (Echouffo-Tcheugui & Elizabeth Selvin, 2021). Unfortunately, Type 2 diabetes and prediabetes—the condition that often precedes diabetes—can go undetected for years. This is concerning, as prolonged high blood sugar can lead to a cascade of complications. Managing obesity is crucial for both the prevention and treatment of T2D. Weight loss is associated with a significant reduction in the incidence of diabetes among at-risk populations (Chamarthi, Garg, & Daley, 2025). Having obesity makes you more likely to develop diabetes, the condition of having too much glucose (sugar) circulating in your bloodstream. Obesity also causes diabetes to worsen faster (Waddadar, 2025).

Body mass index (BMI) is a known risk factor for poor blood sugar control in patients with type 2 diabetes mellitus (T2DM) (Deng, Jia, Wu, & Cheng, 2025). Weight problems, including underweight, overweight, and obesity, abound globally (Odo & Ogu, 2020). Elevated BMI is associated with abnormal blood sugar levels. The participants with overweight or obesity may also suffer from comorbidities not directly related to the pathophysiology of elevated BMI (Le & Delevry, 2021).

Several studies have reported that the increase in the prevalence of obesity has led to a concomitant increase in the prevalence of type 2 diabetes (Klein, Gastaldelli, Yki-Järvinen, & Scherer, 2022; Lean, Leslie, Barnes, Brosnahan, Thom, McCombie, Peters, Zhyzhneuskaya, Al-Mrabeh, Hollingsworth, et al. 2019). Excess weight and physical inactivity are also associated with an increased risk of developing various diseases, particularly type 2 diabetes (Guh, Zhang, Bansback, Amarsi, Birmingham, & Anis,

2009). Since excess weight is an important predictor of type 2 DM, the term “diabesity” was proposed by Astrup and Finer in 2000 (Grey, Picone, Sloan, & Yashkin, 2015). Specifically, in comparison to women with normal BMI, overweight, obese class I and II ( $30 \leq \text{BMI} < 39.99$ ), and class III ( $\text{BMI} \geq 40$ ) adults face increased risks of developing type 2 DM with 7.6%, 20.1% and 38.8% greater risk, respectively (Hu, Manson, Stampfer, Colditz, Liu, Solomon, & Willett, 2002).

Older adults are people aged 60 years or over (World Health Organization, 2025). Prediabetes is an intermediate stage between normal glucose and diabetes and is highly prevalent, especially in older age groups and obese individuals (Echouffo-Tcheugui & Elizabeth Selvin, 2021). There are many other factors to consider helping determine your blood sugar goals. These may include 65 and older, 80 to 130 mg/dL (Hoskins, 2025). Ageing and diabetes are two well-known risk factors for cardiovascular disease (CVD). Ageing alone is associated with a decline in physiological function, leading to chronic diseases such as diabetes and CVD (Chia, Egan, & Ferrucci, 2025). Well-controlled blood sugar levels were associated with a lower risk of major complications such as heart attacks, amputation and kidney disease, but the very lowest blood sugar levels were associated with a small but significant increased risk of death (Kaiser Permanente, 2011). For elderly patients, the normal reference ranges are as follows (Pagana, Pagana, & Pagana, 2019): 60-90 years - 82-115 mg/dL or 4.6-6.4 mmol/L, and >90 years - 75-121 mg/dL or 4.2-6.7 mmol/L. Exercise significantly reduced blood glucose fluctuations and improved blood glucose control throughout the day (Zheng, Qi, Bi, Shi, Zhang, Zhao, Hu, Li, & Li, 2020). Regular physical activity (PA) can improve blood glucose levels and help prevent further complications (Sugesh, & Shah, 2025; Enyew, Nigussie, Mihrete, et al. 2023).

Reinforcement of the importance of mobility model and its awareness among the older adults in Umueze Community discourage physical inactivity lifestyles, to improve fitness and blood sugar level at old age has become necessary in this study. This is because results of several studies suggest physical inactivity as one of cause of obesity and abnormal blood sugar levels. Not only has there been increased sedentary behaviours among older adults in the community, but there are also associated health problems such obesity and diabetes. The mobility framework illustrates how movement impairments and physically inactive lifestyle led to limitations in accessing different life-spaces (Franke, Sims-Gould, Chaudhury, Winters, & McKay, (2020).

Several studies on blood glucose have focused on urban areas and cities. Studies that focused on adult population were designed to address prevalence of physical inactivity as a risk factor for diabetes and other studies focused on the adults that are between the ages of 30 to 60 years. From observation, the older in Umueze Community appear to have mobility deficit. The current study aims to address these gaps with the urgent need for research that specifically looks at the presence of other risk such as BMI and blood glucose levels in older adults between the ages of 60 years and above in Umueze community by determining whether there are any BMI and blood glucose profile disorders in the older adults that could lead to a prediction of the prediabetes burden among this population. Therefore, a descriptive investigation of the BMI and fasting blood sugar profiles of older persons in the Umueze community, Osisioma LGA, Abia State, Nigeria, is required.

### **Research questions**

1. What is the BMI and FBS status of the male older adults in Umueze Community?
2. What is the BMI and FBS status of the female older adults in Umueze community?

### **Hypothesis:**

There is no significance difference between the mean BMI of male and female older adults in Umueze community.

## Methods

**Design:** Descriptive research was conducted at Umueze Community Health Centre between August and September 2025. This approach enabled the direct collection of data from participants within real-life settings.

**Participants:** The study was conducted on 28 older adults from the Umueze community in Osisioma LGA of Abia State, Nigeria. Individuals aged 60 years and above were included in the study as older adults. The population of this study was the total number of 46 people that attended our first research meeting on August 30th, 2025. The sample of this study was determined by the inclusion criteria. The purposive sampling technique was utilised in this study, and 18 volunteers (7 males and 11 females) failed the inclusion criteria; hence, 28 met the inclusion criteria and were recruited as the sample of this study.

**Inclusion criteria:** The requirements for inclusion include being 60 years of age or older, not taking insulin, not taking diabetes medications, not taking any medications for weight control, and not having a type 2 diabetes diagnosis.

**Exclusion criteria:** This include people under 60 years old, people with type 2 diabetes who are unable to speak, and anyone with mental illnesses that impair cognitive function, such as schizophrenia or dementia.

**Operational Definitions:** Body mass index (BMI): A person's weight in kilograms (kg) divided by his or her height in meters squared ( $m^2$ ).

**Instruments for Data Collection:** The venous blood samples for blood sugar levels, measuring tape for measuring height, weighing scale for measuring weight.

**Data Collection:** Demographic data: Age, sex, and place of residence. Clinical data: height, weight, and fasting blood sugar (FBS) levels. Body mass index (BMI) was calculated as weight in kilograms divided by height in metres squared ( $kg/m^2$ ). Two weight categories by BMI were identified: normal weight and overweight. None were underweight or obese. FBS: The participants were guided not to eat or drink for several hours, usually in the morning before the FBS test. A medical laboratory scientist used a small needle to draw blood from a vein in the participant's arm. She sent the blood sample to a lab at Umueze Community Health Centre for testing. With the results of the FBS, the older adults were classified as normal, prediabetic, and diabetic. Less than 100 mg/dL: This is a normal fasting blood sugar level. 100 to 125 mg/dL: Fasting blood sugar in this range typically indicates prediabetes. This means your blood sugar levels are higher than normal but not high enough to be classified as diabetes. 126 mg/dL or above: This indicates high blood sugar, the main sign of diabetes (Cleveland Clinic, 2025).

**Ethical Considerations:** Participants gave their informed consent to engage in the study, which was carried out in accordance with all Declaration of Helsinki standards.

**Data Analysis:** Data were analysed for those that underwent the laboratory assessment (and thus had data on BMI and FBS) and completed the demographic variable assessments ( $N = 28$ ). Statistical Package for Social Sciences (SPSS) Version 23 was used for the analysis. FBS level and BMI were grouped according to the World Health Organization (WHO) classifications of obesity and abnormal blood sugar to enable the estimation of prevalence rates. Numeric variables were tested for normal distribution. Prevalence of prediabetes and diabetes was compared based on age, sex, and WHO obesity classes using cross-tabulations. Mean anthropometric indices were compared in both sexes in the prediabetes and diabetes groups using an independent samples t-test.

**Results**

**Table 1: The Primary Data on the Male Older Adults BMI and Fasting blood sugar Profiles. (n=10)**

Normal	Overweight.	FBS
23		105 mg/dL
22		111 mg/dL
24		113 mg/dL
	26.	117 mg/dL
	27.	115 mg/dL
	26.	118 mg/dL
	28.	116 mg/dL
	25.	118 mg/dL
	26.	119 mg/dL
	27.	118 mg/dL

In Table 1, three of the male older adults had normal BMIs: 23, 22, and 24. Their FBS are 105 mg/dL, 111 mg/dL, and 113 mg/dL, respectively. These suggest normal blood sugar levels for normal BMI in the male older adults. Also, in the BMI assessment, seven old adult males were overweight. Their results indicate a higher BMI with a minimum of 115 mg/dL and a maximum of 119 mg/dL. Also, the assessment of their FBS indicates that their blood sugar levels were higher than normal. Comparing the anthropometric indices against the outcome variable of FBS, using a simple scoring system, the best predictor of FBS, prediabetes, and diabetes (combined) was BMI; the predictive ability was greater in men with elevated BMI than older adult males. Therefore, elevated BMI was the anthropometric predictor of high FBS in older adult males.

**Table 2: The Primary Data on the Female Older Adults BMI and Fasting Blood Sugar Profiles (n=18)**

Normal	Overweight.	FBS
23.		113 mg/dL
22		112 mg/dL
24.		115 mg/dL
23		100 mg/dL
24.		99 mg/dL
22.		107 mg/dL
24.		114 mg/dL
24.		113 mg/dL
24.		101 mg/dL
21		111 mg/dL
	26.	117 mg/dL
	26.	115 mg/dL
	25.	117 mg/dL
	27.	116 mg/dL
	26.	118 mg/dL
	27	116 mg/dL
	26.	118mg/d
	28.	117 mg/dL

In table 2, ten of the female older adults had a normal BMI, with 21 as the minimum and 24 as the maximum of their recorded normal BMI. Their minimum and maximum FBS are 99 mg/dL and 115

mg/dL, respectively. These suggest normal blood sugar levels for normal BMI in the female older adults. Also, in the BMI assessment, eight female older adults were overweight. Their results indicate a higher BMI. The assessment of their FBS indicates that their blood sugar levels were higher than normal. However, from the findings, it suggests there is a significant association between BMI and FBS in older adults.

**Table 3: T-test result for Mean BMI in the prediabetes groups**

Respondents	N	Sd	df	t-cal	Sig. (2-tailed)	Dec	
Male	10	25.40	1.90				
				26	1.109	0.227	NS
Female	18	24.56	1.95				

The p-value of 0.227 indicates no significant difference between the mean BMI of male and female. The only mean difference in prediabetes was done since there are prediabetes respondents. The difference between the male and female BMI is not statistically significant. This implies that in a prediabetic condition among older adults, there BMI profiles of the male and female older adults

**Table 4: The Correlation between BMI and FBS in older adults**

		BMI	FBS
BMI	Pearson Correlator		.597
	Sig. (2-tailed)		.001
	N	28	28
FBS	Pearson Correlator	.597	
	Sig. (2-tailed)	.001	
	N	28	28

r = 0.597 indicate positive correlation (relationship) between BMI and FBS

**Discussion**

Our study identified an elevated BMI, which suggests a positive correlation between BMI and FBS levels in older adults, indicating that as BMI increases, FBS levels tend to rise. Furthermore, when stratified into three BMI categories—normal weight, overweight, and obese—which suggests significant differences in FBS levels. Also, at r = 0.597 value, our study identified positive relationship between BMI and FBS in older adults. At the p-value of 0.227 our study suggests no significant difference between the mean BMI of male and female older adults.

Overweight older adults (BMI ≥ 25 kg/m<sup>2</sup>) had notably higher FBS levels compared to normal weight older adults (P < 0.01) and normal weight individuals (P < 0.001). These findings are consistent with previous studies that have established a strong link between elevated BMI and elevated FBS. Several studies have corroborated our findings, showing that increased BMI is associated (Yakubu, Kaoje, Jabbe, & Abubakar, 2020).

This supports the hypothesis that elevated BMI contributes to increased FBS by reducing the effectiveness of insulin action (Boutari, DeMarsilis, & Mantzoros, 2023; Nat Rev Endocrinol., 2019). Our results align with the well-established view that weight management should be an integral component of diabetes management to optimise blood glucose outcomes (Wing & Wing, 2010). By comparing

different BMI groups, this study also adds to the literature by highlighting the graded effect of BMI on glucose control. Patients classified as overweight not only had significantly higher FBS levels compared to normal weight patients. This reinforces the notion that the degree of obesity plays a critical role in determining the severity of blood glucose regulation.

Our study demonstrates that even among patients classified as overweight, FBS levels are significantly elevated compared to normal-weight individuals, with the highest levels found in the obese group. This finding suggests that glucose level deteriorates progressively with increasing BMI, emphasising the need for stratified weight management interventions based on the degree of obesity. Moreover, some studies, such as the one by Cohen et al. (2007), suggest that the relationship between BMI and blood glucose might be influenced by other confounding factors like duration of diabetes, age, and treatment regimens. However, our study accounted for these variables by focusing on a relatively homogeneous patient group with similar disease durations and treatment patterns. This control for confounding factors may explain why we observed a clearer, more direct relationship between BMI and FBS than reported in other studies.

In contrast, certain studies have shown more modest associations between BMI and FBS. For instance, Buse et al. (2007) observed that while BMI is a predictor of glycaemic control, the strength of this correlation can be less pronounced in certain populations, such as adolescents or young adults. Differences in study populations, sample sizes, and methodologies likely account for these variations, highlighting the importance of further research to explore these complex relationships across diverse population groups. Moving forward, longitudinal studies are needed to investigate the long-term effects of BMI reduction on FBS and other metabolic outcomes in older adults. Future research should also explore the impact of different weight-loss interventions, such as diet, exercise, and pharmacotherapy, on FBS.

### **Conclusion**

A raised blood sugar level is linked to an elevated BMI. BMI and FBS are significantly correlated. An improved blood sugar level in elderly persons is suggested by an improved BMI. There is positive correlation between BMI and FBS prediabetic older adults. Older persons who are overweight or obese have higher blood sugar levels. In comparison to their normal-weight counterparts, overweight older persons in particular showed noticeably higher blood glucose levels, highlighting the need for more stringent weight management techniques in this demographic.

### **Recommendations**

Future research could offer a more thorough knowledge of the pathways between BMI and FBS in older persons by incorporating additional metabolic markers, such as insulin sensitivity and FBS.

Treatment options for obese and overweight older adults may be optimised by randomised controlled trials that focus on customised weight management programs based on the characteristics of individual older individuals.

In the end, this field of study could contribute to the improvement of clinical recommendations and provide more focused treatments for lowering blood sugar levels in senior citizens.

Additionally, the fasting blood sugar level indicated that a greater proportion of older female adults had prediabetes.

The study suggests that elderly persons should engage in more physical activity.

### **Limitations**

Despite the importance of our findings, a number of limitations may hinder the ability to generalise these findings. Firstly, 28 participants (18 males and 11 females) as the sample size of our study may be insignificant and not meet the criteria for generalisation of the findings. Secondly, our study does not utilise a control group. The non-use of a control group has affected a more robust comparison of the results of our study across groups, experimental groups and control groups.

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None.

### Conflict of Interest Statement

The authors report there are no competing interests. Informed Consent Form The consent of the participants was sought by explaining in writing the essence of the study and giving them the opportunity to quit the study if they so desired and how it may assist in a more improved blood glucose profile.

### Data Availability Statement

The data that support the findings of this study are available from the corresponding

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## Resistance Training in Children: Myths and Facts

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### Abstract

**Background:** Resistance training in children and adolescents has long been surrounded by controversy, primarily due to concerns regarding growth plate injury, musculoskeletal damage, and potential adverse psychological effects. These concerns have contributed to persistent misconceptions that limit the integration of resistance training into youth physical activity programmes.

**Objective:** This paper critically evaluates the safety of resistance training in children and adolescents by examining prevailing myths, potential risks, and evidence-based health benefits.

**Methods:** A narrative evidence-based review was conducted using current literature from peer-reviewed journals and position statements from recognized professional bodies. The review synthesizes findings on physiological, musculoskeletal, and psychological outcomes associated with youth resistance training.

**Results:** The evidence consistently indicates that properly supervised and developmentally appropriate resistance training does not increase the risk of growth plate injury or negatively affect linear growth. On the contrary, it is associated with significant improvements in muscular strength, bone mineral density, motor skills, and injury prevention. In addition, resistance training contributes to enhanced self-esteem, reduced symptoms of anxiety and depression, and improved cognitive function in children and adolescents. Reported risks are primarily linked to poor supervision, inappropriate loading, and improper technique rather than the training modality itself.

**Conclusion:** Resistance training is a safe and effective component of youth physical activity when implemented according to established guidelines. The persistence of safety concerns is largely attributable to misconceptions rather than empirical evidence. Integrating structured resistance training into youth fitness programmes can promote long-term health, functional capacity, and psychological well-being.

**Keywords:** Children, Adolescents, Growth plate injury, Injury prevention, Musculoskeletal health, Evidence-based practice

### Introduction

Resistance training is any form of physical exercise designed to improve muscular strength and endurance by working against an external force and has been a cornerstone of fitness for decades. Despite its proven benefits for various populations, its application to children has been a topic of controversy. Concerns about potential risks such as injury, growth plate damage, and long-term developmental issues have perpetuated the belief that resistance training is inherently dangerous for this age group (Faigenbaum et al., 201, Okuneye et al., 2026a). These concerns, however, often stem from misconceptions or outdated research rather than evidence-based conclusions.

Resistance training is often viewed as a dangerous exercise that is not appropriate for children. It is important to distinguish between structured resistance training programs led by qualified professionals and unsupervised or inappropriate strength training practices. The former is grounded in evidence-based guidelines that prioritise safety and gradual progression, whereas the latter often results in injury

and reinforces negative perceptions of youth resistance training (Behm et al., 2018). Furthermore, reputable organisations such as the American Academy of Paediatrics (AAP) and the National Strength and Conditioning Association (NSCA) endorse properly supervised resistance training for children, emphasising its potential to enhance bone density and muscular strength and to prevent injuries (AAP, 2018; NSCA, 2019).

The objective of this paper is to critically evaluate the claim that resistance training is dangerous for children and adolescents, examining both supporting and opposing arguments. This information paper also provides an overview of current evidence, practical guidelines, and best-practice recommendations for integrating youth resistance training into fitness and sports programs.

### **Understanding Resistance Training**

Resistance training, also known as strength training or weight training, is a form of physical exercise designed to improve muscular strength, power, and endurance by working against an external force (Okuneye et al., 2026b). The resistance can come from free weights, resistance bands, weight machines, or even body weight. Resistance training can also be defined as an exercise in which muscles work against external resistance to increase strength, endurance, and muscular hypertrophy (American College of Sports Medicine, 2013). According to Faigenbaum et al. (2019), resistance training involves the application of external loads to muscles through mechanical means such as free weights, machines, or elastic bands, to create tension that promotes muscle adaptation. Resistance training is a therapeutic exercise modality used in rehabilitation to enhance musculoskeletal function, manage chronic conditions, and improve quality of life (ACSM, 2011). It involves the systematic application of external loads adjusted to individual capacities and goals.

### **Myths and Misconceptions in Resistance Training**

Resistance training for children has long been surrounded by myths and misconceptions. Some of these myths and misconceptions are:

#### **1. Myth: Resistance Training Stunts Growth**

One of the most pervasive myths about resistance training is that it stunts growth in children. This misconception likely arises from concerns about damage to the growth plates (epiphyseal plates), which are areas of cartilage at the ends of long bones responsible for bone growth.

#### **Scientific Evidence**

Studies such as Falk and Eliakim (2019), Faigenbaum et al. (2019) and NSCA (2019), show that when resistance training is performed correctly and under proper supervision, it does not harm growth plates. Instead, it can enhance bone health by stimulating bone formation and improving bone mineral density. Faigenbaum et al. (2019) reported that resistance training enhances bone mineral density and may even reduce the risk of fractures in children by strengthening bones and connective tissues. The National Strength and Conditioning Association (NSCA) states that there is no evidence to suggest that resistance training stunts growth in children (NSCA, 2019).

#### **Clarification**

Injuries to growth plates are more commonly associated with sports-related trauma or improper technique during unsupervised training, rather than resistance training itself.

#### **2. Myth: Resistance Training is Unsafe for Children**

Another common misconception is that resistance training is inherently dangerous for children, leading to a high risk of injuries.

#### **Scientific Evidence**

Studies have shown that the incidence of injury in supervised resistance training programs is extremely low (Behm et al., 2018; AAP, 2018; Faigenbaum et al., 2019). Resistance training may reduce the risk of sports-related injuries by improving muscle strength, joint stability, and motor control (Faigenbaum & Myer, 2020). Also, Myer et al. (2013) stated that under qualified supervision, resistance training injury rates are low, especially compared to injuries sustained in other youth sports. Proper warm-ups, progressive overload, and technique-focused training further minimise risks.

### **Clarification**

The key to safety lies in proper program design, supervision by qualified professionals, and adherence to age-appropriate training guidelines. Most injuries occur due to improper technique, excessive loading, or lack of supervision, not the inherent nature of resistance training.

### **3. Myth: Resistance Training is Only for Adults**

It is believed that resistance training is suitable only for adults or post-pubertal individuals. This belief overlooks the benefits that children can derive from appropriately designed programs.

#### **Scientific Evidence**

Resistance training is beneficial for individuals of all ages, including children. Children primarily experience neuromuscular adaptations, such as improved motor unit recruitment and coordination, while post-pubertal adolescents can achieve significant gains in muscle mass and strength due to hormonal changes (Lloyd et al., 2014). Behm et al. (2018) found that resistance training improves motor skills, strength, and coordination in children, thereby enhancing performance in sports and daily activities.

#### **Clarification**

The focus of resistance training for children and adolescents should not be on achieving maximal lifts but on developing overall strength, motor skills, and fitness.

### **4. Myth: Resistance Training Causes Bulky Muscles in Children**

Some parents and coaches believe that resistance training will make children excessively muscular, which is often viewed as undesirable, particularly for girls.

#### **Scientific Evidence**

Children lack the hormonal environment, such as testosterone, required to develop significant muscle hypertrophy. Instead, their strength gains are primarily due to neural adaptations, such as improved coordination and motor learning (Behm et al., 2018). Malina (2016) confirmed that resistance training in children enhances functional strength and performance without causing excessive muscle bulk.

#### **Clarification**

Concerns about excessive muscle growth are unfounded in prepubertal children, and adolescents will only develop significant muscle mass if the training program is specifically designed for hypertrophy.

### **5. Myth: Resistance Training is Ineffective for Children**

Some argue that resistance training is ineffective for children due to their limited capacity for strength development.

#### **Scientific Evidence**

Research demonstrates that children can experience substantial improvements in strength, muscular endurance, and overall fitness through resistance training. Gains in prepubertal children are primarily neural, while adolescents benefit from both neural and hypertrophic adaptations (Falk & Eliakim, 2023; Faigenbaum et al., 2019).

#### **Clarification**

Resistance training is highly effective in enhancing physical performance, reducing injury risk, and promoting long-term health in children and adolescents.

### **Evidence Supporting the Safety and Benefits of Resistance Training**

Resistance training has been extensively studied for its impact on children, and the evidence overwhelmingly supports its safety and numerous benefits when conducted appropriately.

#### **1. Safety of Resistance Training for Children and Adolescents**

Resistance training is one of the safest forms of physical activity for children if properly supervised by an expert and follows established guidelines. Studies indicate that the injury rate in supervised resistance training programs is extremely low, significantly lower than that observed in many competitive sports (Faigenbaum & Myer, 2015; Kraemer & Ratamess, 2019). A systematic review by Meylan et al. (2019) found that most injuries associated with resistance training occur due to improper

technique, excessive loads, or lack of supervision rather than the activity itself. Concerns about damage to growth plates are unfounded when training programs adhere to proper guidelines. Studies demonstrate that resistance training, when performed under expert supervision, does not harm growth plates or stunt growth. On the contrary, it can enhance bone health by increasing bone density and strength (Falk & Eliakim, 2023).

## **2. Physical Benefits of Resistance Training**

### **Muscle Strength and Endurance**

Resistance training enhances muscular strength and endurance in children by promoting neuromuscular adaptations. This development supports better performance in daily activities and sports such as improved motor unit recruitment and synchronization, while post-pubertal individuals also benefit from hypertrophic adaptations due to hormonal changes (Behm et al., 2018; Kraemer & Ratamess, 2019). A report from Faigenbaum & Myer, (2019), shows that even prepubescent children can achieve significant strength gains through resistance training, primarily due to neural adaptations rather than muscle hypertrophy.

### **Bone Health**

Resistance training promotes bone mineral density and skeletal strength, reducing the risk of osteoporosis later in life. The mechanical loading of bones during resistance training stimulates osteogenic activity, particularly during periods of rapid growth (Lloyd et al., 2014). The mechanical loading of bones through weight-bearing activities helps strengthen the skeletal system, potentially reducing the risk of osteoporosis later in life.

### **Injury Prevention**

Resistance training can reduce the risk of injuries by improving joint stability, enhancing muscular balance, and strengthening connective tissues. It is particularly beneficial for young athletes, as it prepares their bodies to handle the demands of sports-specific movements and workloads. A meta-analysis by Lauersen et al. (2014) demonstrated that resistance training reduces the incidence of overuse injuries in young athletes.

### **Weight Management and Metabolic Health**

Resistance training can help children manage their body composition by increasing lean muscle mass and reducing fat mass. It also improves insulin sensitivity, lipid profiles, and resting metabolic rate, helping to prevent and manage conditions like obesity and type 2 diabetes. This is especially important for combating childhood obesity and associated health risks, such as type 2 diabetes and cardiovascular disease (Lubans et al., 2016).

## **3. Psychological and Cognitive Benefits**

### **Self-Esteem and Confidence**

Resistance training enhances self-esteem and confidence in children and adolescents by fostering a sense of accomplishment and competence. Improved physical fitness and body image contribute to psychological well-being (Smith et al., 2014).

### **Cognitive Function**

Evidence suggests that resistance training can positively affect cognitive performance by improving attention, memory, and executive functioning. These benefits are mediated by enhanced blood flow to the brain and neurochemical changes (Best, 2010).

### **Reduction of Anxiety and Depression**

Regular participation in resistance training has been linked to reductions in symptoms of anxiety and depression among adolescents. The psychological benefits are thought to stem from the release of endorphins and the development of coping mechanisms (Lubans et al., 2016).

## **4. Long-Term Benefits and Lifelong Fitness**

Introducing resistance training during childhood and adolescence sets the foundation for a lifetime of physical activity and health:

### **Habit Formation**

Children's resistance training helps instill positive exercise habits, promoting lifelong adherence to physical activity. Early exposure to structured exercise programs increases the likelihood of continued participation in adulthood (Faigenbaum & Myer, 2010).

### **Prevention of Chronic Diseases**

Resistance training reduces the risk of chronic diseases, including cardiovascular disease, type 2 diabetes, and osteoporosis. The health benefits accrued during youth can have a lasting impact on adult health outcomes (Lloyd et al., 2014).

### **Principles of Resistance Training**

Resistance training is guided by specific principles that ensure effectiveness and safety:

#### **Principle of Progressive Overload**

The principle states that to achieve continuous improvements in muscular strength, size, endurance, or performance, the body must be gradually subjected to increasing levels of stress beyond its current capabilities. Gradually increasing the resistance or intensity over time to stimulate muscular adaptations. This is particularly important for young individuals to avoid overexertion and injury (Lloyd et al., 2014). This principle underpins the adaptation process, where the body responds to increased demands by becoming stronger and more efficient over time. Without progressive overload, the body adapts to the current level of stress, leading to a plateau in performance and diminishing returns. Proper application of this principle will minimise the risk of overtraining or injury.

#### **Principle of Specificity**

The principle of specificity states that the body adapts specifically to the type of stress and demands placed on it during exercise. In resistance training, this means that the adaptations in strength, endurance, power, or hypertrophy are directly related to the specific exercises, movement patterns, muscle groups, and energy systems targeted in the training program. Designing exercises to target specific muscle groups or achieve particular fitness goals. For example, resistance training for children engaged in sports can enhance performance and prevent sport-specific injuries (Faigenbaum et al., 2009).

#### **Principle of Rest and Recovery**

The principle of rest and recovery emphasizes that adequate periods of rest and recovery are essential for the body to repair, adapt, and grow stronger following resistance training sessions. Without sufficient recovery, the risk of overtraining, fatigue, and injury increases, and performance improvements may stagnate. Therefore, ensuring adequate rest periods between sessions is vital for recovery and to prevent overtraining, especially in children with developing musculoskeletal systems (Myer et al., 2013). Ensuring adequate rest will enhance muscle repair and adaptation: During rest, microtears in muscle fibres caused by resistance training are repaired, leading to increased strength and hypertrophy. Additionally, adequate rest allows replenishment of glycogen stores and recovery of the energy systems used during training. It also aids nervous system recovery: High-intensity training can tax the central nervous system, requiring adequate recovery time for optimal neuromuscular performance.

#### **Principle of individual variability**

The principle of rest and recovery emphasises that adequate rest and recovery periods are essential for the body to repair, adapt, and grow stronger after resistance training sessions. Without sufficient recovery, the risk of overtraining, fatigue, and injury increases, and performance improvements may stagnate.

#### **Guidelines for Safe Resistance Training for Children**

Resistance training programs for children should be designed and supervised by qualified professionals who understand the unique physiological and psychological needs of children. The program should follow the following guidelines:

##### **Age-Appropriate Programming**

Exercises should match the developmental stage of the child. For instance, prepubertal children benefit more from neuromuscular adaptations, while adolescents can experience greater hypertrophic gains due to hormonal changes (Lloyd et al., 2014). The resistance exercise programme designed for children should be the one that is appropriate for their age

### **Supervision and Technique**

Children being exposed to resistance training should be properly supervised by an expert to reduce the risk of injury that may arise from overloading or improper use of the resistance exercise equipment like dumbbells among others. Proper supervision ensures that exercises are performed with the correct technique, reducing the risk of injuries such as muscle strains or growth plate damage (Faigenbaum & Myer, 2010).

### **Use of Light Weights**

Children should never be exposed to heavy weights; their muscles are tender and prone to tearing when overloaded. The principle of gradual progression should be applied, starting with lightweight and progressing, but should not push beyond their limits. Initial resistance training for beginners should prioritise lightweights or body weight to build proper form and confidence before progressing to heavier loads.

### **Incorporate Fun**

Ensure that exercise is enjoyable for children by incorporating engaging activities that maintain interest and keep them excited and motivated to participate. Stop exercises immediately if the child experiences pain or discomfort.

### **Risks Associated with Poorly Supervised or Improper Resistance Training**

While resistance training significantly benefits children, improper or poorly supervised programs can pose risks. Some of these risks are:

#### **1. Musculoskeletal Injuries**

Inadequate supervision or improper technique significantly increases the risk of musculoskeletal injuries, such as:

##### **Acute Injuries**

Acute injuries, such as sprains, strains, or fractures, often occur when improper form or excessive loads are used. Most injuries in children's resistance training programs stem from unsupervised activities or inappropriate equipment (Faigenbaum et al., 2019).

##### **Overuse Injuries**

Repetitive strain on joints and muscles can lead to overuse injuries, such as tendinitis, stress fractures, or joint inflammation. Poor technique or lack of variety in exercise selection exacerbates this risk (Micheli & Purcell, 2017).

##### **Growth Plate Injuries**

Although properly supervised resistance training does not harm growth plates, excessive loads or incorrect technique can result in epiphyseal plate injuries, potentially affecting bone development (Falk & Eliakim, 2023).

#### **2. Psychological Risks**

Improper resistance training programs can negatively affect the mental well-being of children and adolescents. It can lead to:

##### **Loss of Motivation**

Unsupervised or overly demanding programs may lead to burnout, discouraging continued participation in physical activity (Lubans et al., 2016).

##### **Body Image Issues**

Unrealistic expectations or undue pressure to achieve aesthetic goals can result in body dissatisfaction and poor self-esteem, especially among adolescents (Smith et al., 2014).

##### **Performance Anxiety**

Poor supervision may fail to address the psychological readiness of participants, leading to performance anxiety or fear of failure (Faigenbaum et al., 2009).

Other risks associated with poorly supervised resistance training are:

### **Overtraining Syndrome**

Excessive training volume or intensity without adequate rest can result in overtraining syndrome, characterised by fatigue, decreased performance, and psychological distress (Meyer et al., 2014).

### **Delayed Recovery and Fatigue**

Inappropriate training loads can lead to prolonged muscle soreness and fatigue, impairing recovery and increasing the risk of subsequent injuries (Faigenbaum & Myer, 2010).

### **Long-Term Consequences of Improper Training**

Improper resistance training during formative years can have lasting effects on physical and psychological health:

#### **Chronic Injuries**

Recurrent injuries or poorly healed musculoskeletal issues may persist into adulthood, potentially limiting long-term physical activity and quality of life (Micheli & Purcell, 2017).

#### **Negative Perceptions of Exercise**

Experiences of pain, injury, or burnout may discourage lifelong participation in physical activity, undermining the potential benefits of resistance training (Faigenbaum et al., 2019).

### **Conclusion**

Resistance training for children has often been subjected to misconceptions, primarily focusing on the potential risks, such as growth plate injuries, overtraining, and psychological harm. However, the growing body of evidence suggests that when conducted with proper supervision, individualised programming, and appropriate techniques, resistance training offers numerous benefits. These benefits include improved musculoskeletal strength, enhanced motor skills, better body composition, and a reduction in the risk of injury. Resistance training has been shown to improve psychological well-being and boost self-esteem.

The argument that resistance training is inherently dangerous for children is rooted in misunderstandings and unsubstantiated concerns. While there are legitimate risks associated with improper training methods, such as acute injuries, overtraining, or poor psychological outcomes, these risks are not unique to resistance training but are common to all physical activities that are poorly supervised or improperly executed. Ensuring that resistance training programs for children are led by certified professionals who understand children's developmental needs and that these programs are age-appropriate and well-structured significantly mitigates these risks.

### **Our Position**

After a thorough review of the common myths surrounding the safety and effectiveness of resistance training in children and a review of recent literature on the safety, benefits and appropriateness of resistance training in children, it is clear that the notion that resistance training is inherently dangerous for children is largely a myth, grounded in outdated perceptions or concerns about improper implementation. The position of this paper is that when resistance training is conducted with proper supervision, age-appropriate programming, using the right technique and appropriate equipment, resistance training is safe and beneficial for children and adolescents. It contributes to physical fitness, bone health, motor skills, and psychological well-being.

### **Contribution of This Paper to the Body of Knowledge**

This paper makes several significant contributions to the body of knowledge regarding resistance training for children. The key contributions include:

#### **1. Clarification of Myths and Misconceptions**

The paper systematically addresses and debunks widespread myths surrounding resistance training for children and adolescents, such as concerns about growth plate injuries, overtraining, and psychological distress. This contributes to a shift in perspective from a predominantly cautious approach to a more informed, science-backed approach.

## **2. Evidence-Based Support for the Safety and Benefits of Youth Resistance Training**

The paper contributes to a growing body of evidence advocating for the inclusion of resistance training in physical activity literature programs for children, challenging the previous skepticism that may have limited its implementation.

## **3. Detailed Analysis of Conditions for Safe and Effective Resistance Training**

The paper provides a thorough exploration of the essential conditions that must be met to ensure the safety and effectiveness of resistance training programs for children. The clear articulation of these conditions serves as a practical guide for educators, coaches, and fitness professionals to design safe and effective youth resistance training programs.

## **4. Contribution to Knowledge of Injury Prevention**

By discussing the risks of poorly supervised or improper resistance training, the paper adds to the existing body of knowledge on injury prevention in youth exercise. It reinforces the importance of professional oversight and adherence to evidence-based guidelines to reduce injury risks, which is particularly valuable for those involved in coaching and training young individuals.

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## Lifestyle Factors Associated with Hypertension Among Women Aged 40 Years and Above in Enugu State

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### Abstract

*This study investigated lifestyle factors associated with hypertension among women aged 40 years and above in Enugu State, Nigeria. Two research questions and one null hypothesis guided the study. A cross-sectional research design was adopted for the study. A total of 190 women aged 40 years and above were selected using appropriate sampling techniques. A self-developed lifestyle factors associated with hypertension among women questionnaire (LFAHWQ) was used for data collection. Frequency and percentages were used to answer the research questions, while simple linear regression analysis was employed to test the null hypotheses at a 0.05 level of significance. The findings revealed that 37.9% of the respondents were hypertensive, indicating a high prevalence of hypertension among the study population. The most common lifestyle factors identified were low fruit and vegetable intake (73.7%), high salt intake (65.8%), and physical inactivity (57.9%). Regression analysis showed that all examined lifestyle factors—physical inactivity, high salt intake, alcohol consumption, cigarette smoking, and low fruit and vegetable intake—had statistically significant relationships with hypertension ( $p < 0.05$ ). Low fruit and vegetable intake and high salt intake were the strongest predictors of hypertension. In addition, there was a statistically significant relationships with hypertension ( $\beta = 0.389$ ) ( $\beta = 0.412$ ) and high salt intake ( $\beta = 0.389$ ). This implies that, there is a significant relationship between hypertension and lifestyles. The study concluded that unhealthy lifestyle practices significantly contribute to the development of hypertension among women aged 40 years and above in Enugu State. It is therefore recommended that public health interventions focusing on lifestyle modification be strengthened to reduce the burden of hypertension among this population.*

**Keywords:** Lifestyle factors, Hypertension prevalence, Association, Women, Nigeria

### Introduction

Hypertension, often characterized as a "silent killer," remains a significant global public health challenge and is the leading modifiable risk factor for cardiovascular disease (CVD) and premature mortality (World Health Organization [WHO], 2024). Recent projections suggest that by 2025, the number of adults living with hypertension globally will reach 1.5 billion, with the most substantial burden shifting toward low- and middle-income countries (LMICs), particularly in Sub-Saharan Africa (Adeloye et al., 2021; WHO, 2024). In Nigeria, the prevalence of hypertension is alarmingly high, with national estimates indicating that approximately one in three adults is affected, yet a significant proportion remains undiagnosed or poorly managed (Nigerian Hypertension Society [NHS], 2025). The epidemiological transition in Nigeria, marked by rapid urbanization and the adoption of Westernized lifestyles, has contributed to a rising incidence of non-communicable diseases (NCDs). Emerging data from the 2024 Nigeria Demographic and Health Survey (NDHS) highlight a gender-specific disparity, revealing that Nigerian women are increasingly diagnosed and treated for hypertension at higher rates than men (NDHS, 2024). For women aged 40 years and above, this risk is exacerbated by biological

changes associated with menopause and a higher prevalence of sedentary behaviour and obesity (Ezekwesili et al., 2023).

In Southeast Nigeria, specifically within Enugu State, local studies have reported prevalence rates ranging from 38% to over 50% in middle-aged and elderly populations (Ekochin et al., 2025; Umegbolu & Ogamba, 2024). Despite the academic and clinical prominence of Nsukka as a major educational and commercial hub, there is a paucity of recent data specifically targeting the lifestyle determinants—such as dietary salt intake, physical inactivity, and alcohol consumption—that drive hypertension among women in this transitional period of life.

However, middle aged Women are exposed to multiple risk factors that predispose them to hypertension, including age-related physiological changes, hormonal fluctuations associated with menopause, and unhealthy lifestyle practices. Lifestyle factors such as poor dietary habits, physical inactivity, obesity, alcohol consumption, and stress have been identified as major contributors to the rising prevalence of hypertension.

Hypertension, commonly referred to as high blood pressure, is a chronic medical condition characterized by a persistent elevation of arterial blood pressure. It is typically defined as a systolic blood pressure of  $\geq 140$  mmHg and/or a diastolic blood pressure of  $\geq 90$  mmHg on at least two separate measurements taken under standardized conditions (World Health Organization [WHO], 2023). Hypertension is a major risk factor for cardiovascular diseases, including stroke, myocardial infarction, heart failure, and chronic kidney disease, and it often remains asymptomatic until complications develop (Mills et al., 2020).

Hypertension prevalence among women is influenced by several lifestyle and socio-demographic factors. Studies indicate that obesity, low physical activity, unhealthy dietary patterns, and increasing age significantly increase the likelihood of developing hypertension among women. For example, research shows that overweight and obese women are more likely to develop hypertension and other cardiovascular conditions compared with women with normal body weight (Bani Baker, 2024).

Lifestyle factors refer to the habitual patterns of behaviour, choices, and activities adopted by individuals or groups that influence health status and quality of life. These behaviours include dietary habits, physical activity, tobacco use, alcohol consumption, stress management, and sleep patterns (World Health Organization, 2019). Evidence shows that unhealthy lifestyle behaviours significantly increase the risk of hypertension and other cardiovascular diseases among women. Modifiable factors such as obesity, excessive salt intake, sedentary lifestyle, alcohol consumption, and smoking contribute substantially to elevated blood pressure levels (World Health Organization, 2025). Lifestyle behaviours significantly influence blood pressure regulation. Unhealthy dietary practices (e.g., high salt and saturated fat intake), physical inactivity, excessive alcohol consumption, smoking, and chronic stress have been strongly associated with the onset and progression of hypertension. Conversely, healthy lifestyle modifications—such as regular physical activity, adherence to the DASH diet, weight control, and stress reduction—are effective non-pharmacological strategies for preventing and managing hypertension (Whelton et al., 2018).

The concept of association is central to epidemiological investigation. Association refers to a statistical relationship between two or more variables, indicating that they occur together more frequently than would be expected by chance alone (Friis & Sellers, 2021). In hypertension research, associations are examined between potential risk factors and elevated blood pressure levels to determine patterns and strength of relationships. For instance, there is a well-established positive association between obesity and hypertension, as well as between excessive sodium intake and increased blood pressure. However, it is important to distinguish association from causation, as an observed relationship does not necessarily imply a direct cause-and-effect link.

The focus on women as a specific population group in hypertension research is particularly important due to biological, hormonal, and socio-cultural differences that influence health outcomes. Women experience unique physiological stages such as menstruation, pregnancy, and menopause, all of which

may affect cardiovascular function. Although premenopausal women generally exhibit lower blood pressure compared to men of the same age, the risk of hypertension increases significantly after menopause due to hormonal changes, particularly the decline in oestrogen, which affects vascular elasticity and endothelial function (Lloyd-Jones et al., 2022). Furthermore, hypertensive disorders of pregnancy, including gestational hypertension and preeclampsia, are known to increase long-term cardiovascular risk in women.

Therefore, there is a need to conduct a cross-sectional study to assess lifestyle factors associated with hypertension among women aged 40 years and above in Enugu State, with the aim of providing evidence-based information to support preventive strategies and improve health outcomes. Understanding these behavioural correlates is critical for developing culturally tailored public health interventions.

This study, therefore, sought to investigate the lifestyle factors associated with hypertension among women aged  $\geq 40$  years in Nsukka, Enugu State. By identifying the specific modifiable risk factors within this demographic, the findings aim to inform local health policies and encourage the integration of lifestyle modification programs into primary healthcare delivery in the region.

### **Purpose of the Study**

The purpose of the study was to investigate the lifestyle factors associated with hypertension among women aged 40 years and above in Enugu State. Specifically, the study determined:

1. the hypertension rates among women aged 40 years and above in Enugu State.
2. the lifestyle factors common among women aged 40 years and above in Enugu State

### **Research questions**

1. What are the hypertension rates among women aged 40 years and above in Enugu State?
2. What are the lifestyle factors common among women aged 40 years and above in Enugu State?

### **Hypotheses**

1. There is no significant difference between prevalence and hypertension among women aged 40 years and above in Enugu State.
2. There is no significant difference between lifestyle factors and hypertension among women aged 40 years and above in Enugu State

### **Methods**

The cross-sectional research design was employed in the study. The population for the study consisted of 400 women aged 40 years and above residing in Enugu State. Participants were excluded if they were pregnant (to avoid gestational hypertension bias) or had a known history of secondary hypertension. A multi-stage sampling technique was used to select participants from various health facilities within the study area. A sample size of 200 women aged 40 years and above was determined using Taro Yamane's formula (1967). Multi-stage sampling procedure was used to draw the study sample. First stage involved the use of simple random sampling technique of balloting without replacement to select 4 facilities in Enugu State. The second stage involved the use of non-proportionate stratified random sampling technique to select two health facilities from Urban areas and two health facilities from rural areas. The use of this sampling technique is justified by non-uniformity in the distribution of health facilities in Enugu State. Simple random sampling technique of balloting without replacement was used to select 50 women from each of the selected health facility in the study area. This was made up of fifty women respectively. The preceding sample procedures produced a total of 200 women which constituted the study sample.

A self-developed Lifestyle Factors Associated with Hypertension in Women questionnaire (LFAHWQ) was used for data collection. Two hundred (200) copies of the questionnaire were administered to the respondents and returned completely. Out of the returned 200 copies, 10 copies were not duly filled out, thus discarded. Therefore, data extracted from 190 copies of the questionnaire were used for analysis. This yielded 95 per cent return rate. Face validity of the instrument was established by five experts, from the Department of Human Kinetics and Health Education University of Nigeria, Nsukka, to ascertain if the contents is in line with objectives of the study. Comments and suggestions of the validates were effected accordingly, thereafter, the final copy of the questionnaire was produced. Using Cronbach’s Alpha method to establish the internal consistency of the instrument, a reliability coefficient of .69 was obtained for the LFAHWQ. Nwagu (2005) asserted that a reliability coefficient of .60 and above is high enough for use in a study.

Frequency and percentage were used to analyze and answer the research questions, the null hypotheses were tested using simple linear regression analysis at .05 level of significance. The null hypothesis was rejected when the calculated p-value was less than or equal to .05, and was not rejected when the p-value was greater than .05 level of significance.

**Results**

**Table 1: Prevalence of Hypertension Among Women Aged 40 Years and Above in Enugu State (N = 190)**

Blood Pressure Status	Frequency (f)	Percentage (%)
Hypertensive	72	37.9
Not hypertensive	118	62.1
<b>Total</b>	<b>190</b>	<b>100.0</b>

Table 1 shows that 72 respondents (37.9%) were hypertensive, while 118 respondents (62.1%) were not hypertensive. This indicates that slightly over one-third of women aged 40 years and above in Enugu State had hypertension.

**Table 2: Lifestyle Factors Among Women Aged 40 Years and Above in Enugu State (N = 190)**

Lifestyle Factors	Yes n (%)	No n (%)
Physical inactivity	110 (57.9)	80 (42.1)
High salt intake	125 (65.8)	65 (34.2)
Alcohol consumption	70 (36.8)	120 (63.2)
Cigarette smoking	28 (14.7)	162 (85.3)
Low fruit and vegetable intake	140 (73.7)	50 (26.3)

Table 2 indicates that low fruit and vegetable intake (73.7%), high salt intake (65.8%), and physical inactivity (57.9%) were the most common lifestyle factors among the respondents. However, alcohol consumption and cigarette smoking were also prevalent.

**Table 3: Simple Linear Regression Analysis of Lifestyle Factors and Hypertension Among Women Aged 40 Years and Above in Enugu State (N = 190)**

Variables	B	Std. Error	B	T	P	Decision
Physical inactivity	0.28	0.062	0.32	14.60	0.001	Rejected
High salt intake	0.34	0.058	0.38	5.90	0.000	Rejected
Alcohol consumption	0.21	0.071	0.24	3.00	0.003	Rejected
Cigarette smoking	0.19	0.083	0.17	2.30	0.018	Rejected
Low fruit and vegetable intake	0.36	0.060	0.41	6.10	0.000	Rejected

**Model Summary:** R = 0.64, R<sup>2</sup> = 0.41, Adjusted R<sup>2</sup> = 0.39, p < 0.05

Table 3 show that all the examined lifestyle factors had statistically significant relationships with hypertension among women aged 40 years and above in Enugu State. Low fruit and vegetable intake ( $\beta = 0.412$ ) and high salt intake ( $\beta = 0.389$ ) were the strongest predictors of hypertension. Since the p-values for all predictors were less than 0.05, all null hypotheses were rejected, in other words, there is a significant relationship between hypertension and lifestyles.

### Discussion

Results in Table 1 revealed that 72 respondents (37.9%) were hypertensive, while 118 respondents (62.1%) were not hypertensive. This indicates that slightly over one-third of women aged 40 years and above in Enugu State had hypertension. This result was expected not surprising. This result aligns with reports from the World Health Organization (WHO,2023), which notes that the burden of hypertension increases markedly after the age of 40 due to age-related vascular changes, hormonal alterations, and cumulative exposure to lifestyle risk factors. However, (Bani Baker, 2024) stated that obesity, low physical activity, unhealthy dietary patterns, and increasing age significantly increase the likelihood of developing hypertension among women.

Results in table 2 showed that low fruit and vegetable intake (73.7%), high salt intake (65.8%), and physical inactivity (57.9%) were the most common lifestyle factors among the respondents. This result is expected. It concurs with the findings of global and regional reports that identify unhealthy diets and sedentary lifestyles as dominant behavioural risk factors for hypertension (WHO, 2023). High salt consumption observed in this study may be attributed to dietary patterns that include processed foods, seasoning cubes, and salted traditional meals, which are commonly consumed in many Nigerian households. Excessive salt intake has been shown to increase blood pressure by promoting water retention and increasing vascular resistance (He et al., 2020). Likewise, low consumption of fruits and vegetables deprives individuals of essential micronutrients such as potassium and antioxidants that help regulate blood pressure. This finding also concurs with the finding of Ferri et al., (2025), the authors indicated that diet, body weight, and physical activity account for a considerable proportion of hypertension cases, with body mass index alone contributing to about 20–35% of hypertension risk in some populations. The findings of the present study therefore corroborate existing evidence that hypertension is highly prevalent among women in this age group.

Results in table 3 revealed that all the examined lifestyle factors had statistically significant relationships with hypertension among women aged 40 years and above in Enugu State. Low fruit and vegetable intake ( $\beta = 0.412$ ) and high salt intake ( $\beta = 0.389$ ) were the strongest predictors of hypertension. Since the p-values for all predictors were less than 0.05, all null hypotheses were rejected, in other words, there is a significant relationship between hypertension and lifestyles. This finding is in agreement with previous studies conducted both locally and internationally, confirming that lifestyle factors play a crucial role in the development and progression of hypertension among women aged 40 years and above. It agrees with the finding of (WHO, 2023), who stated that unhealthy diets and sedentary lifestyles as dominant behavioral risk factors for hypertension.

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## Relationship between Managing Emotions and Sports Performance among Student-Athletes in College of Education, Zing, Taraba State, Nigeria

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### Abstract

*Emotion is a complex psychological experience of an individual's state of mind interacting with the biochemical and environmental factors. It is commonly accepted that playing sports can produce strong emotional response. Examining how athletes manage these emotions has opened up new and exciting lines of research intended to inform ways of practice. Meanwhile, athletes who are aware of, and are able to effectively manage emotions such as excitement and anger have an advantage over those that can't or won't. It was therefore hypothesized that there was no significant relationship between managing emotions and sport performance among student-athletes in College of Education, Zing, Taraba State, Nigeria. A correlational research design was used for the study with a sample of one hundred and six student-athletes purposively selected for the study. A section of the Emotional Intelligence Questionnaire dealing with managing emotions was used for data collection. The reliability of the instrument was determined using split-half technique and coefficient alpha of  $r = 0.74$  was obtained. Data collected were analyzed using frequency counts, percentages and Pearson Product Moment Correlation Coefficient at 0.05 level of significance. The result revealed that there was no significant relationship between managing emotions and sport performance ( $r=df, 86=0.208$  ( $p>0.05$ ) among student-athletes in College of Education, Zing. It was therefore recommended among other things that sport psychologists should emphasize emotion regulation and management on student-athletes during training.*

**Key words:** Relationship, Managing Emotions, Sports Performance, Student-Athletes.

### Introduction

Emotion is a complex psychological experience of an individual's state of mind interacting with the biochemical and environmental factors. Of all the factors affecting sports performance, it seems that the most important is the ability of an athlete to identify and assume the appropriate feeling required to perform at his/her best when he/she needs to do so. Whatever might be the level of skill, strength and experience of an athlete, his/her performance in the face of stiff competition will largely be influenced by his/her ability to assume the right emotion and attain an appropriate level of emotional energy for performing at his optimum. Beyond physical health, sports participation fosters emotional intelligence (EI), a critical set of skills essential during adolescence and involves the ability to perceive, understand, regulate, and use emotions effectively (Mayer et al., 2004; Ghimire et al., 2023). Teamwork, goal-setting, and competitive challenges in sports promote self-regulation, empathy, resilience, and social competence in adolescents, thereby assisting them in managing fluctuating self-esteem and peer relationships (Bhattarai et al., 2020; Karki et al., 2023; Suardika & Adelina, 2024)

The significance of emotional influence on sport performance has often been evident in most comments of spectators, team managers and sports analysts on athletes' and team's performance during and after competitions (Argyrols, 2006). Often times, they comment on players' display of confidence or lack

of it, aggressiveness or timidity, resilience or depression, anger or enthusiasm, frustration or determination and other forms of emotionality while attributing to such factors as being responsible for the success or failure of their performances (Ajayi, 2001).

Sport is all forms of usually competitive physical activities through casual or organized participation aimed at using, maintaining, or improving physical ability and skills while providing entertainment to participants, and in some cases spectators. Sports performance is the carrying out of specific physical routines or procedure by one who is trained or skilled in physical activity. It is influenced by a combination of physiological, sociological and socio-cultural factors. Sport performance is an emotional experience for many athletes. Victory in sports can result in happiness and joy, and a defeat may result in despair and disappointment. An athlete's emotional state may also affect the outcome of a competition by influencing performance both during training and while competing (Butler, 2006). Emotions play a central role in sport performance; accordingly, it is important that athletes are able to draw on a range of strategies to enhance emotional control. It was observed that student-athletes often display anger, frustration, aggression and other unsportsmanlike behaviours in the face of provocation from opponents or officiating officials during competitions. Student-athletes in College of Education, Zing have proven to be some of the best in North – East in NICEGA. Games, but have demonstrated poor strategies to cope with their emotions, therefore, the researchers need to investigate how the student – athletes manage their emotions. This may be due to lack of ability to manage emotions appropriately. It was therefore hypothesized that there was no significant relationship between managing emotions and sport performance among student-athletes of College of Education Zing, Taraba state, Nigeria

### **Theoretical Framework**

The theoretical framework adopted for this study is the Ability Model of Emotional Intelligence, propounded by Peter Salovey and John D. Mayer in 1990. This model conceptualizes emotional intelligence as a form of cognitive ability that reflects how effectively an individual can process and utilize emotional information. It comprises four key components: the ability to perceive emotions, use emotions to facilitate thinking, understand emotions, and manage emotions effectively. In the context of sports performance, the model is particularly relevant as it enables athletes to regulate anxiety, stress, and competitive pressure, enhances decision-making and concentration under high-stress conditions, and is widely applied in research examining the relationship between emotional intelligence and performance consistency.

### **Objective of the Study**

The objective of the study is to determine the relationship between managing emotions and Sport Performance

### **Hypothesis**

There is no significant relationship between managing emotions and sport performance among student-athletes in College of Education Zing

### **Emotion and Sport Performance**

Competitive sports evoke a wide range of feelings and emotions. It is commonly accepted that playing sports can produce strong emotional response. Examining how athletes manage these emotions has open up new and exciting lines of research intended to inform ways of practice. For example, athletes who are stressed by work or by colleagues tend to become intensely emotional in sport, and have fragile belief in their ability to maintain appropriate performance states during intense competitions. Meanwhile, athletes who are aware of, and are able to effectively implement strategies to manage emotions such as excitement, anger, irritation etc., have an advantage over those that can't or won't. Developing confidence in athletes so that they can manage performance state successfully is an important objective. Research has shown that, one consequence of a failure to manage stress and corresponding emotions is a narrow focus of concentration. This can lead to athlete missing important performance cue, and therefore, performance declines accordingly.

Emotions experienced before and during sport competition influence performance (Hanin, 2010). Appropriate emotional responses might be beneficial to an athlete, for example, it improved the economy of movement, and the quality of interaction with teammates, reducing the risk of disciplinary action and the risk of injury. Managing emotion is therefore regarded by sport psychologists as an important psychological skill. Emotion management is the automatic or deliberate use of strategies to initiate, maintain, modify or display emotions (Gross & Thomson, 2007). Emotions are subjective feelings experienced in response to events either in the athlete's environment, such as walking onto the field of play, or the athlete's mind, such as anticipation of an upcoming event (Lazarus, 2005). Emotions in sports usually encompass three types of response: physiological such as increased respiration, and heart rate; cognitive such as the changes in attention, perception and information processing priorities; and behavioural such as aggression towards an opponent or displaying a disgust at an official's decision. In such situation, maintaining the current emotion might not facilitate performance. Emotion management strategies are employed when such discrepancy exists between current and desired emotion.

The development of junior athletes' emotional intelligence and self-control is an integral component of moral-volitional training in the education of athletes. The formation of such qualities as purposefulness, perseverance, persistence, independence, initiative, determination, courage, endurance, and self-control comprises the content of the development of a young individual's character and will (Boryshevsky, 2012). The will is an individual's conscious and purposeful activity related to overcoming obstacles and achieving a desired result; it aims at managing a behavioural act. This act can be referred to as an act of volitional action. Achieving a desired result is accompanied by the understanding of one's emotions, a partner's or opponent's emotions, and the ability to consider emotional states in actual activities. Researchers focus on self-control and self-regulation of emotions in the development of the emotional-volitional sphere and emotional intelligence (Castro-Sánchez et al., 2019; Zarytska, 2019).

Athletes are more likely to try to manage emotion if they believe that doing so will facilitate performance. Athletes develop beliefs about emotions associated with optimal performance and this belief plays a role in emotion management in competition. For example, many athletes like to feel anxious before an event and will up-regulate that emotion accordingly. Emotions play a central role in sport performance. Feelings of emotions such as determination to hit the next shot, frustration at a poor call, or guilt for poor pass, can have different impact on performance. Emotion can distract athletes, provide energy or be seen as signal that something is amiss.

A great demonstration on the value of emotional management in sport was when a Canadian women's Hockey team won the gold medal at the 2008 Salt Lake City Olympics. Canada had thirteen penalties called against them by the American referee. The potential for frustration and anger to negatively impact the team was close at hand. However, the coaches and players showed considerable leadership and poise as they maintained their composure and focus to the task. The result was golden. In fact, in the heat of a competition, emotional management becomes a competitive skill. Positive outcomes in sport are typically the result of consistent focus and maintaining optimal arousal levels for the demands of a particular sport.

Personality, competitive experience, social environment and particular situations, are factors that can influence a person's response and the degree to which it affects performance. Understanding the anatomy of emotions and developing strategies for more effective responses might save a performance and potentially add that competitive edge over a competitor.

Research on emotional management conducted by Hanin, (2010) where one hundred and forty-three (N=143) participants completed a six-factor emotional intelligence scale (EIS) of twenty-seven (27) items questions of emotional management scale that was developed by using quotes was proposed to illustrate management of emotions. The result supported the notion that emotional intelligence,

emotional management, and psychological skills usage are inter-correlated, regression analysis suggests that variance between emotional intelligence, emotional management, and psychological skills were evident; indeed, increased usage of psychological skills might enhance both emotional intelligence and emotional management. Therefore, future research should investigate the extent to which changes in physiological skills usage reflects commitment in emotional management and mental toughness.

**Methods**

A correlation design was used for this study. The population of the study comprised two hundred and twenty-eight (128) student-athletes of College of Education, Zing who participated in the NICEGA games. A sample of one hundred and six (106) of them was purposively selected. A segment of the Emotional Intelligence Questionnaire dealing with managing emotion was used to collect data. Of the 106-questionnaire administered, and 88 were properly completed and returned which were used for data analysis. The reliability of the instrument was determined using split-half technique and coefficient alpha of  $r = 0.74$  was obtained. Data collected were analysed using descriptive statistics of frequency counts, percentages mean and standard deviation, while inferential statistics of Pearson Product Moment Correlation Coefficient (PPMCC) was used to test the hypothesis at 0.05 level of significance.

**Results**

Table 1: Demographic information of respondents

				N= 88
Variables	Responses	Respondents	Percentage	
Age	1. 18-22 years	33	37.5	
	2. 23-27 years	46	52.3	
	3. 28-32 years	5	5.6	
	4. 33-37 years	2	2.3	
	5. 38-above	2	2.3	
	<b>Total</b>		<b>88</b>	<b>100%</b>
Gender	1. Male	43	48.9	
	2. Female	45	51.1	
	<b>Total</b>	<b>88</b>	<b>100%</b>	
Sport	1. Ball game	69	78.4	
	2. Racket game	19	21.6	
	<b>Total</b>	<b>88</b>	<b>100%</b>	

Table1 is the result of demographic data of the respondents. The result shows that 88 respondents participated in the study, out of which 33 (37.5%) were between the ages of 18-22years, 46 (52.3%) were of 23-27 years of age, 5 (5.6%) were 28-32 years of age, 2 (2.3%) were 33-37 years of age, while another 2 (2.3%) were 38-year-old and above. On gender, the result showed that 43 (48.9%) were male student-athletes, while 45 (51.1%) were female student-athletes. Consequently, item 3 on the table indicates categories of sports participated by the student-athletes. The result showed that 69 (78.4%) of the student-athletes participated in ball games, while 19 (21.6%) of them competed in racket games.

**Table 2: Frequency and percentage distribution of student-athletes level of sport performance**  
N= 88

Sports	Gender	Performance			Frequency	Percentage
		Win	Draw	Lost		
Football	M	11			11	12.3
	F		16		16	18.18
Handball	M		12		12	13.63
	F		8		8	9.09
Basketball	M	6			6	6.82
	F			6	6	6.82
Volleyball	M	5			5	5.68
	F	5			5	5.68
Tennis	M	3			3	3.40
	F	4			4	4.55
Badminton	M	3			3	3.40
	F	3			3	3.40
Table Tennis	M	3			3	3.40
	F	3			3	3.40
<b>TOTAL</b>		<b>46</b>	<b>36</b>	<b>6</b>	<b>88</b>	<b>100</b>

Table 2 is a frequency and percentage distribution of performance level of student-athletes in college of education, Zing. The result shows all the sports participated for at the NICEGA competition with reference to male and female level of sport performance. Result indicated that in Football game, male student-athletes with the frequency 11(12.3%) Won their game, while the female student-athletes with frequency of 16(18.18%) Drew theirs; in Handball game, male student-athletes with frequency of 12(13.63%) Drew their game, while female student-athletes with frequency of 8 (9.09%) Won their game; in Basketball game, male student-athletes with the frequency of 6(6.82%) won their games while the female student-athletes with frequency of 6(6.82%), lost theirs; in Volleyball game, both the male and female student-athletes with frequency of 5 (5.68%) each won their game; also in the game of Tennis, both male and female student-athletes with frequency of 4(4.55%) and 3(3.40%) won their games respectively; consequently, in Badminton, both male and female athletes with the frequency of 3 (3.40%) and 3(3.40%) respectively, also won their games; in Table Tennis, both male and female student-athletes with a frequency of 3 (3.40%) and 3 (3.40%) each won their game. In summary, 46 student-athletes, representing 52.3 percent of the student-athletes won their games; 36 student-athletes, representing 40.9 percent respondents Drew their games, while 6 student-athletes representing 6.8 percent respondents lost their games. By this result, it means that student-athletes in College of Education Zing, Taraba State have high level of sport performance.

**Hypothesis Tested**

*There is no significant relationship between managing emotions and sport performance among student-athletes in College of Education Zing*

**Table 3: Correlation between sport performance and managing emotions.**

N= 88						
Variables	Mean	r-cal.	df	(alpha)	p-value	Decision
Performance	2.4545					
Managing emotions	3.0620	0.326	86	0.05	0.208	Significant

**Critical value=df,86=0.208 ( $p>0.05$ )**

Results on table 3 is a summary of correlation analysis between managing emotions and sport performance. The r-cal. =0.326, p-value=0.208 and the level of significance  $\alpha=0.05$  shows that the level of significance is more than the p-value, ( $p=0.208>\alpha=0.05$ ), therefore, the null hypothesis was accepted. This means that significant relationship does not exist between sport performance and management of emotions.

### Discussion

The level of sports performance of student-athletes in College of Education Zing, Taraba State, showed that higher percentage of the student-athletes won their games, most of them drew their games while few lost their games. By this result, it means that student-athletes of College of Education Zing had high level of sport performance. This result agrees with the findings of Butler (2006) who reported that sport is an emotional experience for many athletes that an important victory can result in happiness and joy, and a crushing defeat may result in despair and disappointment, and also, athletes' emotional state may affect the outcome of a competition by influencing performance both during training and while competing. The author is also of the view that emotions play a central role in sport performance; accordingly, it is important that athletes are able to draw a range of strategies to enhance emotional control.

The result of this study revealed that no significant relationship exists between managing emotions and sport performance among student-athletes in College of Education Zing, Taraba state. This result is similar to that of Hanin (2010) who carried out research on Handball players, the result supported the notion that emotional intelligence, emotional management and psychological skills are inter-correlated, which showed a significant relationship between managing emotions and sport performance. She also outlined that in the heat of a competition, emotional management becomes a competitive skill and that positive outcomes in sport are typically the result of consistent focus and maintaining optimal arousal levels for the demands of a particular sport. The implication of this finding therefore, is the fact that managing emotions will go a long way in assisting student-athletes to be calmed and focus in the face of stiff opposition during competition and be able to deliver on their motive for participation in sports.

### Conclusion and Recommendations

Based on the findings of this study, it was concluded that student-athletes in College of Education, Zing have high levels of emotional management which is correlated with their performance. Based on the result therefore, the following recommendations are made.

1. Since it has been established that there is no relationship between managing emotions and sports performance, sport psychologists should draw up psychological training programmes that will involve strategies for dealing and controlling emotional balance of athletes.
2. Coaches should inculcate in their players the need to control their emotions in the face of provocation by opponents and officials during competition.
3. Athletes should understand the role of emotions in sports performance, knowing that it makes or mar their performance, hence the need for them to manage it appropriately.

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## Post-Retirement Sustainability of Club and Team Sports Managers in North-West Nigeria: A Concise Review

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### Abstract

*Retirement transition in sport management is increasingly conceptualized as a lifespan career development process rather than a sudden occupational termination. This study examines post-retirement sustainability among club and team sports managers in Nigeria within the framework of sustainable career development, psychological transition theory, Career Transition Theory and human capital preservation in sport administration. The research focuses on the multidimensional nature of retirement sustainability, encompassing financial security, psychosocial wellbeing, professional relevance and adaptive employability after career exit. The study is grounded in Sustainable Career Theory, Career Construction Theory, Schlossberg's Transition Theory and Career Transition Theory. Collectively, these frameworks conceptualize retirement as a dynamic, adaptive and context-bound transition process requiring early preparation, institutional support, identity reconstruction and individual resilience. Career Transition Theory specifically emphasizes the normative and non-normative stages of career exit, coping resources, situational demands and environmental support systems that shape adjustment outcomes among sport professionals. Contemporary sport career literature emphasizes that dual career development; financial literacy, psychosocial preparedness and entrepreneurial skill acquisition significantly enhance retirement adjustment outcomes. Within the Nigerian sports governance environment, particularly in the North-West geopolitical region, post-service welfare protection systems remain weak due to contract-based employment structures, limited pension integration and inadequate structured career transition programs. Findings from existing scholarship indicate that early retirement planning, psychosocial counselling, career identity restructuring and professional diversification training improve post-retirement livelihood sustainability among sport professionals. The study therefore proposes the institutionalization of structured retirement transition programs, financial education modules, career counselling services and policy enforcement mechanisms within Nigerian sports administration systems.*

**Keywords:** Career Transition Theory, Club managers, Post-Retirement Sustainability, Sports Managers, Sustainable Careers

### Introduction

The sustainability of post-retirement career life among sports managers in Nigeria must be examined within the broader framework of national sport governance development and human capital preservation. Nigerian sport administration systems have historically prioritized competitive performance outcomes while giving less attention to long-term workforce welfare planning. Within sport management scholarship, career transition research has shifted toward sustainable occupational development rather than performance-based career valuation. Stambulova and Wylleman (2023) emphasized that sport career development should be viewed as a lifespan adaptive process involving continuous professional adjustment. Similarly, De Vos, Van der Heijden, and Akkermans (2024) argued that sustainable career development must integrate occupational health preservation, long-term employability, and productivity maintenance across professional life stages.

Employment structures within Nigerian professional sports organizations are largely contract-based, creating instability in long-term welfare protection for managerial personnel. Policy frameworks under the Federal Ministry of Youth and Sports Development of Nigeria emphasize sport industry growth but provide limited regulatory enforcement regarding managerial retirement protection. Nigerian sport governance literature indicates that institutional welfare systems remain underdeveloped within club-level sports administration. This structural weakness contributes to post-service socioeconomic vulnerability among sports managers transitioning out of professional employment.

Financial literacy and retirement planning awareness among Nigerian sports administrators remain relatively low. The Organisation for Economic Co-operation and Development (OECD, 2023) reported that individuals with strong financial education demonstrate greater retirement confidence and decision-making stability. In Nigerian occupational sustainability research, access to structured pension systems has been associated with improved post-retirement wellbeing outcomes.

Sport psychology literature between 2022 and 2025 further supports the importance of transition preparation. Lavallee, Wylleman, and Stambulova (2022) demonstrated that unplanned sport career termination increases risk of emotional distress, occupational anxiety, and identity disruption. Park, Lavallee, and Tod (2023) similarly found that career exit without structured adaptation programs is associated with psychological instability and reduced professional self-efficacy.

Dual career development has emerged as an effective strategy for improving occupational transition resilience. Aquilina and Henry (2024) showed that sport professionals who combine sport employment with academic or entrepreneurial development experience smoother retirement adjustment. Career Construction Theory supports this perspective by explaining that professional identity is continuously reconstructed across lifespan career stages (Stambulova & Wylleman, 2023).

Nigerian sport governance challenges are further intensified by regional economic limitations. Within North-West geopolitical states of Nigeria, industrial employment opportunities and private sport commercialization structures remain relatively underdeveloped. This economic environment increases dependence on primary sport administration income during active service periods. Nigerian labour sustainability studies suggest that professionals who engage in skill diversification and entrepreneurship training demonstrate stronger post-service livelihood stability.

### **Post-Retirement Sustainability in Sport Management**

Post-retirement sustainability in sport management refers to the capacity of sports professionals to maintain economic security, social integration, professional relevance and psychological wellbeing after exiting active service. Contemporary career sustainability scholarship between 2022 and 2025 has increasingly emphasized holistic career success indicators rather than narrow income-based assessment models. Sustainable career development is now conceptualized as a multidimensional construct that extends beyond financial stability to include life satisfaction, occupational adaptability and long-term health preservation.

De Vos, Van der Heijden and Akkermans, (2024) defined sustainable career development as the integration of occupational health sustainability, career satisfaction and adaptive employability across the professional lifespan. Occupational health sustainability focuses on maintaining physical and psychological wellness during and after career service. Career satisfaction reflects the degree of meaning and fulfilment derived from professional engagement, while adaptive employability refers to the ability to remain economically and professionally relevant through continuous skill development.

Aquilina and Henry (2024) demonstrated that sport professionals who participate in dual career pathways combining sport employment with academic qualification development or entrepreneurial skill acquisition exhibit stronger transition resilience during career exit. Dual career development provides alternative livelihood options and reduces dependence on single-source occupational income structures. This approach is particularly relevant in developing sport economies where employment security is often unstable.

The implication of contemporary sport transition literature is that retirement preparation should begin during active managerial service rather than after career termination. Early transition planning enables sports professionals to develop financial investment strategies, professional diversification skills and psychological readiness for career exit. Sport organizations therefore have a responsibility to support workforce sustainability through continuous professional development programs.

In emerging sport administration systems such as those found in Nigeria, institutional adoption of sustainable career planning frameworks remains limited. Strengthening organizational commitment to post-service welfare protection is essential for improving long-term career outcomes among sports management professionals.

### **Career Transition Theory and Psychological Adaptation**

The psychological dimension of sport retirement transition is explained through Schlossberg's Transition Theory, which emphasizes situation, self, support, and strategy as determinants of adaptation success. Lavalley, Wylleman, and Stambulova (2022) reported that sport career exit without structured preparation is strongly associated with emotional distress, uncertainty and identity disruption. Park, Lavalley and Tod, (2023) also confirmed that unplanned retirement significantly increases vulnerability to anxiety and financial instability among sport professionals. Application of these psychological transition models to Nigerian sports management indicates the necessity of counselling services and professional mentorship programs.

### **Financial Literacy and Economic Security**

Financial literacy represents one of the most critical determinants of successful post-retirement adjustment among sport management professionals. Economic sustainability after career exit is largely dependent on the level of financial knowledge, investment behaviour and long-term planning strategies developed during active service years. Contemporary retirement economics research indicates that financial competence is directly associated with retirement confidence, livelihood stability and psychological wellbeing during transition periods.

The Organisation for Economic Co-operation and Development (OECD, 2023) reported that individuals with higher financial literacy levels are more likely to engage in proactive retirement saving behaviour and demonstrate stronger decision-making capacity regarding long-term investment management. Financially literate professionals are better equipped to evaluate investment risks, diversify income sources, and maintain sustainable economic security after leaving employment. In sport management employment structures, where contracts are often performance-based, short-term and administratively flexible, financial planning becomes particularly important.

Sport management careers are characterized by income uncertainty due to organizational restructuring, competitive performance pressure and changing administrative leadership. Consequently, reliance on a single employment income stream during active service creates vulnerability during retirement transition. Sustainable career scholarship emphasizes the necessity of asset accumulation, savings discipline and investment portfolio diversification as core components of retirement preparedness.

Tian and Yang (2025) demonstrated that entrepreneurial intention plays a significant role in enhancing post-retirement livelihood adaptation among sport professionals. Entrepreneurial orientation enables retired sports managers to establish independent business ventures, sports consultancy services, coaching enterprises or sport development projects. Entrepreneurial career transition pathways reduce dependence on organizational pension systems and promote economic autonomy.

Furthermore, structured financial management education should be integrated into professional development programs for sports managers. Such programs should include training on personal budgeting, investment risk management, pension planning, real estate investment strategies and small business development. Sport federations, universities and professional associations have important roles in delivering these educational interventions.

In developing sport economies such as Nigeria, where access to formal financial advisory systems may be limited, institutionalized financial literacy training becomes even more critical. Strengthening economic security mechanisms within sports organizations will significantly improve long-term retirement adjustment outcomes among sports management professionals.

### **Nigerian Sports Industry Context**

The sports employment environment in Nigeria is characterized by institutional fragility, inconsistent welfare enforcement and informal managerial appointment structures. Club-level sports organizations often operate without standardized pension integration mechanisms. Although sport contributes significantly to youth development and economic engagement within regions such as the North-West geopolitical zone of Nigeria, post-service welfare systems remain poorly developed. According to contemporary African sport governance discourse, workforce sustainability policies are necessary to prevent human capital depletion within sport institutions.

### **Dual Career Development and Professional Diversification**

Dual career development has emerged as one of the most effective strategic approaches for improving retirement transition outcomes among sport professionals. The concept refers to the simultaneous pursuit of sport-related employment alongside academic education, vocational training or entrepreneurial skill acquisition. Modern sport career sustainability scholarship emphasizes that professional success should not be limited to performance achievements during active service but should also include post-service livelihood security and occupational adaptability.

Aquilina and Henry (2024) demonstrated that sport professionals who engage in dual career pathways combining sport employment with formal education or business skill development experience significantly smoother occupational exit transitions. Dual career participation enhances human capital accumulation, expands employment opportunities and reduces dependency on single occupational income streams. This approach is particularly relevant in sport administration systems where employment security is often influenced by organizational restructuring, leadership changes and performance evaluation pressures.

Career Construction Theory provides strong theoretical support for dual career development by explaining that professional identity is continuously reconstructed across the lifespan. Individuals actively create meaning from their career experiences by adapting their vocational narratives in response to changing life circumstances. Through this perspective, retirement is not considered career termination but rather a transition into a new phase of professional and social engagement.

Stambulova and Wylleman (2023) further argued that adaptive career narratives contribute to long-term psychological stability and occupational resilience. Professionals who develop flexible career identities are more capable of managing career discontinuity, social role change and economic adjustment after retirement. Psychological resilience is strengthened when individuals maintain multiple professional competencies and diversified occupational interests.

Within the Nigerian sports management environment, dual career development is particularly important due to limited institutional welfare protection structures. Sport administrators are encouraged to pursue additional professional qualifications such as sport coaching certification, sport marketing specialization, business entrepreneurship training or academic postgraduate education. Diversification of professional competencies allows retired sports managers to participate in consultancy services, sport development projects or private enterprise activities.

Sport organizations, professional associations and educational institutions have important responsibilities in promoting dual career development programs. Continuous professional development workshops, scholarship opportunities and entrepreneurship incubation programs should be integrated into sports management career structures to enhance long-term sustainability.

On the whole, dual career development represents a strategic human capital preservation mechanism that supports both individual career security and institutional workforce sustainability within modern sport administration systems.

### **Counterarguments and Critical Discussion**

Some scholars argue that retirement preparation should primarily be treated as an individual professional responsibility within neoliberal labour market philosophy. This perspective suggests that sports administrators should independently develop personal investment portfolios, savings mechanisms and post-career livelihood strategies without expecting organizational welfare intervention. Advocates of this position contend that excessive institutional welfare obligations may reduce organizational financial flexibility and operational efficiency.

However, contemporary human resource sustainability scholarship increasingly challenges the individualistic retirement planning model. **De Vos, Ans, Van der Heijden, Beatrice and Akkermans, Jos** (2024) emphasized that sustainable career systems should be conceptualized as shared responsibilities between employees and employing institutions. Their research reinforces the argument that organizational structures must provide career development support, transition planning opportunities, and occupational wellbeing protection across professional lifespan stages.

Similarly, **Aquilina, Dawn and Henry, Ian** (2024) demonstrated that dual career development pathways significantly enhance transition resilience among sport professionals. Their work shows that professionals who combine sport administration employment with academic advancement or entrepreneurial training experience smoother occupational exit adaptation and stronger post-retirement livelihood stability.

In addition, sport career transition psychology research by **Stambulova, Natalia and Wylleman, Paul** (2023–2024) highlighted that career sustainability depends on adaptive coping resources, psychosocial support systems, and structured transition preparation. Their lifespan developmental model conceptualizes sport careers as continuous psychological and professional evolution rather than fixed occupational trajectories.

In developing sport economies such as Nigeria, institutional intervention is particularly necessary because private retirement investment opportunities, professional financial advisory systems, and long-term sport workforce welfare structures remain relatively limited. Without organizational participation, sports managers may face heightened socioeconomic vulnerability following career exit.

### **Policy and Governance Implications**

Sports governing authorities in Nigeria must prioritize retirement transition governance as an integral component of national sport development strategy. Mandatory retirement counselling programs should be embedded within sport employment contracts to provide structured psychological, financial, and professional guidance throughout active service years.

Pension scheme enforcement should be strengthened within Nigerian sport organizations through contributory welfare participation models. Adoption of sustainable pension contribution systems will enhance post-service financial security and reduce retirement poverty risks among sport administrators. Continuous professional education must be institutionalized within sport administration structures. Professional development programs should include sport management certification training, entrepreneurship incubation workshops, digital business literacy, and career diversification education.

The establishment of sport management transition and sustainability centres across Nigeria's geopolitical zones is recommended. These centres can be operated through strategic collaboration between the **Federal Ministry of Sports Development (2024)**, Nigerian universities, sport federations, and professional sport associations.

Public private partnership investment models should be encouraged to support sport workforce welfare development. Government fiscal incentives, sport entrepreneurship funding schemes, and institutional innovation grants can promote post-retirement livelihood sustainability among sport management professionals.

Strengthening governance structures that support structured career transition planning will contribute to human capital preservation, reduce post-service socioeconomic vulnerability, and enhance long-term administrative professionalism within Nigerian sport systems.

### **Challenges**

Post-retirement sustainability of club and team sports managers in North-West Nigeria is constrained by several structural, institutional, and socio-economic challenges.

First, the absence of standardized retirement planning systems within Nigerian sports organizations remains a major obstacle. Many sports managers operate under contract-based employment arrangements without long-term welfare guarantees. This structural instability increases vulnerability to financial insecurity after service exit.

Second, limited financial literacy among sports professionals contributes to poor retirement preparedness. OECD (2023) emphasized that individuals with low financial education demonstrate reduced confidence in post-career financial decision-making. In many Nigerian sports organizations, structured financial management training is not routinely provided during active service.

Third, psychological adaptation challenges remain significant. Lavalée, Wylleman and Stambulova, (2022) reported that sport career termination may generate identity disruption, anxiety and reduced occupational self-efficacy when transition support is weak. Sports managers who strongly associate personal identity with organizational authority may experience greater adjustment difficulty after retirement.

Fourth, institutional policy gaps within Nigeria's sports governance system further complicate sustainability outcomes. The Nigerian sports employment environment lacks enforceable legislation mandating pension integration and career transition programs for sports management personnel.

Fifth, limited access to alternative employment opportunities constitutes a major socioeconomic barrier. While entrepreneurial transition represents a viable pathway, many sports managers lack structured business training or capital access required for post-service enterprise development.

### **Conclusion**

Post-retirement sustainability among club and team sports managers remains a neglected but critical component of sports governance in Nigeria. Evidence from 2022–2025 sport career literature demonstrates that early transition planning, financial literacy, dual career development and institutional support systems significantly enhance retirement adaptation outcomes. Without systematic policy intervention, sports managers may continue to face socio-economic and psychological vulnerabilities after service exit. The development of a structured retirement sustainability framework represents an essential step toward strengthening human capital preservation within Nigerian sport administration.

### **Recommendations**

Based on contemporary sport transition scholarship and Nigerian sports governance realities, the following recommendations are proposed:

1. **Institutionalization of Retirement Transition Programs**  
Sports organizations should establish mandatory retirement planning and counseling units to guide managers during active service.
2. **Integration of Pension and Welfare Protection Schemes**  
Nigerian sports clubs and governing authorities should enforce contributory pension inclusion within managerial employment contracts.
3. **Promotion of Dual Career Education**  
Sports management professionals should be encouraged to pursue academic certification, entrepreneurship training, or professional specialization outside sport administration.

4. **Development of Financial Literacy Training Modules**  
Sport federations and educational institutions should organize periodic financial management workshops for sports personnel.
5. **Establishment of Sport Management Transition Centres**  
Federal and state sports authorities should collaborate with universities to create career transition and consultancy support hubs.
6. **Psychosocial Support and Mentorship Systems**  
Counselling services should be integrated into sports organizations to support psychological adjustment during career exit.
7. **Strengthening Nigerian Sport Governance Policies**  
Policymakers should develop legal frameworks enforcing welfare protection, retirement benefits, and post-service career development for sports administrators.

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## Perceived Barriers to Accessing the Available Health Facilities Among Undergraduates at the University of Nigeria, Nsukka

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### Abstract

*Health facilities are needed in higher institution for appropriate information towards good health which includes clinics, hospitals, psychiatric centres, laboratories among others. The present study aimed to determine the perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka. Descriptive survey design was adopted for this study. Instrument for data collection was done using perceived Barriers to Accessing the Available Health Facilities Questionnaire (PBAAHFQ) and 200 questionnaires were distributed and 195 were dully completed and returned. After checking for the properly completed responses, 2 were found to be eit her incompletely fille d or they were mutilated. Therefore, 193 questionnair es w ere us ed f or analysis. Th e dat a collecte d were analysed using frequenc y and percent age. Th e result revealed that t he mai n perceiv ed barri er to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka is poor attitude of the healthcare workers 174 (90.2%). According to the age of undergraduates, the age range of (21-25) years reported that the main perceived barriers to accessing the available health facilities is waiting time is too long 71 (98.6%). Conclusions drawn from the study shows that an undergraduate within the age range of 21-25 years has high level of barriers to accessing the available health facilities. The study further concluded that poor access to available health facilities among undergraduates in University of Nigeria, Nsukka can results to death. The researcher therefore recommends that health education should be made a General Study (GS) in the University. The researcher also suggests that similar studies should be carried out among tertiary students in Enugu State.*

**Keywords:** Perceived Barriers, Health Facilities, Undergraduates of University of Nigeria Nsukka

### Introduction

Health facilities are seriously needed in higher institution for appropriate information towards good health. Undergraduates are not only concerned about their health but also feel susceptible concerning certain areas of their health and need intervention (WHO, 2016). Although, undergraduates, majority of who are youths are vulnerable, there is tendency to overlook young people's health by policy makers (Keefe, 2017). Recently, more than 2.6 million young people aged 10-24 die each year in the world, mostly due to preventable or treatable cause (Patton, Coffey, Sawyer, Viner, Haller, Bose, Vos, Ferguson & Mathers, 2019). In Sub-Saharan Africa and South East Asia, two-thirds of all deaths occur among people of young age (Blum, 2019). According to Olusesan, Abayomi, Olayinka & David (2018), primary health facilities make up 88per cent of health facilities in Nigeria while secondary and tertiary 51 health facilities make up 12per cent and 0.25per cent respectively. In Nigeria, youths form a significant integral comprises of her undergraduates' population. The Nigeria health system is relatively weak, thus expecting the health facilities in the country's higher institutions to be stronger is unthinkable (WHO, 2019). Despites Nigeria's strategies position in African, the country is greatly underserved in the healthcare sphere. Health facilities (health centres, personnel, and medical equipment's) are inadequate in Nigeria, especially in rural area. In many countries, secondary and tertiary health facilities are crowded with people with simple ailments that can be managed at primary health centres, while

health workers in many of later are idle (Kruk, *et al.*, 2018). Studies in both developed and developing countries have linked inadequate access to healthcare facilities with increasing avoidable and preventable deaths (Kruk, Gage, Joseph, Danaei, García-Saisó & Salomon, 2018). The objectives of health education include educating on the importance of health, developing positive attitudes towards health issues, promoting decision-making in health-related field and to promote, maintain and improve individual and community health.

Health is the state characterized by anatomic, physiologic, and psychological integrity; an ability to perform personally valued family, work, and community roles; an ability to deal with physical, biologic, psychological, and social stress (Stokes, Noren & Shindell, 2020). Thus, for one to be healthy, one needs to be in perfect physical, psychological and social state. Interestingly, this definition introduces the concept of resilience, whereby health is not an absolute state of well-being as previously described, but also a means of coping with stressors experienced by an individual. It therefore follows, that health is determined by a person's physical, psychological, social, religious and economic environment. At Health Council of the Netherlands Conference (2019), experts argued that health was not static, but dynamic. In the conference, their preferred notion of health was: The ability to adapt and to self-manage. This concept viewed health as a dynamic process and a resource for everyday life, not merely an object to be obtained for the sake of itself, in keeping with the definition provided by Stokes, *et al.*, (2020). No Mather how academically equipped an institution is, it is a calm and healthy mind that brings inner strength and self-confidence, hence the need for quality and optimal healthcare facilities (Atueyi, 2019).

Health facilities are places that are equipped with resources that demands of different patients. The health facility includes clinics, hospitals, psychiatric centres, labs etc. The health facilities are equipped with equipment that is necessary to diagnose and treat disease. Health facility regulates a wide range of health care settings for quality of care, such as hospitals, nursing homes, assisted living residences, ambulatory care centres, home health care, medical day care and others. They also provide consumer information in the form of report cards and other performance information. A health facility is, in general, any location where healthcare is provided (Ahmadi-Javid., Seyedi, & Syam, 2017). In this study, health facilities include healthcare centre, medical nursing home, pharmacies and drug stores, medical laboratory or clinical laboratory and ambulatory care with aim of overseeing the good health of the undergraduate students. Though some health facilities may be available, access to those available is vital, hence perceived barriers to accessing available health facilities.

Perceived barriers to access quality health care are those factors that prevent an individual, population, and/or community from having access to health service. According to Backer (2016), barriers to access Health care are factors that prevent an individual, population, and/or community from acquiring access to health services and/or achieving best health. According to Warren, Stanton, Balanda, Gillespie and John (2016), barriers such as attitude change and the availability of a motivated person (health promotion officer) to lead the activities may be needed in order to produce an increase in the level of health promotion in public hospitals. According to University of Nigeria, Nsukka record department (UNN Attendance Register, 2018), less than 25 per cent of the student visited the clinic for the health-related issues in a month due to the above barriers associated with accessing health facilities. Barriers to accessing the availability of health facilities can be realized through health education, health policies, and government, among others. Educational programs for healthcare have a direct impact on the good health (Baysal, 2017). For the purpose of this study, perceived barriers to accessing the availability of health facilities can be described as those factors that are preventing the promoting and maintaining of good health among undergraduates in University of Nigeria, Nsukka this includes; poor attitude of the healthcare workers, waiting to see health personnel, location of the health facilities, unqualified health workers, use of substandard drugs and high cost of healthcare.

Poor attitude of the healthcare workers has been found to be the barrier to access the available health facility among undergraduates. Some patients, especially the uneducated, were treated with impatience

and discourtesy, given less information, and accorded less time. They were ordered around, yelled at, and accused of lying. It is for this reason among others that Larsson, Sahlsten, Segesten & Plos (2011) asserted that, when patients feel belittled verbally, a nurse may exercise the power of language or behave as a parent figure which negatively influences patient participation in nursing care. Zaroui, Joulei, Dorabi & Faraouei (2015) further pointed out that improper attitudes of health personnel as people who are in touch with patients impose more pressure on patients. Poor attitude of the health workers towards the patients can result to wasting of time while waiting to see health personnel on the patients' recent condition.

Waiting to see health personnel can lead to adverse health effects such as stress, anxiety or pain. According to Oche and Adamu (2013), Egbujie, et al. (2018), sixty-one per cent of the respondents waited for 90-180 min in the clinic, whereas 36.1% of the patients spent less than 5 min with the doctor in the consulting room. The commonest reason for the waiting to see health personnel in the General Out-patient Department (GOPD) was the large number of patients with few healthcare workers. However, the time taken for the patient to arrive at the health care can be determined by their location. Therefore, having good accesses to good health is determined by the location/distance of the health care facilities.

Location of the health facilities is a critical barrier to access good health care particularly for rural communities with poor transportation infrastructure who rely on non-motorized transportation. According to Evaitesns, Andreambeloston, Randriamihaja, Ihantamala, Cordier, Cowley (2022), they stated that the relocation of community health workers sites based on a geographical optimum was predicted to increase by 7.4%. Far distance/location to healthcare facilities may add to the high cost of healthcare.

High cost of healthcare has been found as one of the barriers to access the available health care facility. According to Human Rights Measurement Initiative (2022) that Nigeria is fulfilling 48.2% of what it should be fulfilling for the right to health based on its level of income. When looking at the right to health with respect to children, Nigeria achieves 66.6% of what is expected based on its current income.

Undergraduate is a period when some significant changes occur in the life of individuals. An undergraduate student is one who is considered to be enrolled on a full-time basis in a university, or a student enrolled in an accredited course of study requiring at least 16 hours per week of classes for a continuous period of at least six weeks, (New South Wales Government [NSW], 2021). In the context of this study, an undergraduate student is one who graduated from secondary education in a formal setting and enrolled in University of Nigeria, Nsukka. The perceived barriers to accessing the available health facilities among undergraduates in university of Nigeria, Nsukka may be influenced by age.

Age is the length of during which a being has existed. In a study conducted by Namadi (2016), it was reported that students between 16 - 17 years of age were the population of undergraduates with the highest vulnerability to illness while students between the ages of 18 - 27 were reported as the second highest population vulnerable to illness for the purpose of this study, age is the length of during of undergraduate from 16-35 years.

The University of Nigeria, Nsukka (UNN) was established by the Federal Government of Nigeria in 1955 and was founded by Nnamdi Azikiwe in 1955 and formally opened on 7 October 1960. University of Nigeria, Nsukka is the first indigenous university in Nigeria located in Nsukka, Enugu State, and Eastern region of Nigeria. It has sixteen faculties with a total of five hundred and ninety-nine thousand, nine hundred and sixty-two (599,962) students as at 2021/2022 academic session (Academic planning Unit, 2021). University of Nigeria, Nsukka was chosen for this study because of the consistent illness among undergraduates which leads to many health implications such as poor academic performance in examinations. Therefore, this study seeks to investigate the barriers to accessing the available health

facilities among undergraduates in the University of Nigeria, Nsukka.

### **Objective of the Study**

The main objective of the study is to determine the perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka and the study seek to:

- i. find out the perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka.
- ii. find out the perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age.

### **Research Questions**

The following research questions were posed to guide the study:

- i. What are the perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka?
- ii. What are the perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age?

### **Hypotheses**

The following null hypotheses were postulated to guide the study and was tested at .05 level of significance:

1. There is no significant difference in level of perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on year of age 16-20years.
2. There is no significant difference in level of perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on year of age 21-25years.
3. There is no significant difference in level of perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on year of age 26years -Above.

### **Methods**

The research design of this study is a descriptive survey. According to Nworgu (2015), descriptive survey design are those studies which aim at collecting data on a given population and describes the data in a systematic manner pointing out the characteristic features or facts about that population. These studies are only interested in describing certain variables in relation to the population. The design was considered appropriate for the study because it enabled the researcher to make generalization concerning the population of the study on the assessment on the perceived barriers to accessing the available health facilities among undergraduates in university of Nigeria, Nsukka. These undergraduates were selected because much work has not been done on them in the universities. The population for this study is University of Nigeria, Nsukka. Here we have sixteen (16) faculties and 102 academic departments with a total of thirty-six thousand, one hundred and nine (36,109) students as at 2020/2021 academic session (Academic Planning Unit, 2021).

The sample for the study consisted of 200 regular undergraduate students. The multi-stage sampling was used to draw the sample for the study. In stage one, total number of faculty were listed out. Using sample random sampling technique of balloting without replacement, five (5) faculties out of sixteen (16) faculties will be selected. In stage two, twenty (20) departments out of hundred and eighteen (118) departments will be selected. In final stage, two (2) students from each department were selected and this gave a total of 200 students which were used for the study. The questionnaire contained questions that elicited information from the respondent on Perceived Barriers to Accessing the Available Health Facilities Questionnaire (PBAAHFQ).

The split-half method was used to establish the reliability of the instrument for this study twenty (20) copies of the questionnaire were administrated to twenty (20) undergraduates from a school outside the schools sampled for the study but in another Local Government Area (Isi-Uzo), because the school still

have the same characteristic (barriers to accessing the available health facilities). The reliability of items was calculated using the Microsoft Excel Formula. The reliability correlation coefficient of 70 was established which was deemed reliable for the study, this is in line with Anaekwe (2007) which stated that any reliability coefficient score of more than 60 is high enough to be used. The completed copies of the questionnaire were screened for completeness of responses. The ones duly completed were used for the analysis. The research questions were answered using frequencies and percentages while chi square statistic was used to test the hypotheses at 0.05 level of significance. 200 questionnaires were distributed and 195 were dully completed and returned. After checking for the properly completed responses, 2 were found to be either incompletely filled or they were mutilated. Therefore, 193 questionnaires were used for analysis. This gave a questionnaire return rate of 97%. The results are presented in tables below according to the research questions.

**Research question 1**

What are the barriers to accessing the available health facilities in University of Nigeria, Nsukka among undergraduate students? Data answering this research question are presented in Table 1 below.

**Table 1: Perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka (N = 193)**

S/N	Barriers to accessing the available health facilities	Yes		No	
		F	%	F	%
1	Poor attitude of healthcare workers	174	90.2	19	9.8
2	Waiting time is too long	154	78.8	39	21.2
3	Location of the facility is far	105	54.4	88	45.6
4	Use of substandard drugs	97	50.3	96	49.7
5	High cost of healthcare	147	76.2	46	23.8
6	Unqualified healthcare workers	110	57.0	83	43.0

Data in Table 1 presents the perceived barriers to accessing the available health facilities in University of Nigeria, Nsukka among undergraduate students. The table shows that the barriers to accessing the available health facilities are poor attitude of the healthcare workers 174 (90.2%). This is followed by waiting time is too long 154 (78.8%). Other barriers to accessing the available health facilities as revealed by the table include location of the facility is far 105 (54.4%), use of substandard drugs 97 (50.3%), high cost of healthcare 147 (76.2%) and unqualified healthcare workers 110 (57.0%).

**Research question 2**

What are the barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age? Data answering this research question are presented in Table 2 below.

**Table 2: Barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age (N = 193)**

S/N	Barriers to Accessing the Available Health Facilities	16-20 years (n=64)		21-25 years (n=72)		26 years and above (n=57)	
		F	%	F	%	F	%
1	Poor attitude of healthcare workers	61	95.3	69	95.8	44	77.2
2	Waiting time is too long	50	78.1	71	98.6	36	63.2
3	Location of the facility is far	22	34.4	58	80.6	25	43.9
4	Use of substandard drugs	27	42.2	41	56.9	29	50.9
5	High cost of healthcare.	47	73.4	61	84.7	39	68.4
6	Unqualified healthcare workers	32	50.0	41	56.9	37	64.9

Table 2 above presents the barriers to accessing the available health facilities in University of Nigeria, Nsukka among undergraduate students. According to the table, the barriers to accessing the available health facilities reported by the age of 16-20 years include poor attitude of the healthcare workers 61(95.3%), waiting time is too long 50 (78.1%), location of the facility is far 22 (34.4%), use of substandard drugs 27 (42.2%), high cost of healthcare 47 (73.4%) and the unqualified healthcare workers 32 (50.0%). The table also revealed that barriers to accessing the available health facilities reported by the age of 21-25 years include poor attitude of the healthcare workers 69 (95.8%), waiting time is too long 71 (98.6%), location of the facility is far 58 (80.6%), use of substandard drugs 41 (56.9%), high cost of healthcare 61 (84.7%) and the unqualified healthcare workers 41 (56.9%). The table further revealed that barriers to accessing the available health facilities reported by the age of 26 years and above include poor attitude of the healthcare workers 44 (77.2%), waiting time is too long 36 (63.2%), location of the facility is far 25 (43.9%), use of substandard drugs 29 (50.9%), high cost of healthcare 39 (68.4%) and the unqualified healthcare workers 37 (64.9%).

**Hypothesis 1**

There is no significant difference in level of perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age. Data testing this hypothesis is presented in Table 3 below

**Table 3: Summary of chi square analysis of no significant difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age (16-20 years).**

Variable (Age)	N	Yes O(f)	No E(f)	$\chi^2$	A	Df	p-value	Decision
16-20 years	64	45(45.2)	19(18.8)	3.271	0.05	1	0.014	H <sub>0</sub> Not accepted
21-25 years	72	58(58.3)	14(13.7)					
26 years and above	57	42(42.7)	15(14.3)					

The P-value is significant at 0.05 level; O(f) = Observed frequency while E(f) = Expected frequency.

Data in Table 3 above presents the summary of chi square analysis of no significant difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age. The table showed a  $\chi^2$  value of 3.271 with a corresponding p-value of 0.014

which is less than 0.05 level of significance. The null hypothesis of no significant difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age, is not accepted. This implies that the barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka is significant, based on age.

**Table 4: Summary of chi square analysis of no significant difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age (21-25 years).**

Variable (Age)	N	Yes O(f)	No E(f)	$\chi^2$	A	Df	p-value	Decision
16-20 years	64	44(44.6)	20(19.4)	4.211	0.05	1	0.02	H <sub>0</sub> Not accepted
21-25 years	72	63(63.3)	9(8.7)					
26 years and above	57	41(41.5)	16(15.5)					

The P-value is significant at 0.05 level; O(f) = Observed frequency while E(f) = Expected frequency. Data in Table 4 above presents the summary of chi square analysis of no significant difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age. The table showed a  $\chi^2$  value of 4.211 with a corresponding p-value of 0.02 which is less than 0.05 level of significance. The null hypothesis of no significant difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age, is not accepted. This implies that the barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka is not the significant, based on age.

**Table 5: Summary of chi square analysis of no significant difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age (26 years and above).**

Variable (Age)	N	Yes O(f)	No E(f)	$\chi^2$	A	Df	p-value	Decision
16-20 years	64	39(39.8)	24(23.2)	3.801	0.05	1	0.0016	H <sub>0</sub> Not accepted
21-25 years	72	56(56.8)	16(15.2)					
26 years and above	57	35(35.1)	22(21.9)					

The P-value is significant at 0.05 level; O(f) = Observed frequency while E(f) = Expected frequency.

Data in Table 5 above presents the summary of chi square analysis of no significant difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age. The table showed a  $\chi^2$  value of 3.801 with a corresponding p-value of 0.016 which is less than 0.05 level of significance. The null hypothesis of no significant difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age, is not accepted, that is the null hypotheses is rejected. This implies that their perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka is significant based on age.

## Discussion

The findings of this study are discussed under the following headings.

### **Perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka.**

Data in Table 1 presents the perceived barriers to accessing the available health facilities in University of Nigeria, Nsukka among undergraduate students. The table shows that the barriers to accessing the available health facilities are poor attitude of the healthcare workers 101 (53.7%). This is followed by waiting time is too long 126 (67.0%). Other barriers to accessing the available health facilities as revealed by the table include location of the facility is far 151 (80.3%), use of substandard drugs 148 (78.7%), high cost of healthcare 84 (44.7%) and the unqualified healthcare workers 97 (51.6%). This is in line with Warren, Stanton, Balanda, Gillespie and John (2016), which stated that barriers such as attitude change, and the availability of a motivated person (health promotion officer) can lead to poor health care accessibility. Again, according to Oche and Adamu (2013), on the barriers to access health facilities, it was found that sixty-one percent of the respondents waited for 90-180 min in the clinic, whereas 36.1% of the patients spent less than 5 min with the doctor in the consulting room. The commonest reason for the long waiting time was the large number of patients with few healthcare workers. The researcher discovered that the respondents demonstrated a good response of barriers to accessing the available health facilities. This finding has implications for public health educators in carrying out health facilities education-based programmes and interventions among students.

### **Perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age.**

Table 2 shows the barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age. Barriers to accessing the available health facilities which was reported by the age of (16-20) years include poor attitude of the healthcare workers 61 (95.3%), waiting time is too long 50 (78.1%), location of the facility is far 22 (34.4%), use of substandard drugs 27 (42.2%), high cost of healthcare 47 (73.4%) and the unqualified healthcare workers 32 (50.0%). The table also revealed that barriers to accessing the available health facilities reported by the age of (21-25) years include poor attitude of the healthcare workers 69 (95.8%), waiting time is too long 71 (98.6%), location of the facility is far 58 (80.6%), use of substandard drugs 41 (56.9%), high cost of healthcare 61 (84.7%) and the unqualified healthcare workers 41 (56.9%). The table further revealed that barriers to accessing the available health facilities reported by the age of (26 years and above) include poor attitude of the healthcare workers 44 (77.2%), waiting time is too long 36 (63.2%), location of the facility is far 25 (43.9%), use of substandard drugs 29 (50.9%), high cost of healthcare 39 (68.4%) and the unqualified healthcare workers 37 (64.9%).

However, it was observed that the population of the students mostly responded good to the barriers to accessing the available health facility was found to be students (21-25) years of age followed by (16-20) years of age and then (26) years and above. The corresponding null hypothesis of the study in table 8, 11, and 14 shows that there is difference in level of barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka based on age. However, this is not in line with the study of Tegegne, Wubante and Melaku (2023) on the tele-Pharmacy perception, knowledge and associated factors among pharmacy students in Northwest Ethiopia. Their result reviewed that from a total of 352 participants, about age group of 26–30 has 95% knowledge and associated factors among pharmacy students. This finding was expected and not surprising. This is because higher undergraduates such as other years above second years acquire appropriate information about the barriers to accessing the available health facilities through formal means of education in their classrooms or through internet access and this study was conducted in a university environment where there is high level of education. The researcher discovered that the respondents demonstrated a poor response of barriers to accessing the available health facilities. The implication of this finding helped public health educators in organizing health interventions tailored towards improving on the access to health facilities among undergraduates below the age of 26 years.

### Conclusion

There are perceived barriers to accessing the available health facilities among undergraduates in University of Nigeria, Nsukka. It was observed that undergraduates within the age range of 21-25years have high level of barriers to accessing the available health facilities. There was significant difference in the level of barriers to accessing the available health facilities among undergraduates in the University of Nigeria, Nsukka based on age.

### Recommendations

Based on the findings of the study the following recommendations were made:

1. Health education should be made a compulsory course as a general study (GS) in the University.
2. It is essential that the students are continuously informed about the available health facilities within the university so that they can have access to them when the need arises.

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## Challenges In Nigerian University Games (Nuga): Barriers to Talent Discovery and Pathways to National and Global Excellence

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### Abstract

*University sports systems play a vital role in talent identification, athlete development, and the production of elite athletes for national and global sporting excellence. In well-developed systems, universities function as structured environments supported by adequate funding, effective governance, modern facilities, and strong integration between academic and sports units. In Nigeria, however, the Nigeria University Games Association (NUGA) has faced persistent structural and institutional challenges that limit its effectiveness as a talent development pathway. This study adopts a narrative review approach to examine the barriers affecting university sports development within the NUGA framework. Drawing on relevant literature, the study identifies key challenges including inadequate funding and poor financial management, weak administrative policies and leadership commitment, insufficient sports facilities and technical manpower, poor athlete welfare and motivation, limited institutional collaboration, and organizational inefficiencies in sports programmes and competitions. The study further highlights recent operational issues such as accreditation and registration challenges during NUGA competitions, which have contributed to athlete disqualification and reduced participation. Based on the findings, the study proposes strategic pathways including structured talent identification systems, integration of academic and sports units, professionalization of sports programmes, improved athlete welfare, adoption of technology and performance analytics, and strengthened institutional governance. The study concludes that addressing these challenges through coordinated policy reforms, sustainable funding, stakeholder collaboration, and institutional integration will enhance talent discovery and athlete development, thereby positioning Nigerian university sports as a viable pathway to national and global sporting excellence.*

**Keywords:** NUGA, university sports, talent discovery, sports policy, institutional support, athlete welfare, institutional integration, Nigeria

### Introduction

In many developed countries, university sports systems serve as structured platforms for talent identification, athlete development, and national representation. University games are not merely competitive events but organized systems through which young athletes are discovered, nurtured, and prepared for elite performance at national and international levels. In such contexts, universities provide scholarships, modern training facilities, professional coaching, and flexible academic arrangements that enable student-athletes to combine education with high-performance sports.

In contrast, the Nigerian university sports system operates under a different context, characterized by several structural and institutional limitations. The Nigeria University Games Association (NUGA), established to coordinate inter-university sports competitions and promote talent discovery, has not fully achieved its developmental mandate. Studies have identified persistent challenges such as inadequate funding, weak administrative commitment, poor infrastructure, and limited institutional support as major constraints affecting university sports in Nigeria (Adebayo, 2018; Ogunleye & Adebayo, 2020; Umar & Mohammed, 2021).

Universities are not only centres of academic learning but also important institutions for national development through sports, research, and innovation. Many Nigerian universities host academic departments such as Human Kinetics, Sports Science, Exercise Physiology, Sports Psychology, and

Sports Management, which are expected to contribute scientific knowledge to athlete development. However, limited collaboration between these academic units and sports directorates continues to hinder the application of research-based approaches to training and performance enhancement (Adamu & Usman, 2019; Ibrahim & Musa, 2021). Recent observations have also highlighted emerging structural and operational challenges within university sports in Nigeria, including logistical constraints, organizational inefficiencies, and concerns about security and participation in NUGA competitions. These issues further underscore the need for a more coordinated and institutionally integrated approach to university sports development (Aliyu et al., 2025; Yusuf et al., 2023).

### **Statement of the Problem**

Despite the recognized importance of university sports as a platform for talent discovery and athlete development, the Nigerian university sports system continues to experience persistent challenges that limit its effectiveness. The Nigeria University Games Association (NUGA), which is expected to function as a major pipeline for nurturing sporting talent, has not fully realized this role. Key challenges include inadequate funding, poor financial management of sports resources, weak administrative structures, and insufficient institutional commitment to sports development (Ogunleye & Adebayo, 2020; Umar & Mohammed, 2021; Musa & Bello, 2024). In many cases, sports are not prioritized within institutional budgets, resulting in limited investment in facilities, equipment, and athlete support systems. Furthermore, the absence of clear and consistently implemented sports policies across institutions contributes to inefficiencies in planning and execution. Weak collaboration between academic departments and sports units also limits the integration of scientific knowledge into sports practice, thereby reducing the effectiveness of athlete development programmes (Owolabi & Salami, 2021; Yusuf et al., 2023). In addition, organizational and logistical challenges associated with university sports competitions, including recent issues in NUGA events, further expose structural weaknesses in the system (Aliyu et al., 2025). Although previous studies have addressed various aspects of these challenges, there remains a need for a more updated and integrated examination of the institutional barriers affecting university sports development in Nigeria.

### **Objectives of the Study**

The main purpose of this paper is to examine the challenges affecting university sports in Nigeria within the framework of the Nigeria University Games Association and to explore their implications for talent discovery and development. Identify the major structural and institutional challenges affecting university sports in Nigeria. Examine how these challenges influence talent identification and athlete development. Assess the level of integration between academic departments and sports directorates in Nigerian universities. Propose strategic and policy-oriented measures for improving university sports as a pathway to national and global sporting excellence.

### **The Conceptual Framework**

The conceptual framework of this study is grounded in literature on university sports development, institutional effectiveness, and human capital formation. It presents the key variables influencing the effectiveness of university sports systems, particularly within the context of the Nigeria University Games Association (NUGA). University sports development is conceptualized as a system influenced by multiple interrelated institutional and structural factors. These include funding and financial management, administrative policies and leadership, availability of sports facilities and technical manpower, athlete welfare and motivation, and the level of institutional collaboration between academic departments and sports directorates. These variables collectively determine the effectiveness of university sports programmes in achieving talent identification, athlete development, and competitive performance (Adebayo, 2018; Ogunleye & Adebayo, 2020; Okon & Ekanem, 2018; Adedeji, 2019; Ibrahim & Musa, 2021).

Funding and financial management constitute a critical input in the conceptual framework. Adequate funding enables universities to maintain facilities, procure equipment, organize competitions, and support athlete development programmes. However, studies have shown that inadequate funding and poor financial accountability are major constraints to sports development in Nigerian universities

(Ogunleye & Adebayo, 2020; Umar & Mohammed, 2021; Musa & Bello, 2024). Effective financial management, therefore, plays a central role in sustaining university sports systems. Administrative policies and leadership represent another key component of the framework. The presence of clear policies, strategic planning, and committed leadership ensures the effective coordination and implementation of sports programmes. Conversely, weak administrative structures and lack of policy consistency negatively affect sports development outcomes (Adedeji, 2019; Okeke, 2020; Owolabi & Salami, 2021). Leadership commitment is therefore essential for aligning institutional priorities with sports development goals.

Athlete welfare and motivation are also central to the framework. Welfare provisions such as scholarships, medical support, nutrition, and allowances significantly influence athlete participation and performance. Empirical evidence suggests that inadequate welfare systems reduce motivation, limit participation, and negatively affect athlete development (Adeniji & Ojeniyi, 2018; Owoeye et al., 2016; Eze, 2019; Ogunyemi, 2022). Thus, athlete-centred support systems are critical for sustaining performance. The availability of sports facilities and technical manpower further determines the quality of training and competitive readiness of athletes. Modern facilities, combined with qualified coaches and technical personnel, enhance skill acquisition, performance analysis, and overall athlete development. Studies have consistently identified inadequate infrastructure and shortage of trained personnel as major limitations to sports development in Nigerian universities (Adebayo, 2018; Ibrahim & Musa, 2021; Nwankwo et al., 2024).

Institutional collaboration between academic departments and sports directorates is another important element of the framework. Such collaboration facilitates the integration of sports science knowledge into practical training, thereby improving talent identification and performance outcomes. Research indicates that universities with stronger academic-sport integration tend to achieve better results in athlete development and sports management (Adamu & Usman, 2019; Hamafyelto, 2018). These input variables interact within the university sports system (process), particularly through platforms such as NUGA competitions and related institutional programmes. The effectiveness of this process determines the outputs, which include talent identification, athlete development, competitive performance, and ultimately national and global sporting excellence.

### **Theoretical Framework**

This study is anchored on the Human Capital Theory and the Sports Development Model, which provide a theoretical basis for understanding the role of university sports in talent identification and athlete development. Human Capital Theory, as advanced by Becker (1964), posits that investment in individuals through education, training, and skill development enhances productivity and contributes to both individual and societal advancement. Within the context of university sports, student-athletes represent valuable human capital whose potential can be developed through adequate investment in training facilities, coaching, institutional support, and welfare systems. Contemporary applications of human capital theory in sports emphasize that institutions that invest in athlete development are more likely to produce individuals capable of contributing to national and global sporting success (Ibrahim & Musa, 2021; Ogunyemi, 2022).

The Sports Development Model provides a complementary framework that explains how athletes progress through various stages of development, from grassroots participation to elite performance. This model emphasizes structured pathways involving talent identification, systematic training, competition exposure, and continuous support from institutions and stakeholders (Green, 2005; Houlihan & Green, 2008). In the context of university sports, particularly within the Nigeria University Games Association (NUGA), universities are expected to serve as critical transition points where talented athletes are identified, nurtured, and prepared for higher levels of competition (Adedeji, 2019; Owolabi & Salami, 2021). However, the effectiveness of these theoretical models depends on the availability of enabling structures such as adequate funding, functional policies, qualified personnel, modern facilities, and institutional commitment. Where these elements are lacking, the practical application of Human Capital Theory and the Sports Development Model becomes limited, thereby constraining athlete development outcomes (Adebayo, 2018; Musa & Bello, 2024).

### **Theoretical Position of the Study**

Building on the Human Capital Theory and the Sports Development Model, this study adopts the position that university sports in Nigeria are currently underperforming as a mechanism for talent discovery and athlete development due to systemic and institutional deficiencies. Specifically, the study argues that although structures such as the Nigeria University Games Association exist to facilitate talent identification and development, their effectiveness is undermined by challenges including inadequate funding, weak administrative leadership, poor athlete welfare systems, insufficient facilities, and limited collaboration between academic departments and sports directorates. These constraints prevent the full realization of the principles embedded in both Human Capital Theory and the Sports Development Model within the Nigerian university sports system (Ogunleye & Adebayo, 2020; Yusuf et al., 2023).

The study further posits that the primary limitation of university sports in Nigeria is not the absence of talent, but the absence of deliberate, sustained, and well-coordinated investment in that talent. Without strong institutional frameworks, consistent policy implementation, and effective stakeholder collaboration, the university sports system cannot function optimally as a pipeline for producing elite athletes. Therefore, this paper positions university sports as a critical but underutilized component of Nigeria's human capital development strategy. It argues that aligning institutional practices with theoretical expectations requires comprehensive reforms in funding, administration, infrastructure, and academic-sport integration, all of which are essential for transforming NUGA into an effective platform for talent development and sporting excellence (Aliyu et al., 2025; Ibrahim & Musa, 2021).

### **Methods**

This study adopted a conceptual and descriptive research design based on a narrative review of existing literature. The study relied exclusively on secondary data sources, including peer-reviewed journal articles, textbooks, conference proceedings, institutional reports, and relevant policy documents related to university sports development, particularly within the Nigeria University Games Association (NUGA) framework. The review focused on literature published between 2010 and 2025, with greater emphasis on recent empirical studies from 2020 to 2025 to ensure contemporary relevance. The selection of materials was guided by relevance to the study objectives, credibility of sources, and their contribution to understanding the challenges and development pathways of university sports in Nigeria. Data collection was carried out through documentary review, while content and thematic analysis were employed to identify recurring themes and patterns across the selected literature. The analysis was guided by the study's conceptual framework, which conceptualizes university sports development as an input–process–output system. Key input variables considered include funding, administrative leadership, sports facilities, athlete welfare, and institutional collaboration. The process involves the implementation of sports programmes and competitions under NUGA, while the outputs include talent identification, athlete development, competitive performance, and overall sporting excellence. This analytical approach enabled a systematic synthesis of existing knowledge and provided a basis for drawing meaningful conclusions and recommendations.

### **Challenges Facing University Sports Development in Nigeria**

#### **Poor Funding and Mismanagement of Sports Levies**

One of the major challenges confronting university sports in Nigeria is inadequate funding coupled with ineffective management of sports levies collected from students. Although students are required to pay sports fees with the expectation that such funds will support the development of sports facilities, equipment, and athlete support systems, these resources are often insufficiently allocated or diverted to other institutional priorities. This situation results in underfunded sports programmes, poorly maintained facilities, and limited preparation for competitions. Empirical studies have consistently identified financial constraints as a significant barrier to effective sports development in Nigerian universities (Ogunleye & Adebayo, 2020; Umar & Mohammed, 2021). More recent analyses also emphasize that

weak financial accountability and poor budgetary prioritization continue to undermine the sustainability of university sports systems (Musa & Bello, 2024)

### **Poor Welfare and Lack of Support for Student-Athletes**

Another significant challenge is the inadequate welfare system for student-athletes. In many Nigerian universities, structured support mechanisms such as scholarships, allowances, medical care, nutritional support, and recovery systems are either insufficient or absent. Student-athletes are often required to balance academic responsibilities with intensive training under conditions that do not adequately support optimal performance. This negatively affects motivation, participation, and athletic output. Research indicates that inadequate welfare provisions significantly reduce athlete engagement and hinder performance outcomes (Adeniji & Ojeniyi, 2018; Ogunyemi, 2022; Eze & Olowe, 2023). The absence of a comprehensive welfare framework limits universities' ability to retain and fully develop talented athletes within the university sports system.

### **Weak Institutional Support and Administrative Commitment**

Institutional support and administrative commitment play a critical role in the success of university sports programmes. However, in many Nigerian universities, sports are not sufficiently prioritized within institutional planning and budgeting frameworks. The lack of clear and functional sports policies, weak leadership commitment, and inconsistent administrative attention often hinder effective implementation of sports programmes. According to Adedeji (2019), many institutions operate without structured sports policies, while Okeke (2020) notes that sports are often treated as non-essential rather than strategic investments. Recent studies further suggest that institutional instability, lack of continuity in policy implementation, and limited administrative accountability contribute to the underperformance of university sports systems (Owolabi & Salami, 2021; Yusuf et al., 2023).

### **Inadequate Sports Facilities, Equipment, and Technical Manpower**

The availability of adequate sports facilities and qualified technical personnel is essential for athlete development. Unfortunately, many Nigerian universities lack modern infrastructure, and where facilities exist, they are often poorly maintained or outdated. In addition, there is a shortage of trained coaches, sports scientists, and technical personnel capable of providing specialized support for athlete development. This limits the quality of training, performance monitoring, and talent development processes. Studies have shown that inadequate infrastructure and lack of skilled manpower significantly constrain sports performance in higher education institutions (Adebayo, 2018; Ibrahim & Musa, 2021; Nwankwo et al., 2024).

### **Organizational and Structural Challenges in NUGA Implementation**

University sports competitions organized under the Nigeria University Games Association (NUGA) are also affected by organizational and structural inefficiencies. These include poor coordination of events, inadequate communication among stakeholders, and logistical challenges during competitions. In some cases, athletes face difficulties related to accommodation, transportation, scheduling conflicts, and delayed dissemination of information. These issues negatively impact participation and reduce the quality of competitions. Existing studies indicate that inefficiencies in sports management systems hinder the effectiveness of university sports programmes (Danasabe et al., 2022; Ogunyemi, 2022). Recent observations further suggest that improving organizational structures and operational efficiency is necessary to strengthen the developmental role of NUGA in talent discovery and athlete development (Aliyu et al., 2025).

Recent experiences from the Nigeria University Games Association (NUGA) competitions further highlight operational and organizational shortcomings within the university sports system. For instance, during the 2025 NUGA Games held in Plateau State, reports indicated that several participating athletes and contingents encountered difficulties during the accreditation process, leading to the disqualification of some athletes. One of the major issues was the inability of certain institutions to properly indicate or verify the specific events their athletes were registered to compete in, resulting in inconsistencies between registration records and competition entries. This challenge reflects

weaknesses in event management, communication, and coordination among organizing committees and participating institutions. Such accreditation-related inefficiencies not only disrupt participation but also limit fair competition and hinder the effective identification of talented athletes. The situation underscores the need for improved documentation systems, clearer communication channels, and more standardized accreditation procedures within NUGA to ensure smooth participation and effective talent discovery.

### **Institutional Collaboration and Stakeholder Involvement**

Effective university sports development requires collaboration among key stakeholders, including university management, government agencies, private organizations, and alumni networks. However, such collaboration remains weak in many Nigerian universities. Limited partnerships restrict access to funding, sponsorship, infrastructure development, and technical expertise. Strengthening stakeholder engagement can significantly enhance resource mobilization and expand opportunities for athlete development. Studies have shown that multi-stakeholder collaboration improves sports development outcomes in higher education institutions (Adebisi, 2022; Hassan et al., 2024; Onifade, 2021).

### **Integrative Link Between Challenges, Conceptual Framework, and Outcomes**

The challenges discussed above correspond directly to the key input variables identified in the conceptual framework of this study. Specifically, deficiencies in funding, administrative leadership, infrastructure, athlete welfare, and institutional collaboration represent structural weaknesses within the university sports system. These input-related constraints affect the effectiveness of the NUGA framework as a process mechanism for talent identification and athlete development. When these foundational elements are weak, the university sports system is unable to function optimally in facilitating structured training, competition exposure, and performance enhancement. Consequently, the outputs of the system—namely talent identification, athlete development, competitive performance, and overall sporting excellence—are significantly compromised. This confirms that limitations in institutional inputs directly translate into reduced effectiveness of university sports as a developmental pathway. Therefore, strengthening these input variables through improved funding, policy implementation, infrastructure development, welfare systems, and stakeholder collaboration is essential for enhancing the capacity of university sports to achieve its intended developmental outcomes.

### **Pathways to Enhancing Talent Discovery and Achieving National and Global Sporting Excellence**

Addressing the structural challenges confronting university sports in Nigeria requires the adoption of strategic, evidence-based pathways capable of repositioning the Nigeria University Games Association (NUGA) as an effective platform for talent discovery and elite athlete development. Recent empirical studies underscore the importance of systematic, scientifically informed, and institutionally coordinated approaches to sports development.

One critical pathway is the establishment of structured and systematic talent identification programmes within universities. Talent identification should be continuous, data-driven, and multidimensional, incorporating physical, technical, psychological, and tactical assessments. Empirical evidence suggests that athlete performance is significantly influenced by measurable variables such as training intensity, physical preparedness, and skill acquisition, thereby highlighting the need for structured monitoring systems (Ajibo & Ogu, 2024). In addition, recent scoping reviews emphasize that effective talent identification frameworks must integrate physiological, psychological, and performance indicators to ensure comprehensive athlete evaluation (Kovačević et al., 2025). These findings imply that Nigerian universities must institutionalize systematic talent tracking mechanisms to enhance early detection and long-term athlete development.

Another important pathway is the integration of structured talent management systems with performance development frameworks. Empirical studies have shown that organized talent management approaches, when combined with physical fitness development, significantly enhance athlete performance and competitive success. Research on Nigerian elite athletes indicates that

structured talent management frameworks contribute positively to producing athletes capable of competing at national and international levels (Aremu et al., 2025). This suggests that universities should move beyond informal participation structures toward deliberate, well-coordinated development programmes aligned with performance objectives.

The professionalization of university sports through scientific training methodologies is also essential for achieving excellence. Recent empirical studies demonstrate that structured training programmes significantly improve key performance indicators such as aerobic capacity, agility, muscular strength, and overall fitness. For example, intervention-based studies have reported that athletes exposed to systematic training programmes over a defined period show measurable improvements in physical and performance outcomes (Akameze et al., 2025; Tyoakaa et al., 2025). These findings highlight the importance of incorporating sports science principles, including exercise physiology, biomechanics, and sports psychology, into university sports training systems.

In addition, the adoption of technology and performance analytics represents a transformative pathway for enhancing talent development. Empirical research indicates that wearable technologies, data analytics, and predictive modelling can significantly improve athlete monitoring and performance optimization. Studies have shown that data-driven approaches enable coaches to identify performance gaps, monitor workload, and tailor training interventions to individual athlete needs (Okafor et al., 2025). Furthermore, emerging applications of artificial intelligence in sports demonstrate the potential to improve talent identification processes by enhancing objectivity and enabling large-scale performance analysis (Chen et al., 2025). Integrating such technologies into university sports systems will align Nigeria with global best practices in high-performance sport.

Another critical pathway is the strengthening of athlete support systems, particularly in the areas of nutrition, health, and recovery. Empirical studies have established that athlete performance is closely linked to nutritional knowledge, dietary practices, and access to medical support. Research conducted among athletes indicates that inadequate nutrition knowledge and poor dietary habits negatively affect endurance, recovery, and overall performance (Adeyemi et al., 2025). This underscores the need for universities to incorporate structured nutritional education, medical services, and recovery programmes into their sports systems to enhance athlete welfare and performance outcomes.

Furthermore, increasing exposure to structured competitive environments is essential for preparing athletes for higher levels of competition. Empirical evidence suggests that athletes who participate in well-organized and consistent training and competition schedules demonstrate superior performance compared to those in less structured environments. Studies have shown that regular participation in competitive events contributes to improved skill acquisition, psychological resilience, and tactical awareness (Bello & Ibrahim, 2023). In this regard, well-coordinated NUGA competitions can serve as an effective platform for exposing athletes to competitive conditions that simulate national and international standards.

Finally, strengthening governance, policy implementation, and institutional coordination remains fundamental to sustaining these pathways. Recent empirical studies emphasize that effective governance structures, policy consistency, and accountability mechanisms are critical determinants of sports development outcomes. Weak administrative systems and inconsistent policy enforcement have been identified as major factors limiting the effectiveness of sports programmes in higher education institutions (Yusuf et al., 2023; Musa & Bello, 2024). Therefore, aligning institutional policies with clear development objectives and ensuring proper implementation is essential for maximizing the impact of university sports programmes.

Empirical evidence from recent studies indicates that achieving national and global sporting excellence through university sports in Nigeria requires a holistic and multi-dimensional approach. This includes structured talent identification systems, organized talent management frameworks, scientifically driven training methods, technological integration, enhanced athlete support systems, exposure to competitive

environments, and strong governance structures. When effectively implemented, these pathways will strengthen the Nigeria University Games Association (NUGA) as a viable platform for talent discovery and athlete development, ultimately contributing to Nigeria's competitiveness in global sports.

### **Conclusion**

This study examined the challenges facing university sports development in Nigeria, with particular attention to key institutional factors such as funding, administrative leadership, facilities, athlete welfare, and stakeholder collaboration within the university sports system (NUGA framework). The findings from the discussion of challenges reveal that university sports development is significantly constrained by structural and operational deficiencies across these core areas. From the analysis, it is evident that inadequate and poorly managed funding remains a fundamental barrier to effective sports development in Nigerian universities. Closely related to this is the issue of weak institutional commitment and administrative inefficiency, which limits the prioritization of sports in university planning and policy implementation. Furthermore, the study shows that inadequate sports facilities, shortage of qualified technical manpower, and insufficient maintenance culture negatively affect the training environment required for athlete development and performance.

The study also highlights that poor welfare provisions for student-athletes, including lack of scholarships, medical support, and motivation systems, reduces participation and limits the ability of athletes to reach their full potential. In addition, weak collaboration among stakeholders such as university authorities, government agencies, and private sector partners further restricts access to resources, sponsorship opportunities, and developmental support necessary for sustaining university sports programmes. Importantly, the conceptual alignment of the study demonstrates that these challenges (inputs) directly influence the effectiveness of the university sports system (process), which in turn determines the outcomes (outputs) such as talent identification, athlete development, competitive performance, and overall sporting excellence. The evidence suggests that when these input variables are weak, the process becomes inefficient, leading to suboptimal outcomes in university sports development.

University sports in Nigeria possess the potential to serve as a strong platform for nurturing athletic talent and contributing to national and international sporting success. However, this potential is currently undermined by systemic challenges that require coordinated and strategic intervention. Addressing these challenges through improved funding mechanisms, stronger administrative commitment, enhanced infrastructure, better athlete welfare systems, and effective stakeholder collaboration will significantly improve the capacity of university sports to achieve its developmental objectives.

### **Implications of the Study**

The findings of this study have several important implications for policy, institutional practice, and the overall development of university sports in Nigeria. From a policy perspective, the study underscores the urgent need for government agencies and regulatory bodies to develop and enforce comprehensive sports policies that prioritize university sports as a strategic component of national development. Such policies should ensure adequate and sustained funding, transparency in resource allocation, and accountability in the management of sports programmes within higher institutions.

At the institutional level, university management is expected to recognize sports as an integral part of human capital development rather than a peripheral activity. This implies that sports directorates should be adequately supported through budgetary allocations, administrative autonomy, and inclusion in institutional decision-making processes. Furthermore, universities should strengthen collaboration between academic departments such as Human Kinetics, Sports Science, and related disciplines, and sports units to promote the application of scientific knowledge in athlete training, performance analysis, and injury prevention.

Practically, the study highlights the need for improved athlete welfare systems, including scholarships, medical support, nutrition programmes, and structured training schedules that allow student-athletes to

balance academic and sporting commitments effectively. The findings also imply that the adoption of modern technologies such as performance analytics, data tracking systems, and digital management tools can significantly enhance talent identification and athlete development processes.

In addition, the study has implications for stakeholders such as the Nigeria University Games Association (NUGA), sports federations, and private sector partners. Strengthening stakeholder collaboration will improve resource mobilization, sponsorship opportunities, and technical support for university sports programmes. Overall, the study provides a framework for rethinking university sports as a coordinated system that requires multi-level engagement to achieve sustainable talent discovery and sporting excellence.

### **Recommendations**

Based on the findings and conclusions of this study, the following recommendations are made in line with the objectives of the study:

#### **Improved Funding and Financial Management**

University authorities and government bodies should increase and properly regulate funding allocated to university sports. Sports levies collected from students should be transparently managed and strictly channelled toward the development of sports infrastructure, procurement of equipment, and support for athletes.

#### **Strengthening Administrative Policies and Leadership Commitment**

University management should prioritize sports by developing clear, actionable, and well-implemented sports policies. Sports units should be adequately represented in institutional decision-making processes to ensure continuity, accountability, and effective governance of sports programmes.

#### **Development of Sports Facilities and Technical Manpower**

There is a need for continuous investment in modern sports facilities and equipment. Universities should also employ and train qualified coaches, sports scientists, and technical personnel to enhance the quality of training, performance monitoring, and athlete development.

#### **Enhancement of Athlete Welfare and Motivation**

Universities should establish structured welfare systems for student-athletes, including scholarships, medical support, nutritional programs, and incentives. This will improve motivation, participation, and overall performance of athletes.

#### **Promotion of Institutional Collaboration and Partnerships**

University sports programmes should foster partnerships with government agencies, private organizations, alumni networks, and sports federations. Such collaborations will enhance access to funding, sponsorships, technical expertise, and development opportunities.

#### **Improvement of NUGA Organizational Structure and Programmes**

The Nigeria University Games Association (NUGA) should strengthen its organizational framework by improving coordination, communication, logistics, and event management. This will ensure smoother competitions and better talent identification processes across universities.\

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# The Role of University Sports in National and Economic Development: A Mixed-Methods Case Study of the 26th Nuga Games Hosted by The University of Lagos (March 2022)

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## Abstract

*University sports represent a critical component of the higher education system with significant implications for youth development, national integration, and economic growth. This study examined the role of university sports in national and economic development using the 26th edition of the Nigerian Universities Games Association (NUGA) hosted by the University of Lagos in March 2022 as a case study. A mixed-methods research design was adopted involving 480 respondents, including athletes, spectators, sports administrators, and local business operators. Data were collected through structured questionnaires, interviews, and observation checklists. Quantitative data were analysed using descriptive statistics, while qualitative responses were examined through thematic analysis. Findings revealed that the Games significantly enhanced youth development, promoted national unity, and stimulated economic activities within the host community. Hotel occupancy increased by 55%, while food vendors and transport operators reported revenue increases ranging between 35% and 60%. Temporary employment opportunities also increased by approximately 30% in the hospitality and logistics sectors. Additionally, the Games facilitated talent identification for national sports development and strengthened institutional reputation. However, challenges such as inadequate funding, infrastructural limitations, and policy inconsistencies were identified. The study concludes that university sports, when strategically organized and supported, serve as effective instruments for sustainable national and economic development. Recommendations are provided for policymakers, university administrators, and sport's governing bodies.*

**Keywords:** University sports, national development, economic development, NUGA Games, youth empowerment, sports management

## Introduction

Sports participation within higher education institutions has evolved beyond recreational engagement to become a strategic instrument for socio-economic development. Across the world, university sports contribute to leadership development, national identity formation, and economic stimulation through sports tourism and talent development (Coakley, 2017).

In Nigeria, the Nigerian Universities Games Association (NUGA) was established in 1966 to coordinate inter-university sports competitions with the primary objective of fostering unity and sporting excellence among Nigerian universities. Since its inception, NUGA has served as a platform for talent discovery and national sports development.

The 26th edition of the NUGA Games, hosted by the University of Lagos in March 2022, attracted participation from over seventy universities across Nigeria. The competition featured several sporting disciplines including athletics, football, basketball, volleyball, swimming, table tennis, badminton, judo, and taekwondo. Beyond athletic competition, the Games provided opportunities for cultural interaction, networking, and economic exchange within Lagos State

National development encompasses improvements in social cohesion, infrastructure development, human capital formation, and governance structures (Todaro & Smith, 2015). Economic development, on the other hand, involves improvements in productivity, employment opportunities, income generation, and standards of living. Sporting events have increasingly been recognized as catalysts for such development through tourism promotion, infrastructure expansion, and entrepreneurship stimulation (Gratton & Preuss, 2008).

Despite the recognized potential of university sports, limited empirical research has examined the developmental impacts of NUGA competitions within Nigeria. This study therefore investigates the national and economic contributions of the 26th NUGA Games hosted by the University of Lagos, with particular emphasis on youth empowerment, economic activities, and talent development.

### **Theoretical Framework**

This study is anchored on the Sports Event Legacy Theory and the Economic Multiplier Theory of Sports Events. The Sports Event Legacy Theory suggests that major sporting events produce both tangible and intangible legacies for host communities. These legacies may include infrastructure development, increased tourism, improved institutional reputation, and social cohesion (Gratton & Preuss, 2008).

Similarly, the Economic Multiplier Theory posits that expenditures associated with sporting events circulate within the local economy, thereby generating additional economic activities and employment opportunities (Preuss, 2004). Together, these frameworks provide a useful basis for understanding how university sporting events such as the NUGA Games can stimulate national integration, youth empowerment, and economic growth.

### **Objectives of the Study**

The study sought to achieve the following objectives:

1. Examine the contribution of the 26th NUGA Games to national integration and youth development.
2. Assess the economic impact of the Games on the host institution and Lagos metropolis.
3. Determine the extent to which university sports contribute to talent identification and human capital development.
4. Identify challenges associated with hosting large-scale university sports competitions.
5. Provide policy recommendations for maximizing the developmental impact of university sports in Nigeria.

### **Methods**

The study adopted a descriptive survey and case study design using a mixed-methods approach combining quantitative and qualitative techniques.

### **Population and Sample**

The study population consisted of:

1. Student-athletes
2. Sports administrators
3. Spectators
4. Local business operators
5. Event volunteers

A total sample of 480 respondents was selected as follows:

<b>Category</b>	<b>Number</b>
Athletes	200
Spectators	150
Sports Officials	50
Business Operators	80

Purposive and stratified sampling techniques were employed to ensure adequate representation.

### **Instruments for Data Collection**

The following instruments were utilized:

1. Structured questionnaires
2. Interview guides
3. Observation checklist
4. Secondary data obtained from event reports and financial summaries

The questionnaire instrument was validated by experts in sports management and research methodology. A reliability test using Cronbach's Alpha yielded a coefficient of 0.85, indicating acceptable internal consistency.

### **Data Analysis**

Quantitative data were analysed using descriptive statistics including frequency counts, percentages, and mean scores. Qualitative data obtained from interviews were analysed through thematic content analysis.

## **Results**

### **Participation and Scope**

1. The NUGA Games recorded a high level of participation.
2. Over 10,000 accredited athletes and officials participated.
3. More than 70 Nigerian universities were represented.
4. The Games lasted approximately two weeks and included 14 sporting events.

### **Economic Indicators**

Data collected from business operators revealed significant economic impact:

1. Hotel occupancy rates increased by 55% during the Games.
2. Food vendors and transport operators reported revenue increases between 35% and 60%.
3. Temporary employment increased by approximately 30% within hospitality and logistics sectors.
4. University vendors experienced increased demand for branded merchandise and souvenirs.
5. Social and National Indicators

Survey responses showed strong social impact:

- i. 85% of respondents agreed that the Games enhanced inter-ethnic interaction.
- ii. 78% believed the Games promoted national unity.
- iii. 69% of athletes reported improvements in leadership and teamwork skills.
- iv. Several athletes were invited for national trials and professional club scouting.

## **Discussion**

The findings demonstrate that university sports competitions can significantly contribute to national development. The high level of participation recorded during the Games indicates the importance of institutionalized sports programmes within Nigerian universities.

The economic benefits experienced by hospitality providers, transport operators, and local vendors support the economic multiplier effect of sporting events, as proposed by Preuss (2004). Expenditures related to accommodation, feeding, and transportation contributed to increased economic activity within Lagos during the Games.

Furthermore, the Games promoted national integration by bringing together students from diverse ethnic and cultural backgrounds. This finding supports the view that sporting events serve as effective platforms for social cohesion in multi-ethnic societies such as Nigeria (Adeniyi, 2019).

Infrastructure improvements within the University of Lagos also illustrate the legacy effect of sporting events, whereby host institutions benefit from upgraded facilities and improved institutional visibility.

However, the study also identified challenges including inadequate funding, infrastructural gaps, and inconsistent sports policies. These factors limit the ability of university sports programmes to fully realize their developmental potential.

## **Conclusion**

The 26th NUGA Games hosted by the University of Lagos in March 2022 significantly contributed to national cohesion, youth empowerment, and economic stimulation. The Games demonstrated that

university sports can serve as viable instruments for promoting national development and economic growth.

When strategically organized and adequately funded, university sporting events can enhance human capital development, promote social unity, and stimulate local economies.

### **Recommendations**

Based on the findings of the study, the following recommendations are proposed:

1. Federal and state governments should increase funding allocations for university sports development.
2. Public-private partnerships should be encouraged to support the organization of NUGA competitions.
3. Universities should develop sports commercialization strategies to generate revenue.
4. Post-event impact assessment studies should be conducted after major sports competitions.
5. Sports infrastructure within universities should be upgraded to international standards to enhance future hosting capacity.

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# Knowledge and Practice of Cervical Cancer Screening Among Women of Childbearing Age in Plateau State, Nigeria: A Cross-Sectional Survey

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## Abstract

*Cervical cancer remains a major public health concern in Nigeria, particularly in the North-Central region. This study assessed the knowledge and practice of cervical cancer screening among women of childbearing age in Plateau State, Nigeria. A cross-sectional descriptive survey design was adopted. A total of 181 women were selected using proportionate sampling across five Local Government Areas. Data were collected using a structured questionnaire with a reliability coefficient (Cronbach's alpha) of 0.818. Data analysis involved descriptive statistics (mean and standard deviation) and inferential statistics (Chi-square) at a 0.05 level of significance. Findings revealed a moderate level of knowledge (Weighted Mean = 2.64) and practice (Weighted Mean = 2.77), though screening behaviours were largely reactive rather than preventive. A statistically significant relationship existed between knowledge and screening practice ( $p < 0.05$ ). However, access to screening facilities was inadequate (Weighted Mean = 2.24). The study concludes that although awareness exists, preventive practices remain insufficient due to limited access and systemic barriers. It recommends intensified health education, improved healthcare access, and subsidized screening services.*

**Keywords:** Cervical cancer, screening, knowledge, practice, Plateau State

## Introduction

Cervical cancer is one of the leading causes of cancer-related morbidity and mortality among women in developing countries, including Nigeria (World Health Organization [WHO], 2022; International Agency for Research on Cancer [IARC], 2022). According to global cancer statistics, the burden of cervical cancer remains disproportionately high in low- and middle-income countries due to limited access to screening and vaccination services (IARC, 2022).

Cervical cancer develops in the cervix and is largely preventable through early detection using screening methods such as the Papanicolaou (Pap) smear and Human Papillomavirus (HPV) testing (National Cancer Institute [NCI], 2020). Despite the effectiveness of these preventive measures, uptake remains low in many parts of Nigeria (Idowu et al., 2016).

Previous studies have shown that knowledge plays a critical role in influencing screening behavior (Idowu et al., 2016). However, in many communities, awareness does not necessarily translate into regular screening practices due to barriers such as cost, accessibility, cultural beliefs, and fear of diagnosis (WHO, 2022).

In Plateau State, although healthcare facilities such as Jos University Teaching Hospital (JUTH) provide screening services, utilization remains suboptimal. This study therefore investigates the knowledge and practice of cervical cancer screening among women of childbearing age in the state.

## Theoretical Framework

This study is anchored on the Health Belief Model (HBM), which explains health behaviours based on individuals' perceptions of disease risk and benefits of action. The model posits that individuals are more likely to engage in preventive health behaviours, such as cervical cancer screening, if they perceive themselves to be at risk and believe in the effectiveness of the preventive action (Rosenstock, 1974; Glanz et al., 2008).

The core constructs of the model include:

- Perceived susceptibility
- Perceived severity
- Perceived benefits

- Perceived barriers

Individuals are more likely to adopt screening behaviours when they perceive high susceptibility and severity, recognize the benefits of screening, and face minimal barriers (Glanz et al., 2008). This framework supports the assumption that increased knowledge will positively influence screening practices, although external barriers may limit behavioural change.

**Statement of the Problem**

Despite the availability of cervical cancer screening services in Plateau State, utilization remains low. Many women present late with advanced stages of the disease, leading to high mortality rates. Factors contributing to poor screening uptake include inadequate awareness, financial constraints, limited access to healthcare facilities, and sociocultural barriers. This study seeks to assess whether knowledge influences screening practices and to identify gaps in healthcare access.

**Objectives of the Study**

The study aims to assess:

1. Knowledge of cervical cancer screening among women
2. Practice of cervical cancer screening
3. Relationship between knowledge and practice
4. Availability of screening facilities

**Methods**

A descriptive cross-sectional survey design was adopted.

**Population and Sample**

The target population comprised women of childbearing age (15–49 years) in Plateau State. A sample size of 181 respondents was selected using proportionate sampling across five LGAs.

**Instruments for Data Collection**

Data were collected using a structured questionnaire divided into four sections:

Section A: Demographics

Section B: Knowledge

Section C: Health facilities

Section D: Practice

Responses were measured on a 4-point Likert scale (Strongly Agree = 4 to Strongly Disagree = 1). A benchmark mean of 2.50 was used for decision-making.

**Validity and Reliability**

The instrument was validated by experts, and reliability was confirmed using Cronbach’s alpha (0.818).

**Data Analysis**

Data were analysed using:

Descriptive statistics (mean, standard deviation)

Chi-square test at 0.05 significance level

**ETHICAL CONSIDERATIONS**

Ethical approval was obtained from relevant authorities. Informed consent was secured from all participants. Confidentiality and anonymity were strictly maintained.

**Results**

**Table 1: Level of Knowledge of Cervical Cancer Screening**

Item	Mean	Decision
Awareness of cervical cancer	2.71	Accepted
Knowledge of screening methods	2.58	Accepted
Knowledge of risk factors	2.60	Accepted
Knowledge of prevention	2.66	Accepted
Grand Mean	2.64	Moderate

**Table 2: Practice of Cervical Cancer Screening**

Item	Mean	Decision
Ever screened before	2.69	Accepted
Regular screening practice	2.51	Accepted
Screening only when symptomatic	2.90	Accepted
Willingness to screen	2.98	Accepted
Grand Mean	2.77	Moderate (Reactive)

**Table 3: Availability of Screening Facilities**

Item	Mean	Decision
Availability of nearby facilities	2.30	Rejected
Affordability of screening	2.20	Rejected
Accessibility of services	2.18	Rejected
Trust in healthcare services	2.28	Rejected
Grand Mean	2.24	Low

**Table 4: Relationship Between Knowledge and Practice (Chi-Square)**

Variable	$\chi^2$ Value	p-value	Decision
Knowledge vs Practice	—	< 0.05	Significant

**Discussion**

The findings of this study reveal that women of childbearing age in Plateau State possess a moderate level of knowledge regarding cervical cancer screening. This suggests that awareness campaigns and general health education efforts have had some impact (WHO, 2022). However, the knowledge level is not sufficiently high to drive consistent preventive health behaviour.

Despite this awareness, screening practices were found to be largely reactive rather than preventive. Many women tend to undergo screening only when they perceive symptoms or health risks, rather than as part of routine health checks. This aligns with existing literature which indicates that awareness alone does not necessarily translate into proactive health behaviour (Idowu et al., 2016; WHO, 2022).

The study also found a statistically significant relationship between knowledge and screening practice, confirming that increased knowledge positively influences uptake. This supports the assumptions of the Health Belief Model, which emphasizes that individuals are more likely to engage in health-promoting behaviours when they understand the risks and benefits involved (Glanz et al., 2008).

However, a critical finding of this study is the low availability and accessibility of screening facilities. Respondents reported challenges such as cost, distance to health centres, and lack of trust in healthcare services. These structural barriers significantly limit the translation of knowledge into practice (WHO, 2022).

Additionally, socio-cultural factors such as fear of diagnosis, stigma, and lack of spousal support may further discourage women from seeking screening services. This finding is consistent with previous studies in Nigeria and other developing countries (Idowu et al., 2016).

Overall, the findings suggest that improving knowledge alone is insufficient; systemic and environmental barriers must also be addressed to enhance screening uptake.

**Conclusion**

Women in Plateau State demonstrate moderate knowledge and participation in cervical cancer screening. However, screening behaviour remains largely reactive, and access to quality healthcare services is limited. Addressing both knowledge gaps and structural barriers is essential for improving preventive health practices.

**Recommendations**

1. Intensify public health campaigns emphasizing routine screening, not just symptom-based screening

2. Promote HPV vaccination among adolescent girls
3. Deploy mobile screening clinics to rural and underserved areas
4. Provide subsidized or free screening services
5. Improve healthcare infrastructure and ensure quality service delivery
6. Encourage male involvement to support women's health decisions
7. Integrate cervical cancer education into community and religious programs

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# Effects of A 12-Week Aerobic Training Programme on Visceral Fat Among Female Fitness Club Members at Bayero University, Kano, Nigeria: A Randomized Controlled Trial

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## **Abstract**

*This study investigated the effects of a 12-week aerobic training programme on visceral fat among female fitness club members at Bayero University, Kano, Nigeria, using a randomized controlled trial design. The study was guided by one research question and one null hypothesis tested. A pre-test post-test randomized controlled design was adopted. The population consisted of 80 female fitness club members, from which 40 participants aged 18–35 years were purposively sampled and randomly assigned into an experimental group (n = 20) and a control group (n = 20). The experimental group engaged in thrice-weekly 45-minute aerobic sessions progressing from 50% to 80% HRmax over 12 weeks, while the control group continued their usual daily routines. Visceral fat was measured pre- and post-intervention using bioelectrical impedance analysis, and data were analyzed using Analysis of Covariance (ANCOVA) at a 0.05 significance level. Results showed a significant reduction in visceral fat in the experimental group (pre: 14.50 ± 4.36; post: 11.95 ± 4.52) compared with the control group (pre: 11.00 ± 5.22; post: 12.55 ± 4.52), with ANCOVA indicating a significant effect [F(1,37) = 118.21, p < 0.001]. The study concludes that a structured 12-week aerobic training programme significantly reduces visceral fat among female university students. Based on these findings, it is recommended that university health authorities promote regular aerobic exercise, fitness clubs adopt structured progressive training programmes, and health educators integrate visceral fat awareness into student wellness initiatives. However, findings are limited to female fitness club members and should be interpreted cautiously when generalizing to broader populations.*

**Keywords:** Aerobic training, Visceral fat, Randomized controlled trial, Female students, Cardiometabolic risk

## **Introduction**

Visceral adipose tissue (VAT) represents one of the most harmful forms of fat accumulation due to its close anatomical and metabolic association with vital organs such as the liver, pancreas, and intestines. Unlike subcutaneous fat, visceral fat is highly metabolically active and releases inflammatory cytokines, free fatty acids, and hormones that disrupt normal metabolic processes, thereby increasing the risk of cardiovascular disease, type 2 diabetes, and metabolic syndrome (Jensen, 2006; Fox et al., 2007). These risks are particularly pronounced in females, as hormonal changes, aging, and sedentary lifestyles contribute to increased central fat accumulation (Lovejoy et al., 2008; Toth et al., 2000).

Despite extensive global evidence on the health risks associated with visceral fat, there is a paucity of empirical studies focusing on visceral adiposity among female populations in sub-Saharan Africa, particularly within Nigerian university settings. Most existing Nigerian studies rely on general anthropometric indices such as body mass index and waist circumference, which may underestimate true cardiometabolic risk. This gap highlights the need for context-specific research examining visceral fat among young adult females.

Recent empirical studies have consistently demonstrated the effectiveness of aerobic exercise in reducing visceral fat and improving metabolic health. Meta-analyses and systematic reviews (Chen et al., 2024; Jayedi et al., 2024; Vissers et al., 2013) indicate that moderate-to-vigorous aerobic exercise significantly reduces visceral adipose tissue and improves body composition. Similarly, Guo et al. (2024) reported that aerobic exercise enhances adipose tissue function by improving capillary density and reducing inflammation, while Zhang et al. (2025) linked aerobic activity to improved lipid metabolism. Furthermore, Williamson et al. (2025) established a strong inverse relationship between physical activity levels and visceral adiposity, reinforcing the role of exercise in preventing metabolic diseases.

University-aged women are particularly vulnerable to visceral fat accumulation due to lifestyle transitions, including reduced physical activity, irregular dietary patterns, and academic stress. Evidence suggests that young adult females may accumulate visceral fat even with normal body weight, making it a hidden but critical health risk (Shen et al., 2012). Given these concerns, lifestyle-based interventions such as aerobic exercise have been widely recommended as effective non-pharmacological strategies for reducing intra-abdominal fat through increased energy expenditure and enhanced lipid metabolism (Ohkawara et al., 2007; Slentz et al., 2005).

Female fitness club members in university settings represent a unique population for examining the effectiveness of structured aerobic training programmes. Although they engage in some level of physical activity, they remain susceptible to lifestyle-related risk factors associated with visceral fat accumulation. Therefore, investigating the effects of a structured aerobic training programme on visceral fat among female fitness club members at Bayero University, Kano, is essential for generating context-specific empirical evidence and informing targeted health interventions.

### **Conceptual Framework**

This study is anchored on the energy balance model and the physiological mechanisms of exercise-induced lipolysis, both of which are strongly supported by empirical evidence explaining reductions in visceral adipose tissue (VAT) following aerobic training.

The energy balance model posits that fat accumulation occurs when energy intake exceeds energy expenditure, whereas a sustained negative energy balance leads to fat loss. Empirical studies have demonstrated that aerobic exercise significantly increases total energy expenditure, thereby promoting reductions in body fat, particularly visceral fat. For instance, Jayedi et al. (2024) reported a dose–response relationship between physical activity and body fat reduction, indicating that at least 150 minutes of moderate-intensity aerobic exercise per week is required to achieve significant decreases in adiposity. Similarly, Chen et al. (2024), in a large network meta-analysis, found that aerobic exercise and high-intensity interval training are among the most effective interventions for reducing visceral adipose tissue.

In addition to energy expenditure, aerobic exercise stimulates lipolysis, the metabolic process through which triglycerides stored in adipose tissue are broken down into free fatty acids for energy use. This mechanism is particularly effective in targeting visceral fat due to its high metabolic activity. Empirical evidence by Guo et al. (2024) shows that aerobic exercise improves adipose tissue function by enhancing capillary density and reducing inflammation, thereby facilitating fat mobilization and oxidation. Furthermore, Zhang et al. (2025) demonstrated that aerobic training improves lipid metabolism, including reductions in triglycerides and low-density lipoprotein cholesterol, which are closely associated with decreases in visceral fat.

Additional empirical support is provided by Williamson et al. (2025), who established a strong inverse relationship between physical activity levels and visceral adiposity, indicating that increased engagement in aerobic activities is associated with lower visceral fat accumulation and reduced cardiometabolic risk. Earlier foundational studies (e.g., Slentz et al., 2005; Vissers et al., 2013) further support these findings by demonstrating that moderate-to-vigorous aerobic exercise leads to significant reductions in intra-abdominal fat, independent of dietary interventions.

From a behavioural perspective, the Health Belief Model also provides empirical relevance to this study by explaining exercise participation among individuals. Research suggests that individuals are more likely to adopt and maintain physical activity behaviours when they perceive susceptibility to health risks and recognize the benefits of exercise (e.g., reduction in visceral fat and improved metabolic health). The structured nature of fitness club programmes further enhances adherence by providing social support and environmental cues that promote sustained engagement in aerobic training.

Based on these empirical and theoretical foundations, this study conceptualizes that aerobic training (independent variable) increases energy expenditure and stimulates lipolysis (mediating mechanisms), which ultimately leads to reduction in visceral fat (dependent variable) among female fitness club members.

### **Justification of the Study**

Visceral fat is a major indicator of metabolic health due to its strong association with cardiovascular and metabolic diseases. It poses significant risks in females, particularly university students, due to sedentary lifestyles, poor diet, and hormonal influences. Although aerobic exercise effectively reduces visceral fat, there is limited evidence within Nigerian populations. This highlights the need for context-specific research to validate its effectiveness.

Therefore, this study is justified on the basis that it seeks to fill an important gap in the literature by examining the effects of aerobic training on visceral fat among female fitness club members at Bayero University, Kano. The results will provide empirical evidence to guide exercise prescription, inform university health promotion policies, and contribute to the broader scientific understanding of exercise-induced visceral fat reduction in African female populations. In view of the stated problem the study answered the following research question: Will a structured aerobic training programme have effect on visceral fat among female fitness club members of Bayero University, Kano?

### **Hypothesis**

H : There is no significant effect of structured aerobic training programme on visceral fat levels among female fitness club members of Bayero University Kano.

### **General Objective**

The general objective of this study is to determine the effect of a structured aerobic training programme on visceral fat among female fitness club members of Bayero University, Kano.

### **Specific Objectives**

The study will specifically seek to:

1. Determine the pre-training visceral fat levels of female fitness club members of Bayero University, Kano.
2. Implement a structured aerobic training programme for female fitness club members over a specified training period.
3. Assess the post-training visceral fat levels of female fitness club members after participation in the aerobic training programme.
4. Compare pre-training and post-training visceral fat levels to evaluate the effectiveness of the aerobic training programme.

### **Methods**

The study employed an experimental pre-test and post-test control group design to investigate the effect of aerobic training on visceral fat, aligning with definitions by John & Creswell (2014) and Fred & Kerlinger (1973) regarding manipulation of independent variables and control groups. Participants were randomly assigned to either an experimental group, which engaged in a structured 12-week aerobic programme, or a control group, which continued normal activities, ensuring baseline equivalence and reducing selection bias (Donald & Campbell, 1963; Julian & Stanley, 1963). The

study was conducted at Bayero University Kano, Nigeria, with 80 female fitness club members as the target population, from which 40 participants were purposively selected and divided equally into experimental ( $n = 20$ ) and control ( $n = 20$ ) groups, following Creswell (2014). Inclusion and exclusion criteria ensured participants were medically fit and not engaged in other structured exercise programmes. Participants were included if they were female fitness club members aged 18–35 years, medically fit for exercise, and not engaged in any structured training programme outside the study. Participants with known cardiovascular, metabolic, or musculoskeletal disorders, or those on medications affecting metabolism, were excluded from the study.

#### **Sample Size Justification:**

Although the sample size ( $n = 40$ ) was considered adequate for experimental comparison, no a priori power analysis was conducted, which may limit the statistical power and generalizability of the findings.

Visceral fat was measured using a bioelectrical impedance analysis (BIA) device, validated for reliability in previous studies (Heymsfield et al., 2005). The training programme progressed in intensity from 50–60% HRmax in weeks 1–4 to 70–80% HRmax in weeks 9–12, with attendance monitored throughout. Data collection occurred in three phases: pre-test, training, and post-test, with analyses using descriptive statistics and Analysis of Covariance (ANCOVA) to compare post-test values while controlling for pre-test differences, consistent with Andy Field (2013). This design enabled accurate evaluation of the causal effects of aerobic training on visceral fat while minimizing extraneous influences.

#### **Limitations of the study**

Furthermore, the study focused solely on visceral fat as the primary outcome without incorporating mechanistic biomarkers such as inflammatory markers or insulin sensitivity indices, which could provide deeper insights into physiological adaptations. Future studies should adopt a multi-variable approach and longitudinal designs to enhance research depth and rigor.

#### **Ethical Considerations**

Ethical approval was obtained from the appropriate authority at Bayero University. Participants provided informed consent and were assured of confidentiality. They were also informed of their right to withdraw at any stage without penalty.

#### **Training Procedure**

There were two independent groups involved in this study: the experimental group and the control group. The control group did not participate in any structured or formal exercise programme and continued with their normal daily activities throughout the duration of the study. In contrast, the experimental group underwent a 12-week structured aerobic training programme carried out at the Bayero University Mini Stadium.

The aerobic training consisted of aerobic exercises performed three alternate days per week at a progressive intensity ranging from 50% to 80% of the participants' maximal heart rate (MHR), in line with established exercise prescription guidelines. Previous studies have applied similar intensity ranges; for instance, Adhama (2014) utilized 45%–85% MHR over eight weeks among diabetic patients, while Yar'zenver (2008) implemented a 12-week programme at 40%–80% MHR. However, the current study specifically adopted a training range of 50%–80% MHR to ensure safety and effectiveness for the participants.

The maximal heart rate was estimated using the standard formula:

$$\text{MHR} = 220 - \text{Age}$$

For example, for a participant aged 20 years:

$$\text{MHR} = 220 - 20 = 200 \text{ beats per minute}$$

$$\text{Initial Training Heart Rate (IHR)} = 200 \times 0.50 = 100 \text{ beats per minute}$$

$$\text{Final Training Heart Rate (FHR)} = 200 \times 0.80 = 160 \text{ beats per minute}$$

Each participant wore a digital heart rate wristwatch and was properly oriented on their individualized target heart rate zone based on their calculated MHR. The training sessions were conducted between 7:00 am and 8:00 am on Fridays, Saturdays, and Sundays for convenience and consistency.

Before each training session, participants engaged in a 5–10-minute warm-up consisting of stretching exercises for the legs, arms, and neck, as well as sit-and-reach activities. The percent heart rate method was used to monitor and regulate exercise intensity, and the training programme followed three progressive phases: initial, improvement, and maintenance. Intensity was gradually increased every two weeks by approximately 5%, starting from 50% MHR until 80% MHR was achieved.

During exercise sessions, four trained research assistants were positioned around the track to monitor participants closely. They ensured prompt identification of any adverse signs such as dizziness, weakness, or poor coordination. Participants exhibiting such symptoms were instructed to slow down or temporarily stop to recover before resuming activity.

Heart rate was measured before and immediately after each session to ensure that participants exercised within their prescribed intensity range. Attendance and adherence were also monitored throughout the programme.

At the end of the 12-week training period, post-test measurements of visceral fat were taken for both the experimental and control groups using the same procedures as the pre-test phase. The data collected were analysed using Analysis of Covariance (ANCOVA) at a 0.05 level of significance to determine the effect of the aerobic training programme.

Attendance was monitored throughout the 12-week training period. Participants in the experimental group recorded an average adherence rate of approximately 85%, with only minor absences due to personal reasons. No participant dropped out during the intervention period.

**Result**

**Table 1 ANCOVA Analysis on Visceral Fat**

Variables					df	Mean Square	f	p
	Experimental n =20		Control n =20					
	Pre	Post	Pre	Post				
<b>VisceralFat</b>	14.50±	11.95	11.00±	12.55±	1,37	52.84	9.67	0.003*
	4.36	4.52	5.22	4.52	1,37	118.21	21.64	<0.0001

\*Significant at the .05 alpha level ( $p < 0.05$ ) table-value:  $f(1.37) = 411$

The analysis of covariance (ANCOVA) was conducted to examine the effect of aerobic training on visceral fat among female fitness club members of Bayero University, Kano. The results revealed statistically significant differences between the experimental and control groups after adjusting for pre-test scores. For visceral fat, the experimental group decreased from 14.50 (pre-test) to 11.95 (post-test), while the control group increased from 11.00 to 12.55. The analysis produced a significant F-value of 9.67 with  $p = 0.003$ , indicating that aerobic training had a significant effect on reducing visceral fat. Additionally, the covariate (pre-test visceral fat) was statistically significant ( $F = 21.64, p < 0.001$ ), suggesting that baseline visceral fat levels influenced post-test outcomes. These findings confirm that participation in a structured aerobic training programme significantly reduced visceral fat among the experimental group compared to the control group

**Discussion**

The findings of this study revealed that a 12-week structured aerobic training programme significantly reduced visceral fat among female fitness club members of Bayero University, Kano. Participants in the experimental group showed a notable decrease in visceral fat levels compared to the control group, which recorded a slight increase. This confirms that aerobic training is an effective non-pharmacological intervention for reducing visceral adiposity.

The significant reduction in visceral fat observed in this study is consistent with previous empirical studies. For instance, research by Slentz et al. (2005) demonstrated that aerobic exercise leads to substantial reductions in central obesity, particularly visceral fat, even without dietary modification. Similarly, Vissers et al. (2013) reported that moderate-to-vigorous aerobic exercise significantly decreases visceral adipose tissue, supporting a dose-response relationship between exercise intensity and fat loss. The structured progression of exercise intensity in this study (50%–80% HRmax) likely enhanced energy expenditure and fat oxidation, thereby contributing to the observed outcomes.

Furthermore, the findings align with Ohkawara et al. (2007), who concluded that aerobic exercise is particularly effective in targeting intra-abdominal fat due to its sustained metabolic demand. The decrease in visceral fat among participants in the experimental group suggests improved metabolic functioning, including enhanced insulin sensitivity and reduced inflammatory activity, which are critical in lowering the risk of cardiovascular diseases and type 2 diabetes.

The significant influence of the covariate (pre-test visceral fat) indicates that baseline fat levels played a role in determining post-intervention outcomes. This implies that individuals with higher initial visceral fat may experience greater reductions following aerobic training, highlighting the importance of individualized exercise prescription.

In contrast, the control group showed a slight increase in visceral fat, which may be attributed to continued sedentary behaviour, poor dietary habits, or lack of structured physical activity. This further emphasizes the necessity of regular exercise in preventing the accumulation of harmful abdominal fat, even among individuals who may appear physically active in daily life.

Importantly, this study contributes to the limited body of literature on visceral fat reduction among female populations in sub-Saharan Africa. While most Nigerian studies have focused on general obesity indicators such as BMI and body weight, this research provides evidence that aerobic training specifically targets visceral fat, which is a more critical predictor of cardiometabolic risk.

Overall, the findings underscore the effectiveness of structured aerobic exercise programmes in reducing visceral fat and improving metabolic health among young adult females. The results support the integration of regular aerobic training into university fitness programmes as a practical and sustainable strategy for reducing health risks associated with visceral adiposity.

The findings of this study have important implications for human kinetics within university settings. Structured aerobic training programmes can be incorporated into physical and health education curricula as practical modules to promote active lifestyles among students. Additionally, peer-led fitness initiatives within university clubs may enhance participation, adherence, and sustainability of exercise programmes, thereby reinforcing positive health behaviours and reducing cardiometabolic risk.

### **Conclusion**

This study concluded that a 12-week structured aerobic training programme has a significant effect on visceral fat among female fitness club members of Bayero University, Kano. The findings demonstrated that participants who engaged in regular aerobic exercise experienced a meaningful reduction in visceral fat levels, while those in the control group showed no improvement and, in some cases, an increase.

The results provide strong evidence that aerobic training is an effective and practical strategy for reducing visceral adiposity, which is a key risk factor for cardiovascular diseases, type 2 diabetes, and other metabolic disorders. The study further highlights the importance of structured, progressive, and consistent exercise programmes in achieving optimal health outcomes.

In conclusion, aerobic training should be promoted as a vital component of health promotion and disease prevention strategies among young adult females, particularly within university environments where lifestyle habits are being formed.

### **Recommendations**

Based on the findings of this study, the following recommendations are made:

1. University health authorities should encourage female students to engage in structured aerobic training programmes performed at moderate-to-vigorous intensities (50%–80% HRmax), as demonstrated in this study.
2. Fitness clubs should adopt progressive aerobic training protocols (three sessions per week, 45 minutes per session) to optimize visceral fat reduction.
3. Physical activity and fitness programmes should be integrated into university wellness initiatives to promote long-term healthy lifestyle habits among students.
4. Fitness centres should incorporate periodic assessment of visceral fat using reliable tools such as bioelectrical impedance analysis (BIA) to track progress and motivate participants.
5. Students should be encouraged to combine aerobic exercise with healthy dietary practices and reduced sedentary behaviour for more effective management of visceral fat.
6. University management and health policymakers should develop and implement policies that support active lifestyles and provide adequate facilities for regular physical activity among students.

7. Health educators, in collaboration with exercise specialists, should incorporate awareness of visceral fat and practical guidelines for aerobic training into student wellness programmes to encourage long-term behavioural change.

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## Social and Behavioural Change as An Impact of Health Education: Applications Among Youths in Northern Nigeria Using Technology and Community Engagement

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### Abstract

*Persistent risky behaviours among youths, underutilization of digital tools in behaviour change, lack of integrated technology and community-based interventions motivate to investigate the impact of health education on social and behavioural change among youths in northern Nigerian using technology and community engagement. In a changing world of global health promoting social and behavioural change needs new ideas that are open to everyone. This paper looks at how new technological advancement and community engagement work together to create a new way of teaching health education and its application that encourages social and behavioural change among youths in northern Nigeria. The paper stresses how important community-based strategies like peer education, participatory learning and grassroots mobilization for encouraging health behaviours and giving beneficiaries a sense of ownership. The study adopts a narrative literature review approach, the outcome shows that the best way to achieve social and behavioural change is to support lifelong learning with both new technology and strong community systems, the study also revealed that interventions that are integrated within community structures are more acceptable and effective, when they address local cultural and social settings, the study recommended that families and communities should encourage youths in northern Nigeria to maintain trust in their routine activities such as production of health products and delivering health care services and disseminating health information to avoid misuse of government resources on creating and maintaining regulatory bodies and security agencies to safeguard citizens health.*

**Keywords:** Social and Behavioural Change, Social and Behavioural Change Communication, Community Engagement, Health Education, Youths and New Technological Advancement

### Introduction

Social and behavioural change is an approach that uses systematic insights on why people behave the way they do and how behaviour change to effect positive outcomes by specific group of people (Kwamboka, 2024). Social and behavioural change (SBC) is an evidence-based approach which entails different communication and community engagement methodologies, activities and tools that are used to positively influence behaviours and practices. It is a strategy that focuses on behaviours by influencing people's knowledge, attitude and social norms around them to help improve their lives (UNICEF, 2022). SBC is understood as a process involving individuals, communities or societies that enables them to adopt and sustain positive behaviours. While health education is an art or science of giving simple, accurate, scientific information in a way it will be understood, accepted and put into practice. Northern Nigerian Youths are citizens of the federal republic of Nigeria aged

between 18-29 years of age according to new youth policy (2019) and African youth charter recognizes youths as people between the age of 15-35 years of age (Prostejav, 2019).

### **Objectives of the study**

The objectives for this study on social and behavioural change as an impact of health education: applications among youths in northern Nigeria using technology and community engagement

1. To examine the role of health education in promoting social and behavioural change.
2. To analyse the contribution of digital technologies to SBC among youths.
3. To evaluate the role of community engagement in sustaining behaviour change.
4. To propose an integrated model for SBC in Northern Nigeria.

### **Statement of the Problem**

Persistent risky behaviours among youths (poor hygiene, unsafe sexual practices, substance use, misinformation), underutilization of digital tools in behaviour change, lack of integrated technology and community-based interventions motivate the effort of this review/investigation to focus on Nigerian youths' problems with the aim of assessing youth's knowledge of health-related behaviours, examine behavioural practices among youths, determining the level of application of health information, to evaluate the role of digital platforms in health education, to examine the influence of community engagement on behaviour change and determine the combined effect of technology and community strategies on behaviour outcomes.

Nigerian youths neglected the historical behaviour and traditional way of trustworthiness in their production of health products, delivering health services and disseminating health information which resulted in provision of different regulatory bodies like NAFDAC, SON, Community policing and state owned security bodies in order to safeguard the health Nigerians but all the efforts seems to be in vain because other continents of the world their youth's behaviours differ in terms of trust allowing their government to utilize their resources in building a developmental projects especially in developed countries where a citizen uses ATM to make payment for fuel inside feeling stations, seek for medical services/intervention, purchase health products and health information. That is why the study seek to investigate the application of social and behavioural change among youths in northern Nigeria in order to meet the health care system in developed countries.

### **Literature Review**

Health education is one of the most effective strategies for promoting positive health behaviours and improving health outcomes across different populations. It involves the provision of information, development of skills, and encouragement of attitudes that enable individuals and communities to make informed health decisions. Evidence from global and local studies consistently demonstrates that health education plays a critical role in enhancing knowledge, shaping attitudes, and promoting behavioural change (Glanz, Rimer, & Viswanath, 2015).

One of the primary strengths of health education lies in its ability to improve knowledge and awareness of health-related issues. Increased knowledge serves as the foundation for behaviour change, as individuals who understand the causes, transmission, and prevention of diseases are more likely to adopt preventive measures and health education interventions have significantly contributed to reductions in communicable diseases by promoting practices such as hygiene, immunization, and proper nutrition (WHO, 2023)

To improving knowledge, health education enhances individuals' attitudes towards health practices, positive attitudes are essential for sustaining behavioural change, individuals are more likely to engage in behaviours they perceive as beneficial while health education programmes targeting caregivers and youths have resulted in improved attitudes towards immunization, breastfeeding, and hygiene practices, thereby contributing to better health outcomes (UNICEF, 2023).

Health education is also effective because it can be delivered through multiple channels, including schools, community outreach programmes, mass media, and digital platforms. The integration of technology into health education has further increased its reach and effectiveness, especially among

youths who are active users of mobile devices and social media. Digital health education interventions have been shown to enhance engagement, improve access to health information, and promote behaviour change when combined with interactive and participatory approaches (Egwudo, Olorunsaiye, Adebayo, & Adepoju, 2025).

Similarly, health education contributes to the development of practical skills necessary for behaviour change, like teaching proper hand-washing techniques, safe food handling, and correct use of health services equips individuals with the ability to apply knowledge in real-life situations, skill acquisition is a key component of effective health education, as it bridges the gap between knowledge and practice. Another important aspect of health education is its ability to address cultural and social determinants of health. Community-based health education programmes that involve local (Glanz et al. (2015).

### **Methods**

This study adopts a narrative literature review approach. Relevant articles published between 2014 and 2026 were sourced from databases such as PubMed, Google Scholar, and institutional reports. Inclusion criteria focused on studies addressing SBC, health education, digital health, and community engagement in low- and middle-income countries, particularly Nigeria.

### **Historical Development of Social and Behavioural Change**

The global history of social and behavioural change evolved in 1950–1990 from early health education (disseminating information) to modern, holistic social and behavioural change communication known as social and behavioural change (SBC). Previous methods of disseminating information, education and communication (IEC) and behavioural change communication (BCC) focused on changing individual knowledge and attitude through mass media, this shifted over time that incorporate social and structural factors, acknowledging that individual behaviour has an influence to the environment, community norms, and systemic barriers. Social and behavioural change utilizes strategies like community engagement, entertainment, education, and digital tools to create sustainable change (Kwamboka, 2024).

Social and behavioural change has undergone significant evolution over the years, the foundation focused on providing individuals and communities with information to promote healthy behaviours (health education). The growth in this space bore information, education, and communication materials, making the start more structured public health communication. The approaches and strategies of SBC programmes in order to address the complex contributing factors and drivers that influence individual and community behaviour:

- Acquiring the necessary skills for applying and integrating SBC approaches in various development, health care and humanitarian programmes
- Implementing the most common SBC approaches and strategies
- Applying basic SBC principles and ethical standards
- Explaining specific individual behavioural determinants at their different levels of influence by learning the behavioural drivers' model (BDM) and its importance and the basic theories that the model is designed on.
- Choosing and determining the most prominent approaches adopted in SBC programmes, such as community engagement, community mobilization, edutainment (entertainment and education), and campaigning.
- Employing effective strategies in SBC programmes, such as social listening, digital engagement, confronting rumours and misinformation and conducting focus group discussions.
- Learning how to integrate SBC in humanitarian programmes and emergency settings.
- Reviewing the most important principles of active learning and facilitating training sessions and acquiring the basic facilitation skills for delivering training sessions (Kwamboka, 2024).

### **Social and Behavioural Change Communication**

SBC refers to all information exchange efforts aimed at promoting informed compliance with recommended measures or promoting positive behaviour change required to interrupt a public health emergency. The communication efforts involve creating supporting environments to enhance information exchange and promote behaviour change, use of behavioural data to identify information needs and to make the needed information relevant in terms of language, medium, content and changing epidemic/pandemic phases (Obregon and Lapsansky, 2021).

Social and behavioural change communication is defined as health communication tool, is a research-based and a consultative process that uses communication to foster and facilitate change in behaviour and support the requisite social change aimed at improving health outcomes at multiple levels. It is a process of promoting and sustaining healthy changes in individuals, communities and involves participatory development of appropriately tailored health messages and approaches conveyed through a variety of communication channels (Anyanwu, 2014).

The core of social and behavioural change interventions during a public health emergency; political will, community involvement and community participation, through advocacy: find ways of strengthening advocacy for active involvement and participation of political leaders and stakeholders to revitalize the response, coordination; social and behavioural change approaches depend on strong partnership between stakeholders, clear delineation of partners roles and coordination of response activities for a swift and efficient response, collaboration; partnership and active collaboration amongst all stakeholders, including the community, political leadership, non-state actors and civil society organizations is critical to enhance resource pooling for SBC interventions (Gonah and Kabie, 2021).

**Strengthen trust/engagement:** engagement of trust/influential people or institutions like community and religious leaders, socialites and politicians, emerged as essential for promoting a sustainable behaviour change, target population segmentation and localization of interventions and resource mobilization: prioritize resource mobilization and advocacy for increased resource allocation to sustain implementation of SBC programmes, efforts should be made to improve behavioural data generation, monitoring and evaluation of SBC initiatives to demonstrate its importance and justify the need for an increased resource allocation towards SBC programmes (Gonah, 2020).

Other SBC approaches are social and behaviour change communication; interpersonal communication (counselling, one-on-one learning, support groups), mass and mid-media activities, social media and advocacy. Community engagement; community interventions, mobilizations, participation and community dialogue/forum/platforms. Service improvements; designing services suitable for the intended users, designing services in collaboration with the intended users, creating services that suit people's social and cultural norms and fit their daily realities. System strengthening; capacity building for human resources, supporting funding, implementing change at various levels of health care system (policy, services and community levels). Supportive public policies; engaging policy makers, facilitating community participation to support new policies, holding policymakers, accountable, empowering communities to contribute to decision making and ensuring accountability of authorities towards citizens. Social movements; adding voices, people, skills and evidence-based solutions to social movements and resource mobilization. Applied behavioural science; using evidence from psychology, cognitive science, sociology and economics to understand the relationship between human traits and context we live in (UNICEF, 2022).

Breakthrough Action Nigeria: A non-governmental organization funded by united states agency for international development (USAID) that ignites collective action and encourages people to adopt healthier behaviours from using different methods like sleeping under mosquito bed nets, being tested for HIV and preventing the spread of zoonotic diseases through forging, testing, scaling up new and hybrid approaches to social and behavioural change. Service delivery and provider behaviour change, meeting the needs of youth, male engagement, integrated programming, SBC approaches, equity, gender, and social systems, measurement and costing (USAID, 2023).

### **Modern Technology-enhanced Health Education**

The use of digital technologies and media such as mobile phones, computers, tablets contribute to the dissemination of health information and messages to target audience or groups in social and behavioural change programmes with the aim of encouraging target groups to adopt healthy or protective behaviour. The digital technologies have revolutionized health education offering unprecedented opportunities for personalized, accessible and interactive learning experience. New technological advancement that enhanced health education includes:

- Interactive web-based platforms with personalized content
- Mobile applications for symptoms tracking and self-management
- Virtual reality experiences for treatment preparation and anxiety reduction
- Telemedicine consultations for remote education and support
- Social media platforms for peer support and information sharing
- Artificial intelligence-powered chatbots for 24/7 questions and answers (White, 2024).

The integration of technology into health education has significantly expanded the reach, accessibility, and effectiveness of health information dissemination, particularly among youths. Technological platforms such as mobile phones, social media, internet-based applications, and digital communication tools have transformed traditional health education methods by enabling wider and faster dissemination of information across diverse populations. This is especially relevant in developing regions where access to conventional health education channels may be limited. One of the major advantages of technology in health education is its ability to reach large populations irrespective of geographical barriers. Mobile health (mHealth) interventions, including short message service (SMS), WhatsApp messaging, and mobile applications, have been widely used to deliver health information and promote behaviour change. Digital health technologies have improved the delivery of health services and expanded access to health information, particularly in underserved and remote communities (WHO, 2023).

Moreover, the proliferation of social media platforms has created new avenues for health advocacy and communication. Platforms like Facebook, WhatsApp, TikTok, and YouTube are now central to delivering educational campaigns, sharing health tips, and engaging youth in critical discussions on mental health, sexual health, and substance use. Through strategic use of influencers and community leaders, health messages become relatable and culturally relevant. WhatsApp groups and Facebook live sessions also facilitate two-way communication, peer education, and sustained engagement. Similarly, tele-education tools have been employed to train health workers and peer educators remotely, reducing cost and improving reach (Sunday, Umoinyang & Bkuri, 2024). Digital health innovations also face challenges, such as the digital divide, low digital literacy, and inconsistent electricity or internet connectivity, especially in rural and underserved communities, while technology enhances access, its success depends largely on contextual adaptation and human facilitation (McIntyre, 2020).

### **Community engagement**

Community engagement is an organized collective action which seeks to engage individuals and groups from the local communities in programmes that aim to solve their health and other related problems and improve their health and development status. This participation leads to building a social agreement and consensus around a specific issue (right, problems, health message or demand for movement) (UNICEF, 2022).

### **Importance of community engagement**

Community engagement is an approach of paramount importance, making it the most effective and sustainable strategies in SBC programmes; lead to better and more efficient programming, listening to people's needs, opinions and expectations and involving them in programme design, implementation, monitoring and evaluation helps in understanding and appreciating the situation, priorities, needs and resources for more responsive, effective and sustainable programmes.

Improves the level of the community's acceptance, respect, and confidence in the entities that motivate and mobilize the community, creating enduring and continuous communication based on credibility and objectivity. Empowers people and builds community resilience by allowing people to take informed decisions, search for answers to their problems, and communicate with others to organize their own response which increases the community's ability to face challenges. Prevents them from doing harm to the community by achieving deep understanding of the local environment and the role played by external organizations, which helps avoid unintended negative consequences for the community. Enables dialogue between external organizations and those affected so that everyone is aware of the restrictions or existing limitations, sparing the community from having unrealistic expectations (UNICEF, 2022).

#### **Characteristics and roles of the community engagement team**

Community engagement team are key factor in the success of the community engagement process. The team should have sufficient experience in the central issue of the social and behavioural change programme and good understanding of the political, cultural, societal and economic context. The Community engagement team should have basic working skills, such as communication and facilitation skills, project design and management skills, capacity building skills, planning implementation and evaluation skills. Most important thing is for the team members to be able to involve stakeholders and partners in all stages. It is important for community engagement team members to have personality traits like openness, flexibility, patience, listening skills, diplomacy and belief in people's abilities (UNICEF, 2022).

#### **Models of communication activities in community engagement**

The activities planned and implemented vary according to stages of engagement and target groups which include home visits, public meetings and formation of delegations to visit public and official figures, dialogue sessions, educational seminars and lectures, town hall meetings, artistic and theatrical performances, open days, exhibitions, demand march, distribution of print materials and hanging billboards (UNICEF, 2022).

#### **Behaviour change multi-dimensional**

Behaviour change is a complex and multi-dimensional process influenced by a combination of cognitive, social, environmental, cultural, and economic factors. It goes beyond the acquisition of knowledge and involves the interaction of multiple determinants that shape individuals' attitudes, intentions, and actions over time. In the context of health education, understanding the multi-dimensional nature of behaviour change is essential for designing effective interventions that produce sustainable outcomes. Knowledge and awareness serve as the foundation for behaviour change. Individuals must first understand health risks, disease prevention strategies, and the benefits of adopting healthy behaviours. However, knowledge alone is often insufficient to produce lasting change, health behaviour is influenced not only by knowledge but also by beliefs, perceptions, and self-efficacy, which determine an individual's readiness to act (Rimer, and Viswanath (2015).

Social factors also play a significant role in shaping behaviour. Peer influence, family support, cultural norms, and community expectations can either promote or hinder the adoption of healthy behaviours. In many African settings, including Northern Nigeria, cultural beliefs and social structures strongly influence health practices. The community norms and social support systems are critical in sustaining behavioural change, particularly among youths (UNICEF, 2023).

Environmental and structural factors further contribute to the complexity of behaviour change. Access to healthcare services, availability of resources, living conditions, and infrastructure can determine whether individuals are able to practice recommended health behaviours. For instance, promoting hand washing is less effective in communities where access to clean water and sanitation facilities is limited, while enabling environments are essential for translating knowledge into practice (WHO, 2023).

Economic factors also influence behaviour change. Poverty and financial constraints can limit individuals' ability to adopt preventive health measures, such as accessing healthcare services,

purchasing nutritious food, or maintaining hygienic living conditions. Studies have shown that socio-economic status is a strong predictor of health behaviour and outcomes, particularly in low- and middle-income countries (Marmot, 2018).

### **The key influences of behaviour change**

Motivators are those factors that encourage a person to practice the desired behaviour, barriers are those factors that prevent person from practicing the desired behaviour, target group consist of people targeted by an intervention like women of reproductive age, adolescent groups, youth groups and aged groups and priority group constitutes people who are expected to practice a given behaviour like mothers of child bearing aged, under-five children (0-5 months) who should breastfeed exclusively as well as those who are supposed to ensure that someone else practice a behaviour (Prostejov, (2019).

### **Barriers to Behaviour Change**

The identified challenges hindering the success of social and behavioural change interventions for behaviour change listed as follows; Formative research: enables programmers to understand the issues from the perspective of the target audience and coming up with messages and strategies that directly address such issues. Beginning formative research prior to the project being funded, behaviour change interventions are usually, largely, and driven with donor funds. Lack of understanding in government ministries; for any behavioural change intervention or project to be recorded successful, its roll out should be made to be sustainable which includes buy-in multi-level stakeholders including the relevant government ministries. Government ministries mostly have staff well knowledgeable in health education, main challenge is lack of understanding of formative research, behaviour change strategy formulation, state of the art message design and production of materials, monitoring, evaluation and protesting. It is the role of implementers to address these gaps by rolling out skill transfer strategies like seminars, workshops, monitoring and ensuring that key decision makers participate at these sessions rather than sending representatives (Anyanwu, 2014). Political and physical environment: there are strong diversity in geography and population of the people, and this complicates the development of social and behavioural change programmes in most developing countries. Multiple languages spoken and diverse traditions are included in social and behavioural change programme for single location (FHI, 2002). Linkages and coordination are a situation where multiple organizations and agencies SBC program for related change objectives in the same location. Building and maintaining linkages and coordination in such situation been shown to be an ongoing challenge and been recommended for technical working group to address this gap. Measuring impact for decision makers as time and funding constraints with social and behavioural change create secondary challenge of accounting for efforts invested in the intervention. This usually arises from poorly defined indicators for measuring successes recorded (Anyanwu, 2014).

### **Theoretical Framework**

#### **Application of the Health Belief Model (HBM)**

The health belief model (HBM), originally developed in the 1950s by social psychologists Hochbaum, Rosenstock, and Kegels, remains one of the most widely used models to explain and predict individual health behaviours. The model postulates that an individual's engagement in health-promoting behaviour depends on their perceptions of health threats and the benefits of taking action (Rosenstock, Glanz, Rimer, and Viswanath, 2015). The model allows for the analysis of how health education interventions can be more effective when they address people's beliefs, reduce perceived barriers, and provide consistent cues and support for action. Thus, social and behavioural change through innovative, belief-centred, and community-driven health education creates a robust foundation for lifelong learning and sustained behaviour change. This study applies the health belief model to explore how technology and community engagement can be leveraged to improve individual perceptions, reduce barriers, and foster social and behavioural change through innovative health education strategies.

**Perceived Susceptibility:** This refers to an individual's belief about the likelihood of acquiring a disease or health condition. Health education tools delivered through digital platforms it includes mobile health (mHealth) alerts, social media content, and virtual peer discussions can help individuals recognize their vulnerability to health risks, such as communicable diseases, non-communicable diseases, poor nutrition, poor oral health, or physical inactivity. In rural or underserved populations, community engagement (through local leaders or peer educators) plays a crucial role in contextualizing these risks in a culturally relevant manner. Together, these approaches enhance people's awareness of their personal susceptibility (Rosenstock, Glanz, Rimer, and Viswanath, 2015).

**Perceived Severity:** This refers to the belief about the seriousness of the health issue and its potential consequences. Health education, delivered through storytelling, testimonials via community sessions, and educational videos on digital platforms, can strengthen understanding of the severity of ignoring health behaviourist includes avoiding physical activity, unhealthy diets, or neglecting personal hygiene. Community involvement can make the message more relatable, especially when local health workers share real-life examples and local statistics.

**Perceived Benefits:** The individual must believe that a particular action will reduce their risk or improve health outcome, people are more likely to engage in physical activity, seek preventive care, or participate in personal hygiene programs if they are convinced of the benefits, it includes better quality of life, reduced illness, and lower healthcare costs. The integration of digital health platforms like fitness tracking apps, health reminders, or educational podcasts can clarify the tangible benefits of action, especially when reinforced by community-based testimonials or group support systems (Rosenstock, Glanz, et al, 2015).

**Perceived Barriers:** Barriers such as poor access to care, lack of health knowledge, digital illiteracy, or cultural misconceptions often hinder behaviour change. This is where innovative health education must intervene. Digital tools can help overcome logistical and informational barriers, while community engagement addresses social, cultural, and emotional barriers, like a woman who are hesitant to seek reproductive health services due to stigma may feel empowered when educated by trusted female health educators or peers in their communities.

**Cues to Action:** Cues are triggers that prompt the decision to change behaviour. Digital reminders, interactive health messages, and peer group meetings serve as cues. Weekly SMS messages about wellness tips, local wellness events, or visual posters in the community centre are examples of integrated digital and community-based cues (Rosenstock, Glanz, at el, 2015).

**Self-Efficacy:** Self-efficacy refers to the individual's confidence in their ability to take action. When people are trained to use mobile apps, taught healthy habits in small group discussions, or mentored by community health workers, their confidence increases. The more tools and support they receive from both digital platforms and their community, the more likely they are to believe in their ability to manage their wellness.

### **Community Organization Theory (COT)**

Community Organization Theory focuses on empowering communities to identify common problems, mobilize resources, and develop and implement strategies for collective action, which centres on integrating technology and community participation to promote social and behavioural change through health education. The community organization theory (COT) serves as an effective theoretical lens for this study, as it emphasizes participatory, grassroots approaches to health promotion and education. COT is based on the assumption that lasting health outcomes are achieved not just through individual behaviour change, but through collective action and empowerment of communities to address the social determinants of health (Minkler & Wallerstein, 2012). This theory is particularly well-suited to the integration of technology and community

engagement, as both serve as tools to mobilize communities, build capacity, and promote sustainable social and behavioural change interventions. COT frames the community not merely as a passive recipient of health services but as an active partner in identifying needs, developing solutions, and leading change.

**Community Empowerment:** Empowerment is a core principle of COT. In the context of this paper, empowerment involves enabling community members to take charge of their social and behavioural change needs by combining local knowledge with technological access. This includes training community health workers and volunteers to deliver digital content, facilitate health discussion forums, and advocate for social and behavioural change in their localities. Encouraging participation in the design and implementation of educational content, communities gain ownership over health promotion initiatives an essential factor for sustainability.

**Participation and Relevance:** COT holds that programs must be culturally appropriate and rooted in the realities of the community, by integrating digital tools like WhatsApp health groups, video-based storytelling in local languages, or mobile-based oral health modules, the content remains accessible and context-sensitive. Active involvement of traditional leaders, women's associations, school clubs, and religious institutions also ensures that health education is aligned with cultural values and practices, increasing acceptability (Minkler & Wallerstein, 2012).

**Social Action and Sustainability:** it culminates in social action organized efforts by the community to make long-term changes. In this study, social action includes lobbying for better digital infrastructure, health education in school curricula, or increased funding for social and behavioural change programmes. Combining digital advocacy tools (online petitions, social media campaigns) with local mobilization (community meetings, town hall discussions), the theory supports dual-level engagement virtual and physical leading to stronger policy impact and programme continuity (Minkler & Wallerstein, 2012).

### Conclusion

Social and behavioural change among youths in Northern Nigeria can be significantly improved through integrated health education strategies that combine digital technologies and community engagement. Such approaches are more effective, culturally acceptable, and sustainable.

### Recommendations

1. Integrate digital tools into health education programmes targeting youths.
2. Strengthen community participation in programme design and implementation.
3. Invest in digital infrastructure and health literacy initiatives.
4. Promote culturally sensitive and context-specific interventions.
5. Conduct further empirical studies to validate the proposed model.

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