

Comparison of Quality of Life of Medical Students in Annual and Modular System in Public Sector Medical Colleges in Karachi, Pakistan

Ayema Haque,¹ Sobia Mansoor,¹ Farheen Malik,¹ Jawad Ahmed,¹ Zeba Haque.²

Abstract

Background: Curriculum structure in medical education in Pakistan includes an annual system which is based on subject wise learning and clinical rotations, and a modular system, with the basic and clinical sciences taught cohesively. The effect of curriculum designs on the quality of life (QoL) of medical students has not been assessed in Pakistan. We aim to compare these two curricula structures focused on QoL. **Methods:** Cross-sectional study of medical students from three different medical schools in Karachi, Pakistan, and comparing QoL based on their curricula. QoL was measured using the WHOQOL-BREF questionnaire. Random sampling method was used to select students from each year (1st to 5th year) from each institution. Kruskal Wallis test and Mann-Whitney U test were used to compare scores among different years of medical training and between curricular systems. **Results:** Response rate was 85%. Out of 404 participants, 81.3% were females, and the average age was 21±1 years. According to the year of study, significant differences were observed in physical health and overall QoL domain, with 3rd-year students having the highest scores. Overall QoL of students in clinical years was found to be significantly higher than those in preclinical years. The modular system was found to have a better but not significantly higher QoL when compared to the annual system (mean 83.34±11.41 vs. 82.32±10.27, respectively). **Conclusion:** Overall QoL in the modular system was slightly higher than the annual system, but a significant difference was noted only in the environmental domain. QoL of students in clinical years was higher than in preclinical years.

Key Words: WHOQOL-BREF; Medical Students; Quality of Life (Source: MeSH-NLM).

Introduction

The journey through medical school is a stressful period for students. Physical health and psychological equilibrium are compromised right from the beginning of medical school.¹ The quality of life (QoL) of health care providers has been a focus of concern in recent years, and a thorough understanding of the overall effects of various variables on their QoL is crucial.

Students pursuing medicine come across significantly higher stress and depression when compared to other bachelor's degrees.^{2,3} Medical students are usually subjected to high amount of workload, and financial and professional stressors during their course of study.^{2,3} Thus, exploration of medical students' (QoL) has become an essential study area. QoL, as defined by World Health Organization (WHO), is "an individual's perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns".⁴ Initially, the WHO developed a standardized questionnaire called WHOQOL-100 and later the WHOQOL-BREF- a shortened version to evaluate the QoL across different domains including physical, psychological, social, and environmental factors- was formulated.⁵

Multiple studies have evaluated the QoL of medical students using WHOQOL-BREF, owing to increasing concern towards the QoL of medical students around the globe.^{6,7} A vast number of factors, including academic courses, contact with diseases and death, assessment procedures, hectic schedules, and tedious classes, affect the QoL of medical students. The amalgam of all these aspects predisposes students to different ailments like stress, depression, anxiety, burnout, and suicidal ideation.^{3,6,8,9}

Different medical curricula trends are observed in various universities of Pakistan, which include modular and annual systems. The annual system is regarded as the oldest but foundational trends of teaching, with its curriculum based on subject-wise learning and clinical rotations accordingly. According to its curriculum, the first two years are based on basic medical subjects including Anatomy (Histology and Embryology), Biochemistry, and Physiology. The third and fourth years are based on learning of Pathology, Microbiology, and Pharmacology, whereas final year students are taught Medicine, Surgery, Obstetrics and Gynecology, and Pediatrics. The modular system has a different approach with innumerable horizontal and vertical integration. It is divided into ten semesters. This modular

¹ MBBS, Dow Medical College, Karachi, Pakistan.

² Professor of Biochemistry, Dow University of Health sciences, Karachi, Pakistan.

About the Author: Ayema is a 2021 graduate from Dow Medical College, Karachi, Pakistan. She has completed USMLE step 1 with a score of 250. She has 5 PubMed indexed published articles and 3 non PubMed articles.

Correspondence:

Ayema Haque

Address: Dow Medical College, Mission Rd, New Labour Colony Nanakwara, Karachi, Pakistan

Email: ayema.haque@gmail.com

Editor: Francisco J. Bonilla-Escobar

Student Editors: Rahul Abraham & Andrew Thomas

Copyeditor: Sebastian Diebel

Proofreader: Adnan Mujanovic

Layout Editor: Sajjad Ali

Submission: Feb 5, 2021

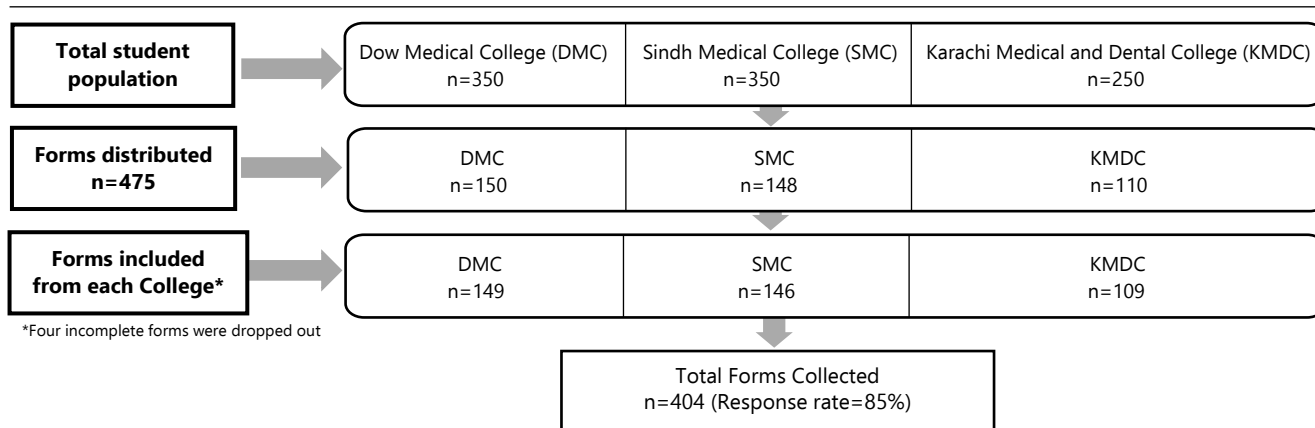
Revisions: Sep 1, 2021; Feb 13, 2022

Responses: Oct 8, 2021; Feb 16, 2022

Acceptance: Apr 27, 2022

Publication: Apr 28, 2022

Process: Peer-reviewed

Figure 1. Flowchart Showing Distribution of Surveys and Responses from Students in Three Different Colleges in Karachi, Pakistan.

system consists of several sub-modules that are based on organ systems, with the integration of basic and clinical sciences. With the recent changes in the education system and many medical universities riveting back to its traditional teaching methods, the impacts of these different teaching systems on students' need to be addressed now more than ever before.

This primary aim of this study was conducted to measure and compare the quality of life of medical students undertaking a bachelor's degree in medicine and surgery (MBBS) in modular or annual (non-modular) systems. Secondly, we aimed to assess the variations in QoL of students from first to final year in the aforementioned systems. The results of the study can assist us in endorsing the well-being of medical students, which will ultimately benefit the profession as well as patient care.

Methods

A questionnaire-based cross-sectional study was conducted from October 2019 to March 2020 at Dow Medical College (DMC), Sindh Medical College (SMC), and Karachi Medical and Dental College (KM&DC) associated with public sector Universities of Karachi. DMC¹⁰ and SMC¹¹ follow a modular system, whereas KM&DC observes an annual (non-modular) system.¹² Ethical approval was obtained from the Institutional Review Board of Dow University of Health Sciences (IRB-1368) and individual permission was obtained from SMC and KM&DC.

The sample size was calculated by using online OpenEpi sample size calculator. Keeping 80% as power and 95 as alpha level. Assuming risk/prevalence ratio as 3 for a cross sectional study, the sample size was calculated to be a total of 284 responses based on a similar study.¹³ The sample size was inflated to 400 to accommodate the dropouts and incomplete data.

A total of 350 students are enrolled in each batch of DMC and SMC per year while 250 students are admitted to KMDC every year. Through random sampling method 30 students from each year (1st to 5th year) in DMC and SMC, while 20 students each year from KMDC were selected and were asked to fill the questionnaire

after verbal and written consent. The forms were distributed and collected by the principal and co-principal investigators. The data collected from each college and batch is given in [Figure 1](#). The non-response rate was approximately 15%.

Any undergraduate medical student enrolled at DMC, SMC, or KMDC who consented to respond voluntarily was included.

Study tool comprised of two parts, a demographic part and a WHOQOL-BREF part. The demographics part consisted of age, gender, medical school name, and year of study. WHOQOL-BREF questionnaire was used as a data collecting instrument to analyze the QoL of life of medical students.^{6,7} Permission to use this questionnaire was obtained from the WHO. It consisted of 26 items and measured general QoL as well as QoL in four physical domains, namely, physical health, psychological health, social relationships, and environment. The options for each question were scored from 1 (very dissatisfied/very poor) to 5 (very satisfied/very good). A separate question assessed an individual's perception of their overall health.

The questionnaires were distributed to the students after explaining the study. Informed consent was obtained from all the participants and confidentiality was ensured. Twenty minutes were given to the volunteers to fill up the form in front of the principal investigator so as to limit the chance of consultation with friends and colleagues.

A total of 404 forms were complete and were included in the analysis. WHOQOL-BREF manual guidelines were used to calculate the scores in each domain. The domain score was calculated using the mean score of items within each domain. Using the below-mentioned formula, scores were converted to a 100-scale. The closer the score to 100 the better the QoL. $\text{Converted score} = (\text{Score} - 4) \times (100/16)$.

SPSS v.20 was used to analyze all the data. Kruskal Wallis test was used to compare scores among different years of study and the Mann-Whitney U test was used to compare scores between different curricular systems. A p-value <0.05 was considered to

be statistically significant. Basic variables were analyzed using descriptive methods. Mean with standard deviation was computed to present the QoL scores. The Cronbach's alpha coefficient was computed to assess the reliability of responses of the WHOQoL data. The overall Cronbach's alpha coefficient was 0.778.

Results

A total of 404 students were included in the study. Out of these, most were female, comprising 81.3%. The mean age of the sample was 21.23 ± 1.29 years ranging from 18 to 26 years.

The responses of the QoL were defined in four domains that are physical, psychological, social, and environmental and were then tabulated according to the academic years as well as the educational system.

Overall QoL score was highest among the third-year and lowest among the fourth-year medical students (*Figure 2A*). The overall QoL scores according to first, second, third, fourth, and fifth years are 81.55 ± 9.70 , 81.60 ± 9.49 , 85.50 ± 11.06 , 80.79 ± 9.35 , 82.36 ± 10.72 , respectively. The physical domain scores according to first, second, third, fourth, and fifth years are 13.29 ± 1.09 , 13.96 ± 2.17 , 14.59 ± 3.31 , 13.73 ± 3.23 , 13.75 ± 3.04 respectively. Significant differences were observed in the physical health domain (p -value=0.030) and overall QoL domain (p -value=0.031) according to different years of study. However, no statistically significant difference was noted in the psychological, social relationships, and environmental domains. Third-year students had the highest overall score in each domain. Although statistically non-significant, a consistent lesser score of fourth-year students was found in almost all domains of QoL (*Figure 2B*).

Comparing between annual and modular systems shows that a significant difference ($p=0.028$) was found only in the environmental domain with a mean of 13.84 ± 4.31 in modular compared to a mean of 14.32 ± 3.69 in annual system. There were no marked differences in the other domains (*Figure 3*). The modular system was found to have a better but not statistically significant QoL, with a mean score of 83.34 ± 11.41 , whereas the annual system had a mean score of 82.32 ± 10.27 .

Table 1 compares different domains of QoL among preclinical and clinical year students. A significant difference was noted in the physical health ($p < 0.05$) and environment ($p < 0.05$) domains of clinical and preclinical groups of medical students with a better score found in the clinical years. The overall QoL of students in clinical years was also found to be significantly better than the students in preclinical years ($p < 0.05$).

Discussion

Medical students are expected to become proficient in the art of integrating textbook knowledge with clinical skills. Overburdened with academic responsibilities leaves no time to spare for personal well-being. Although several studies have been conducted to measure the QoL in medical students,¹³ none have

been done to compare QoL in different educational systems observed in medical colleges across Pakistan.

Our study found WHOQOL-BREF reliable in accessing the QoL of Pakistani medical students studying in modular as well as the annual system. Cronbach's alpha coefficient was comparable to that found in other studies done in Thailand and Iran.^{6,14} Medical schools in Pakistan either follow the modular or annual educational system. Both the systems vary considerably in clinical hours, teaching techniques, and subjects taught each year. The modular system focuses on an approach that integrates the pathophysiology, pharmacology as well as the management of diseases regarding different organ systems. Thus, students study many subjects at the same time.

The year of study was a significant indicator of overall QoL ($p < 0.05$). This was consistent with studies carried out in Asia where the year of study was determined as an important indicator of QoL ($p < 0.05$).^{13,15} Zhang et al in their study concluded that the scores of different academic years were significantly different in the psychological health and social relations domains ($p < 0.05$). Aforementioned study also showed that the scores of different specialties had significant differences in psychological health and social relations domains ($p < 0.05$). Students from clinical medicine had the highest scores.¹³

The QoL of students in third year was the highest. Final year students had the second-highest score in QoL after third-year students (*Figure 2*). We found that third-year medical students had the highest scores in all domains (*Figure 3*), which was opposite to study done in Brazil and China where students of the third year had the lowest QoL.^{13,16,17} Zhang Y et al. reasoned the low QoL of third-year Chinese medical students with the presumption that the start of clinical years brought with itself the feeling of inadequate knowledge and skills to interact with patients, especially the terminally ill.¹³

Our contrary findings may be attributed to the fact that in our educational system, the first two years of medical school revolve in gaining knowledge through books with meager clinical exposure.

Table 1. QoL Among Clinical and Preclinical Students in DMC, SMC and KMDC.

Domains	Type		p-value
	Preclinical Mean (SD)	Clinical Mean (SD)	
Physical health	13.81 (2.13)	14.29 (2.51)	0.027
Psychological	13.30 (2.55)	13.58 (2.84)	0.200
Social relationships	13.20 (2.87)	13.53 (3.07)	0.280
Environment	13.89 (2.10)	14.33 (2.66)	0.066
Overall QoL	81.59 (10.50)	84.04 (13.37)	0.025

Legend: SD: Standard deviation.

Figure 2. Quality of Life of Medical Students: (A) Overall Scores in Different Years; (B) Comparison of Different Domains in Each Year.

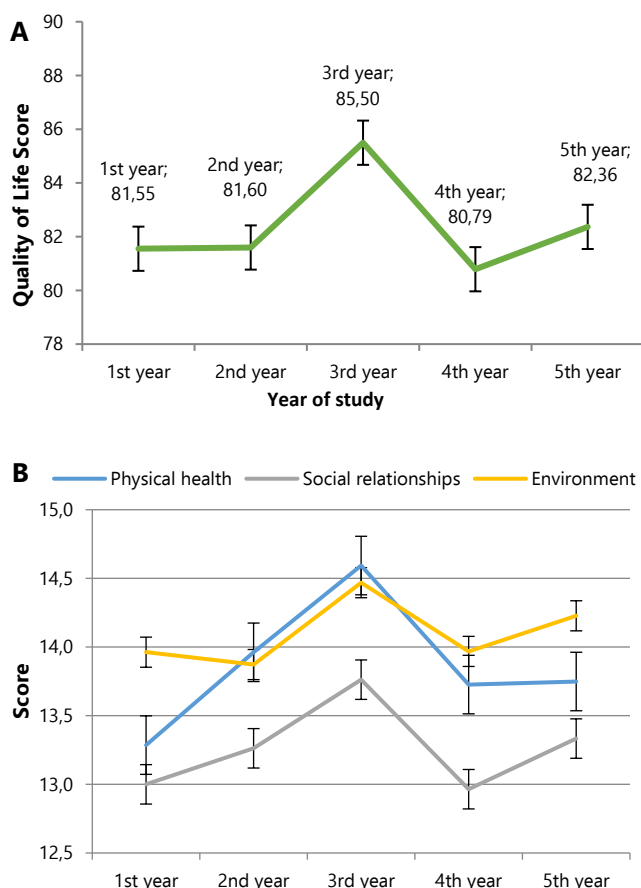
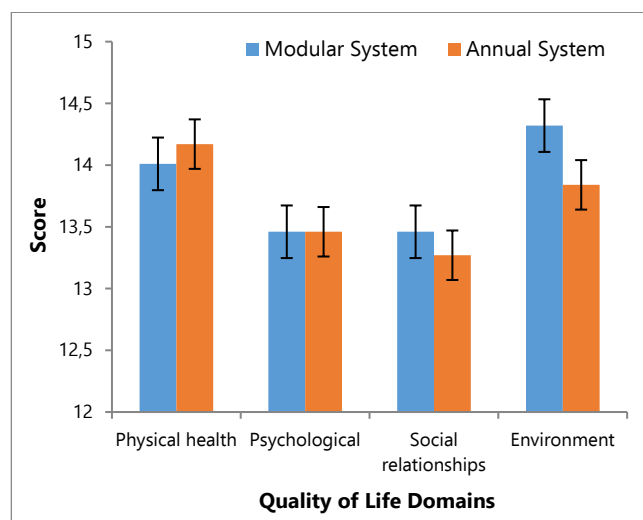


Figure 3. Comparison of Scores in Different Domains in Modular and Annual (Non-Modular) System.



Our study showed that fourth-year medical students had the least score in QoL (Figure 2), which can be reasoned with lengthier curriculum and longer clinical hours. Teachers have considerably higher expectations from students, as this is not their first year in clinical settings. This could be rationalized because medical students face multitudes of stressors such as bullying by teachers, competition for marks, hectic schedules, and difficult examinations,¹⁸ which affect the psychological and mental health of students.

The dilemma of balancing medical school with other aspects of life takes a toll on students' mental as well as physical health. Most students are not able to get adequate sleep, and this adversely affects cognitive ability as well as physical health.¹⁹ Medical students have less physical activity due to long hours of study. They also identified a lack of time and exhaustion from academic activities as a contributing factor to their sedentary lifestyle.²⁰

No study has compared these two sectors in terms of QoL, to the best of our knowledge. Students of both systems had an equal score in the psychological domain (Figure 3). This may be because the core curricula are the same despite different subjects per year. The stress factors throughout medical schools are similar.¹⁸ A

significant difference was found in the environmental domain ($p < 0.05$) of both systems. The environmental domain includes factors such as opportunities for learning new skills and information, physical environment, transport, and participation in leisure and recreational activities.⁵ Students from the annual system scored lower in the environmental domain (Figure 3), which can be logically explained by the longer clinical hours, evening, and night calls observed.

Integration of clinical and basic sciences achieved in a modular system is proven to increase academic score and reduce anxiety.^{21,22} Our study found that students present in clinical years had better QoL scores than preclinical years. Our results were in parallel to the study conducted in New York.²³

Based on the study, a few recommendations can be made. To improve the QoL of its students, the institute should take measures to arrange supportive seminars and recreational activities for students.²⁴ Clinical faculty should work on helping students develop communication skills as it is core part of the medical profession.²⁵ An exercise program, which focuses on reducing stress and improving health personal well-being, can be useful if added to medical school curriculum.²⁶ Institutions should take adequate measures to resolve the issues faced by the students and support them for example setting up a running student health service where concerns regarding physical and mental health of students could be addressed within the university premises. Teachers should ensure the psychological and physical well-being of students and develop compassionate relations with them. These measures can help students make their life better and lower their burden. They would be able to take care of themselves, improve themselves, and be more productive.

Our study was limited by some factors, such as our research sample consisted of three public-sector medical schools in one

city of Pakistan. Thus, results cannot be generalized to all medical schools. We were not able to compare QoL among male and female students because of the low male population in the sample, and the results drawn would have been inaccurate. Our research was not based on randomized sampling, which would have yielded more accurate and reliable results. Also, we did not assess the socio-demographic profile of individuals. Inquiring about factors such as race and ethnicity, family income, and future plans could have yielded some relation with QoL. Finally, our study focused only on medical students.

Conclusion

The primary aim of our study was to measure and compare the QoL of medical students undertaking a bachelor's degree in medicine and surgery (MBBS) in modular or annual (non-modular) systems. The study showed that third-year students had the highest QoL. Overall QoL score in the modular system was slightly higher than the annual system, but a significant difference was noted only in the environmental domain between the two systems. It was also noted that the QoL of students in clinical

years was better than preclinical years. A broader study, including potential confounding factors to be included in the analysis as well as other healthcare areas, should be considered for future research.

Summary - Accelerating Translation

ہماری تحقیق کا مقصد ایم بی بی ای پروگرام میں داخلہ لینے والے میڈیکل طلباء کے معیار کی پیمائش کرنا تھا اور اس کا موازنہ پبلک سیکٹر میڈیکل کالجوں میں نصاب QoL زندگی کے مادیولر بمقابلہ سالانہ نظام کے درمیان کرنا تھا۔ ہمارا مقصد میڈیکل اسکول کے مختلف کے تغیرات اور تبدیلیوں کا جائزہ لینا بھی تھا۔ کراچی کے تین مختلف پبلک QoL سالوں میں سیکٹر میڈیکل کالجوں کے 404 طلباء سمیت ایک کراس سیکشنل مطالعہ کیا گیا۔ یہ مطالعہ WHOQOL-BREF کی پیمائش QoL اکتوبر 2019 سے مارچ 2020 تک کیا گیا تھا۔ SPSS سوالنامے کے ذریعے کی گئی تھی، جس میں 26 اشیاء شامل تھیں۔ ڈیٹا کا تجزیہ استعمال کرتے ہوئے کیا گیا تھا۔ مطالعہ کے سال کے مطابق، جسمانی صحت اور مجموعی $p < 0.05$ میں نمایاں فرق دیکھے گئے، تیسرے سال کے طالب علموں کے p ٹومین (QoL) اسکور سب سے زیادہ ہیں۔ سالانہ اور مادیولر سسٹمز کا موازنہ کرتے وقت، مادیولر سسٹم نے حاصل کیا۔ کلینیکل سالوں میں طلباء QoL 83.34 ± 11.41 کے اوسط اسکور کے ساتھ بہتر p ابتدائی سالوں میں موجود طلباء کے مقابلے میں نمایاں طور پر بہتر (QoL) کی مجموعی اسکور سالانہ QoL > 0.05 پائی گئی۔ مطالعہ سے پتہ چلتا ہے کہ مادیولر سسٹم میں مجموعی نظام سے بہتر تھا۔ ہم یہ بھی نتیجہ اخذ کرتے ہیں کہ تیسرے سال کے طلباء کے پاس سب سے سب سے کم تھا۔ QoL زیادہ جبکہ چوتھے سال کے طلباء کے پاس

References

- Abdulghani HM, AlKhanhal AA, Mahmoud ES, Ponnampereuma GG, Alfari EA. Stress and its effects on medical students: A cross-sectional study at a college of Medicine in Saudi Arabia. *J Health Popul Nutr* 2011; 29:516-22.
- Sohail N. Stress and academic performance among medical students. *J Coll Physicians Surg Pak* 2013; 23(1): 67-71.
- Qamar K, Khan NS, Bashir Kiani MR. Factors associated with stress among medical students. *J Pak Med Assoc* 2015; 65(7): 753-5.
- WHOQOL Group. Measuring quality of life. Available from: <https://www.who.int/healthinfo/survey/whoqol-qualityoflife/en/>. Last updated March 11, 2020; cited June 17, 2020.
- Rocha IC, Arcinas MM. Quality of life of Filipino caregivers of children in need of special protection: correlations with their role overload and role distress. *Journal of Caring Sciences*. 2020 Dec;9(4):173.
- Li K, Kay NS, Nokkaew N. The performance of the World Health Organization's WHOQOL-BREF in assessing the quality of life of Thai college students. *Soc Indic Res* 2009; 90:489-501.
- Naseem S, Orooj F, Ghazanfar H, Ghazanfar A. Quality of life of Pakistani medical students studying in a private institution. *J Pak Med Assoc* 2016; 66:579-83.
- Akhtar M, Herwig BK, Faize FA. Depression and Anxiety among International Medical Students in Germany: The Predictive Role of Coping Styles *J Pak Med Assoc* 2019; 69(2): 230-4.
- Jadoon NA, Yaqoob R, Raza A, Shehzad MA, Zeshan SC. Anxiety and depression among medical students: a cross-sectional study. *J Pak Med Assoc* 2010; 60: 699-702.
- Dow University of Health Sciences. Integrated modular medical curriculum. Available from: <https://www.duhs.edu.pk/download/Final%20Module%20Book-20160514.pdf>. Last updated December 29, 2019; cited June 17, 2020.
- Sindh Medical College, Jinnah Sindh Medical University. Study guide-MBBS/Modules. Available from: <http://www.jsmu.edu.pk/institute-smc-mbbs-study-guide.html>. Last updated May 19, 2020; cited June 17, 2020.
- Karachi Medical and Dental College. The curriculum of MBBS. Available from: <https://kmdc.edu.pk/the-curriculum-of-mbbs/>. Last updated June 10, 2020; cited June 17, 2020.
- Zhang Y, Qu B, Lun S, Wang D, Guo Y, Liu J. Quality of life of medical students in China: a study using the WHOQOL-BREF. *PLoS One* 2012; 7:e49714. doi: 10.1371/journal.pone.0049714.
- Mazaheri M. Overall and specific life satisfaction domains: preliminary Iranian students norms. *Iran J Public Health* 2010; 39:89-94
- Cherkil S, Gardens SJ, Deepak KS. Perceived stressors as determinants of quality of life among the undergraduates in medical education. *The International Journal of Indian Psychology* 2019; 7: 519-28.
- Paro HB, Morales NM, Silva CH, Rezende CH, Pinto RM, Morales RR, et al. Health-related quality of life of medical students. *Med Educ* 2010; 44: 227-35
- Mazaheri M. Overall and specific life satisfaction domains: preliminary Iranian students norms. *Iran J Public Health* 2010; 39:89-94
- Ghazanfar H, Hameed S, Bhatti JRA, Haqlu, Saeed R, Shafi MS, et al. Stressors and coping strategies for stress among Pakistani medical students. *RMJ* 2015; 40: 228-32.
- Azad MC, Fraser K, Rumana N, Abdullah AF, Shahana N, Hanly PJ, et al. Sleep disturbances among medical students: a global perspective. *J Clin Sleep Med* 2015; 11:69-74.
- Rao CR, Darshan BB, Das N, Rajan V, Bhogun M, Gupta A. Practice of physical activity among future doctors: A cross sectional analysis. *Int J Prev Med* 2012; 3:365-9.
- Yune SJ, Jung JS. Changes of academic performance by integration between basic and clinical medicine in pre-clerkship medical education. *Korean J Med Educ* 2018; 30:209-18.
- Slavin SJ, Schindler DL, Chibnall JT. Medical student mental health 3.0: improving student wellness through curricular changes. *Acad Med* 2014; 89(4): 573-7.
- Andre A, Pierre GC, McAndrew M. Quality of life among dental students: A survey study. *J Dent Educ* 2017; 81:1164-70.
- Brajša-Žganec A, Merkaš M, Šverko I. Quality of life and leisure activities: How do leisure activities contribute to subjective well-being?. *Soc Indic Res* 2011; 102:81-91.
- Liénard A, Merckaert I, Libert Y, Bragard I, Delvaux N, Etienne A, et al. Transfer of communication skills to the workplace during clinical rounds: impact of a program for residents. *PLoS One* 2010; 5:e12426.

26. Worobetz A, Retief PJ, Loughran S, Walsh J, Casey M, Hayes P, et al. A feasibility study of an exercise intervention to educate and promote health and well-being among medical students: the 'MED-WELL' programme. BMC Med Educ 2020; 20(1): 183

Acknowledgments

None.

Conflict of Interest Statement & Funding

The Authors have no funding, financial relationships or conflicts of interest to disclose.

Author Contributions

Conceptualization; Formal Analysis; Project Administration; Resources: ZH; Data Curation; Investigation: AH, SM; Methodology: AH, SM, FM, ZH; Supervision: JA, ZH; Writing – Original Draft Preparation; Writing – Review & Editing: AH, SM, FM, JA, ZH.

Cite as

Haque A, Mansoor SM, Malik FM, Ahmed JA, Haque ZH. Comparison of Quality of Life of Medical Students in Annual and Modular System in Public Sector Medical Colleges in Karachi, Pakistan. Int J Med Stud. 2022 Jul-Sep;10(3):258-63.

This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

ISSN 2076-6327

This journal is published by [Pitt Open Library Publishing](https://openlibrarypublishing.com/)

