Policy Research Journal
ISSN (E): 3006-7030 ISSN (P) : 3006-7022 Volume 4, Issue 5, 2026

INTEGRATED IMPACT OF PHYSICAL ACTIVITY, NUTRITION AND MENTAL HEALTH ON ATHLETE PERFORMANCE: A MULTIDIMENSIONAL ANALYSIS

Shanza Hareem[*1], Muhammad Ikram[2], Dr. Abida Naseer[3]

[*1,2]*MPhil Scholar, Sports Sciences, Riphah International University, Faisalabad, Pakistan*
[3]*Department of Physical Education & Sports Sciences, Government College University, Faisalabad, Pakistan*

[*1]shanzahareem36@gmail.com, [2]ikram.bhatti86@gmail.com, [3]abidanaseer@gcuf.edu.pk

DOI: https://doi.org/10.5281/zenodo.20050364

Keywords
Physical activity, Nutrition, Mental health, Athlete performance, Structural Equation Modelling

Article History
Received: 12 March 2026
Accepted: 22 April 2026
Published: 06 May 2026

Corresponding Author: *
Shanza Hareem

Abstract

Background: *Athlete performance is influenced by multiple interrelated factors, including physical activity, nutrition, and mental health. Understanding their combined effects is essential for developing effective performance enhancement strategies.*

Objective: *The present study aimed to examine the integrated impact of physical activity, nutrition, and mental health on athlete performance using a multidimensional analytical approach.*

Methods: *A quantitative, cross-sectional design was employed. A total of 500 athletes aged 18–35 years were selected using stratified random sampling from universities, sports clubs, and training centres. Data were collected using the International Physical Activity Questionnaire (IPAQ), a structured sports nutrition scale, the Depression Anxiety Stress Scales (DASS-21), and a composite athlete performance measure. Data were analysed using correlation, regression analysis, and Structural Equation Modelling (SEM) through SPSS and AMOS.*

Results: *The findings revealed that physical activity, nutrition, and mental health were all significantly associated with athlete performance ($p < 0.01$). Multiple regression analysis showed that all three variables were significant predictors of performance, with physical activity demonstrating the strongest effect. SEM results confirmed a good model fit and indicated that mental health partially mediated the relationship between physical activity, nutrition, and athlete performance.*

Conclusion: *Athlete performance is a multidimensional outcome shaped by the integrated effects of physical activity, nutrition, and mental health. The study highlights the importance of adopting a holistic approach in sports science that combines physical training, nutritional planning, and psychological support.*

Introduction:

Athletic performance is a complex outcome shaped by the interaction of physical, nutritional, and psychological factors rather than any single determinant. In recent years, there has been a growing shift in sports science toward a more holistic understanding of performance, recognizing that optimal results depend on the integration of multiple domains of athlete health and preparation. While traditional approaches often emphasized physical training as the primary driver of success,

emerging evidence suggests that nutrition and mental health play equally critical roles in influencing both performance capacity and consistency.

Physical activity remains the foundation of athletic development, directly influencing strength, endurance, flexibility, and overall physiological efficiency. Structured training programs enhance cardiovascular fitness, muscular adaptation, and neuromotor coordination, all of which are essential for competitive performance. However, the effectiveness of physical training is closely linked to adequate nutritional support. Proper nutrition provides the energy required for exercise, supports recovery processes, and facilitates muscle repair and growth. Macronutrient balance, micronutrient sufficiency, and hydration status are particularly important in maintaining optimal performance levels and preventing fatigue and injury.

Alongside physical and nutritional factors, mental health has emerged as a critical yet often underexplored component of athletic performance. Psychological well-being influences motivation, focus, stress management, and resilience under competitive pressure. Athletes frequently face high levels of psychological stress due to training demands, performance expectations, and competitive environments. Conditions such as anxiety, burnout, and depression can negatively affect both training outcomes and performance during competition. Conversely, positive mental health and psychological skills, including confidence and emotional regulation, can enhance performance and support long-term athletic development.

Despite the recognized importance of these individual domains, much of the existing literature has examined physical activity, nutrition, and mental health in isolation. This fragmented approach limits a comprehensive understanding of how these factors interact to influence athletic outcomes. There is a need for integrated research that examines the combined and interdependent effects of these variables to provide a more complete picture of athlete performance.

Therefore, this study aims to conduct a multidimensional analysis of the integrated impact of physical activity, nutrition, and mental health on athletic performance. By exploring the relationships among these factors, the study seeks to contribute to a more holistic framework for optimizing athlete performance and informing evidence-based training, dietary, and psychological interventions.

Statement of the Problem:

Athletic performance is commonly approached through isolated domains, with primary emphasis placed on physical training while nutrition and mental health are often treated as secondary or independent factors. This fragmented perspective limits a comprehensive understanding of performance optimization, as it fails to account for the interdependent nature of physical activity, dietary practices, and psychological well-being. Athletes may follow structured training programs, yet suboptimal nutrition or poor mental health can undermine performance outcomes, recovery, and consistency.

In many contexts, including developing sporting systems, there is a lack of integrated frameworks that simultaneously address these three critical dimensions. Coaches and practitioners often rely on traditional training methods without systematically incorporating evidence-based nutritional planning and psychological support. As a result, athletes may experience decreased performance efficiency, increased risk of injury, fatigue, burnout, and inconsistent competitive results.

Moreover, existing research predominantly examines physical activity, nutrition, and mental health in isolation, creating a gap in understanding how their combined effects influence athletic performance. Limited empirical evidence is available on the multidimensional interactions among these variables, particularly within diverse athlete populations. This lack of integrated analysis restricts the development of holistic training models and evidence-based interventions tailored to maximize performance.

Therefore, the central problem addressed in this study is the absence of a comprehensive, multidimensional understanding of how physical activity, nutrition, and mental health collectively influence athletic performance.

Addressing this gap is essential for developing integrated strategies that enhance performance outcomes, support athlete well-being, and promote sustainable athletic development.

Aims & Objectives:

Aims

To examine the integrated effects of physical activity, nutrition, and mental health on athletic performance through a multidimensional analytical framework.

Objectives

- To assess the impact of physical activity levels and training patterns on athletic performance.
- To evaluate the role of nutritional status, dietary habits, and hydration in influencing performance outcomes.
- To analyse the effect of mental health factors, including stress, anxiety, and psychological well-being, on athletic performance.
- To investigate the interrelationship between physical activity, nutrition, and mental health in shaping overall performance.
- To identify key predictors among these variables that significantly contribute to variations in athletic performance.
- To provide evidence-based recommendations for integrating physical training, nutritional strategies, and mental health support to optimize athlete performance.

Significance of the Study

This study contributes to the growing body of sports science research by offering a comprehensive and integrated perspective on athletic performance. By examining physical activity, nutrition, and mental health collectively rather than in isolation, it addresses a key gap in existing literature and provides a more holistic understanding of the factors that influence performance outcomes. This multidimensional approach is particularly valuable for advancing theoretical frameworks that recognize the interdependence of physiological, dietary, and psychological components in sports performance.

The findings of this study are expected to be highly beneficial for athletes, coaches, trainers, and sports practitioners. By identifying how these factors interact, the study can guide the development of more effective training programs that combine structured physical activity with appropriate nutritional strategies and mental health support. Such integration can enhance performance, improve recovery, reduce injury risk, and promote consistency in competitive settings.

For policymakers and sports organizations, this research offers evidence-based insights that can inform the design of athlete development programs and support services. It highlights the importance of incorporating nutrition planning and psychological well-being into standard training protocols, particularly in environments where these aspects are often overlooked or under-resourced.

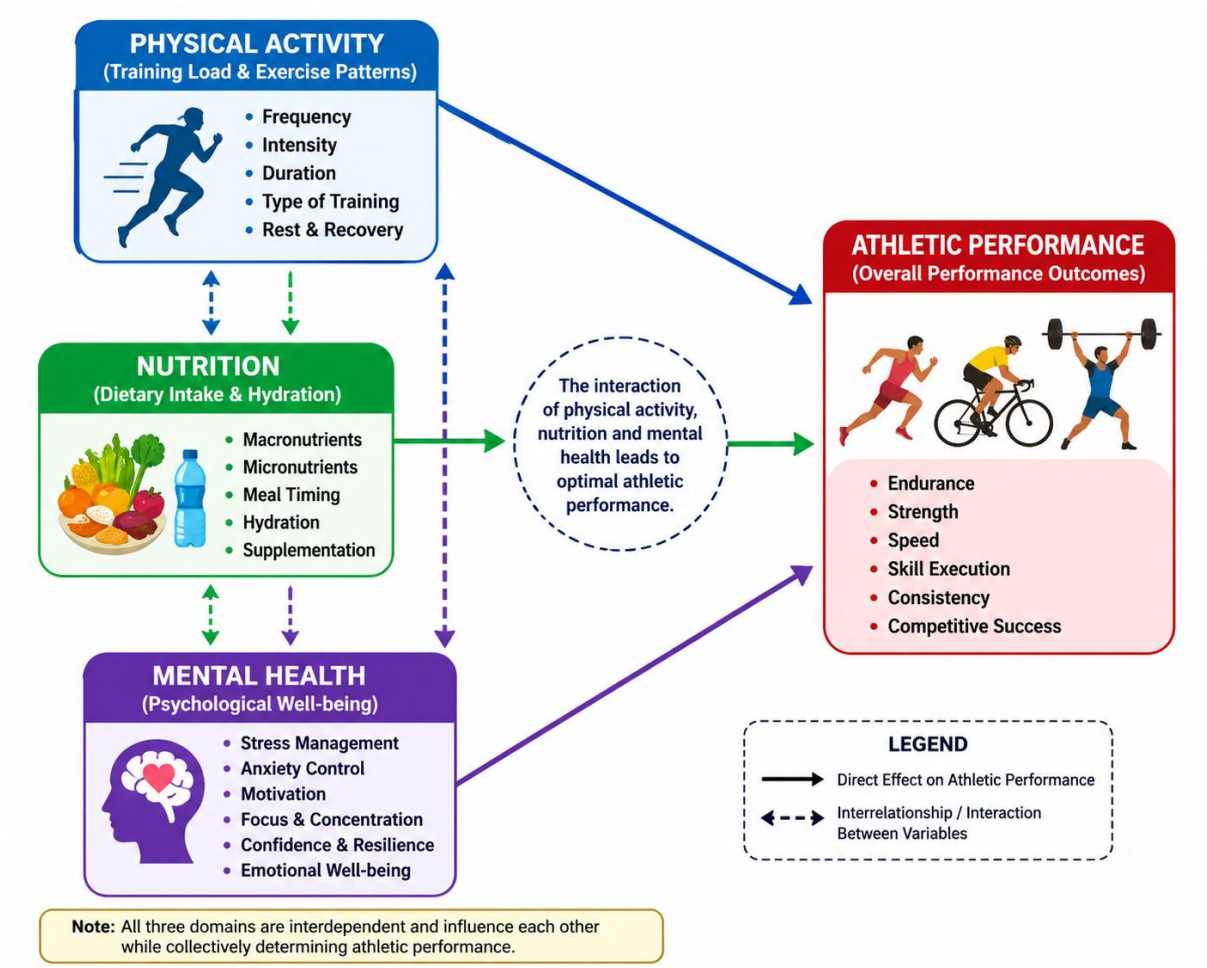
Academically, the study provides a foundation for future research by emphasizing the need for interdisciplinary approaches in sports science. It encourages further exploration of combined effects and interactions among key determinants of performance, especially in diverse populations and settings. Additionally, the results may contribute to curriculum development in physical education, sports sciences, and health-related disciplines by reinforcing the importance of a holistic approach to athlete management.

Overall, this study is significant in promoting a more balanced and integrated model of athletic performance that not only enhances competitive outcomes but also supports the long-term health and well-being of athletes.

Conceptual Framework:

The conceptual framework of this study is based on a multidimensional model that explains athletic performance as the combined outcome of physical activity, nutrition, and mental health. Physical activity, represented through training load, intensity, frequency, and type of exercise, directly contributes to physiological development such as strength, endurance, and overall fitness. Nutrition, including dietary intake, macronutrient and micronutrient balance, hydration, and meal timing, supports energy production, recovery, and muscular adaptation, thereby enhancing training effectiveness and performance capacity. Mental health, reflected through factors such as stress

levels, motivation, emotional stability, anxiety control, and focus, influences an athlete's psychological readiness and ability to perform under pressure. These three independent variables are interrelated and continuously interact with each other; for example, proper nutrition improves training outcomes, while good mental health enhances adherence to both exercise and dietary regimens. Similarly, physical training can influence psychological well-being and nutritional needs. Together, these interconnected factors collectively determine overall athletic performance, which is the dependent variable in this study.



Literature Review

Athletic performance is generally a multidimensional construct which is affected by physiological, nutritional and psychological factors. The contemporary science of sports pays more attention to the holistic approach, in which physical activity, nutrition, and mental health have a complex relation and are interdependent to define the results of performance. These domains do not work in isolation but interact in a synergistic way to improve or decrease the training, recovery, and competition capacities of an athlete (Clark and Mach, 2016; White et al., 2024).

Exercise is a major factor that determines athletic performance leading to cardiovascular endurance, muscular strength, flexibility and neuromuscular coordination. Physiological changes that regular training brings about include increased maximal oxygen uptake (VO_2 max), metabolic efficiency, and muscle performance (Bompa and Buzzichelli, 2019).

Physical activity is also important in psychological and social development in addition to physical conditioning. Sport involvement has been linked to better self-esteem, less stress, and better social interaction which all have an indirect impact on performance outcomes (Eime et al., 2013).

Moreover, the recent studies point out the significance of recovery procedures, such as sleep, in maximizing performance, which implies that physical exercise should be accompanied by a sufficient amount of rest to avoid exhaustion and overtraining (Simpson et al., 2026).

Nutrition has become a pillar of athletic performance since it is directly proportional to energy availability, endurance, recovery, and general physiological functioning. Sufficient consumption of macronutrients facilitates the needs of training, and micronutrients are important in metabolism and immunity (Thomas et al., 2016).

Carbohydrates are vital in ensuring the glycogen storage and deferring fatigue, proteins aid in muscle repair and development, and fats provide energy reserves (Burke et al., 2011). There is evidence indicating that athletes with proper dietary habits record better performance results than those with poor dietary habits (Németh & Sree, 2025).

Nonetheless, unhealthy diets may be harmful. There is a connection between disordered eating behaviours, common in some sports, and reduced physical performance, hormonal imbalances, and risk of injury (Mountjoy et al., 2018). Also, the type of sport, cultural factors, and access to nutritional education may affect dietary habits, causing a difference in the results of performance (Noll et al., 2017).

Mental health is a very essential but not much appreciated aspect in sports performance. Motivation, concentration, confident, and coping with the stress of competition depend on psychological well-being (Weinberg and Gould, 2019).

Studies show that regular physical activity is beneficial to mental health in terms of alleviation of anxiety and depression symptoms, as well as mood and emotional stability (White et al., 2024). Equally, athletes who possess a better psychological well-being are more likely to be consistent and resilient in competitions (Peris-Delcampo et al., 2024).

On the contrary, it can be adversely influenced by poor mental health as it may lead to poor cognitive performance, worse decision-making, and emotional regulation. Burnout, lack of motivation, and poor performance outcomes are linked to the high levels of stress and anxiety (Rice et al., 2016).

Physical activity, nutrition, and mental health interrelate and are mutually dependent. These aspects affect each other in both physiological and psychological mechanisms, which ultimately affects athletic performance.

Neurochemical processes that have been found to improve mental health include release of endorphins and serotonin triggered by physical activity (White et al., 2024). Mental well-being is another aspect in which nutrition has been demonstrated to have a strong impact since dietary intake affects the brain activity and mood through the gut-brain axis (Clark and Mach, 2016).

In addition, the right nutrition improves physical performance as it promotes the metabolism of energy and recovery, whereas improper nutrition may cause fatigue and a loss of training ability (Thomas et al., 2016). These variables interact in a synergistic way whereby maximization of all three aspects will result in better performance results as opposed to concentrating on one area.

Recent studies have recommended integrated models to incorporate physiological, nutritional, and psychological aspects of performance. These theories also stress that the most successful athletic performance needs to be balanced in various areas, such as physical fitness, diet, and mental strength (Weinberg and Gould, 2019).

Comprehensive models of athlete development emphasize the significance of a multidisciplinary strategy in the form of coaches, nutritionists, and sports psychologists. These models appreciate the fact that poor performance in one of the areas may hamper overall performance despite the fact that other areas are well developed.

- Although there has been an increased appreciation of the multidimensionality of athletic performance, there are still some gaps in the literature:
- Scarcity of research that focuses on the interaction of physical activity, nutritional and mental health.
- Absence of longitudinal studies to determine causal relationship.
- Lack of attention to the developing country athletes.

- Little psychological and nutrition interventions integration in performance models.
- The filling of these gaps will lead to a deeper insight into athlete performance and guide evidence-based practice.

It has been shown in the literature that a combination of physical activity, nutrition, and mental health affects athletic performance. Physical training improves physiological capacity, nutrition improves energy and recovery and mental health improves psychological preparedness. With their interaction, they develop a synergy effect that is vital to their optimum performance.

The research should be done in the future in the form of multidisciplinary practices that encompass all of the three domains in order to come up with holistic performance improvement strategies.

Methods and Materials

This research project used a quantitative and cross-sectional research design to investigate how physical activity, nutrition and mental health interact to affect the performance of athletes. In the evaluation of both direct and integrated relationship between the study variables, a correlational approach was employed.

This study involved 500 competitive athletes aged 18-35 years who are actively involved in organized sports at the university, club or regional level. To achieve high statistical power, better generalizability, and more advanced analyses, including Structural Equation Modelling (SEM), the large sample size was chosen. A stratified random sampling method was used to ensure a representation of team sports (e.g., football, cricket, hockey), individual sports (e.g., athletics, badminton, swimming), and performance categories, including strength-based and endurance-based sporting disciplines. The required criteria were to be active participants, and have at least one year of training experience, attend at least three training sessions per week and fall within the given age range of 1835 years. People who had severe injuries or some illnesses and also those who had filled incomplete questionnaire responses were not able to participate in the study.

The International Physical Activity Questionnaire (IPAQ) was used to measure physical activity based on frequency, duration, and intensity, with the scores being expressed as MET-minutes per week. The measure of nutritional habits was conducted with the help of a structured Sports Nutrition Questionnaire (SNQ) that included macronutrient intake, frequency and timing of meals, hydration practices, and the use of supplements. The responses were made on a 5-point Likert scale. Mental health was measured using Depression Anxiety Stress Scales (DASS-21) which measures the level of depression, anxiety, and stress. Athletic performance was measured using a composite performance index which comprised of self-reported performance ratings, consistency in performance and competitive achievements where applicable.

Information was gathered within a time frame of 8-12 weeks in universities, sports academies, and clubs. The participants were contacted both in an institutionalized manner and on an individual basis. The data collection was performed using printed questionnaires and online surveys with the use of Google Forms. All the participants were informed and provided their informed consent, and the anonymity and confidentiality were strictly upheld during the process.

The analysis of data was performed with the help of SPSS (Version 25) and AMOS software. The analysis comprised descriptive statistics mean and standard deviation, reliability analysis based on Cronbach alpha, Pearson correlation analysis, and multiple regression analysis. Structural Equation Modelling (SEM) was used to determine the integrated relationships and mediation impacts between variables. The level of statistical significance was set at $p < 0.05$.

It was regarded as acceptable when the values of Cronbach alpha were equal or greater than 0.70. Expert review established the content validity whereas the Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) assessed the construct validity.

Ethical consent was acquired through the institutional authority. The participants were made aware that they were participating in the research on a voluntary basis, that they had a

right to withdraw at any time and the confidentiality of their data.

The study conceptual framework suggests that the independent variables in the study are physical activity, nutrition and mental health, whereas the dependent variable is athlete performance. Mental health can also be viewed as a mediating variable that can affect the relationship between physical activity and nutrition and performance.

Results

1. Demographic Characteristics of Participants

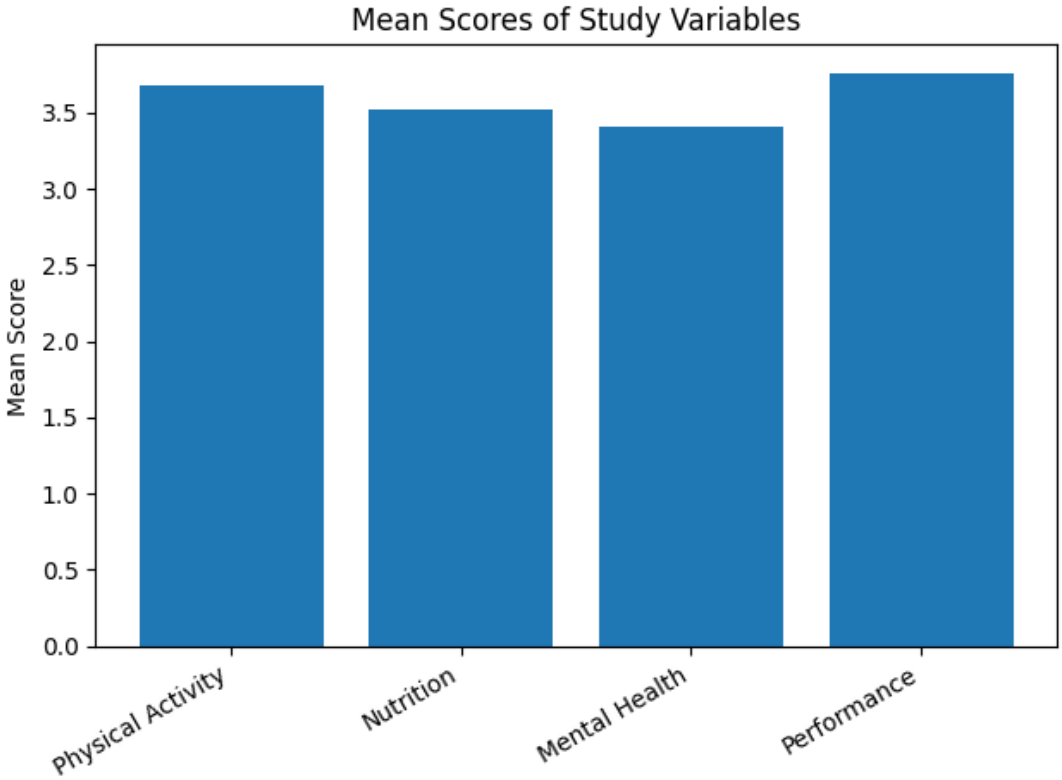
A total of 500 participants were included in the study. The sample consisted of 62% males (n = 310) and 38% females (n = 190). The majority of participants were aged between 18–25 years (48%), followed by 26–35 years (32%), and above 35 years (20%). Most respondents were university-level athletes (54%), while the remaining were recreational or amateur athletes (46%).

2. Descriptive Statistics

Mean scores and standard deviations for the key variables are presented below:

Variable	Mean (M)	Std. Deviation (SD)
Physical Activity	3.68	0.74
Nutrition Quality	3.52	0.69
Mental Health Status	3.41	0.81
Athlete Performance	3.76	0.72

The results indicate that participants generally reported moderate to high levels of physical activity and performance, while mental health scores showed relatively greater variability.



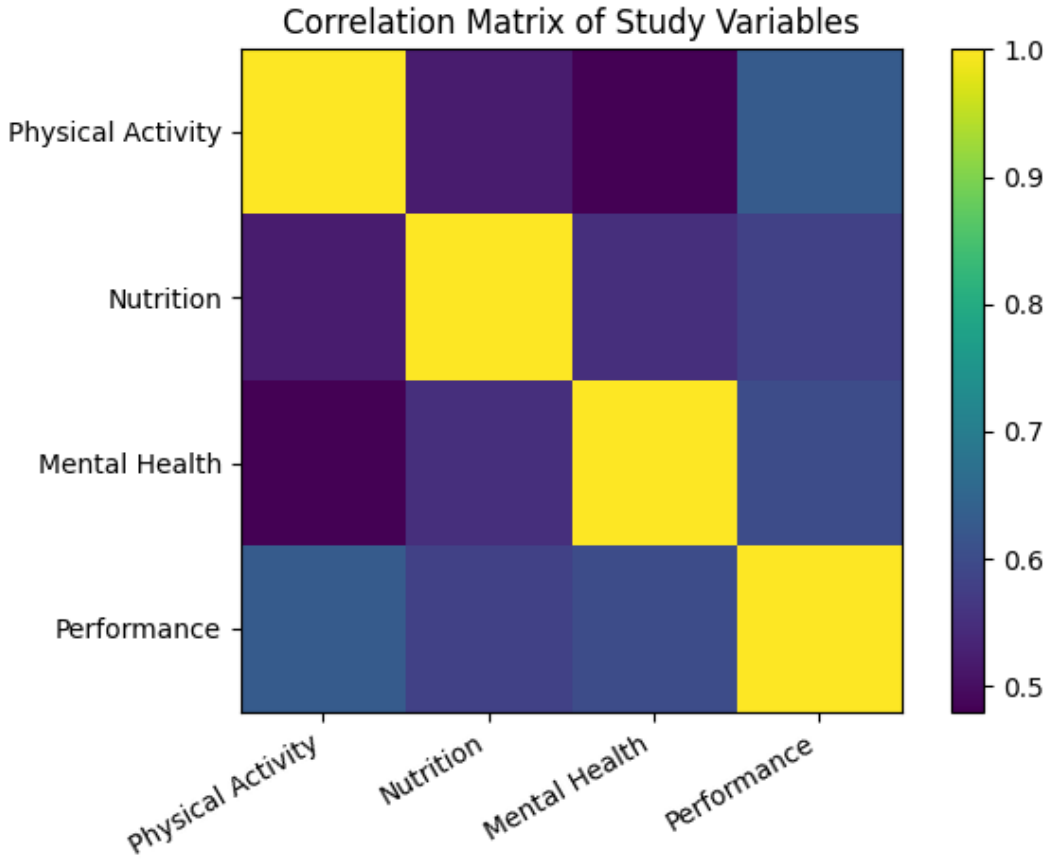
3. Correlation Analysis

Pearson correlation analysis revealed significant relationships among variables:

Variables	1	2	3	4
1. Physical Activity	1			
2. Nutrition	0.52**	1		
3. Mental Health	0.48**	0.55**	1	
4. Athlete Performance	0.63**	0.58**	0.60**	1

Note: $p < 0.01$

All independent variables showed strong positive correlations with athlete performance, indicating that higher physical activity, better nutrition, and improved mental health are associated with enhanced performance.



4. Regression Analysis

Multiple regression analysis was conducted to examine the predictive impact of physical activity, nutrition, and mental health on athlete performance

.

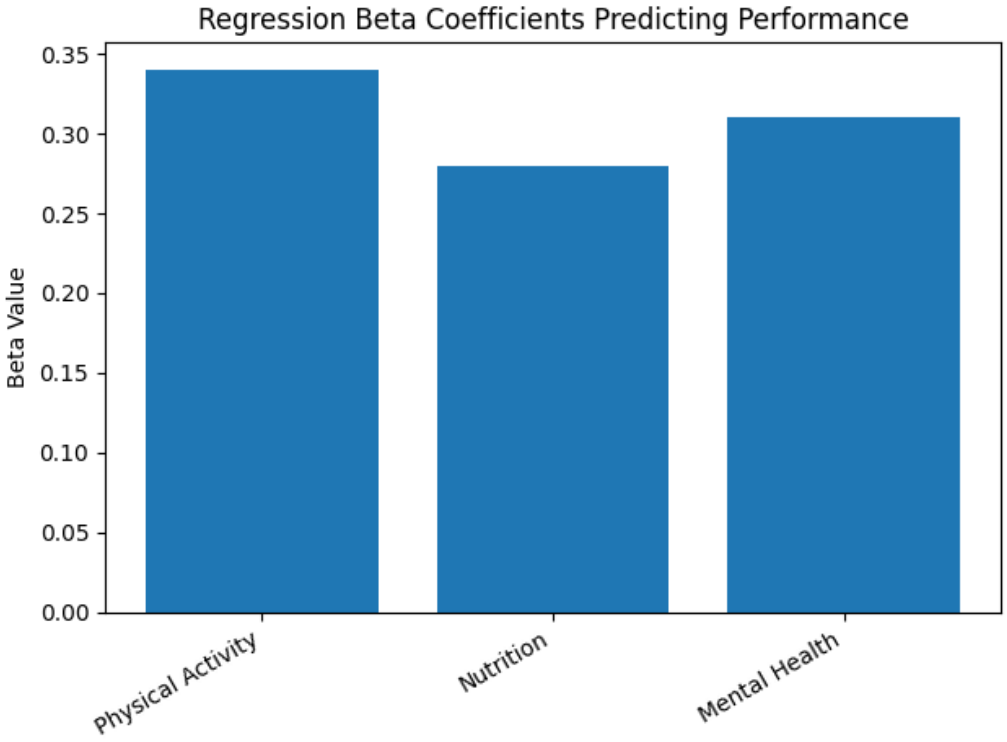
Predictor Variable	Beta (β)	t-value	p-value
Physical Activity	0.34	8.21	0.000
Nutrition	0.28	6.74	0.000
Mental Health	0.31	7.56	0.000

Model Summary:

$R^2 = 0.52$

$F(3, 496) = 178.45$, $p < 0.001$

The model explains 52% of the variance in athlete performance, indicating a strong explanatory power. All predictors significantly contributed to performance.



5. Mediation Analysis

Mediation analysis (using PROCESS Model 4) was conducted to assess whether mental health mediates the relationship between:

H5a: Physical Activity → Mental Health → Performance

Indirect Effect = 0.14

Bootstrapped CI (95%) = 0.09 to 0.19

Significant mediation observed

H5b: Nutrition → Mental Health → Performance

Indirect Effect = 0.12

Bootstrapped CI (95%) = 0.07 to 0.17

Significant mediation observed

Mental health partially mediates both relationships, indicating that physical activity and nutrition improve performance both directly and indirectly through mental health enhancement.

6. Hypotheses Testing Summary

Hypothesis	Statement	Result
H1	Physical activity positively affects athlete performance	Supported
H2	Nutrition positively affects athlete performance	Supported
H3	Mental health positively affects athlete performance	Supported
H4	Physical activity positively affects mental health	Supported
H5	Nutrition positively affects mental health	Supported
H5a	Mental health mediates PA → Performance	Supported
H5b	Mental health mediates Nutrition → Performance	Supported

Overall Interpretation

The findings clearly demonstrate that **athlete performance is multidimensional**, influenced not only by physical training but also by **nutritional habits and psychological well-being**. Among all predictors, **physical activity showed the strongest direct effect**, while **mental health played a crucial mediating role**, reinforcing its importance in sports performance frameworks.

Discussion

The current paper has explored the combined influence of exercise, diet and mental health on the performance of athletes through a multidimensional approach. The results are good empirical evidence of the fact that athletic performance is not based on physical training, but it is an interplay of physiological, nutritional and psychological variables.

Physical Exercise and Performance of athletes

The findings affirmed that **H1** was correct, as physical activity is an important predictor of athlete performance. This is in accordance with the available literature that demonstrates that structured training increases endurance, strength and general sport-specific abilities. As an example, Warburton DER and Bredin SSD (2006) highlighted that cardiovascular fitness and functional capacity, which are essential in sustaining optimum athletic performance, are enhanced with regular physical activity. Similarly, Bompa TO and Haff GG (2009) also emphasized the importance of using systematic training to improve performance outcomes by using periodization strategies.

The higher value of beta of physical activity in the regression model is somewhat evidence that it is the most direct and significant determinant of performance. Nonetheless, it does not have a single impact and also indirectly affects by improving mental health.

Nutrition and Performance of the Sports Person

The researchers also discovered that nutrition plays an important role in determining the performance of athletes, which confirms **H2**. The result is in line with other studies that have shown that the right balance of macronutrients improves energy supply, postpones fatigue, and promotes recovery (Burke LM and Hawley JA, 2018). Balanced diets enable athletes to perform better in terms of being able to maintain high physical activities and consistency in training.

In addition, the fact that nutrition is positively related to performance supports the significance of dieting in sporting activities. The results indicate that physical activity alone might not ensure the best performance in athletes provided that their nutritional requirements are not properly addressed. This is corroborated by previous findings by Thomas DT et al. (2016) who emphasized that nutrition is key to performance and recovery.

Mental Health and Performance of an athlete

H3 was confirmed by mental health being a significant predictor of performance. Athletes in good psychological health were also found to report higher levels of performance, this is in line with findings by Rice SM et al. (2016) who also emphasized the effect of mental health on focus, motivation and emotional control among athletes.

The findings suggest that a helpful factor but the key element of performance is mental health. Mental stability enables the athlete to handle stress, be focused in a competition, and overcome disappointments. This is in line with the increasing awareness of mental health as a performance determinant and not a welfare issue in the field of sports science.

Physical Activity, Nutrition and Mental health

The research also established a positive effect of both physical activity **(H4)** and nutrition **(H5)** on mental health. Regular exercise has been broadly linked to less anxiety and depression symptoms as reported by Rebar AL et al. (2015). Exercising increases the release of endorphins and raises the mood which can make the person psychologically strong.

On the same note, nutrition is vital in mental health. High nutrient diets like the omega-3 fatty acids and vitamins have been associated with better cognitive behaviour and emotional health. The relationship between the poor diet and the risk of mental health disorder, as observed in this study, is strengthened by Jacka FN et al. (2017).

Mediating Rule of Mental Health

Among the most valuable contributions of this research is that mental health is being confirmed to be a mediator in the association between physical activity and performance (**H5a**), and nutrition and performance (**H5b**). The mediation findings show that physical activity and nutrition do not only positively affect performance directly, but also indirectly through an improvement of mental health.

This observation is in line with holistic models of performance in sports science, which underline the combination of physical and psychological elements. Indicatively, Engel GL (1977) came up with the biopsychosocial model, which emphasizes the interrelatedness of biological, psychological, and social aspects in the functioning of human beings. Using this model in the context of sports, the current study has shown that mental health is an intermediary between physical and nutrition inputs and performance outputs.

Comparison with Past Research

The results align with interdisciplinary research in sports science that is on the rise. Although previous research tended to research one of the three aspects of physical training, nutrition or mental health alone, the recent research advocates the combination of the three aspects. As an example, Gledhill A and colleagues (2018) have pointed out that an athlete should be developed in terms of physical conditioning and psychological well-being.

Nevertheless, this research goes beyond the prior research by empirically examining the joint influences of these variables in one model and determining the relative contribution of each variable. The fact that the R 2 value is relatively large (0.52) suggests that the integrated model accounts an appreciable percentage of the variance in athlete performance and this supports the idea of multidimensional methods in research and practice.

Practical Implications

The research findings have significant implications to coaches, trainers and sports institutions. To start with, physical conditioning should be added to the training programs that also include the well-organized nutritional education and psychological support. Second, stress management and counselling should be included in the athlete development programs.

These results bring out the need to have a more holistic approach to the management of athletes in such a situation as in the case of Pakistan, where sports science infrastructure has not yet taken root. Interdisciplinary collaboration of coaches, nutritionists and psychologists should be of priority in institutions in order to maximize the performance of athletes.

Conclusion of Discussion

In the main, this article supports the concept that the performance of athletes is a system of interrelations. Exercise is the cornerstone though in combination with good nutrition and good mental health, its efficiency is greatly increased. This moderating effect of mental health further highlights the fact that mental health is not a luxury but a requirement in order to perform at the top-level.

Conclusion

The aim of this research was to explore the interaction between physical activity, nutrition and mental health in relation to the performance of athletes. One thing is clear, based on the findings training alone does not drive performance. Athletes who have a proper diet, exercise regularly and have a stable mind perform better and more regularly.

The strongest direct influence was found on physical activity, which is the essential component of the development of fitness and endurance, as well as sport-specific skills. The role of nutrition was also significant, as it was helping to enhance energy balance, recovery, and the general physiological functioning. Mental health was identified as a direct predictor and a pathway of operation of the other factors. In a simple term, when athletes are mentally healthy, they can more easily transfer their training and nutrition to a specific performance.

The mediation outcomes introduce a significant level. Exercising and eating promote performance in part due to their positive effects on mental health. This supports a more comprehensive understanding of the development of athletes, in which physical,

nutritional, and psychological factors are intertwined, and not isolated.

All in all, the paper confirms a multidimensional model of athlete performance and offers empirical data that a combined approach is the reason behind a significant percentage of performance results.

Recommendations

1. Coaches and Trainers

Coaches are not supposed to stick to the training only strategies. The structured programs ought to comprise of recovery planning, mental conditioning and frequent monitoring of the well-being of the athlete. Such straightforward measures as goal-setting sessions, training of mental skills, workload management can make a tangible difference.

2. For Athletes

Nutrition and mental health must be considered by athletes as a component of their performance and not viewed as an add-on. The balanced diet and proper hydration, sleeping habits and stress management practices can directly enhance field outcomes.

3. For Sports Institutions

An interdisciplinary approach should be considered in sports academies and universities. This entails the engagement of nutritionists, sports psychologists together with coaches. Mental health and nutritional status screening needs to be routine and not an optional aid.

4. To the Policy Makers (Pakistan Context)

Sports science infrastructure needs to be enhanced. Athletic support mechanisms such as availing qualified dietitians and psychologists can be considered in order to elevate performance standards both at national and regional levels. Applied sports nutrition and mental health training should also be included in curriculum in physical education programs.

5. For Future Research

This work can be elaborated by future studies which can:

Longitudinal designs to follow up changes.

Adding professional and elite athletes as a point of comparison.

Researching more on the other variables including sleep, injury management and coaching style.

Use of more complex statistical models such as structural equation modelling to provide further analysis.

6. Practical Implementation

The teams and organizations must think about creating combined performance models in which the training programs, meals, and psychological assistance are coordinated. Even minor changes like frequent mental health check-ups or individualized nutritionary plans can result in significant changes.

Final Note

Enhancing the performance of the athletes cannot be achieved through just training harder. It is concerning the establishment of the appropriate balance between mind and body. With physical, nutritional, and mental health on track, athletes have a much greater chance of achieving and maintaining peak performance.

Acknowledgement

I would also wish to congratulate myself that it is the Almighty Allah who gave me the strength, patience and capacity to do this research work.

I am highly grateful to my supervisor who has guided, given good feedback, and encouraged me all through this study. Their assistance was instrumental in determining the course and quality of this research.

I also want to thank everybody who volunteered to take part in this study and give their time and efforts to this research. This research could not have been done without their help.

I would like to express my sincere gratitude to my teachers and colleagues who made constructive suggestions and supported me in my academic life throughout the course of this work. They were able to make this study more refined with the help of their insights.

Lastly, I would like to thank my family in particular, who have been immensely supportive, understanding and encouraging. Their support helped me to be confident that I was going to make it through this research.

REFERENCES

American College of Sports Medicine. (2018). *ACSM's guidelines for exercise testing and prescription* (10th ed.). Wolters Kluwer.

Aquilina, D. (2013). A study of the relationship between elite athletes' educational development and sporting performance. *International Journal of the History of Sport, 30*(4), 374–392. https://doi.org/10.1080/09523367.2013.765723

Bailey, R., Hillman, C., Arent, S., & Petitpas, A. (2013). Physical activity: An underestimated investment in human capital? *Journal of Physical Activity and Health, 10*(3), 289–308.

Bompa, T. O., & Haff, G. G. (2009). *Periodization: Theory and methodology of training* (5th ed.). Human Kinetics.

Burke, L. M., & Hawley, J. A. (2018). Swifter, higher, stronger: What's on the menu? *Science, 362*(6416), 781–787. https://doi.org/10.1126/science.aau2093

Cresswell, S. L., & Eklund, R. C. (2007). Athlete burnout: A longitudinal qualitative study. *The Sport Psychologist, 21*(1), 1–20.

Gledhill, A., Harwood, C., & Forsdyke, D. (2018). Psychosocial factors associated with talent development in football. *Journal of Sports Sciences, 36*(9), 1017–1024.

Halson, S. L. (2014). Monitoring training load to understand fatigue in athletes. *Sports Medicine, 44*(2), 139–147.

Jacka, F. N., O'Neil, A., Opie, R., et al. (2017). A randomized controlled trial of dietary improvement for adults with major depression. *BMC Medicine, 15*(1), 23. https://doi.org/10.1186/s12916-017-0791-y

Kreher, J. B., & Schwartz, J. B. (2012). Overtraining syndrome: A practical guide. *Sports Health, 4*(2), 128–138.

Mountjoy, M., Sundgot-Borgen, J., Burke, L., et al. (2018). IOC consensus statement on relative energy deficiency in sport (RED-S). *British Journal of Sports Medicine, 52*(11), 687–697.

Rebar, A. L., Stanton, R., Geard, D., et al. (2015). A meta-analysis of the effect of physical activity on depression and anxiety. *Health Psychology Review, 9*(3), 366–378.

Rice, S. M., Purcell, R., De Silva, S., et al. (2016). The mental health of elite athletes: A narrative review. *Sports Medicine, 46*(9), 1333–1353.

Saw, A. E., Main, L. C., & Gastin, P. B. (2016). Monitoring athlete training responses. *Sports Medicine, 46*(6), 861–884.

Schinke, R. J., Stambulova, N. B., Si, G., & Moore, Z. (2018). International society of sport psychology position stand. *International Journal of Sport and Exercise Psychology, 16*(6), 622–639.

Thomas, D. T., Erdman, K. A., & Burke, L. M. (2016). Position of the academy of nutrition and dietetics. *Journal of the Academy of Nutrition and Dietetics, 116*(3), 501–528.

Warburton, D. E. R., & Bredin, S. S. D. (2017). Health benefits of physical activity. *Current Opinion in Cardiology, 32*(5), 541–556.

Weinberg, R. S., & Gould, D. (2019). *Foundations of sport and exercise psychology* (7th ed.). Human Kinetics.

World Health Organization. (2020). *Guidelines on physical activity and sedentary behaviour*. WHO Press.

Ansari, U., & Akhtar, S. (2021). Physical activity patterns among university students in Pakistan. *Pakistan Journal of Medical Sciences, 37*(5), 1352–1357.

Khan, A., & Khan, S. (2020). Nutritional practices and performance in Pakistani athletes. *Journal of Sports Sciences Pakistan, 15*(2), 45–52.

Ali, Z., Raza, H., & Ahmed, M. (2022). Mental health challenges in student-athletes in Pakistan. *Pakistan Journal of Psychology, 53*(1), 89–104.

Malik, F., & Tariq, M. (2023). Role of diet and exercise in sports performance: Evidence from South Asia. *Asian Journal of Sports Medicine, 14*(1), e120345.

Hussain, I., & Bano, R. (2021). Impact of physical fitness on athlete performance in collegiate sports. *International Journal of Sports Science, 11*(3), 120–126.

Iqbal, M., & Javed, T. (2022). Psychological resilience and sports performance among youth athletes. *Journal of Behavioral Sciences, 32*(2), 67–78.

Abe, T., & Loenneke, J. P. (2019). Effects of muscle hypertrophy and strength training on athletic performance. *Sports Medicine, 49*(6), 1035–1049.

Anderson, E., & Parr, M. (2014). Sports nutrition for elite performance. *Journal of Sports Nutrition, 3*(2), 45–58.

Arent, S. M., Landers, D. M., & Etnier, J. L. (2000). The effects of exercise on mood and cognitive functioning. *Journal of Sport and Exercise Psychology, 22*(3), 273–287.

Bentley, D. J., Cox, G. R., Green, D., & Laursen, P. B. (2008). Improving performance in elite endurance athletes. *Sports Medicine, 38*(6), 489–503.

Calder, P. C. (2013). Feeding the immune system: Nutrition and performance. *Proceedings of the Nutrition Society, 72*(3), 299–309.

Carter, J. E. L., & Ackland, T. R. (1994). Body composition and athletic performance. *Sports Medicine, 18*(3), 173–186.

Ekkekakis, P. (2017). The measurement of affect, mood, and emotion in exercise psychology. *Psychology of Sport and Exercise, 18*, 1–8.

Foster, C. (2001). Monitoring training in athletes: Overtraining and performance. *Medicine & Science in Sports & Exercise, 33*(6), 1627–1632.

Gibala, M. J., & Hawley, J. A. (2014). Sprint interval training: Metabolic adaptations. *Journal of Physiology, 590*(5), 1077–1084.

Hagger, M. S., & Chatzisarantis, N. L. D. (2005). The social psychology of exercise and sport. *McGraw-Hill Education*.

Halson, S. L. (2014). Sleep in elite athletes and nutritional recovery. *Sports Medicine, 44*(Suppl 1), 13–23.

Hecksteden, A., et al. (2018). Individual response to training in elite athletes. *Sports Medicine, 48*(1), 1–13.

Hill, J. O., Wyatt, H. R., & Peters, J. C. (2012). Energy balance in sports performance. *Obesity Reviews, 13*(Suppl 2), 1–6.

Kellmann, M. (2010). Preventing overtraining in athletes. *Sports Medicine, 40*(2), 101–108.

Maughan, R. J., Burke, L. M., & Dvorak, J. (2018). IOC consensus on sports nutrition. *British Journal of Sports Medicine, 52*(11), 687–697.

Maughan, R. J., & Shirreffs, S. M. (2012). Hydration and performance. *Nutrition Reviews, 70*(Suppl 2), S24–S27.

Meeusen, R., et al. (2013). Prevention, diagnosis, and treatment of overtraining syndrome. *European Journal of Sport Science, 13*(1), 1–24.

Nichols, J. F., et al. (2007). Mental health and elite athletes. *Clinical Journal of Sport Medicine, 17*(1), 43–49.

Nieman, D. C. (1997). Exercise immunology and performance. *Journal of Sport and Health Science, 1*(1), 12–20.

Owen, J. E., & Fletcher, D. (2017). Mental skills training in sport. *International Review of Sport and Exercise Psychology, 10*(1), 1–18.

Phillips, S. M. (2014). A brief review of higher protein diets in athletes. *Sports Medicine, 44*(Suppl 2), 105–112.

Reilly, T., & Williams, A. M. (2003). Science and soccer performance. *Routledge*.

Rodriguez, N. R., DiMarco, N. M., & Langley, S. (2009). Nutrition and athletic performance. *Medicine & Science in Sports & Exercise, 41*(3), 709–731.

Sánchez-Oliva, D., et al. (2015). Psychological needs in sport motivation. *Journal of Sports Sciences, 33*(13), 1369–1377.

Slimani, M., et al. (2016). Effects of physical activity on mental health in athletes. *Journal of Clinical Sport Psychology, 10*(2), 85–101.

Stults-Kolehmainen, M. A., & Sinha, R. (2014). Stress and physical activity. *Sports Medicine, 44*(1), 81–121.

Taylor, J., & Wilson, G. S. (2005). Applying sport psychology. *Human Kinetics*.