

Research article

Physical Activity, Social Support, and Psychological Well-Being in University Students: Implications for Health Promotion and Preventive Rehabilitation

Sandey Tantra Paramitha¹, Upik Rahmi², Leni Anggraeni³, Siti Aisyah⁴, Maltha Kharisma⁴ and Eko Purnomo⁵

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- 1 Universitas Pendidikan Indonesia, Postgraduate School, Bandung, Indonesia;
- 2 Universitas Pendidikan Indonesia, Faculty of Sports Education and Health, Bandung, Indonesia;
- 3 Universitas Pendidikan Indonesia, Faculty of Social Sciences Education, Bandung, Indonesia;
- 4 Universitas Negeri Padang, Faculty of Languages and Arts, Padang, Indonesia;
- 5 Universitas Negeri Padang, Faculty of Sports Science, Padang, Indonesia

* Correspondence: sandeytantra18@upi.edu

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Abstract: Physical activity and social support are theoretically recognized as protective factors against psychological disorders and are central components of health promotion and preventive rehabilitation frameworks. However, in students who are actively engaged in sports-based Student Activity Units (UKM), their direct relationship with psychological well-being has not been consistently reported. This study aims to analyze the effect of physical activity and social support on quality of life (QoL) and anxiety in student members of UKM sports, with implications for lifestyle medicine and functional health promotion. This study used a quantitative design with a cross-sectional approach. The sample consisted of 65 active student members of UKM sports at Universitas Pendidikan Indonesia, selected through proportionate stratified random sampling. Physical activity was measured using the International Physical Activity Questionnaire–Short Form (IPAQ-SF), social support using the Multidimensional Scale of Perceived Social Support (MSPSS), quality of life using the WHOQOL-BREF, and anxiety using the Zung Self-Rating Anxiety Scale (SAS). Hypothesis testing was performed using bootstrap regression analysis (1,000 resamplings; 95% BCa confidence intervals). The results showed that physical activity and social support did not have a statistically significant direct effect on QoL or anxiety ($p > 0.05$). Despite the positive directional trend between physical activity and QoL and a negative trend toward anxiety, confidence intervals uniformly encompassed zero. These findings suggest that in a physically active student population, other factors including academic stress, performance demands, burnout, coping strategies, and emotional regulation may mediate or moderate psychological well-being outcomes. From a preventive rehabilitation and health promotion perspective, these results underscore the importance of comprehensive, multidimensional interventions beyond exercise prescription alone, integrating psychosocial support, stress management, and lifestyle medicine approaches to optimize functional health among university students.

Keywords: Physical activity; Social support; Quality of life; Anxiety; Health promotion; Preventive rehabilitation; Lifestyle medicine; Sports student activity unit

1. Introduction

Undergraduate students represent a population at elevated risk for psychological distress, particularly anxiety and diminished quality of life, driven by academic demands, social transitions, and the developmental challenges of emerging adulthood [1]. These concerns carry significant public health implications, as mental health problems in this phase of life can adversely affect academic achievement, social functioning,

and long-term well-being outcomes that are directly relevant to preventive rehabilitation and functional health promotion [1].

Social support, encompassing emotional, informational, and instrumental assistance from family, peers, and significant others, has been consistently identified as a major protective factor against anxiety and psychological decline [1,2,3,4]. Higher levels of social support are associated with lower anxiety, with family support recognized as a particularly powerful protective source [4]. Social support further functions as a mediator between psychological stress and anxiety, suggesting that strengthening support networks may serve as an important component of preventive health strategies [3]. Gender differences are also relevant: female students tend to report higher anxiety and greater sensitivity to variations in social support [5,6]. Psychological variables such as self-esteem and stress further mediate the relationship between gender, social support, and anxiety [7,8].

Social support also contributes directly to quality of life through enhanced psychological well-being, life satisfaction, and health-related outcomes, and indirectly by bolstering resilience, self-esteem, and adaptive coping capacity [11,12,13]. Peer support positively influences academic engagement and social integration, though its effectiveness depends on quality and contextual appropriateness [14,15].

Beyond psychosocial factors, physical activity has been recognized as a key behavioral determinant of mental health and quality of life. Physical activity promotes emotional regulation, self-efficacy, and self-control, contributing to improved psychological well-being [16,17,18]. In the context of preventive rehabilitation, regular physical activity is understood as a modifiable lifestyle behavior that reduces the risk of both physical and mental health deterioration over time [19,20]. Social support can also strengthen engagement in physical activity, creating a chain mediation pathway toward improved quality of life [19,20].

Nevertheless, contemporary changes in student lifestyles including increasing sedentary behavior and excessive digital technology use highlight the urgency of simultaneously examining behavioral and psychosocial protective factors within a health promotion framework. Physical inactivity represents a growing risk factor with implications not only for mental health but also for long-term functional capacity and rehabilitation burden.

Although previous studies have examined social support and physical activity separately, research integrating both as simultaneous predictors of anxiety and quality of life in collectivist cultural contexts remains limited. Most existing evidence derives from individualistic societies, where family and community dynamics differ substantially. The present study addresses this gap by proposing a comprehensive predictive model that integrates behavioral (physical activity) and psychosocial (social support) factors, with direct implications for health promotion, lifestyle medicine, and preventive rehabilitation strategies in higher education settings.

Based on the theoretical framework and prior literature, the following formal hypotheses were established:

- H1: Physical activity is a significant positive predictor of quality of life (across physical, psychological, social, and environmental domains) in undergraduate students enrolled in sports activity units.
- H2: Physical activity is a significant negative predictor of anxiety levels in undergraduate students enrolled in sports activity units.
- H3: Social support is a significant positive predictor of quality of life in undergraduate students enrolled in sports activity units.
- H4: Social support is a significant negative predictor of anxiety in undergraduate students enrolled in sports activity units.

2. Methods

2.1 Design

This study employed a quantitative, non-experimental, cross-sectional design to examine the predictive relationships between physical activity, social support, quality of life, and anxiety. The cross-sectional framework was chosen because data were collected at a single time point to analyze associations between independent variables (physical activity and social support) and dependent variables (quality of life and anxiety). The study is classified as non-experimental because no conditions were manipulated; rather, naturally occurring variations in participants' physical activity and social support were observed and measured. This design is also consistent with an *ex post facto* approach, in which the researcher examines relationships among variables after they have already occurred, without direct experimental control. Together, these descriptors indicate a study designed to test predictive relationships in an observational framework, with acknowledged limitations in causal inference.

Given that the data did not fully meet normality assumptions, hypothesis testing was conducted using bootstrap regression analysis to obtain robust parameter estimates. This design is appropriate for examining predictive relationships in populations already engaged in structured physical activity, where contextual and psychological factors may jointly influence outcomes.

2.2 Participants

The study population comprised 190 active students of Universitas Pendidikan Indonesia who were registered members of sports-based Student Activity Units (UKM). A sample of 65 respondents was selected using the Slovin formula (margin of error = 10%) with proportionate stratified random sampling. Inclusion criteria were: (1) active enrollment at Universitas Pendidikan Indonesia; (2) registered UKM sports membership for at least three months; (3) age 18–25 years; (4) provision of informed consent; and (5) complete questionnaire responses. Exclusion criteria included: (1) incomplete questionnaire data; (2) current injury or medical condition limiting physical activity; and (3) active psychological disorder requiring intensive treatment.

The authors acknowledge that a sample of $n = 65$ drawn exclusively from sports UKM members represents a specific, physically active subgroup of the broader student population. This restricts generalizability to the wider undergraduate population and to students not engaged in organized sports.

2.3 Instrument

Data were collected through an online questionnaire (Google Form) consisting of: (1) the International Physical Activity Questionnaire–Short Form (IPAQ-SF) to measure physical activity; (2) the Multidimensional Scale of Perceived Social Support (MSPSS) to measure social support; (3) the WHOQOL-BREF to measure quality of life; and (4) the Zung Self-Rating Anxiety Scale (SAS) to measure anxiety levels.

2.4 Data Analysis

All instruments have had good validity and reliability in previous studies. Data analysis was performed using IBM SPSS version 27. Descriptive statistics were used to describe the characteristics of the respondents. Normality tests were performed using the Kolmogorov–Smirnov test. Because the data were not completely normally distributed, hypothesis testing was performed using regression analysis with the bootstrap method (1,000 resampling's; 95% confidence interval). The significance level was set at $p < 0.05$.

3. Results

This section presents the results of the data analysis obtained from 65 study respondents. The analysis was conducted in stages, starting with a description of respondent characteristics, the distribution of quality of life by domain, and a bootstrap regression analysis to examine the influence of physical activity and social support on quality of life and anxiety levels.

In general, the descriptive results provide an overview of the respondent profile based on gender, physical activity level, social support, and anxiety level. Next, quality of life was analyzed based on four domains: physical, psychological, social, and environmental. To address the research objectives, a bootstrap regression test was conducted to determine whether physical activity and social support played a role as predictors of quality of life and anxiety. The research results are presented systematically in Table 1 below.

Table 1. Respondent Characteristics (N = 65)

Variables	Category	n	%
Gender	Man	48	73,85
	Woman	17	26,15
Physical Activity	High	34	52,31
	Moderate	31	47,69
	Low	0	0
Social Support	High	46	70,77
	Moderate	17	26,15
	Low	2	3,08
Anxiety	Normal	39	60,00
	Low	22	33,85
	Currently	3	4,62
	Heavy	1	1,54

Table 1 shows that the majority of respondents were male (73.85%). The majority of students had high levels of physical activity (52.31%) and high levels of social support (70.77%). Furthermore, most respondents had normal levels of anxiety (60.00%), with only a small proportion experiencing moderate to severe anxiety. In general, these characteristics indicate that respondents tended to have good levels of physical activity, strong social support, and relatively low levels of anxiety, indicating a relatively good state of psychological well-being.

Table 2. Distribution of Quality of Life by Domain

Domain QoL	Very Good	Good	Average	Fair	Very Poor
Physical	7	28	29	1	0
Psychological	18	34	13	0	0
Social	11	18	34	2	0
Environmental	12	37	15	1	0

Table 2 shows that overall quality of life ranged from good to average across all domains. The psychological and environmental domains mostly showed good ratings, while the physical and social domains were clustered in the average range. No participants rated any domain as very poor.

Table 3. Bootstrap Regression Results: Physical Activity

Dependent Variable	B	p-value	95% CI (BCa)	Effect Size	Interpretation
QoL - Physical	0,001	0,243	−0,001 – 0,003	Trivial	Not significant
QoL - Psychological	0,001	0,155	0,000 – 0,003	Trivial	Not significant
QoL - Social	0,001	0,352	−0,001 – 0,003	Trivial	Not significant
QoL - Environmental	0,001	0,137	0,000 – 0,003	Trivial	Not significant
Anxiety	0,001	0,137	0,000 – 0,003	Trivial	Not significant

Physical activity did not significantly predict any QoL domain or anxiety (all $p > 0.05$). Although the directional trend was positive, effect sizes were trivially small and all confidence intervals encompassed zero, indicating H1 and H2 were not supported.

Table 4. Bootstrap Regression Results: Social Support

Dependent Variable	B	p-value	95% CI (BCa)	Effect Size	Interpretation
QoL - Physical	0,239	0,310	−0,179 – 0,761	Small	Not significant
QoL - Psychological	0,089	0,599	−0,210 – 0,465	Trivial	Not significant
QoL - Social	0,451	0,068	−0,063 – 0,945	Small-moderate	Not significant (approximate)
QoL - Environmental	0,175	0,363	−0,200 – 0,586	Small	Not significant
Anxiety	−0,083	0,585	−0,355 – 0,174	Trivial	Not significant

Social support did not significantly predict any QoL domain or anxiety (all $p > 0.05$). A near-significant positive trend was observed for the social QoL domain ($p = 0.068$; small-to-moderate effect), though the confidence interval still encompassed zero. H3 and H4 were not supported. Notably, regression coefficients for social support yielded small to small-moderate effect sizes, suggesting that the absence of statistical significance may partly reflect the limited statistical power of the current sample rather than a true null relationship.

4. Discussion

This study examined whether physical activity and social support predict quality of life (QoL) and anxiety in university students engaged in sports Student Activity Units (UKM). Bootstrap regression analysis was employed to address non-normality and to yield robust parameter estimates. Overall, neither physical activity nor social support demonstrated statistically significant direct predictive effects on QoL or anxiety. Although regression coefficients were consistently in the hypothesized direction (positive for QoL, negative for anxiety), all 95% BCa confidence intervals encompassed zero.

4.1. Physical Activity dan Quality of Life

The results showed that physical activity did not significantly impact all dimensions of QoL (physical, psychological, social, and environmental). This finding indicates that among relatively young and healthy sports student groups, high levels of physical activity do not automatically improve perceived quality of life. This is likely due to sample homogeneity and the potential for a ceiling effect, where respondents' levels of physical activity and QoL are already relatively high, limiting variation in scores [21]. Additionally, students in sports clubs face dual roles as both students and athletes. Academic pressure, training demands, and competitive goals can create stress that can potentially overshadow the psychological benefits of physical activity [22], [23]. Extrinsic motivation in participating in training or competitions can also reduce

the positive impact of sport on well-being compared to intrinsic motivation [24]. The risk of physical fatigue and injury is also a factor that can reduce the perception of quality of life, especially in the physical and psychological dimensions [25].

Although various studies have shown a positive relationship between physical activity and QoL [26], [27], the results of this study confirm that in the context of students who are already physically active, contextual factors such as academic stress and performance pressure can moderate the relationship.

4.2. Physical Activity dan Anxiety

Analysis shows that physical activity has no significant effect on anxiety levels. Although theoretically, physical activity plays a role in reducing anxiety through neurobiological and psychological mechanisms [28], [29], in the context of UKM sports students, this influence was not directly detected. These results align with research showing that weekly sports participation is not necessarily effective in reducing stress and anxiety when academic pressure remains high. [30]. The effectiveness of physical activity in reducing anxiety is also influenced by moderator variables such as flow experience, mental toughness, and social support [31], [32]. Without these factors, physical activity alone may not be powerful enough to produce significant change.

In the context of competitive sport, physical activity can even be a source of additional stress due to performance pressure and social evaluation [23]. This suggests that the relationship between physical activity and anxiety is complex and contextual.

4.3. Social Support dan Quality of Life

The analysis results showed that social support did not significantly influence overall QoL, although there was a tendency for a positive relationship in the social dimension. Theoretically, social support is an important component of the biopsychosocial model that influences individual well-being. Support from family and friends is known to contribute to improved psychological well-being and quality of life [33]. However, in this study, the relationship was not statistically significant. This is likely due to a ceiling effect or sample homogeneity [34]. In addition, the quality of life of UKM sports students may be more influenced by intrinsic factors such as performance achievement, personal satisfaction, and skill development than external social support [35]. Several previous studies also show that social support does not always have a direct effect on QoL, but can work through reducing academic stress [36].

4.4. Social Support dan Anxiety

The analysis showed that social support had a negative relationship with anxiety, but it was not statistically significant. Theoretically, stress-buffering theory states that social support can protect individuals from the negative impacts of stress [37]. Neuropsychologically, social support is also associated with regulation of stress responses and reduced anxiety [38]. However, this study shows that social support does not directly influence anxiety in sports student clubs. This finding aligns with research showing that the relationship is often mediated by academic self-efficacy or coping strategies [39], [40]. Additionally, academic pressure and athletic performance demands may remain direct predictors of anxiety even when social support is available [41]. Personality factors also play a role in determining an individual's response to social support, where students with certain characteristics still show high levels of anxiety even though they receive support.

4.5. Interpretation of Negative Findings and Practical Significance

The failure to reject null hypotheses in this study does not indicate that physical activity and social support are irrelevant to student well-being. Several alternative explanations merit discussion. First, a Type II error (false negative) cannot be excluded: the sample size of $n = 65$ may be insufficient to detect small-to-moderate population effects, particularly when controlling for contextual variability. Social support's small-

to-moderate effect on social QoL ($B = 0.451$; $p = 0.068$) is consistent with this interpretation. Second, the restricted sample (sports UKM members only) limits variation in both predictor and outcome variables, biasing results toward null findings. Third, confounding variables not measured in this study including academic stress, burnout, coping style, intrinsic motivation, athletic performance pressure, emotional regulation, and resilience likely contribute meaningfully to QoL and anxiety in this population and may have masked expected associations.

From a practical standpoint, even the observed directional trends carry meaningful implications. The consistent positive associations between physical activity and QoL, and negative associations between social support and anxiety, suggest that these factors contribute to psychological well-being in expected directions, even if the magnitude was insufficient to reach conventional significance thresholds in this sample. A larger, more diverse sample would likely yield statistically detectable effects.

4.6. Implications for Preventive Rehabilitation and Lifestyle Medicine

The findings of this study carry important implications for health promotion, lifestyle medicine, and preventive rehabilitation in university settings. Preventive rehabilitation is concerned with identifying and modifying lifestyle risk factors before clinical dysfunction develops. In the context of university students, physical inactivity if it were to emerge as a pattern represents a modifiable risk factor for both mental and physical health deterioration over the long term. The current findings suggest that even in a population maintaining adequate physical activity levels, the psychological benefits are not automatic and may depend on whether physical activity is voluntarily and intrinsically motivated, embedded in a supportive social environment, and accompanied by effective stress management.

From a lifestyle medicine perspective, interventions targeting university students should move beyond exercise prescription alone. Functional health in this population requires comprehensive approaches that integrate: (1) structured physical activity tailored to intrinsic motivation and personal goals rather than purely competitive performance; (2) psychosocial support networks that promote emotional well-being, peer connection, and resilience; (3) stress management and burnout prevention programs that address the dual academic-athletic role burden; (4) counseling and emotional regulation training; and (5) monitoring of long-term health outcomes beyond the university period, recognizing that current behavioral patterns shape future disease risk and rehabilitation needs.

Universities and sports UKM administrators should consider incorporating preventive rehabilitation principles into their student development frameworks, treating psychological well-being not merely as an individual concern but as a public health priority with long-term functional health consequences. The integration of health promotion and preventive rehabilitation strategies within campus sport programs represents a promising direction for future research and policy development.

5. Conclusions

This study examined physical activity and social support as predictors of quality of life and anxiety in university students engaged in sports activity units. The primary finding is that neither predictor demonstrated statistically significant direct effects on the outcome variables. This result does not negate the importance of physical activity or social support for student well-being; rather, it underscores that their relationship with psychological outcomes is multidimensional and context-dependent.

Ceiling effects, sample homogeneity, limited statistical power ($n=65$), and the unmeasured influence of confounders including academic stress, burnout, coping strategies, intrinsic motivation, and emotional regulation likely contributed to the observed null findings. The consistent positive directional trends between physical activity and QoL, and the near-significant social support effect on social QoL ($p = 0.068$), suggest

that meaningful relationships may exist but require larger, more heterogeneous samples for detection.

From a preventive rehabilitation and health promotion perspective, these findings reinforce that well-being interventions for university student-athletes must be comprehensive, addressing not only physical activity promotion but also psychosocial support, stress management, adaptive coping, and the creation of sport environments that prioritize intrinsic motivation and psychological safety over performance pressure alone. Future research should employ larger samples, longitudinal designs, and mediating variable models to elucidate the pathways through which physical activity and social support influence functional health and long-term well-being in this population.

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