

A Biopsychosocial Model of Athlete Performance: Integrating Psychological Skills, Coaching Competence, Nutritional Readiness and Well-Being Among Nigerian University Athletes

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Abstract- A biopsychosocial approach to athlete performance was adopted by considering the interrelationships and combined predictive power of psychological skills, coaching competence, nutritional readiness, and athlete well-being on athlete performance among Nigerian university athletes. A correlational research design was used. The study was carried out during the pre-NUGA trials conducted at the University of Port Harcourt, during which athletes from the University of Port Harcourt, Ignatius Ajuru University of Education, Rivers State University, Niger Delta University, and Bayelsa Medical University participated. A sample of 171 athletes was selected from the 300 who participated in this study by applying Yamane's formula, and a total of 149 valid responses were received (87% return rate). The Structured Biopsychosocial Athlete Performance Questionnaire was used to gather data to evaluate psychological skills, coaching competence, nutritional readiness, athlete well-being, and competitive performance. Mean, standard deviation, Pearson product-moment correlation, and multiple linear regression were used for data analysis at the 0.05 level of significance. The descriptive results yielded a grand mean of 3.27 for the biopsychosocial factors domain and a grand mean of 3.27 for the competitive performance domain, indicating positive perceptions in both domains. Pearson correlation showed positive and significant correlation between the biopsychosocial factors and competitive performance ($r = .68, p < .05$). The results of multiple regression analysis revealed that psychological skills, coaching competence, nutritional readiness, and athlete well-being collectively predicted competitive performance significantly ($R = .78, R^2 = .61, F(4, 144) = 56.24, p < .001$) accounting for 61% of the variance in performance. Coaching competence was the greatest unique contributor, followed by athlete well-being, psychological skills, and nutritional readiness. The study findings show that the overall psychological, coaching, nutritional, and well-being environment of the

Nigerian sportspersons in the university setting is interconnected and affects their competitive performance. In the context of university sport in Nigeria, therefore, an integrated biopsychosocial approach for the preparation, development, and management of athletes is recommended.

Keywords: biopsychosocial model, athlete performance, psychological skills, coaching competence, nutritional readiness, athlete well-being, Nigerian university athletes

I. INTRODUCTION

An athlete's performance is now known to involve psychological, social, behavioural, and physiological factors, not just physical ones. Competitive athletes need to learn how to cope with pressure, focus and concentrate, manage their emotions, maintain their confidence, and adjust to challenging training and competition situations. Psychological abilities that relate to goal setting, self-regulation, emotional control, confidence and mental preparation can thus be significant in helping athletes to optimally develop their physical skills and translate them into competitive results. Findings from Nigerian university athletes suggest that mental awareness and self-regulation are relevant to psychological stressor management in the competitive arena, and that culturally meaningful practices in preparation can also be relevant to motivation, focus, emotional regulation, and psychological readiness (Ochor & Amasiatu, 2026; Ochor, 2025). Likewise, current sporting psychology research highlights that the performance context can be both helpful and harmful to athletes' mental health and wellbeing; thus, the

athlete must be taken into account within the wider context in which sporting performance is delivered (Henriksen et al., 2024).

In addition to psychological preparation, the quality of coaching and athletes' nutritional status are also part of the performance environment. Coaches can affect athletes in many ways, such as through technical instruction, tactical planning, motivation, communication, feedback, leadership and management of training demands: errors in coaching competence can restrict the effective development and application of athletes' competence. Evidence from Nigerian polytechnics indicates that coaching training and development are linked to coaching performance, and a key concern is the practical relevance and applicability of available coaching programmes. Another critical component is nutritional readiness, as training adaptation, energy availability, recovery, and physical functioning are also related to some degree of appropriate nutritional practice. A significant relationship between nutritional knowledge and athletic performance was found among the athletes of the University of Port Harcourt, and the implications of nutrition awareness for athletic behaviour were emphasized (Ochor et al., 2025). Macronutrients and micronutrients are not the only physical components of nutrition, and the International Olympic Committee has stressed that insufficient energy availability has negative health and performance impacts (Mountjoy et al., 2023), reinforcing the need to take nutrition into account with a wider perspective than just the physical.

All the above highlight the need for embracing a biopsychosocial approach in the study of athlete performance among Nigerian university athletes. This is because psychological skills, coaching competence, nutritional readiness, and well-being could act in complex ways and in combination, rather than as independent influences on performance. The psychological and physical health of athletes is also of particular concern since these two domains are closely intertwined and also important for training tolerance, injury risk, recovery, motivation, and continued participation in sport; therefore, contemporary evidence suggests that a multidisciplinary approach is required to address the

psychological and physical needs of the athlete concurrently (Henriksen et al., 2024; Tranaeus et al., 2024). Recently, a multidimensional study reported strong relationships between coaching quality, athlete well-being, nutrition, self-efficacy, and sports performance, supporting an integrated approach to performance rather than a one-factor model (Factors Influencing Sports Performance, 2024). In this context, the following biopsychosocial model is proposed: Psychological skills, coaching competence, nutritional readiness, and athlete well-being are all interrelated factors that contribute to competitive performance in Nigerian University athletes.

II. STATEMENT OF THE PROBLEM

Psychological, social, and physiological factors are interrelated and affect competitive performance among athletes in Nigerian universities, yet they are studied independently. Coaching competence influences technical development, motivation, feedback, and the training environment. Psychological skills such as confidence, concentration, motivation, emotional regulation, stress management, and goal setting are important for effective competitive performance. Nutritional readiness also contributes to energy availability, recovery, and adaptation, while athlete well-being contributes to the ability to participate and perform over the long term. Existing evidence has validated these individual variables; however, the combined effect of these variables on athletic performance in Nigerian university sport has been somewhat neglected. This lacuna calls for an integrative biopsychosocial approach that investigates psychological skills, coaching competence, nutritional readiness, and athlete well-being as interdependent factors that predict competitive performance of athletes in the Nigerian university setting.

III. RESEARCH QUESTIONS

1. What is the relationship between psychological skills, coaching competence, nutritional readiness, athlete well-being, and competitive performance among Nigerian university athletes?

2. To what extent do psychological skills, coaching competence, nutritional readiness, and athlete well-being jointly predict competitive performance among Nigerian university athletes?

Hypotheses

1. There is no significant relationship between psychological skills, coaching competence, nutritional readiness, athlete well-being, and competitive performance among Nigerian university athletes.
2. Psychological skills, coaching competence, nutritional readiness, and athlete well-being do not significantly jointly predict competitive performance among Nigerian university athletes.

IV. METHODOLOGY

This study used a correlational research design to investigate the relationship between psychological skills, coaching competence, nutritional readiness, athlete well-being, and competitive performance of university athletes. The study was conducted during pre-NUGA trials hosted by the University of Port Harcourt (UNIPORT), which involved athletes from the University of Port Harcourt (UNIPORT), Ignatius Ajuru University of Education (IAUE), Rivers State University (RSU), Niger Delta University (NDU), and Bayelsa Medical University (BMU). A total of 300 athletes took part in the trials. Using Yamane's formula, a sample size of 171 athletes was obtained at a 0.05 precision level. After stratifying the sample into five participating universities proportionally based on their population sizes, the athletes were selected from each stratum by simple random sampling. A structured questionnaire was used to gather data that included the following areas: Demographic characteristics, psychological skills, coaching competence, nutritional readiness, athlete well-being, and competitive performance. Psychological skills were measured in terms of goal setting, concentration, self-confidence, motivational skills, emotional regulation and stress management; coaching competence was measured in terms of technical instruction, feedback, communication, motorisation, tactical competence and support of athletes; nutritional readiness was measured in terms of nutrition knowledge, nutrition practices, hydration,

energy preparation and recovery practices; and athlete well-being was measured in terms of relevant psychological, physical and social dimensions. Athletes' performance was measured by appropriate indicators related to their performance levels during the pre-NUGA trials, which were then used as assessment tools for competitive performance. It was face- and content-validated by experts in sport psychology, sport science, coaching, and sports nutrition, and internally validated through pilot testing with Cronbach's alpha.

The results obtained were coded and analysed with mean, standard deviation, Pearson Product-Moment Correlation (PPMC) and multiple linear regression. Mean and standard deviation were used to describe the major study variables. To answer the first study question regarding the direction and intensity of the relationships among psychological skills, coaching competence, nutritional readiness, athlete well-being and competitive performance, PPMC was used. To address the second question and determine the contribution of psychological skills, coaching competence, nutritional readiness, and athlete well-being to the prediction of competitive performance, multiple linear regression was performed. The two null hypotheses were tested at the 0.05 level of significance. The data were screened for completeness and checked for the necessary assumptions before conducting the inferential analysis, such as normality, linearity, homoscedasticity, and multicollinearity. Ethical principles were followed throughout the study, including seeking appropriate approval, informed consent, voluntary participation, confidentiality, anonymity, and the right to withdraw without penalty. Therefore, the methodology was adequate to analyse the suggested biopsychosocial perspective on athlete performance among university athletes involved in the 2025 pre-NUGA trials.

V. RESULT

Table 1: Mean and standard deviation summary of relationship between psychological skills, coaching competence, nutritional readiness, athlete well-being, and competitive performance among Nigerian university athletes

S/N Item		Mean ($\bar{x}$)	SD	Remark
1	I set clear goals to guide my performance in training and competition.	3.27	0.83	Agreed
2	I am able to maintain concentration and confidence during competition.	3.34	0.79	Agreed
3	I can effectively control stress and emotions when competing under pressure.	3.11	0.88	Agreed
4	My coach provides effective technical instruction and constructive feedback.	3.41	0.75	Agreed
5	My coach motivates me and provides adequate support for my sporting development.	3.38	0.77	Agreed
6	I maintain appropriate nutrition and hydration to meet the demands of training and competition.	3.17	0.84	Agreed
7	My nutritional practices support my energy, recovery, and readiness for competition.	3.19	0.84	Agreed
8	I am physically and psychologically able to cope with the demands of university sport.	3.30	0.81	Agreed
9	I receive adequate social and emotional support from my coach and teammates.	3.25	0.82	Agreed
10	My overall psychological, coaching, nutritional, and well-being conditions support my sporting performance.	3.32	0.79	Agreed
	Grand Mean	3.27	0.81	Agreed

The results show a grand mean of 3.27, which is above the criterion mean of 2.50, indicating that the athletes generally agreed that psychological skills, coaching competence, nutritional readiness, and athlete well-being positively supported their sporting performance. All 10 items were accepted, with the

highest mean recorded for effective coaching instruction and feedback (3.41) and the lowest for stress and emotional control (3.11). Overall, the findings suggest that the biopsychosocial factors were positively perceived as important contributors to athlete performance.

Table 2: Mean and standard deviation summary of psychological skills, coaching competence, nutritional readiness, and athlete well-being jointly predict competitive performance among Nigerian university athletes

S/N Item		Mean ($\bar{x}$)	SD	Remark
11	I consistently perform according to the standard expected of me during competitions.	3.29	0.80	Accepted
12	I am able to apply the skills learned during training effectively in competition.	3.36	0.77	Accepted
13	I maintain concentration and performance throughout competitive events.	3.25	0.83	Accepted
14	I perform effectively even when experiencing competitive pressure.	3.18	0.86	Accepted
15	I recover sufficiently to maintain my performance across successive events.	3.20	0.84	Accepted
16	I rarely experience a major decline in performance because of fatigue.	3.08	0.89	Accepted
17	My psychological preparation improves my competitive performance.	3.34	0.79	Accepted
18	The quality of coaching I receive contributes positively to my performance.	3.39	0.76	Accepted
19	My nutritional preparation contributes positively to my performance and recovery.	3.23	0.82	Accepted
20	My overall well-being enables me to perform consistently and effectively in competition.	3.31	0.80	Accepted
	Grand Mean	3.27	0.82	Accepted

The results indicate a grand mean of 3.27, which is above the criterion mean of 2.50, showing that the

athletes generally agreed that they demonstrated positive competitive performance. All 10 items were

accepted, with the highest mean recorded for the contribution of coaching quality to performance (3.39), while the lowest was recorded for performance decline due to fatigue (3.08). Overall, the findings suggest that the athletes perceived

themselves as capable of maintaining effective performance and applying their skills successfully during competition.

Hypothesis One			
Variables	Competitive Performance (r) p-value Remark		
Psychological Skills	0.62	<0.001	Significant
Coaching Competence	0.68	<0.001	Significant
Nutritional Readiness	0.54	<0.001	Significant
Athlete Well-being	0.59	<0.001	Significant

The result indicates significant positive relationships between psychological skills, coaching competence, nutritional readiness, athlete well-being, and competitive performance. Coaching competence showed the strongest relationship with competitive performance ($r = 0.68$), followed by psychological

skills ($r = 0.62$), athlete well-being ($r = 0.59$), and nutritional readiness ($r = 0.54$). This suggests that higher levels of these biopsychosocial factors were associated with better competitive performance among the athletes.

Hypothesis Two Regression Coefficients					
Predictor	B	β	t	p-value	Decision
Psychological Skills	0.21	0.24	3.82	<0.001	Significant
Coaching Competence	0.29	0.31	4.91	<0.001	Significant
Nutritional Readiness	0.16	0.18	2.96	0.004	Significant
Athlete Well-being	0.23	0.25	4.07	<0.001	Significant

The four predictors jointly explained 61% of the variance in competitive performance ($R^2 = 0.61$), indicating a substantial predictive contribution. Coaching competence made the strongest unique contribution ($\beta = 0.31$), followed by athlete well-being ($\beta = 0.25$), psychological skills ($\beta = 0.24$), and nutritional readiness ($\beta = 0.18$). The findings therefore support the proposed biopsychosocial

model, showing that psychological, coaching, nutritional, and well-being factors collectively provide a meaningful explanation of competitive performance among Nigerian university athletes.

VI. DISCUSSION

The finding for Research Question One revealed that the biopsychosocial factors were significantly related

to the competitive performance of the Nigerian university athletes ($r = .68$, $p < .05$), meaning that those athletes who reported high levels of psychological skills, coaching competence, nutritional readiness, and a high level of well-being tended to report high levels of competitive performance. The discovery reinforces the idea that performance in sports is multi-faceted and is not just a matter of physical and technical skill. According to the systematic review and meta-analysis conducted by Lochbaum et al. (2025), which analysed 127 studies, meaningful relationships exist between psychological characteristics (motivation, self-efficacy, and conscientiousness) and sport performance, and psychological intervention can lead to improvements in sport performance, as reported by Reinebo et al. (2024). In Nigeria, Ochor and Amasiatu (2026) observed that the psychological skills of athletes to monitor mental state, manage emotions during challenging situations, and use mental skills to improve performance were applied to performance enhancement among University of Port Harcourt athletes. In a similar study, Ochor (2025) reported that mental preparation techniques, such as incorporating music into the event before the competition, were correlated with decreased anxiety, increased motivation, better emotional control, and confidence levels among Nigerian athletes. The current result corroborates this finding, as it shows that psychological preparedness is an important part of the athlete.

Coaching competence can also be seen as having a significant relationship with performance because of the contribution of biopsychosocial factors. Coaching competence had the greatest individual correlation with competitive performance ($r = .68$), indicating that effective instruction, constructive feedback, motivation, communication, and support of the athlete are particularly influential. The results align with those of Yang et al. (2024), who found that the quality of coaching was positively linked to self-efficacy, athlete well-being, nutrition and sports performance. Ochor et al. (2026) also corroborated this finding in their study on the training and development of coaches in Nigerian polytechnics, which revealed that training and development had a positive impact on the performance of coaches in

terms of tactical development and man-management, but indicated some practical issues with some of the training programmes already in place. It suggests that the coach is a significant social element of the athlete's performance ecosystem, transforming and applying technical knowledge and psychological support into everyday training and competition practices. Thus, the current study indicates that university athletes are more likely to perform effectively when they are coached by coaches who provide contextually appropriate, supportive, and competent coaching.

The positive effects of the biopsychosocial factors on competitive performance also emphasize the need for nutritional preparation and the state of an athlete's health. In the current study, a positive association was found between nutritional readiness and athlete well-being with competitive performance, meaning that athletes who had the appropriate nutrition, hydration, recovery, and physical and psychological functioning were more likely to report effective performance. Ochor et al. (2025) conducted a study of 83 athletes from the University of Port Harcourt in Nigeria to assess nutritional knowledge, dietary habits, and their effects on sport performance and recovery, which supports this. The discovery also aligns with the multidimensional evidence provided by Yang et al. (2024), who illustrated the interplay between nutrition, psychological, and coaching factors in determining sports performance. Importantly, Ochor and Amasiatu (2026) further show that psychological regulation and performance demands interact to influence athlete functioning, not just physical preparation. All these research findings confirm the biopsychosocial view that the athlete needs to be psychologically ready, well supported by the coaching environment, nutritionally ready, and physically and psychologically well to perform properly.

Research Question Two focused on the interaction of psychological skills, coaching competence, nutritional readiness, and athlete well-being on competitive performance. The overall model was significant in the multiple regression analysis ($R = .78$, $R^2 = .61$, $F(4,144) = 56.24$, $p < .001$), and the four predictors accounted for 61% of the variance in

competitive performance. Athlete well-being ($\beta = .25$), psychological skills ($\beta = .24$), and nutritional readiness ($\beta = .18$) were the next strongest unique contributions, while coaching competence ($\beta = .31$) was the strongest. This finding supports the proposed biopsychosocial model, as the psychological, social, nutritional and well-being issues had a more significant impact on performance than any one of these factors alone. The findings align with Yang et al. (2024), who showed the interwoven role of coaching quality, nutrition, well-being, self-efficacy, and other factors in sports performance. It also builds on the work of Ochor, who has recently studied mental-state regulation, culturally appropriate psychological preparation, nutritional preparedness and coach development in Nigeria, separately. The present study thus has increased integrative value by combining these domains in a single empirical model and demonstrating that successful university athletic performance depends on coordinated psychological preparation, competent coaching, appropriate nutrition, and maintenance of the athlete's well-being.

VII. CONCLUSION

The study revealed a significant, positive relationship between psychological skills, coaching competence, nutritional readiness, athlete well-being, and competitive performance among athletes at the Federal University of Technology, Mimbashi, Nigeria. The significant regression model also revealed that these factors accounted for a considerable amount of variance in performance, with the greatest amount being accounted for by coaching competence. Overall, the results suggest a biopsychosocial model, where psychological, coaching, nutritional, and well-being factors all contribute, in their interplay, to the performance of the university athlete, not just physical factors.

VIII. RECOMMENDATIONS

1. University sports authorities should institutionalise psychological skills training covering goal setting, concentration, confidence, stress management, and emotional regulation as part of routine athlete preparation before major competitions.

2. Coaches should undergo regular professional development programmes in technical instruction, feedback, motivation, communication, and athlete-centred coaching to strengthen coaching competence and improve competitive outcomes.
3. Universities should provide structured sports nutrition support through qualified nutrition professionals, with emphasis on balanced diets, hydration, energy needs, competition preparation, and recovery practices.
4. University sports programmes should adopt comprehensive athlete well-being systems that provide psychological, physical, academic, and social support, enabling athletes to manage training demands, recover adequately, and sustain effective performance.

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