

ORIGINAL ARTICLE

Health-Related Quality of Life among Medical Students and Its Associated Factors: A Cross-Sectional Study

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ABSTRACT

Objective: To assess the health-related quality of life (HRQOL) and its associated factors among medical students residing in Faisalabad, Pakistan.

Methods: This cross-sectional study was conducted at Aziz Fatimah Medical and Dental College, Faisalabad, Pakistan from July 2023 to December 2023. All medical students aged 18 years and above were included. HRQOL was assessed using the 36-Item Short Form Survey (SF-36), covering eight domains: Physical Functioning, Role Limitations due to Physical Health, Role Limitations due to Emotional Problems, Vitality, Mental Health, Social Functioning, Bodily Pain, and General Health Perception. Each domain was scored from 0 (low) to 100 (high). Physical and Mental Component Summary scores were also calculated.

Results: Of total 300 students, SF-36 domains showed higher mean scores in Bodily Pain and Physical Functioning i.e., 66.6 ± 24.9 and 61.6 ± 29.1 . Males reported significantly higher mean scores in General Health Perception (p-value < 0.001) and Vitality (p-value 0.013), while females had significantly higher Physical Functioning scores (p-value < 0.005). Students > 21 years had significantly higher mean scores in Physical Functioning (p-value 0.017). Furthermore, day scholars showed significantly better mean scores in Physical Functioning (p-value < 0.001), Bodily Pain (p-value 0.020), Social Functioning (p-value 0.030), and Physical Component Summary (p-value < 0.001) than hostelites. Students who exercised (p-value 0.020), had strong family relationships (p-value 0.003), and faced no distressing family events (p-value < 0.001) reported significantly higher SF-36 scores.

Conclusion: Overall, SF-36 domains showed higher mean scores in Bodily Pain and Physical Functioning, with significant differences in HRQOL based on age, gender, residence, and lifestyle factors among medical students.

Keywords: Health Status, Medical, Mental Health, Quality of Life, Students.

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INTRODUCTION

Health-related quality of life (HRQOL) is the measure of an individual's perceived physical and mental health across time, with an emphasis on how these elements are impacted by a medical condition, therapy, or general state of health.¹ It is a complex concept that often includes the following components. The ability to perform physical tasks and daily activities, ranging from easy self-care to more complex ones, is known as physical functioning (PF); mental and emotional well-being (MH & RE) refers to an individual's psychological state, encompassing their mood, stress levels, anxiety, and depression; Role functioning (RP) is the ability to perform tasks at work, school, or in the family; general health perceptions (GH) is an individual's overall

assessment of their health, which may include things like discomfort, energy levels, and general well-being. Social functioning (SF) is the capacity to interact with people, maintain and enjoy social relationships, and carry out social roles.²

Students entering the medical industry must be prepared to commit a substantial amount of their time, energy, and cognitive faculties to their studies due to the demanding nature of the field. This academic path may be intellectually interesting, but it also often entails severe pressures that could negatively impact medical students' HRQOL.³ A person's overall degree of life satisfaction and perceived health are represented by the complex phrase HRQOL.⁴ It encompasses mental, bodily, and social well-being. However, the demanding nature of medical school frequently puts students at

risk for a lower HRQOL, necessitating a deeper understanding of the factors influencing their health.⁴

One of the key factors affecting HRQOL is physical exercise. It helps with reducing stress, improving mood, and enhancing cognitive function—all of which are necessary to maintain a high HRQOL. While it may be challenging for medical students to integrate regular exercise into their busy schedules, it is crucial for minimizing the negative effects of fatigue and stress. The level of satisfaction with family life is still another crucial factor.⁵

Family support is often the primary source of emotional and financial stability for kids. Strong familial ties provide stability and comfort, which may mitigate the consequences of academic stress.⁶ Poor family dynamics, on the other hand, might worsen HRQOL and lead to more stress. If medical students feel that their families understand and support them, they are more likely to maintain their positive attitude and cope with the demands of medical school.⁶ Social ties are necessary to offer emotional support, reduce feelings of loneliness, and foster a sense of belonging. Medical students who have strong, supportive peer relationships are better equipped to handle the demands of medical school.⁷ Medical students need to understand that they will likely come into a variety of stressful situations during their academic careers. How they respond to these events can have a significant impact on their overall quality of life.⁸

The study involving medical students from Brazil has identified several key factors that influence their quality of life.⁹ The most important are social relationships, physical activity, mental health (including anxiety and depression), and sleep quality. Students who regularly exercise and sleep better report high quality of life scores.^{9,10}

The main aim of the research is to fully evaluate the HRQOL and to identify key factors that can influence this important outcome. The research results will help policymakers, education managers, and health program planners develop evidence-based targeted interventions. These interventions can reduce the harmful effects of stress, promote healthy participation and family relationships, and promote a balanced lifestyle for medical students. Ultimately, a deeper understanding of these factors will allow the development of complex wellness programs that go beyond academic students, physicians, and medical students, focusing on mental and emotional health. These programs are needed to nurture a flexible and emotionally healthy workforce that meets the growing needs of the health sector.

METHODS

This cross-sectional study was conducted at Aziz Fatimah Medical and Dental College, Faisalabad, Pakistan from July 2023 to Dec 2023. Ethical approval was obtained from the Institutional Review Board of Aziz Fatimah Medical and Dental College (IEC/245-2). Informed written consent was also obtained from all participants.

By using Epitools sample size calculator taking standard deviation (SD) of male students RE score 43.5,⁴ level of confidence 95%, and 5% margin of error, the estimated sample size was 291. However, we enrolled 300 medical students. Medical students aged 18 years and older, enrolled in the MBBS program at the university, were included in the study. Students with chronic illnesses, disabilities affecting quality of life, or those not willing to participate in the study were excluded in the study. The primary outcome was HRQOL, assessed using the 36-Item Short Form Survey (SF-36). It is a validated 36-item questionnaire developed in the Medical Outcomes Study (MOS) to measure HRQOL.⁴ The SF-36 evaluates quality of life across eight domains: PF, RP, RE, Vitality (VT), MH, SF, Bodily Pain (BP), and GH. Each domain is scored on a scale from 0 to 100, where higher scores indicate better quality of life.

Physical Component Summary (PCS) also calculated, which depicts physical quality of life by averaging the scores of PF, RP, BP, and GH, and the Mental Component Summary (MCS), representing mental quality of life by determining the average of SF, RE, MH, and VT. The scoring process involved two steps: first, each response is translated into a pre-coded numeric value, yielding a raw score ranging from 0 to 100-0 representing a very low quality of life and 100 indicating a very positive response. In the second step, the scores for each domain are calculated by summing the item scores related to that domain and dividing by the number of items. Data collection was performed using a non-probability convenience sampling technique through structured questionnaires administered during class sessions or via online platforms. Demographic data, including age, gender, year of study, residential status (hostelite or day scholar), and lifestyle habits of the participants were also collected.

Statistical Package for Social Sciences (SPSS) version 24 was used for the purpose of statistical analysis. Mean and SD was calculated for SF-36 score and its domain. Frequency and percentages were calculated for qualitative variables such as age categories, gender, year of students, residence, and lifestyle habits. Independent t-test and One-Way ANOVA test applied to

compare SF-36 domain and overall SF-36 score with demographic characteristics and lifestyle habits of students. The p-value of ≤ 0.05 was considered statistically significant.

RESULTS

Of total 300 medical students, 134 (44.7%) were males and 166 (55.3%) were females. There were 116 (38.7%) students aged 21 years or younger, while 184 (61.3%) students were over 21 years old. Most of the students were 4th-year MBBS students 75 (25.0%), followed by 1st year students 59 (19.7%), 2nd year students 57 (19.0%), 3rd year students 57 (19.0%), and 5th year students 52 (17.3%). The majority of students were day scholars 225 (75.0%), exercised 1 to 2 times per week 119 (39.7%), felt little exhausted after exercising 93 (31.0%), satisfied with their family 103 (34.3%), had distressing family events in the last year 157 (52.3%), and had good relationship with their roommates and friends 145 (48.3%).

SF-36 domains showed higher mean scores in BP 66.6 \pm 24.9, and PF 61.6 \pm 29.1, followed by SF 57.3 \pm 23.3, GH 55.4 \pm 18.1 and PCS 58.1 \pm 18.6. Lower mean scores were observed in RE 45.8 \pm 41.0 and RP 48.7 \pm 37.3. The mean comparison of SF-36 domains between male and female medical students showed that males reported significantly higher mean scores in GH and VT compared to females i.e., 59.4 \pm 17.4 vs. 52.1 \pm 18.1 (p-value < 0.001) and 51.3 \pm 13.0 vs. 47.4 \pm 13.6 (p-value 0.013). While, females reported

significantly higher mean scores in PF compared to males i.e., 65.7 \pm 26.6 vs. 56.4 \pm 31.3 (p-value < 0.005) (Table 1).

Students older than 21 years had significantly higher PF mean scores 64.7 \pm 29.4 compared to those aged 21 years or younger 56.5 \pm 28.0 (p-value 0.017). Furthermore, day scholars reported significantly better mean scores in PF (p-value <0.001), BP (p-value 0.020), SF (p-value 0.030), and PCS (p-value <0.001) compared to hostelites (Table 2).

A significantly higher mean score of SF-36 was found with students who exercised more than four times per week (p-value 0.020), felt little exhausted after exercising (p-value <0.001), very satisfied with their family (p-value 0.003), had no distressing family events in the last year (p-value <0.001), and had very good relationship with their roommates and friends (p-value 0.002) (Table 3).

DISCUSSION

This study provides valuable insights into the HRQOL of medical students, highlighting significant differences based on gender, age, and living conditions. A notable gender distribution was observed, with females representing more than half of the participants. In this study, gender differences revealed that females scored higher in PF and SF, while males scored higher across the remaining six domains of HRQOL, with significant associations in the PF and VT scores. A study conducted

Table 1: Mean comparison of SF-36 domains between male and female medical students (n= 300)

Domains	Total Mean \pm SD	Gender		p-value
		Male (n= 134) Mean \pm SD	Female (n= 166) Mean \pm SD	
Physical Functioning	61.6 \pm 29.1	56.4 \pm 31.3	65.7 \pm 26.6	0.005*
Role Limitations due to Physical Health	48.7 \pm 37.3	49.4 \pm 37.4	48.1 \pm 37.2	0.770
Bodily Pain	66.6 \pm 24.9	69.0 \pm 24.1	64.8 \pm 25.5	0.140
General Health Perception	55.4 \pm 18.1	59.4 \pm 17.4	52.1 \pm 18.1	<0.001*
Role Limitations due to Emotional Problems	45.8 \pm 41.0	46.5 \pm 40.6	45.3 \pm 41.3	0.810
Vitality	49.2 \pm 13.4	51.3 \pm 13.0	47.4 \pm 13.6	0.013*
General Mental Health	53.0 \pm 16.3	54.8 \pm 16.8	51.6 \pm 15.8	0.080
Social Functioning	57.3 \pm 23.3	53.6 \pm 22.5	60.0 \pm 23.6	0.130
Physical Component Summary	58.1 \pm 18.6	58.5 \pm 18.9	57.7 \pm 18.5	0.710
Mental Component Summary	51.3 \pm 17.8	49.2 \pm 15.8	53.6 \pm 17.6	0.160

- SF-36: 36-Item Short Form Survey

*p-value ≤ 0.05 (Independent sample t-test)

Table 2: Mean comparison of SF-36 domains with respect to age and residence of medical students (n= 300)

Domains	Age		p-value	Residence		p-value
	≤ 21 years (n= 116) Mean ±SD	> 21 years (n= 184) Mean ±SD		Hostelite (n= 75) Mean ± SD	Day scholar (n= 225) Mean ± SD	
Physical Functioning	56.5 ±28.0	64.7 ±29.4	0.017*	49.3 ±28.6	65.6 ±28.2	<0.001*
Role Limitations due to Physical Health	48.9 ±34.9	48.6 ±38.8	0.950	43.0 ±37.5	50.6 ±37.1	0.120
Bodily Pain	67.2 ±23.1	66.3 ±26.1	0.770	61.1 ±26.4	68.5 ±24.2	0.020*
General Health Perception	55.0 ±16.2	55.6 ±19.3	0.760	52.4 ±18.7	56.4 ±17.8	0.090
Role Limitations due to Emotional Problems	42.5 ±39.9	48.0 ±41.6	0.260	42.6 ±42.2	46.96 ±40.6	0.430
Vitality	50.1 ±13.0	48.6 ±13.7	0.340	50.4 ±12.0	48.8 ±13.9	0.370
General Mental Health	52.4 ±15.3	53.4 ±16.9	0.620	50.4 ±17.1	53.9 ±16.0	0.999
Social Functioning	56.7 ±22.6	57.7 ±23.8	0.730	52.5 ±20.8	59.0 ±23.9	0.030*
Physical Component Summary	56.9 ±16.0	58.8 ±20.2	0.380	51.4 ±19.5	60.3 ±17.8	<0.001*
Mental Component Summary	50.4 ±16.3	51.9 ±18.7	0.480	48.9 ±18.0	52.1 ±17.7	0.180

-SF-36: 36-Item Short Form Survey

*p-value ≤ 0.05 (Independent sample t-test)

by Backhaus *et al.* reported that male participants consistently scored higher in physical health domains compared to their female counterparts.¹² In contrast, our study found that females outperformed males in PF, which suggests that while females may experience lower vitality, they maintain a higher level of physical functioning. This discrepancy could be attributed to different coping mechanisms among genders, where females may engage in more adaptive behaviors when facing health-related challenges.

In terms of age, students older than 21 years exhibited significantly higher scores in PF compared to their younger peers. This finding is consistent with the research of Al Wahaibi *et al.* which suggested that older students tend to have more experience managing stressors and maintaining their physical health, possibly due to enhanced life skills and better understanding of health practices.¹³ The increased responsibilities associated with being older students may also motivate them to prioritize their health more effectively, leading to better HRQOL outcomes.

Residential status also played a critical role in the results, with day scholars demonstrating superior mean scores across multiple domains, including PF, BP, SF, and PCS compared to hostelites. This is consistent with previous research suggesting that students living at home often experience less stress related to accommo-

dation issues and may have better support systems in place.¹⁴ Students living with family reported better mental and physical health outcomes, potentially due to the emotional and logistical support they receive at home.^{14,15} Interestingly, this study found that students who engaged in physical activity more than four times per week reported significantly higher HRQOL scores. This finding aligns with previous literature emphasizing the positive impact of regular physical exercise on mental and physical well-being.¹⁶⁻¹⁸ Research conducted by Medhi *et al.* also indicated that increased frequency of physical activity correlates with better scores in various HRQOL domains.¹⁹ Moreover, students who expressed satisfaction with their family relationships and those who had not experienced distressing family events over the past year reported better HRQOL. This supports existing evidence that highlights the importance of social support and stable family environments in enhancing students' HRQOL, as indicated in a study by Moirangthem *et al.*²⁰ One limitation of this study is its cross-sectional design, which limits the ability to establish causal relationships between the identified factors and HRQOL. Additionally, reliance on self-reported data may introduce biases, as students might have subjective perceptions of their quality of life. The focus on a single institution may also restrict the generalizability of the findings to a

Table 3: Mean comparison between SF-36 scores and participants' lifestyle habits (n= 300)

Variables	Total	SF-36 score Mean \pm SD	p-value
Exercise (frequency per week)			
Never	90	50.7 \pm 16.8	0.020 ^{^*}
1-2	119	55.3 \pm 15.3	
3-4	35	55.5 \pm 15.0	
> 4	56	59.3 \pm 18.0	
Post-Exercise Status			
Pleasant	78	57.2 \pm 16.7	< 0.001 ^{^*}
No Change	80	52.0 \pm 15.2	
A Little Exhausted	93	59.2 \pm 15.7	
Exhausted	49	46.6 \pm 15.9	
Satisfaction with your Family			
Very Satisfied	100	59.5 \pm 17.3	0.003 ^{^*}
Satisfied	103	53.4 \pm 16.4	
Neutral	81	51.9 \pm 14.2	
Dissatisfied	12	48.4 \pm 12.4	
Very Dissatisfied	04	42.1 \pm 23.1	
Distressing Family Events in the Last Year			
Yes	157	50.9 \pm 15.1	< 0.001 ^{^*}
No	143	58.9 \pm 16.9	
Relationship with Roommate and Friends			
Very good	72	58.2 \pm 16.9	0.002 ^{^*}
Good	145	56.0 \pm 17.0	
General	75	50.3 \pm 13.3	
Bad or Very Bad	8	41.6 \pm 15.9	

- SF-36: 36-Item Short Form Survey, *p-value \leq 0.05 (~Independent t-test and ^One-Way ANOVA test)

broader population. However, the study presents several strengths that enhance its significance, including the use of the validated tool SF-36, which allows for a comprehensive assessment of HRQOL across multiple domains. The diverse participant pool, consisting of medical students from various academic years, further strengthens the findings. For future research, a longitudinal approach is recommended to track changes in HRQOL over time among medical students. Exploring the effects of specific interventions aimed at improving physical and mental well-being, such as structured physical activity programs and stress management techniques, could provide valuable insights. Additionally, investigating the role of social support networks and coping strategies on HRQOL would contribute to a better understanding of how to enhance student health outcomes and promote a supportive academic environment.

CONCLUSION

The study revealed significant differences in the

HRQOL of medical students based on gender, age, residence, and lifestyle factors. Overall, the SF-36 domains showed higher mean scores in BP and PF. Notably, males had significantly higher score in GH and VT, while females performed better in PF. Students over 21 years old showed better PF compared to younger students. Day scholars reported superior scores in PF, BP, and SF compared to hostelites. Moreover, students who exercised regularly, had strong family relationships, and did not experience distressing events had better overall health outcomes. These findings underscore the significant impact of students' habits and social factors on their overall well-being.

ETHICAL APPROVAL: This study was approved by the Institutional Ethical Committee of Aziz Fatimah Medical & Dental College, Faisalabad (Reference No: IEC/245-23, dated: 14.06.2023).

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Literature search, drafting & revision. ZK & LS: Data collection & writing of manuscript. AS: Data collection & literature search. MT: Writing of manuscript & revision. All authors approved the final version of the manuscript.

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