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University Students' Attitudes Toward Campus Sports and Their Overall Life Satisfaction, With Body Appreciation and Mental Well- Being

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University Students' Attitudes Toward Campus Sports and Their Overall Life Satisfaction, With Body Appreciation and Mental Well-Being

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Abstract

This study examined the relationship between university students' attitudes toward campus sports and their overall life satisfaction, with body appreciation and mental well-being tested as sequential mediators. Participants were 200 undergraduates from Kwara State University of Education, Ilorin, Nigeria, who completed validated self-report measures. Data were analyzed using Pearson correlations and Hayes' PROCESS Macro Model 6 with 5,000 bootstrap resamples. Results indicated that positive attitudes toward sport were significantly associated with body appreciation, mental well-being, and life satisfaction. Mediation analyses revealed that body appreciation and mental well-being independently mediated this relationship. At the same time, a sequential pathway from attitude toward sport to body appreciation to mental well-being to life satisfaction was also significant. The model explained 32.3% of the variance in life satisfaction. These findings highlight the importance of sport-related attitudes as psychological resources that foster body appreciation and mental well-being, ultimately enhancing life satisfaction. The study underscores the potential of campus-based sport programs to promote positive body image and mental health, offering practical implications for interventions aimed at improving student well-being during emerging adulthood.

Keywords

sport attitudes, body appreciation, mental well-being, life satisfaction, undergraduates

Introduction

Life satisfaction refers to individuals' cognitive and evaluative judgment of their overall quality of life based on self-determined criteria (Alves et al., 2025; Simões de Almeida et al., 2025). It is characterized by lasting satisfaction rather than temporary joy and is conceptually different from affective well-being. Individuals who enjoy balanced mental and physical health, demonstrate resilience, and cultivate optimism and self-esteem are more likely to report higher levels of life satisfaction(Chan & Huang, 2024; Peleg & Peleg, 2025). Among university students, life satisfaction has significant implications, as it predicts academic persistence, mitigates psychological distress, and enhances self-rated health during the critical developmental stage of emerging adulthood.

Sports and physical exercise activities have been identified as key factors influencing individuals' quality of life and overall life satisfaction. Furthermore, participation in sports activities and physical exercise is regarded as a central component of an active lifestyle and has been associated with diverse physical, mental, and social health benefits. For instance, physical activity levels are significantly associated with mental well-being among Nigerian university students (Ugwueze et al., 2021; Nwabuwe & Okparavero,

2025), and physical activity has been linked to life satisfaction through affective and cognitive regulatory processes in student populations (Eriki et al., 2026). Given these potential associations, examining the relationship between sport-related variables and life satisfaction may provide valuable insight for programmes aimed at improving undergraduates' mental well-being.

Sports participation and attitudes toward sport are related; however, they represent different concepts. Attitudes mirror individuals' cognitive and affective evaluations of a behaviour, whereas sport participation refers to actual behavioural engagement. This distinction is consistent with general models of attitude-behaviour relations, which emphasize that attitudes do not necessarily translate directly into behavior (Cayolla et al., 2023). Existing empirical evidence in physical activity research further supports this distinction, showing that attitudes toward physical activity are associated with behavioral intentions but do not consistently result in participation. Hence, the present study examined attitudes toward sport as a psychological construct reflecting evaluative and cognitive orientations, rather than as a proxy for behavioral engagement. Attitudes are theoretically important because they are modifiable through information, modelling, and mastery experiences; unlike physiological fitness, they can be targeted by campus programming even before behaviour changes (Linge et al., 2021).

Body Appreciation as a Serial Mediator in Mental Well-Being

Body appreciation is conceptualized as a positive body image construct that reflects individuals' acceptance, respect, and self-appreciation toward their bodies, alongside active engagement in health-promoting behaviors and the rejection of unrealistic sociocultural appearance ideals (Aslan & Bozkur, 2026). Research has consistently shown that higher levels of body appreciation are linked to greater psychological well-being, healthier lifestyle choices, and reduced vulnerability to body dissatisfaction and eating disorders (Tylka, 2019; Cozma et al., 2026). Within the university student population, cultivating body appreciation is particularly important, as this developmental stage often involves heightened exposure to sociocultural pressures and identity formation, making positive body image a protective factor for overall life satisfaction and mental health. However, participation in sports appears to reinforce this appreciation, supporting not only appearance but also functionality, self-confidence, and overall well-being. Individuals who accept and value their bodies tend to be less influenced by societal beauty norms and may be better equipped to cope with negative social comparisons. Existing research provides supporting evidence: ((Marmara et al., 2025) found that body appreciation mediated the association between planned physical activity and positive well-being among young adults, and Riddervold et al., (2024) reported that adolescents who participate in sports tend to be more satisfied with their lives, partly because they appreciate their bodies more. Cross-national data further show that body appreciation varies systematically across cultural contexts, with Nigerian women reporting comparatively high body appreciation (Balogun-Mwangi et al., 2023), making the Nigerian university setting a particularly informative context for testing this pathway.

Mental health entails an individual's emotional, cognitive, and social functions, self-acceptance, autonomy, and the realization of personal potential. It is related to functioning well within oneself and in relationships with others (Cilar Budler, 2025). Active participation in sports is reported to be an important factor associated with mental well-being by improving emotion regulation, resilience, self-esteem, and general mental health. (Zhang, 2025) argued that this contribution may enhance an individual's psychological resources and is associated with life satisfaction.

Developing the habit of engaging in sports during university years provides students with benefits in multiple domains. Participation in sports may primarily enhance the physical aspect of self-concept and may also contribute to body appreciation and psychological well-being. Students who value their bodies generally report higher self-esteem, enhanced emotion regulation, and good mental health resilience, which in turn are associated with higher levels of life satisfaction. These processes can be understood within the Broaden-and-Build Theory (Fredrickson, 2001), which suggests that positive experiences broaden individuals' cognitive and behavioural repertoires and help build enduring psychological resources over time.

Sports engagement enhances life satisfaction indirectly by fostering body appreciation and mental well-being. Within a sequential mediation model, positive feelings about sports foster greater body appreciation, which supports positive well-being and ultimately elevates life satisfaction. This proposed sequence is grounded in theory, as valuing one's body naturally promotes positive mental health, whereas body-related shame damages emotional state, personal drive, and interpersonal relationships with others. Because the university years represent a crucial formative period for social and cognitive habits, identifying these pathways offers deeper insight into students' mental health and provides a direction for future targeted interventions.

The present study

The study investigated how sports attitudes relate to life satisfaction among undergraduate students at Kwara State University of Education in Ilorin, Nigeria, focusing on the sequential mediating mechanisms of body appreciation and positive mental health. Specifically, the study explores the pathway through which favorable attitudes toward sports influence overall life satisfaction by first enhancing body appreciation, which subsequently fosters mental well-being. While this serial mediation structure is grounded in established theoretical and empirical work, the study's cross-sectional design means these directional links represent a conceptual model rather than definitive proof of causality or temporal sequence. Based on this theoretical framework, the following hypotheses were formulated:

H1: Attitude toward sport, body appreciation, positive mental health, and life satisfaction are expected to be positively correlated with each other.

H2: Body appreciation will mediate the relationship between attitude toward sport and life satisfaction.

H3: Positive mental health will mediate the relationship between attitude toward sport and life satisfaction.

H4: Body appreciation and mental well-being will sequentially mediate the relationship between attitude toward sport and life satisfaction.

Methodology

Participants and procedure

The participants were undergraduate students studying at Kwara State University of Education, Ilorin, Nigeria. A convenience sampling strategy was used, and participants were recruited on a voluntary basis through face-to-face data collection. To determine the required sample size for the serial multiple mediation model, a Monte Carlo power analysis was conducted following the guidelines developed by Schoemann et al. (2017). Assuming medium-level correlations among the variables, 2,000 Monte Carlo replications were performed at each candidate sample size to achieve a power of 0.80 at a 95% confidence level. The results indicated that a minimum of 160 participants was sufficient to detect the hypothesized

serial indirect effect. At the analysed sample size of N = 200, simulated power was 1.000 for the serial indirect effect, 0.835 for the indirect effect through body appreciation alone, and 0.961 for the indirect effect through mental well-being alone. The analytic sample therefore comprised 200 cases.

The participants consisted of 200 youths aged between 17 and 26 (M = 21.52, SD = 1.99). 52.5% (n = 105) of the participants were female and 47.5% (n = 95) were male. By level of study, 41 (20.5%) were in their first year, 53 (26.5%) in the second, 45 (22.5%) in the third, 44 (22.0%) in the fourth, and 17 (8.5%) in the fifth. Regarding body mass index (BMI) categories, 61.5% (n = 123) were classified as having a normal BMI, 20.5% (n = 41) as overweight, 12.0% (n = 24) as underweight, and 6.0% (n = 12) as obese. In terms of perceived family economic status, 79.5% (n = 159) reported a moderate economic status, 13.0% (n = 26) reported a good economic status, and 7.5% (n = 15) reported a poor economic status. Furthermore, 60.0% (n = 120) reported engaging in regular exercise, whereas 40.0% (n = 80) reported not exercising regularly. In addition, 84 (42.0%) resided on campus and 116 (58.0%) off campus, and 84 (42.0%) reported membership of a university sports team or club. The only inclusion criterion was being 18 years of age or older. Prior to participation, all participants were informed about the purpose and voluntary nature of the study through an informed consent form presented at the beginning of the questionnaire. Participation was anonymous, and the confidentiality of the participants' responses was assured. All procedures related to informed consent, voluntary participation, and anonymity were conducted in accordance with standard ethical research practices.

The study was approved by Kwara State University of Education, Ilorin, Research and Ethics Committee. All procedures performed in the study were conducted in accordance with the principles of the Declaration of the Helsinki. Participants were informed that their responses would be collected and reported anonymously to ensure confidentiality.

Measures

This study used four self-report tools and a demographic information form. Below is information about the measurement tools used.

Attitude Toward Sport Scale: The Attitudes toward Physical Activity Scale, originally developed by Mok et al. (2015), is used to obtain a general sense of how people feel about engaging in physical activity. The scale assesses attitudes, beliefs, and self-efficacy regarding physical activity and was validated using Rasch analysis across five national contexts. In the present study, a 12-item adaptation was used, with each item rated from 1 ("strongly disagree") to 5 ("strongly agree") and averaged. An example item is as follows: "Engaging in sport is enjoyable for me." Higher scores reflect a more favourable and welcoming view of participating in sport-related activities. In our sample, the scale performed reliably, as indicated by a strong internal consistency coefficient (Cronbach's $\alpha = 0.89$).

Mental Well-Being Scale: The Warwick-Edinburgh Mental Well-being Scale was developed by Tennant et al. (2007) and comprises positively worded items spanning hedonic and eudaimonic aspects of positive mental health. In the present study, a 14-item version was used, with items answered on a 5-point scale and averaged. An example item is as follows: "I've been feeling good about myself." Higher scores signal better mental well-being. Within the current study, the reliability level was satisfactory (Cronbach's $\alpha = 0.89$).

Body Appreciation Scale: The Body Appreciation Scale-2 was developed by Tylka and Wood-Barcalow (2015). It comprises 10 items rated on a 5-point Likert-type scale (1 = never, 5 = always) and averaged.

An example item is as follows: "I respect my body." Total scores range from 10 to 50, with higher scores indicating greater appreciation of and respect for one's body. Internal consistency in the current study was high (Cronbach's $\alpha = 0.88$).

Satisfaction with Life Scale: The Satisfaction with Life Scale (SWLS) was originally developed by Diener et al. (1985) to measure individuals' global cognitive judgments of their life satisfaction. The scale includes five items rated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree) and averaged. Higher scores reflect a greater sense of satisfaction with one's life. An example item is, "In most ways, my life is close to my ideal." In the present study, internal consistency was acceptable (Cronbach's $\alpha = 0.82$).

Demographic information form

A brief self-report form was developed by the researchers and used to collect participants' demographic information, including sex, age, level of study, body mass index category, perceived family economic status, residence, sports-team membership, and regular exercise engagement.

Statistical analysis

SPSS version 29.0 was used to compute descriptive statistics to examine the central tendency and variability of the study variables. Internal consistency reliability was assessed using Cronbach's alpha coefficients for each scale. Pearson correlation coefficients were calculated to assess the bivariate relationships among attitude toward sport, body appreciation, mental well-being, and life satisfaction. To test the hypothesized serial mediation model, Hayes, (2018) PROCESS macro Model 6 was employed. Indirect effects were estimated using the bias-corrected bootstrap method with 5,000 resamples and a 95% confidence interval (CI). According to Hayes, (2018), an indirect effect is considered statistically significant if the confidence interval does not include zero. Given the moderate to high correlations among some study variables, additional analyses were performed to examine potential overlap among predictors and distributional assumptions. The variance inflation factor (VIF) values ranged from 1.336 to 1.543, and tolerance values ranged from 0.648 to 0.749, indicating no evidence of problematic similarity among variables. In addition, skewness and kurtosis values were examined to assess normality, following the guidelines suggested by Demir, (2022), who indicate that values within ±2 can be considered acceptable. All skewness and kurtosis values fell within this range, suggesting that the variables did not substantially deviate from normal distribution. These findings indicated that the assumptions underlying the regression-based mediation analyses were adequately met and that each predictor contributed unique explanatory information to the model.

Findings

Preliminary analyses

Descriptive statistics and bivariate correlations are presented in Table 1.

The attitude toward sport, body appreciation, mental well-being, and life satisfaction scores were all positively correlated, as shown in Table 1. The correlation coefficients ranged from 0.36 to 0.52. These results support the initial hypotheses of the study, indicating that higher levels of attitude toward sport, body appreciation, and mental well-being were associated with greater life satisfaction.

Table 1. Descriptive statistics and bivariate correlations among the variables (N = 200).

Variable	M	SD	Min–Max	α	Skewness	Kurtosis	1	2	3	4
1. Attitude toward sport	42.62	8.51	19–59	0.89	-0.29	-0.31	–			
2. Body appreciation	34.90	7.14	14–50	0.88	-0.38	-0.31	0.48**	–		
3. Mental well-being	47.81	8.80	22–67	0.89	-0.36	0.07	0.50**	0.36**	–	
4. Life satisfaction	23.34	6.37	6–35	0.82	-0.32	-0.63	0.40**	0.39**	0.52**	–

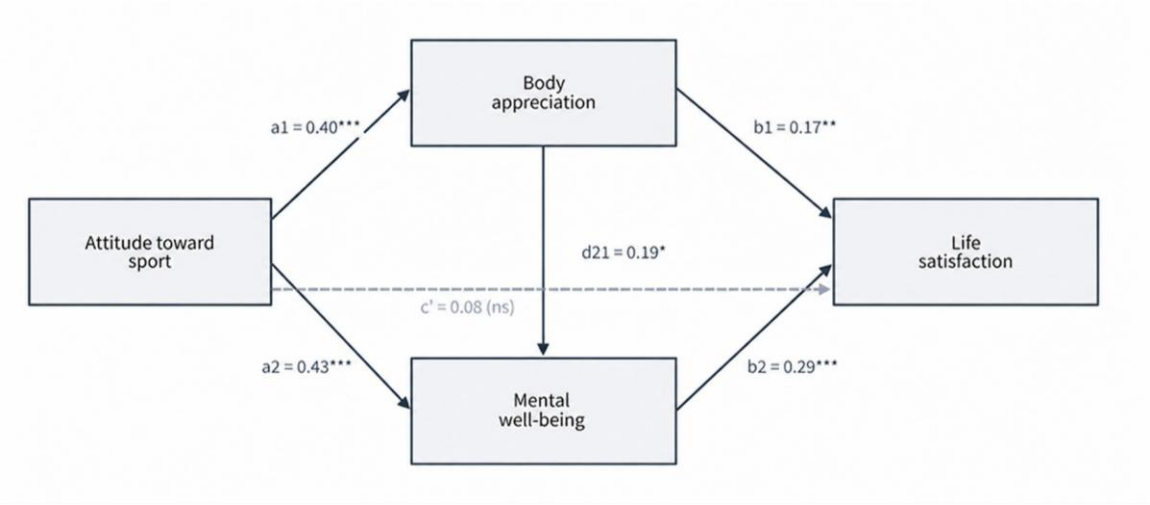
*Note. ** = Correlation is significant at the 0.01 level (two-tailed). α = Cronbach's alpha; M = mean; SD = standard deviation.*

Serial multiple mediation analyses

In this study, Harman's single factor test was used to examine the possible presence of common method bias in the proposed model. All items in the measurement instruments used in the study were entered into an unrotated principal component analysis. According to Podsakoff et al. (2003), common method bias is a concern if a single factor explains more than 50% of the total variance. In this analysis, the first unrotated factor explained 27.79% of the variance, indicating that common method bias is not a significant issue in the current data. The following section presents the results of the serial multiple mediation analysis in detail.

To examine both the direct and indirect effects of attitude toward sport on life satisfaction, a serial mediation model including body appreciation and mental well-being as sequential mediators was tested. The results of these analyses are presented in Figure 1 and detailed in Table 2.

Figure 1. The serial mediation model.



*Note. Path coefficients are unstandardized. **p < 0.01, ***p < 0.001. The dashed direct path (c') is not statistically significant.*

As depicted in Figure 1 and Table 2, the total effect of attitude toward sport on life satisfaction was significant (B = 0.299, p < 0.001). When the mediators body appreciation and mental well-being were included in the model, the direct effect of attitude toward sport on life satisfaction was no longer statistically significant once the two mediators were included (B = 0.083, p = 0.132), indicating that body appreciation and mental well-being jointly accounted for the association.

Attitude toward sport significantly predicted both body appreciation (B = 0.404, SE = 0.052, t(198) = 7.73, p < 0.001) and mental well-being (B = 0.435, SE = 0.072, t(197) = 6.04, p < 0.01). Additionally, body appreciation was a significant positive predictor of mental well-being (B = 0.194, SE = 0.086, t(197) = 2.26, p < 0.001), and mental well-being, in turn, significantly predicted life satisfaction (B = 0.286, SE

= 0.050, t(196) = 5.75, p < 0.001). Body appreciation significantly predicted life satisfaction even once mental well-being was included in the model (B = 0.172, SE = 0.061, t(196) = 2.84, p = 0.005).

Indirect effects analysis revealed that body appreciation significantly mediated the relationship between attitude toward sport and life satisfaction, as the bootstrapped confidence interval excluded zero (B = 0.070, 95% CI [0.023, 0.130]). Mental well-being, however, significantly mediated this relationship, with a confidence interval that excluded zero (B = 0.124, 95% CI [0.070, 0.195]). Also, a significant serial mediation effect was observed through both body appreciation and mental well-being (B = 0.022, 95% CI [0.004, 0.048]), indicating that attitude toward sport predicted body appreciation, which in turn predicted mental well-being, ultimately leading to higher life satisfaction. The total indirect effect was also significant (B = 0.216, 95% CI [0.144, 0.302]). The model accounted for 32.3% of the variance in life satisfaction.

Table 2. Testing the pathways of the serial mediation model.

Path	B	β	SE	95% CI
Total effect	0.299	0.399	0.047	[0.202, 0.386]
Direct effect	0.083	0.110	0.059	[-0.031, 0.198]
Total indirect effect	0.216	0.289	0.041	[0.144, 0.302]
Attitude toward sport ➔ Body appreciation ➔ Life satisfaction	0.070	0.093	0.027	[0.023, 0.130]
Attitude toward sport ➔ Mental well-being ➔ Life satisfaction	0.124	0.166	0.032	[0.070, 0.195]
Attitude toward sport ➔ Body appreciation ➔ Mental well-being ➔ Life satisfaction	0.022	0.030	0.011	[0.004, 0.048]

Note. N = 200, k = 5000 bootstrap samples; B = unstandardized coefficient; β = standardized coefficient; SE = bootstrap standard error; CI = bias-corrected bootstrap confidence interval. ➔ denotes a directional path in the indirect effect.

Discussion

The findings demonstrated that positive attitudes toward sports participation were significantly correlated with body appreciation, mental well-being, and life satisfaction. Mediation analyses further revealed that both body appreciation and mental well-being served as mediators in this relationship, operating independently as well as sequentially. Specifically, a pathway emerged in which favorable attitudes toward sport predicted greater body appreciation, which subsequently enhanced mental well-being, eventually leading to higher life satisfaction. Most importantly, the direct effect of sport attitudes on life satisfaction remained significant after accounting for the mediators, indicating partial rather than full mediation.

Furthermore, these results underscore the link between sports participation and overall life satisfaction. Most prior studies conceptualize sports engagement primarily in behavioral terms, providing a relevant basis for understanding how positive attitudes drive the initiation and maintenance of physical activity (Stevens et al., 2020). Across demographics, research consistently links physical exercise and sports participation to higher levels of subjective well-being and positive mental health. Similarly, Li et al., (2024) and Martín-Rodríguez et al., (2024) asserted that positive sports attitudes are associated with mental well-being in university settings, youth populations, and adaptive sports programmes, highlighting a consistent relationship across diverse age groups and contexts. Beyond individual outcomes, sports participation fosters social cohesion, expands interpersonal relationship networks, and cultivates a positive attitude toward life satisfaction. In Nigeria, Ugwueze et al., (2021) found a significant positive relationship between physical exercise and mental health among male undergraduates, supporting the present findings. Therefore, these insights demonstrate that a positive inclination toward sports, whether

expressed as attitudes or active participation, enhances life satisfaction by mitigating stress, bolstering physical and mental wellness, and building self-assurance. Positive sports attitudes therefore constitute a vital element in strengthening psychological resilience and promoting overall mental well-being.

The results of this study also show that body appreciation mediates the relationship between sport engagement and life satisfaction. This suggests that positive changes in physical self-perception may enhance body appreciation. When young people adopt positive attitudes toward sports, they are more likely to engage in behaviours that emphasize bodily functionality rather than appearance, fostering acceptance of their bodies. Functionality-focused activities may therefore help them develop a balanced and realistic body image. Although much of the cited research concerns sport participation rather than attitudes, it points to a plausible mechanism whereby positive evaluative orientations toward sport encourage engagement in such activities, thereby supporting body appreciation. Riddervold et al., (2024) reported that adolescents who participate in sports tend to be more satisfied with their lives, partly due to greater body appreciation. Marmara et al., (2025) likewise found that body appreciation aided the association between planned physical activity and well-being among young adults. Other studies confirm this pattern: participation in aerobic dance, school sports clubs, and university sports courses has been linked to improvements in body image, perceived health, and self-care. In contrast, individuals who struggle to develop a positive relationship with their bodies appear more prone to habits such as emotional eating, unhealthy dieting, or reduced levels of physical activity. Research also suggests that sports participation strengthens self-esteem and competence beliefs, further supporting positive body evaluations. Taken together, these findings highlight body appreciation as a key psychological mechanism in the sport–life satisfaction relationship.

Statistical testing confirmed the significance of all three routes within the framework. The indirect effect via mental well-being was strongest (B = 0.124, 95% CI [0.070, 0.195]), followed by the effect via body appreciation alone (B = 0.070, 95% CI [0.023, 0.130]), while the sequential route through body appreciation and then mental well-being was smaller yet reliable (B = 0.022, 95% CI [0.004, 0.048]). Together, the two mediators accounted for 72.3% of the total effect, rendering the direct effect non-significant and consistent with full mediation. Body appreciation thus operates both as an upstream mediator that feeds into mental well-being and as a modest independent channel, rather than a competing pathway. This pattern aligns well with theory, since self-acceptance is recognized as a core aspect of mental well-being; therefore, body appreciation is best understood as a contributing factor to well-being rather than a competing explanatory pathway.

Another important finding revealed in this study is the significant mediating role of mental well-being in the relationship between attitudes toward sport and life satisfaction, indicating that this association is, at least partially, explained through individuals' mental well-being. Previous studies have repeatedly demonstrated that active participation in sports contributes to mental well-being by supporting positive outcomes such as emotion regulation, mental resilience, and enhanced self-esteem. When these mental resources are strengthened, it becomes easier for individuals to experience greater life satisfaction (Martín-Rodríguez et al., 2024).

This study also revealed a sequential mediation pattern in which body appreciation and mental well-being help explain why having positive attitudes toward participating in sports is linked to higher life satisfaction. Previous research consistently describes physical activity as a behaviour that can ease stress and anxiety and life satisfaction as one of the central indicators of mental well-being. From this perspective, a favourable attitude toward engaging in sports may encourage a way of relating to the body

that highlights what the body can do rather than how it looks, which in turn can nurture greater body appreciation. A meta-analysis has reported that body satisfaction is negatively associated with eating disorders, depression and anxiety levels, and positively associated with self-esteem and mental well-being. Furthermore, harbouring positive feelings toward one's own body has positive effects on life satisfaction and self-perceived success. In light of the explanations and research findings in the literature, the serial mediation model identified in this study becomes more comprehensible: attitudes toward sport may influence life satisfaction not only directly, but also through this chain of mental processes, beginning with body appreciation and extending through mental well-being.

In terms of effect size, the overall model accounted for 32.3% of the variance in life satisfaction. While the direct effect of attitudes toward sport on life satisfaction was reduced once the mediators were introduced, it remained significant, suggesting that body appreciation and mental well-being account for a meaningful, though not exclusive, portion of this relationship. The total indirect effect corresponded to 72.3% of the total effect. Although moderate associations were observed among some of the study variables, additional diagnostics indicated that these associations did not reach problematic levels. Specifically, VIF and tolerance values remained within acceptable ranges, suggesting that the observed relationships were not driven by excessive conceptual overlap. These findings indicate that body appreciation and mental well-being, while related, represent distinct but interrelated constructs that operate at different stages of the sequential mediation process linking attitudes toward sport and life satisfaction.

Practical Implications

The results suggest that universities can enhance student well-being by fostering positive attitudes toward sport. Campus programs should emphasize the functional benefits of physical activity, promote body appreciation, and integrate mental health support into sports initiatives. For example, workshops combining physical activity with psychoeducation on body image could strengthen both body appreciation and mental well-being, ultimately improving life satisfaction. These interventions may be particularly valuable during emerging adulthood, a developmental stage marked by identity formation and heightened vulnerability to stress.

Conclusions

In conclusion, this study provides empirical insight into the psychological mechanisms connecting sports attitudes with overall life satisfaction among university undergraduates. The findings confirm that positive attitudes toward sport contribute to life satisfaction through the sequential mediating roles of body appreciation and mental well-being. By targeting attitudes as an entry point, universities can design interventions that not only encourage participation in sports but also promote holistic student well-being.

Limitations and future directions

Despite its contributions, the study has limitations. The cross-sectional design precludes causal inference, and reliance on self-report measures may introduce bias. The sample was limited to one Nigerian university, which may restrict generalizability across cultural contexts. Future research should employ longitudinal or experimental designs and include diverse populations to strengthen external validity.

In addition to these methodological limitations, this study did not account for other health factors that may mediate these relations. For example, perceived health and physical fitness may be integral to

shaping attitudes toward sports participation. Other lifestyle factors, such as diet or tendencies toward overeating or unhealthy weight control behaviours, may also be relevant. This raises the possibility that these attitudes and behaviours may meaningfully influence the observed outcomes. Furthermore, cultural norms related to sport participation, body image, and well-being may have influenced the observed relationships, suggesting that the findings should be interpreted within the sociocultural context in which the data were collected. Measurement limitations should also be acknowledged: the shortened adaptations of the attitude and well-being scales used here depart from the original full-length instruments, and full validation evidence for these forms in a Nigerian undergraduate population is not yet available. Confirmatory factor analysis and measurement invariance testing should accompany future data collection.

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Ethical considerations

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and all applicable institutional and national guidelines for research involving human participants. Ethical approval for this study was obtained from the University Research and Ethics Committee of Kwara State University of Education, Ilorin, Nigeria. All procedures were conducted in accordance with institutional ethical guidelines and the principles of the Declaration. Participants were informed about the study procedures and assured that their data would be processed and reported in anonymized form to protect confidentiality.

Consent to participate

Informed consent was obtained from all participants included in the study. Participants were provided with clear information about the study's aims, procedures, and their rights, including the right to withdraw at any time without penalty. All participants voluntarily agreed to take part, and their confidentiality was safeguarded through anonymized data handling and reporting.

Consent for publication

All participants provided informed consent for the publication of anonymized data included in this study. No information that could identify individual participants is reported in this manuscript.

Author contributions

1. **ASUKUTI** Abdullahi Ibrahim: Conceptualization of the study, development of the research design, and drafting of the introduction and theoretical framework.
2. **AKANBI Faidat Oluwaseyi**: Data collection, preparation of the dataset, and contribution to the methodology section.
3. **ALEGE Barakat Bukola**: Statistical analysis, interpretation of results, and drafting of the results section.
4. **Fatai MUSTAPHA**: Literature review, integration of related studies, and drafting of the discussion section.
5. **Hammed Popoola Aminu**: Editing and critical revision of the manuscript for intellectual content, including refinement of limitations and implications.
6. **Ibrahim Barakat Bose**: Oversight of the project, coordination among team members, and final approval of the manuscript for submission.

All authors contributed to the writing of the manuscript, reviewed the final draft, and approved the final manuscript for publication.

Declaration of AI Usage

Artificial intelligence tools (Microsoft Copilot) were used for language refinement, paraphrasing, and improving clarity and coherence of the text. All substantive ideas, interpretations, and conclusions are those of the authors, and the responsibility for the content remains entirely with the authors. No AI tools were used to generate, analyze, or simulate data, nor to conduct statistical analyses.

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Data availability statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

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