

[Open Peer Review on Qeios](#)

# The Assessment of Anxiety Levels in Undergraduate Medical Students and The Determination of Various Coping Mechanisms Used

Maryam Shahab, Aysha Imtiaz, Sumaira Nazir, Tamanna Nazir, Saadia Khan

**Funding:** The author(s) received no specific funding for this work.

**Potential competing interests:** The author(s) declared that no potential competing interests exist.

## Abstract

The aim of this study was to assess the level of anxiety experienced by undergraduate medical students in Peshawar, Pakistan (PK) and to identify the most effective coping strategy. A cross-sectional study was conducted on the undergraduate medical students of 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> Professional MBBS classes enrolled in KGMC and RMI. A total of 300 self-administered questionnaires were distributed. To determine the level of anxiety experienced by both male and female students the Hamilton Anxiety Scale was used. In order to identify the various coping strategies implemented by students, the Brief Coping Orientation to Problems Experienced Inventory was utilized. There was a total of 244 respondents with a response rate of 81.3%. There was no significant difference between the anxiety levels irrespective of the various aspects that were assessed: gender, medical institution, student residence, and year of academic study. The mean age of our study sample was  $21.34 \pm 1.30$  years. The most frequent coping method made use of “religion” followed by “planning”, “acceptance” and “active coping”. The least commonly used coping strategy was “substance use”. The lower the anxiety score, the higher the score was on the Brief COPE scale, indicating that students with better coping strategies suffered from lower levels of anxiety.

**Keywords:** anxiety, cope, exam anxiety, medical students, Pakistan, undergraduate.

## Introduction

The prevalence of exams as a means of assessment is a tradition that has been carried on throughout the years; the assessment and evaluation of students learning is a pivotal aspect in the advancement of their education. To objectively assess students' work, teachers and instructors have a wide variety of methods and instruments available, one of which is testing<sup>[1]</sup>. Nowadays, the method of testing is extensively used, not only in education but in many aspects of life with many important decisions hinging upon their results. Obtaining a medical education is one of the most challenging, stressful, and burdensome tasks there are. It requires dealing with an extensive course load, and demands its students to be persistently alert, and active, and cope with highly nerve-racking circumstances. The inability to meet these

educational demands and undergo the examination period in a calm and composed manner may result in the development of anxiety.

Anxiety is defined as “an abnormal and overwhelming sense of apprehension and fear often marked by physiological signs (as sweating, tension, and increased pulse), by doubt concerning the reality and nature of the threat, and by self-doubt about one’s capacity to cope with it”<sup>[2]</sup>. Exam anxiety is “a set of responses that includes excessive worry, depression, nervousness and irrelevant thinking to a class of stimuli from an individual’s experience of assessment/test and outcome”<sup>[3]</sup>.

Multiple factors influence the level of anxiety experienced by a student. These factors can be divided into four different categories: lifestyle issues, lack of required information, studying style, and psychological factors<sup>[3][4]</sup>. Lifestyle issues include an inadequately rested mind and body, insufficient physical activity, a poor diet, and incompetent time management skills<sup>[5][6]</sup>. The absence of strategic studying also largely contributes to exam-related anxiety. It includes factors such as the inability of the students to cover the course contents, lack of proper sleep before the exam, and improper revision techniques<sup>[7]</sup>. Psychological factors contributing to exam anxiety consist of negative and discouraging thoughts about the exam itself and its outcome, the feeling of having no control over the situation, going blank during the exam due to severe anxiety, and the perception of an extensive course load which the student feels they will not be able to cover<sup>[8][9]</sup>.

The examination system in Pakistan (PK) is also a large contributor to anxiety experienced by medical students. It consists of multiple components: a theory paper, Objective Structured Clinical Examination (OSCE), and a viva voce. The exam duration spans over an average period of 4-6 weeks. These varying testing techniques and prolonged duration provide a very stressful and anxious environment for students. The demographic variables that may influence anxiety levels are age, gender, student residence, year of medical study, and whether it is a public or private based institution.

The prevalence of anxiety inevitably leads to the development of various coping strategies. To cope means “to deal with and attempt to overcome problems and difficulties”<sup>[2]</sup> [2]. The implementation of coping methods is a natural response generated to deal with the various stressors causing anxiety<sup>[10]</sup>. Coping can be generally classified into two categories: Problem-Focused Coping (PFC) and Emotion-Focused Coping (EFC). Previous studies have proved PFC to be more effective as opposed to EFC in the management of stressful conditions. PFC has also been shown to have a positive influence on individuals’ mental health as compared to EFC, which has proved to be linked to depression-related symptoms, phobic anxiety, and somatization<sup>[11][12]</sup>. A number of coping methods are implemented by students to reduce their anxiety. Certain coping strategies may cause more harm than relief, common examples being drug abuse and negatively expressing suppressed feelings. Innocuous means that may assist in the reduction of anxiety levels are meditation and prayers, expressing emotions in a positive and productive manner, and planning.

## Materials and Methods

A study was conducted in Khyber Girls Medical College (KGMC) and Rehman Medical Institute (RMI), Peshawar, PK between the months of January and April 2019 by the 4<sup>th</sup> Professional MBBS students of KGMC. This study aimed to

determine the level of anxiety experienced by the students and identify their various coping strategies. The sample size was calculated to be 235 students using Select Statistical Services Sample Size Calculator. A total of 300 self-administered questionnaires were distributed: 150 questionnaires in each medical institution and 50 per academic class. The sampling technique employed was convenience nonprobability.

The students of RMI were approached after approval by their dean. The questionnaires were not administered during the legitimate examination period and thus relied solely on the student's capability to recall their experiences and emotions during previous examinations. A total of 244 students participated from both medical colleges, who were present at the time of distribution of the questionnaires and were voluntarily willing to participate in the study. The study sample was designed according to gender, age, year of study, and student residence. The study carried out was a cross-sectional study. A consent form was attached to the questionnaire in which confidentiality and anonymity of the student were ensured. It provided the students the opportunity to decline participation. Any empty or incomplete questionnaires that were returned were excluded.

Two standardized questionnaires were used in this study. To determine the level of anxiety experienced by both male and female students the Hamilton Anxiety Scale (HAM-A) was used. HAM-A was initially created for the assessment of the severity of symptoms of anxiety. It consists of 14 items; each defined by a series of symptoms and measures both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (physical complaints related to anxiety). Each item is scored from 0 meaning not present to 4 meaning severe. The scale has a total score range of 0-56; where < 17 indicates mild severity of anxiety level, 18-24 indicates mild to moderate severity of anxiety, and > 25-30 moderate to severe level of anxiety. To identify the various coping strategies implemented by students, the Brief Coping Orientation to Problems Experienced (COPE) Inventory (Brief COPE) was utilized. This survey makes use of 14 different scales; these include self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame.

Data collection was completed over a period of eight weeks from February 15, 2019, to April 11, 2019. Data were analyzed using S.P.S.S. (Statistical Package for the Social Sciences) Software Version 20. A descriptive analysis was performed, and chi-square values were calculated for categorical data; mean and standard deviation was carried out for continuous data. One-way analysis of variance (ANOVA) was used to determine the means between groups and to determine the statistically significant difference between them.

## Results

300 self-administered questionnaires were administered to both medical colleges, RMI and KGMC, out of which 244 questionnaires were received, giving a total response rate of 81.3%; 39.0% were from KGMC, and the remaining 42.3% were from RMI. There were 65 (21.7%) males and 179 (59.7%) females. There were 124 (41.3%) day scholars and 120 (40%) students residing in hostels. The mean age of our study sample was  $21.34 \pm 1.30$  years.

According to the HAM-A scale; the number of students experiencing mild anxiety was most prevalent at 50.0%, followed by severe anxiety at 26.6%, with the least prevalent being moderate anxiety at 23.4%. Between the two genders,

females showed no significantly greater level of anxiety as compared to their male counterparts. Students residing within the hostels also displayed similar levels of anxiety in juxtaposition to students who would commute daily. When comparing anxiety levels between the two colleges, it was found that there was no significant difference between the degree of anxiety of students from both KGMC and RMI. Analysis of anxiety levels in the various academic years proved that the anxiety levels remained relatively stable as the students progressed through further academic years of study.

The most common coping strategy employed by female medical students was identified to be “religion”, followed by “acceptance” and “planning”. The most frequent coping method implemented by male students were “religion” and “planning”, followed by “self-blame”, “behavioral disengagement”, and “instrumental support”. The least frequently used coping strategy that was in both male and female medical students was recognized to be “substance use”. Between the two genders, a statistically significant difference ( $p$ -value < 0.05) was present in the categories of “substance use” (higher in males), “emotional support”, “instrumental support”, and “positive reframing” (all higher in females).

The coping mechanism employed most actively in both RMI and KGMC was “religion”, and similarly “substance use” was the least utilized coping mechanism in the two institutions. While comparing coping mechanisms between day scholars and hostel residing students, both groups of students utilized “religion” as their primary coping mechanism. Intriguingly, there was a significant difference between the two groups of students in the category of “venting”; hostel residing students made more use of this coping strategy. The least commonly employed coping mechanism was “substance use”. The most frequently used coping mechanism was “religion” followed by “planning” and then “acceptance” in both 2<sup>nd</sup> year and 4<sup>th</sup> year; whereas 3<sup>rd</sup> year students used “religion” followed by “planning” and “acceptance” and lastly “active coping”. The least frequently used coping strategy utilized was “substance use” regardless of the year of study.

After a final analysis of the HAM-A and Brief COPE scores of each individual, it was observed that the lower the anxiety score, the higher the score was on the Brief COPE scale, indicating that students with better coping strategies suffered from lower levels of anxiety.

## Discussion

Exams often illicit adverse emotional reactions in students in the form of exam anxiety; it is a natural process that has the ability to create an unconstructive environment, especially for those students who cannot effectively cope with the rising pressure<sup>[3]</sup>. The aim of this study was to perceive the levels of exam anxiety felt by these students and identify their primary coping strategies. The coping strategies were further assessed to see whether they provided any ameliorating effect on the anxiety levels.

Unpredictably, it was found that neither gender showed significantly higher levels of anxiety than the other, which has been supported by previous studies<sup>[13][14][15]</sup>. This may be since showing any sign of mental weakness has long since been a taboo in the Pakistani culture, especially in the Pathan population, which was much of the population under surveillance within this study. As a result of this, individuals are not encouraged, as they should be, to unveil information about their mental health status, which may lead to more detrimental health problems in the future. The insignificance in

the anxiety levels may also be attributed to the fact that females may not have honestly expressed the extent of anxiety they experienced due to certain cultural and social standards they are required to meet; showing any signs of mental weakness may result in disengagement from the community and the lack of marriage proposals.

In the 21<sup>st</sup> century, the new generation of Pakistani females is being encouraged in furthering their studies and are being provided more opportunities to succeed in their respective fields of interest. This is demonstrated by the fact that several all-female medical colleges have been established throughout the country, one of them being KGMC. Due to these equal opportunities prevailed, the Pakistani youth is highly success-oriented regardless of their gender and thus the majority desires a fulfilling education. Inevitably, being academically successful leads to the development of anxiety. A mild level of anxiety may prove to be beneficial to students as it may motivate them to work harder; however, once anxiety crosses a certain limit it starts to cause harmful effects on the body and mind and is no longer beneficial<sup>[16]</sup>.

The medical field is exceedingly competitive and stressful in itself; and when superimposed with other factors such as familial pressure and cultural shaming due to failure, can result in the development of severe anxiety faced by both male and female medical students. Apart from these determinants, this may have been simply because there was a larger female population as compared to the opposite gender providing a narrow window in which anxiety levels could be assessed amongst the two genders. On the contrary, multiple previous studies have revealed that females are more prone to suffer from higher anxiety levels as compared to males<sup>[3][5][16][17][18][19][20]</sup>. In contradiction to the majority, certain studies proved to show that on occasion, males experienced greater levels of anxiety than females<sup>[21]</sup>.

It was also portrayed that the residence of students did not significantly affect their anxiety levels. This may be because, during exam preparation leave, the majority of students living in hostels go back home and therefore study in a calm and serene environment, similar to the day scholars. The lack of difference between the anxiety levels between the various academic years may be an outcome of ongoing exposure to annual professional examinations resulting in acclimatization to the examination environment and the development and implementation of more effective coping strategies.

Coping is the means, by which these students try to persevere through and endure the stressful atmosphere of examinations. Most students, despite their gender, year of academic study, residence, as well as medical institution, chose religion as their primary method of coping with anxiety. This is most likely since the dominating religion within the Pakistani population is Islam and due to the Islamic setup of families, from a young age, these students are taught to be more spiritually connected to God, causing them to turn to their religion in times of anguish as a way of coping with their distress and when they yearn to obtain anything.

In a similar light, due to Islamic rulings, the usage of drugs in a manner that may harm the mind or body is looked down upon. This decree may be a possible cause of its low preponderance as a coping strategy in the participants. Some participants however may have answered falsely and denied using drugs because of Islamic societal pressure. Another explanation for the low figure of “substance use” as a coping method could be the issue that the students did not understand the term “drugs” in the self-administered questionnaire, and assumed it was alcohol, tobacco smoking, snuff, and other illegal drugs, as compared to the intended caffeine, anxiolytic drugs, or amphetamines (study drugs/central nervous system stimulants). In the current study, the methods of coping with anxiety that proved to be statistically significant included substance abuse, emotional support, instrumental support, and positive reframing.

The major limiting factor in this study was that it was not conducted during a legitimate examination period and relied solely on the student's ability to recall their past experiences and emotions. Another limiting factor was that multiple factors were being analyzed (gender, medical institution, student residence, and year of academic study); naturally with an extensive amount of data, the chances of human error increase while assessing the results. This may have led to bias causing misinterpretation of the data. Another issue encountered was a time delay in receiving the responses from the two institutions along with incomplete questionnaires returned. The unwillingness of students to participate in the study was an additional drawback. Furthermore, the responses received were majorly females, as KGMC is a female medical college and RMI is a co-educational medical institution, resulting in an imbalanced response rate between males and females.

## Conclusions

The current study presented that among the medical students of both KGMC and RMI, there was no significant difference between the anxiety levels irrespective of the various aspects that were assessed in undergraduate medical students: gender, medical institution, student residence, and year of academic study. Interpretation of the coping strategies revealed that the most frequent coping method made use of "religion" regardless of the category being analyzed. Other commonly used strategies were "planning", "acceptance" and "active coping". The coping mechanism that was utilized the least was "substance use" irrespective of the factor being assessed. On the whole, it was concluded students who suffered from lower levels of anxiety did so because of more effective use of coping strategies. Both KGMC and RMI have set up psychiatry sessions for their students providing them an opportunity to discuss their problems. Medical colleges all over the nation should also be encouraged to implement similar programs and encourage their students' mental and physical well-being.

## Disclosures

**Conflicts of Interest:** The authors declare no conflict of interest.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

## Acknowledgments

Before anyone we would love to pray special gratitude to the gracious Lord, Almighty Allah, who gave us the nerves to stand the difficulties faced during the project, without whose support the project completion would have been impossible. We will also use this platform to thank Dr. Sabina Aziz, Head of the Department of Community Medicine, Khyber Girls Medical College, Peshawar. Special thanks to Dr. Fatima Zulfiqar, the patron of this research who was always there to support and help us complete the project. It was no doubt her encouragement at each step that helped us drive the path. May Almighty Allah keep showering His blessings upon us, through our lives and in the world hereafter (Ameen).

## References

1. <sup>a</sup> Trifoni A, Shahini M. How does exam anxiety affect the performance of university students?. *Mediterr J Soc Sci.* 2011;2(2):93-100.
2. <sup>a, b</sup> Merriam-Webster's Collegiate® Dictionary, Eleventh Edition. Available online: <https://www.merriam-webster.com/dictionary/anxiety>
3. <sup>a, b, c, d</sup> Hashmat S, Hashmat M, Aminullah F, Aziz S. Factors causing exam anxiety in medical students. *J Pak Med Assoc.* 2008;58(4):167-170.
4. <sup>a</sup> Frischenschlager O, Haidinger G, Mitterauer L. Factors associated with academic success at Vienna medical school: prospective survey. *Croat Med J.* 2005;46(1):58-65.
5. <sup>a, b</sup> Acharya S. Factors affecting stress among Indian dental students. *J Dent Educ.* 2003;67(10):1140-1148.
6. <sup>a</sup> Parkerson GR Jr, Broadhead WE, Tse CK. The health status and life satisfaction of first year medical students. *Acad Med.* 1990;65(9):586-8.
7. <sup>a</sup> Sansgiry SS, Bhosle M, Sail K. Factors that affect academic performance among pharmacy students. *Am Journal Pharm Educ.* 2006;70(5):104-16.
8. <sup>a</sup> Alexander DA, Haldane JD. Medical education: a student perspective. *Int J Med Educ.* 1979;13(5):336-41.
9. <sup>a</sup> Miller PM, Surtees PG. Psychological Symptoms and their course in first year medical students as assessed by Interval General Health Questionnaire (IGHQ). *Br J Psychiatry.* 1991;159:199-207.
10. <sup>a</sup> Akhtar M, Herwig B, Faize F. Depression and anxiety among international medical students in Germany: the predictive role of coping styles. *J Pak Med Assoc.* 2019;69(2):230-234.
11. <sup>a</sup> Penley JA, Tomaka J, Wiebe JS. The association of coping to physical and psychological health outcomes: a meta-analytic review. *J of Behav Med.* 2002;25:551-603.
12. <sup>a</sup> Watson DC, Sinha B. Emotion regulation, coping, and psychological symptoms. *Int J Stress Manag.* 2008;15:222-34.
13. <sup>a</sup> Niemi PM, Vainiomaki PT. Medical students' distress—quality, continuity and gender differences during a six-year medical programme. *Med Teach.* 2006;28:136–141.
14. <sup>a</sup> Kunttu K, Virtala A, Huttunen T. Perceived health and symptoms in university students: students have symptoms-but what is their underlying message? Reports based on the student health survey 2000. Helsinki: The Social Insurance Institution, Finland. *Social Security and Health Report.* 2004;63:35–54.
15. <sup>a</sup> Inam SN, Saqib A, Alam E. Prevalence of anxiety and depression among medical students of private university. *J Pak Med Assoc.* 2003;53:44-7.
16. <sup>a, b</sup> Khan AN, Rasool SA, Sultan A, Tahira I. Prevalence of examination related anxiety in a private medical college. *J Ayub Med Coll.* 2013;25(1-2):113-115.
17. <sup>a</sup> Shaikh BT, Kahloon A, Kazmi M, Khalid H, Nawaz K, Khan NA, Khan S. Students, stress and coping strategies: a case of Pakistani medical school. *Edu Health.* 2004;17(3):346-353.
18. <sup>a</sup> Afzal H, Afzal S, Siddique SA, Naqvi SA. Measures used by medical students to reduce test anxiety. *J Pak Med Assoc.* 2012;62(9): 982-986.
19. <sup>a</sup> Kumar S, Bhukar JP. Stress level and coping strategies of college students. *JPSEM.* 2013;4(1): 5-11.



20. <sup>^</sup>Khoshhal KI, Khairy GA, Guraya SY, Guraya SS. Exam anxiety in the undergraduate medical students in Taibah university. *Med Teach*. 2017;39(6):668.
21. <sup>^</sup>Khan MS, Mahmood S, Badshah A, Ali SU, Jamal Y. Prevalence of depression, anxiety and their associated factors among medical students in Karachi, Pakistan. *J Pak Med Assoc*. 2006;56:583–586.