

Exploring the link between physical activity and quality of life among university students

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ABSTRACT

This study aimed to examine the relationship between physical activity (PA) and quality of life (QoL) among university students, considering several factors: gender, specialization, academic level, and place of residence. This was a cross-sectional descriptive quantitative study. The study sample consisted of 302 university students from Dar Al-Uloom University in Saudi Arabia. Of these participants, 170 were males (56.58%) and 132 were females (43.42%). QoL was assessed using the WHOQOL-BREF, and PA levels were measured with the short form of the International Physical Activity Questionnaire (IPAQ). The study showed that university students were generally physically active throughout the week, and their overall QoL was ranked 'high', especially in areas such as life meaning, personal needs, and mood. QoL was higher among females and first-year students ($p \leq 0.05$), while no differences were found based on college or residence ($p > 0.05$). PA was positively associated with QoL, with all correlations being statistically significant ($p \leq 0.05$) and ranging from $r = 0.549$ to $r = 0.767$, indicating that higher levels of PA are strongly associated with higher perceived QoL. In conclusion, PA is an essential aspect of maintaining good health and well-being, and it is positively associated with QoL.

KEYWORDS

Physical Activity; Quality of Life; University Students

1. INTRODUCTION

Physical activity (PA) is an important aspect of a healthy lifestyle and has been shown to have many benefits for both physical and mental health. Quality of life (QoL) is a multidimensional concept that encompasses various aspects of one's life, including physical, psychological, and social well-being. Data from the World Health Organization (WHO) show that physical inactivity is a major global health concern. According to the WHO, physical inactivity is the fourth leading risk factor for global mortality, accounting for 6% of all deaths worldwide. In addition, physical inactivity is associated with a higher risk of non-communicable diseases such as heart disease, stroke, and diabetes (Lee et al., 2012).

Regular PA is crucial for maintaining good health and enhancing the QoL. It has numerous benefits, including reducing the risk of chronic diseases, improving mental health, and enhancing cognitive function. Physical inactivity is one of the leading risk factors for mortality worldwide and has a significant negative impact on the global economy. However, PA interventions have been shown to significantly improve physical and mental health-related QoL in adults, as well as social functioning, self-esteem, and overall well-being. A study by Shin et al. (2017) found that higher levels of PA were associated with better health-related QoL among breast cancer survivors. This highlights the importance of PA as a crucial component of a healthy lifestyle.

The issue of QoL has received a lot of attention from researchers and professionals around the world. In the study by Abu Hammad (2019), the results showed that the level of quality of psychological life and psychological happiness was high among students, and that there were no differences between males and females on the scale of psychological QoL. A study by Abu Al-Tayeb (2019) concluded that the level of QoL and psychological adjustment among swimming practitioners is higher than that of non-swimmers.

Numerous studies have examined the relationship between PA and QoL. A study by Rebar et al. (2015) found that PA is positively associated with improved mental health outcomes, such as depression and anxiety, in non-clinical adult populations. Schuch et al. (2016) conducted a meta-analysis of 25 randomized controlled trials and found that exercise improves both physical and psychological QoL in people with depression. Similarly, Marker et al. (2018) conducted a systematic review and meta-analysis of 33 studies involving children and adolescents and found that PA is associated with improved health-related QoL.

Factors that may influence the relationship between PA and QoL have also been examined. Henson et al. (2013) found that sedentary behavior is negatively associated with cardiometabolic health markers, while PA is positively associated with these markers. Schnohr et al. (2005) found that stress and life dissatisfaction are inversely associated with jogging and other types of PA in leisure time.

Anoky et al. (2012) showed a positive relationship between QoL and PA. Furthermore, in the study by Sun et al. (2015), the results indicated that there is a positive effect of practicing PA on a healthy lifestyle to improve the QoL and the psychological and social adjustment of individuals. Houston et al. (2016) showed that athletes have a higher QoL than non-athletes, and that paying attention to quality-of-life dimensions reduces the athletes' vulnerability to injury. Moreover, a study by Maher et al. (2015) found that a PA intervention program that included social support and motivational interviewing was effective in promoting PA and improving the QoL in older adults. Another study by Hamer & Stamatakis (2014) found that higher levels of PA were associated with better mental health outcomes in middle-aged adults.

The relationship between PA and QoL has been the subject of many research studies, but the findings have been mixed. Therefore, there is a need for further research to gain a better understanding of this relationship and to identify the most effective strategies for promoting PA and improving QoL. In this research, we aim to examine the relationship between PA and QoL and the various factors that may influence this relationship, hoping to provide a comprehensive understanding of this relationship and to identify potential strategies for promoting PA and improving QoL.

2. METHODS

2.1. Design and Participants

This study was a cross-sectional descriptive quantitative study. The study sample consisted of 302 university students from Dar Al-Uloom University in Saudi Arabia. Of these participants, 170 were males (56.58%) and 132 were females (43.42%). The students represented different specializations, including those enrolled in scientific colleges (38.16%) and humanities colleges (61.84%). Regarding academic level, participants were distributed across all years of study, with 22.37% in the first year, 26.64% in the second year, 27.63% in the third year, 13.82% in the fourth year, and 9.54% studying for more than four years. Concerning residence, the majority of students (87.50%) lived inside the city of Riyadh, while 12.50% resided outside Riyadh (Table 1).

Table 1. Demographic characteristics of participants

Variables	Levels	Frequencies	Percentage
Gender	Male	172	56.58%
	Female	132	43.42%
Faculty	Science Faculty	116	38.16%
	Humanities Faculty	188	61.84%
Level	First Year	68	22.37%
	Second Year	81	26.64%
	Third Year	84	27.63%
	Fourth Year	42	13.82%
	More than Four Years	29	9.54%
Residence	Inside Al-Riyadh	266	87.50%
	Outside Al-Riyadh	38	12.50%
Total		304	100.00%

2.2. Instruments and Procedure

The QoL (QoL) was assessed by the World Health Organization QoL Questionnaire-short form (WHOQoL-Bref). The WHOQOL assesses the individual's perceptions in the context of their culture and value systems, and their personal goals, standards, and concerns. It was developed collaboratively in several centers worldwide and have been widely field-tested. The WHOQOL instrument comprises 26 items, which measure the following broad domains: physical health, psychological health, social relationships, and environment. The WHOQOL-BREF is a shorter version of the original instrument that may be more convenient for use in large research studies (WHO, 2017).

The official short version of the International PA Questionnaire (IPAQ) was used in this study (International PA Questionnaire, 2017) to measure PA levels. The Arabic version has been validated and used in Saudi Arabia's adult population studies (Al-Hazzaa, 2004) & IPAQ short version of (Lee et al., 2011). The short form of IPAQ used in the present study has 7 items providing information on time spent walking, in vigorous- and moderate-intensity physical activities and in sedentary activity during the previous 7 days. IPAQ defines moderate physical activities as those that produce a moderate increase in respiration rate, heart rate and sweating for at least 10 min duration. Vigorous physical activities are defined as those producing vigorous increases in respiration rate, heart rate and sweating for at least 10 min duration. Participants were asked to think about all the vigorous and

moderate activities that they had done in the previous 7 days during work, transport, household, yard/garden and leisure/sports. The IPAQ assessed total PA and total sedentary time, whereas the intensity of activity was converted to MET units ($\text{MET}^{\text{h}} \cdot \text{week}^{-1}$), as recommended by a previous study (Kokandi et al., 2019).

The results were obtained from the IPAQ-PL and WHOQoL-Bref questionnaires. A link was sent through the Deanship of Graduate Studies to Dar AL-Uloom University students. The questionnaire was filled out through a Google Drive program, it was anonymous and contained demographic data including gender, type of college, educational level, and place of residence (with choices for each question).

2.3. Statistical Analysis

The Statistical Package of Social Sciences was used for data analysis. A descriptive statistical analysis was conducted to summarize the responses of university students regarding their levels of PA and QoL. Frequencies and percentages were calculated to describe the number of days and duration of students' engagement in high-, moderate-intensity, and walking activities during the past seven days. Mean and standard deviation values were computed for the WHOQOL-BREF questionnaire to assess students' QoL across psychological, social, environmental, and physical domains. In addition, a four-way ANOVA was performed to examine differences in QoL according to gender, college type, academic level, and place of residence, followed by Scheffé's post-hoc test for detailed comparisons. Furthermore, Pearson correlation coefficients were calculated to explore the relationship between PA levels and QoL scores. The level of statistical significance was set at $p < 0.05$.

3. RESULTS

In the following, Table 2 shows the frequency and duration of PA among participants. Specifically, it details how many days per week and how many hours participants engage in high-intensity activity, moderate-intensity activity, walking for at least 10 minutes, and the number of days they sit on non-weekend days.

Table 2. Frequency and duration of PA among participants

Question	Response	Frequency	Percentage	Rank
Days of high-intensity PA	One Day	1	0.33	5
	Two Days	16	5.26	4
	Three Days	52	17.11	3
	Four Days	132	43.42	1
	Five Days	103	33.88	2
Time spent doing vigorous activity	One Hour or less	6	1.97	5
	Two Hours	17	5.59	4
	Three Hours	68	22.37	3
	Four Hours	113	37.17	1
	Five Hours	100	32.89	2
Days of moderate-intensity PA	One Day or nothing	1	0.33	5
	Two Days	14	4.61	4
	Three Days	61	20.07	3
	Four Days	134	44.08	1
	Five Days	94	30.92	2
Time spent in moderate-intensity activity	One Hour or less	0	0	5
	Two Hours	14	4.61	4
	Three Hours	51	16.78	3
	Four Hours	128	42.11	1
	Five Hours	111	36.51	2
Days walking ≥ 10 minutes	One Day or nothing	3	0.99	5
	Two Days	15	4.93	4
	Three Days	58	19.08	3
	Four Days	134	44.08	1
	Five Days	94	30.92	2
Time spent walking	One Hour or less	5	1.64	5
	Two Hours	21	6.91	4
	Three Hours	71	23.36	3
	Four Hours	117	38.49	1
	Five Hours	90	29.61	2
Days spent sitting (non-weekend)	One Day or nothing	34	11.18	5
	Two Days	114	37.5	1
	Three Days	69	22.7	2
	Four Days	50	16.45	3
	Five Days	37	12.17	4

Most participants engaged in PA predominantly four days per week, with the highest duration being around four hours for both high- and moderate-intensity activities as well as walking. High-intensity activity was reported by 43% of participants for four days, while moderate-intensity activity and walking showed similar patterns. In contrast, non-weekend sitting was less frequent, with the

largest group sitting only two days per week (37.5%). Overall, the data indicate that the sample maintains a moderate to high level of PA throughout the week.

Table 3 shows participants' perceptions of their QoL based on their responses to 26 items, each rated for satisfaction or experience level. The results are ranked according to the mean scores, with higher means indicating greater satisfaction

Table 3. Participants' responses on QoL items ranked by mean scores

#	Items	Mean*	SD	Quality-of-Life	Rank
25	How satisfied are you with your mood and your travels?	4.15	0.85	Very Good	1
6	How do you feel that there is meaning in your life?	4.14	0.75	Very Good	2
13	Are you adequate to satisfy your needs?	4.13	0.86	Very Good	3
15	Are you accepting of your physical structure?	4.13	0.89	Very Good	4
22	How satisfied are you with the social support provided by your friends?	4.10	0.84	Very Good	5
17	How satisfied are you with your daily duties?	4.09	0.85	Very Good	6
14	How much are you able to move around here and there?	4.08	0.80	Very Good	7
19	How satisfied are you with yourself?	4.07	0.86	Very Good	8
5	How much do you enjoy life?	4.05	1.17	Very Good	9
11	To what extent do you rest and relax?	4.05	0.86	Very Good	10
12	What is the availability of the information that you need in your daily life?	4.05	0.86	Very Good	11
16	To what extent are you satisfied with your sleep?	4.05	0.89	Very Good	12
21	How satisfied are you with your sex life?	4.05	0.84	Very Good	13
8	How secure do you feel in life?	4.04	0.83	Very Good	14
20	How satisfied are you with your relationships?	4.03	0.85	Very Good	15
24	How satisfied are you with the health services provided by the community?	4.03	0.88	Very Good	16
9	How much health care is in your natural environment?	4.01	0.87	Very Good	17
18	How satisfied are you with your ability to work?	4.01	0.91	Very Good	18
23	How satisfied are you with your housing or where you live?	3.96	0.90	Very Good	19

7	To what extent can you focus your mind simply?	3.94	1.59	Very Good	20
10	Do you have enough and sufficient effectiveness to carry out the duties of daily life?	3.90	0.96	Very Good	21
3	In your opinion, to what extent can your illness lead to your inability to work?	3.51	1.39	Very Good	22
1	What is your assessment of the QoL?	2.84	1.24	Mid	23
4	To go on with your life, how much care do you need?	2.64	0.80	Mid	24
2	How satisfied are you with your health condition?	2.58	0.85	Mid	25
26	What is the extent of your feelings of sadness, depression, and anxiety?	2.28	0.90	Poor	26
Overall score		3.80	0.57	Very Good	=

Overall, the findings reveal that participants reported a very good overall QoL ($M = 3.80$, $SD = 0.57$). The highest-rated aspects were satisfaction with mood and travel ($M = 4.15$), feeling that life has meaning ($M = 4.14$), and ability to satisfy personal needs ($M = 4.13$)—suggesting a generally positive sense of well-being and self-contentment. Conversely, the lowest-rated items were satisfaction with health condition ($M = 2.58$), need for care to continue daily life ($M = 2.64$), and feelings of sadness, depression, and anxiety ($M = 2.28$), indicating that emotional distress and health limitations were the weakest areas of QoL among participants.

Table 4 presents the means and standard deviations of students' QoL responses across different demographic groups: gender, college, academic level, and residence place. Female students ($M = 3.93$, $SD = 0.50$) reported slightly higher QoL than males ($M = 3.71$, $SD = 0.60$), and Humanities Faculty students ($M = 3.83$, $SD = 0.54$) scored slightly higher than those in the Science Faculty ($M = 3.76$, $SD = 0.61$). By academic level, first-year students had the highest mean score ($M = 4.05$, $SD = 0.57$), while fourth-year students had the lowest ($M = 3.68$, $SD = 0.58$), suggesting a slight decrease in perceived QoL as students advance. Residence had minimal impact, with students inside Al-Riyadh ($M = 3.81$, $SD = 0.56$) scoring slightly higher than those outside ($M = 3.79$, $SD = 0.60$). Overall, differences are small but indicate that gender and academic level may influence students' perception of QoL.

Table 4. Students' quality-of-life scores by gender, college, academic level, and residence place

Variables	Levels	Frequencies	Mean	SD
Gender	Male	172	3.71	.596
	Female	132	3.93	.500
College	Science Faculty	116	3.76	.609
	Humanities Faculty	188	3.83	.538
Academic Level	First Year	68	4.05	.567
	Second Year	81	3.72	.501
	Third Year	84	3.76	.558
	Fourth Year	42	3.68	.577
	More than Four Years	29	3.70	.745
Residence Place	Inside Al-Riyadh	266	3.81	.563
	Outside Al-Riyadh	38	3.79	.596

To test the statistical significance of these differences, a four-way ANOVA test was conducted as shown in Table 5.

Table 5. Students' quality-of-life scores by gender, college, academic level, and residence place

Source of Variance	Sum of Squares	df	Mean Square	F value	p value
Gender	3.754	1	3.754	12.002	.001*
College	.400	1	.400	1.278	.259
Academic Level	8.624	4	2.156	6.888	.006*
Residence Place	.067	1	.067	.214	.644
Error	92.580	296	.313		
Total	4493.895	303			

Note. Significant at ($\alpha \leq 0.05$).

The analysis revealed significant differences by gender ($F = 12.002$, $p = .001$), with females reporting higher quality-of-life scores than males. There were no significant differences based on college ($F = 1.278$, $p = .259$) or residence place ($F = 0.214$, $p = .644$). Academic level showed significant differences ($F = 6.888$, $p = .006$), indicating that students' perceptions of QoL vary across different years of study. To identify which academic levels differed significantly, Scheffe's post-hoc test was conducted, as presented in Table 6.

Table 6. Scheffe's test results for differences in students' quality-of-life scores by academic level

Academic Level	First Year	Second Year	Third Year	Fourth Year	More than Four Years
Means	4.05	3.72	3.76	3.68	3.70
First Year	4.05	0.33*	0.29*	0.37*	0.35*
Second	3.72		0.04	0.04	0.02
Third Year	3.76			0.08	0.06
Fourth	3.68				0.02

Table 6 shows the results of Scheffe's post-hoc test examining differences in quality-of-life scores across academic levels. It indicates that first-year students ($M = 4.05$) reported significantly higher quality-of-life scores compared to second-year ($M = 3.72$), third-year ($M = 3.76$), fourth-year ($M = 3.68$), and students with more than four years ($M = 3.70$), with all differences being statistically significant ($p \leq 0.05$). This confirms that the observed differences in quality-of-life scores by academic level are primarily due to higher perceptions of QoL among first-year students. In the following, Table 7 shows the Pearson correlation between students' quality-of-life scores and PA survey responses.

Table 7. Pearson correlation between students' quality-of-life scores and PA survey responses

PA Questions	Pearson Correlation Coefficients	p value
Days of high-intensity PA	.767**	.001*
Time spent doing vigorous activity	.632**	.001*
Days of moderate-intensity PA	.767**	.001*
Time spent in moderate-intensity activity	.717**	.001*
Days walking ≥ 10 minutes	.633**	.001*
Time spent walking	.589**	.001*
Days spent sitting (non-weekend)	.549**	.001*

All correlations were positive and statistically significant ($p \leq 0.05$), ranging from $r = 0.549$ to $r = 0.767$, indicating that higher levels of PA are strongly associated with higher perceived QoL. This suggests that students who engage more frequently in PA tend to report better overall QoL.

4. DISCUSSION

The results showed that the majority of participants were physically active four days a week, and the longest length of walking and high- and moderate-intensity activities was approximately four hours. For four days, 43% of individuals reported engaging in high-intensity activity, although walking and moderate-intensity activity displayed comparable trends. Conversely, the majority of the sample only sat twice a week (37.5%), indicating a lower frequency of non-weekend sitting. Overall, the statistics show that the sample stays physically active throughout the week at a moderate to high level.

Regarding students' QoL, the results showed that participants' overall QoL was quite good ($M = 3.80$, $SD = 0.57$). A generally favourable sense of well-being and self-contentment was suggested by the highest ratings for the following aspects: feeling that life has significance ($M = 4.14$), ability to satisfy personal requirements ($M = 4.13$), and satisfaction with mood and travel ($M = 4.15$). On the other hand, participants' weakest areas of QoL were emotional distress and health limitations, as evidenced by the lowest-rated items of satisfaction with health condition ($M = 2.58$), need for care to continue daily life ($M = 2.64$), and feelings of sadness, depression, and anxiety ($M = 2.28$). In general, the QoL is high among the sample members in the psychological, social, and health fields that are expressed in the summary QoL scale of the World Health Organization. This may be due to the study sample members enjoying a kind of distinguished social and living well-being, as they are students at a private university and from the rich strata of society with a comfortable standard of living. In addition, the university provides students with student and sports activities that enhance their positive feelings and thoughts, which made them realize their QoL. These activities also allow them to strengthen social relationships, and those that support curiosity, independence, and creativity, in addition to that, this is reflected in their daily health, and their reduced feelings of sadness and anxiety. There is also a quality in social life through the positive social atmosphere among students and the establishment of relationships, friendships, and social bonds within the university campus.

The results also showed there are statistically significant differences between the averages of the student's responses to the quality-of-life questionnaire, according to their sex, in favor of females ($p < 0.05$). We can encourage them in sports activities, as well as participating in the various

university teams, and representing the university in the union championships for universities, and within the university. Saudi Arabia-undoubtedly reflects positively on the quality of psychological, social, health and other QoL. This result differs from Abu Hammad's study (2019), which examined gender differences in psychological QoL and happiness. The difference may be due to variations in the university environment, as Abu Hammad studied private university students. That study found high levels of psychological QoL and happiness with no significant gender differences. In the current study, there were no significant differences in quality-of-life scores based on college or place of residence ($p > 0.05$). However, significant differences were found according to academic level, favoring first-year students ($p < 0.05$), this may be because first-year students engage in preparatory courses that include various activities, such as sports, whereas advanced students face greater academic pressure and fewer opportunities for extracurricular activities.

The study also showed a significant positive correlation between students' PA levels and their quality-of-life scores across all fields of study ($p < 0.05$). This may be attributed to the physiological and psychological benefits of regular PA, including increased strength, agility, flexibility, improved blood flow, enhanced heart and lung efficiency, and stronger immunity. PA also stimulates the release of hormones that improve mood, reduce stress, anxiety, and depression, and enhance sleep quality. These findings align with previous studies: Abu al-Tayeb (2019) found that swimmers had higher QoL and psychosocial adjustment than non-swimmers; Anokey et al. (2012) reported a positive relationship between PA and health-related QoL; Houston et al. (2016) found athletes scored higher on quality-of-life measures than non-athletes; Kokandi et al. (2019) reported a strong correlation between IPAQ and WHOQOL across all study domains; and Puciato et al. (2017) observed that higher levels of intense PA were associated with better overall QoL, including psychological, social, environmental, and health domains.

5. CONCLUSIONS

PA is an essential aspect of maintaining good health and well-being, and it is positively associated with QoL. The study showed that university students were generally physically active throughout the week, and their overall QoL was high, especially in areas such as life meaning, personal needs, and mood. QoL was higher among females and first-year students, while no differences were found based on college or residence. PA was positively associated with QoL, likely due to its physical and psychological benefits. The type and intensity of PA, social support, motivation, and self-efficacy are important factors that may influence this relationship. Therefore, it

is crucial to continue researching this relationship and identifying effective strategies to promote PA and improve QoL, as physical inactivity is a major global health concern.

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AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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