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Increasing Levels of Test Anxiety and Psychological Distress with Advancing Years of Medical Education

Nusrat Aziz[1]*, Abdul Halim Serafi[1]
1.*Department of Physiology, Faculty of Medicine, Umm Al-Qura University, Makkah 24382, Kingdom of Saudi Arabia*

ABSTRACT

A cross-sectional study was conducted on 411 female students (age group of 19-24 years) in second to sixth year of medical education at Umm Al-Qura University, Saudi Arabia to assess test anxiety and psychological distress among students during examinations and with the duration of the course. The study employed questionnaires from 'Westside Test Anxiety scale' and 'Kessler Psychological Distress scale (K10)' and the scores obtained were used to estimate the level of test anxiety and depression among students. Overall, there was high prevalence of test anxiety (53.04%) and psychological distress (82.50%) among students before examinations, with a significant (p<0.01) positive linear correlation between test anxiety and psychological distress with advancing years of the course. Test anxiety was alone found to have a significant effect with course length while psychological distress did not. Test anxiety and psychological distress was highest for students in fifth and sixth years of the course.

Keywords: medical students, test anxiety, psychological distress, clinical, preclinical

*Corresponding Author Email: drnusrataziz@gmail.com
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INTRODUCTION

The students of medical science suffer from many stressful situations owing to complexity of the course, performance pressure from peers and family, and limited relaxation opportunities. This psychological distress affects their physical and mental behavior and significantly increases anxiety and depression levels. The academic stress and low motivational state has been even reported to be associated with extreme behavior including suicidal tendency [1-4].

The anxiety experienced by the students during examinations has been reported to be significantly higher than the basal values owing to the aforementioned reasons [5, 6]. This form of anxiety has been defined as 'test anxiety', which is a situation specific personality trait characterized by worry and emotional downfall in the individual [7, 8]. Test anxiety has been related to cortical arousal beyond a threshold inducing frustration and decreased memory and fright of failure in the patients [9]. Some studies have established a correlation of increased performance with low-moderate test anxiety; however, almost all studies have been conclusive about decreased efficiency with high test anxiety [10, 11]. Test anxiety has been found in particularly among young non-smoking female students studying medicine and nursing, in the beginning of their courses; which at times also influences cognitive functions in these students [12, 13].

The psychological distress in the Indian subcontinent students has been studied by several researchers. According to literature, about 49.1 % and 70% students of India and Pakistan, respectively, suffer from test anxiety [14, 15]. Similar patterns on test anxiety have also been reported across the globe with 38% Swedish, 30% American, and 58% Saudi Arabian medical students being diagnosed of depression and anxiety, using a 21-item BDI questionnaire [16-18]. Test anxiety has been found to increase in correlation with poor working memory and perceived level of stress in medical students; and at times this anxiety leads to intrusive thoughts [7]. Therefore, assessment of test anxiety and psychological distress could be considered as benchmarks for assessing the stress and depression levels among medical students.

Considering the need to evaluate the anxiety and depression among medical students, the present cross sectional study was conducted on female students studying medicine in Umm Al-Qura University, Makkah, Kingdom of Saudi Arabia. The objective was to assess the magnitude of test anxiety and psychological distress during examinations in Saudi medical undergraduates, establish a correlation between these two factors and to analyze their vertical progression with the advancement of the course.

MATERIALS AND METHOD

Selection of Cohort for the Study and the Study Design

Inclusion criteria

Female students studying bachelor in medicine course in the Umm Al-Qura University, Makkah, Kingdom of Saudi Arabia in the age group of 19-24 years were included. The participants were in second year to sixth year of the course. 411 students met the inclusion criteria for the study.

Exclusion criteria

Students having history of diagnosed depression and students on medication for anxiety or depression were excluded from the study. The first year university students were also excluded from the study, since it is a preparatory medical course before the actual course begins.

Study design

This study was approved by Biomedical Ethics Committee of Umm Al-Qura University (approval no. 147). The students from second to sixth year of the course participated in the study during their revision classes in between examination days or after they had finished writing their examination. The students were explained the significance of the study and were instructed to base their responses to the questionnaire on their experience during the examination. Students who voluntarily participated were only included and a written consent was signed by each participant. The overall response rate was 70%.

Westside test anxiety scale (WTAS)

The students took Westside Test Anxiety scale (WTAS) test, comprising of ten questions on self-assessment of anxiety and cognitive impairment, in accordance with the method previously described by Driscoll [19]. The test is a reliable method to assess test anxiety with a correlation of r = 0.44 with WTAS score; positive score indicating enhanced performance in subjects with decreasing test anxiety score.

The test has 6 questions on dealing with memory loss and poor cognitive processing and 4 questions on anxiety during examinations. The response was scored from 1-5, with scores more than 3 indicating significantly high test anxiety above normal and requirement of an intervention. The scores for WTAS questionnaire were categorized into low, normal or average, high normal, moderately high, high and extremely high test anxiety levels; as per standard recommendations [20].

Kessler's Psychological Distress Scale (K-10)

The students also took the Kessler's Psychological distress scale (K-10), a reliable technique for assessment of psychological distress. This test has 10 questions covering queries on anxiety and depressive symptoms experienced in the last 4 weeks [21]. This test reportedly has good psychometric properties with a Cronbach's alpha of 0.89 [22]. Also, population research

and outcome studies using the test have shown a reliability of 0.42 to 0.72 for kappa and weighted kappa scores, respectively. Also, the format of questionnaire has been shown to have high sensitivity (in the upper 90th to 99th %ile range of population) [23].

The range of scores in the test were between 10-50, with a score between 22-29 indicating high psychological distress and between 30-50 a very high psychological distress, preferably requiring intervention [24]. In a study conducted on Hong Kong adolescents for screening of depressive symptoms, a good validity of K-10 scale (with a cut off of 27) using the gold standard method of Becks Depression Inventory has been reported [25]. In the present work, the scores of K-10 were analyzed into low, moderate, high and very high psychological distress.

Statistical analysis

The data was collected, tabulated and analyzed with Statistical package for Social Sciences 20 (SPSS 20) for independent sample t-test, correlation and regression analyses. A value of $p \leq 0.05$ was considered significant.

RESULTS AND DISCUSSION

Description of age, Test Anxiety score and Psychological Distress score among female medical students included in this study has been presented in Table 1.

Table 1: Description of students participating in the study classified according to age and years of medical education

Year of medical education	N	Age	
		Mean	S.D.
2nd	103	19.93	0.630
3rd	77	20.84	0.563
4th	81	21.70	0.732
5th	74	22.95	0.792
6th	76	23.99	0.739

N= number of students, S.D=Standard deviation.

Analysis of Test Anxiety in Students by WTAS Scale

The plot of scores of test anxiety among students by WTAS questionnaire has been presented in Figure 1. The data indicates that the students in 5th and 6th year of the course suffered the most from test anxiety. The overall prevalence of high test anxiety scores was found to be 53.04%. The analysis of mean scores with the confidence interval revealed maximum distress in the 5th year of the course followed by slight decrease in the 6th year. Bivariate Pearson's correlation showed that there was a statistically significant ($p < 0.05$) positive correlation ($r = 0.11$) between study years and test anxiety. Linear regression analysis with test anxiety as independent variable and study years as predictor revealed positive linear relationship with $p < 0.05$, $F = 5.07$ and an unstandardized coefficient $B = 0.059$.

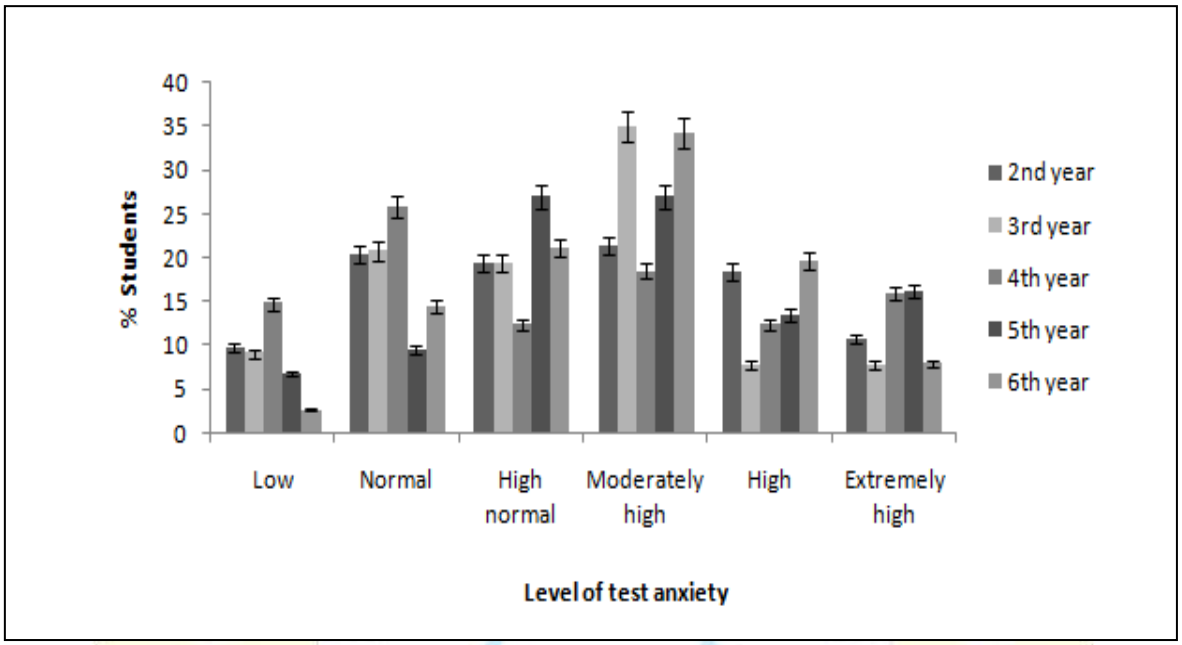

Figure 1: Levels of test anxiety scores among students with years of study assessed by WTAS questionnaire.

Assuming that clinical subjects increase test anxiety and psychological distress and to observe the effect of clinical training, we analyzed the difference in the above parameters between the scores obtained from the students of 2nd and 3rd years as the preclinical group and from students of 5th and 6th years as the clinical group. The statistical analysis for significant difference in test anxiety among students in preclinical and clinical group was insignificant ($p = 0.06$). The 4th year of medical education is the transitional year with mostly preclinical subjects and few clinical subjects, and clinical rotations in hospitals. The 5th and 6th year of medical school involve rigorous clinical training only.

The Prevalence rates for high test anxiety were 50.6% in preclinical and 59.25% in clinical groups. Linear regression analysis showed that test anxiety increased significantly ($p < 0.05$) and linearly with years of medical education, with B value of 0.059. The plot of 'mean scores of test anxiety' vs. 'years of study' established a significant increase ($p < 0.05$) in test anxiety among students in 5th and 6th year of the course (Figure 2).

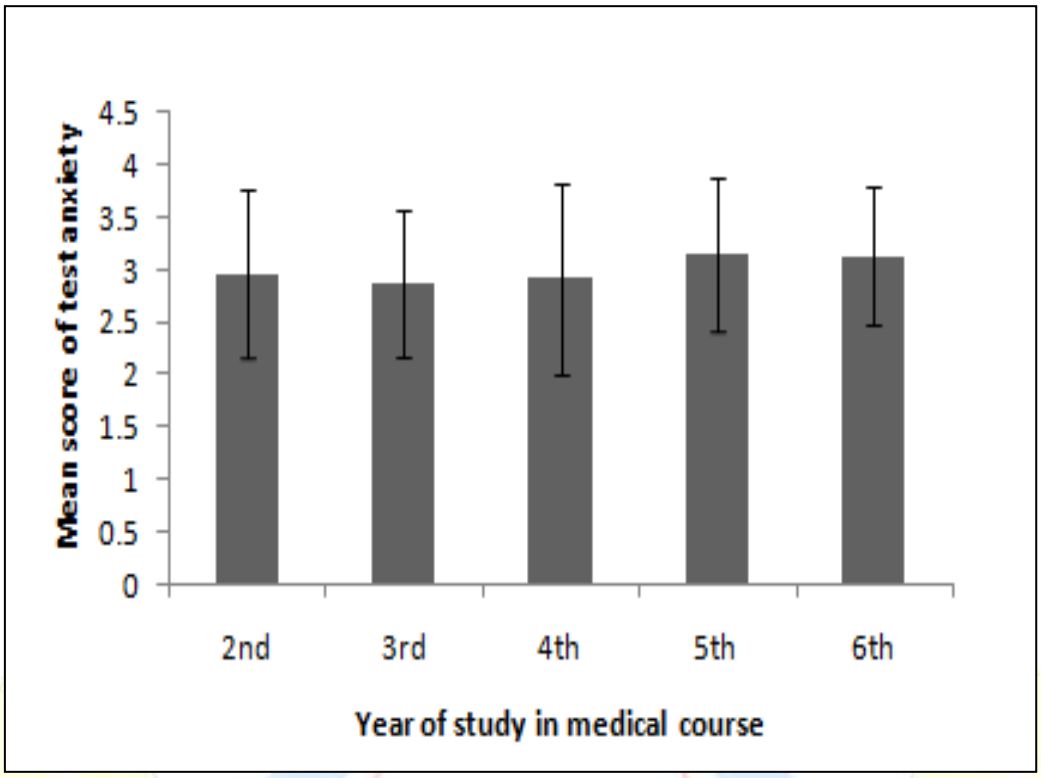

Figure 2: Values of mean test anxiety scores with years of study among students.

Analysis of Psychological Distress in Students by Kessler's Psychological Distress (K-10) Scale

The analysis of psychological distress by K-10 scores revealed that both test anxiety and psychological distress show peak in the 5th year of medical education followed by slight decrease in the 6th year (Figure 3).

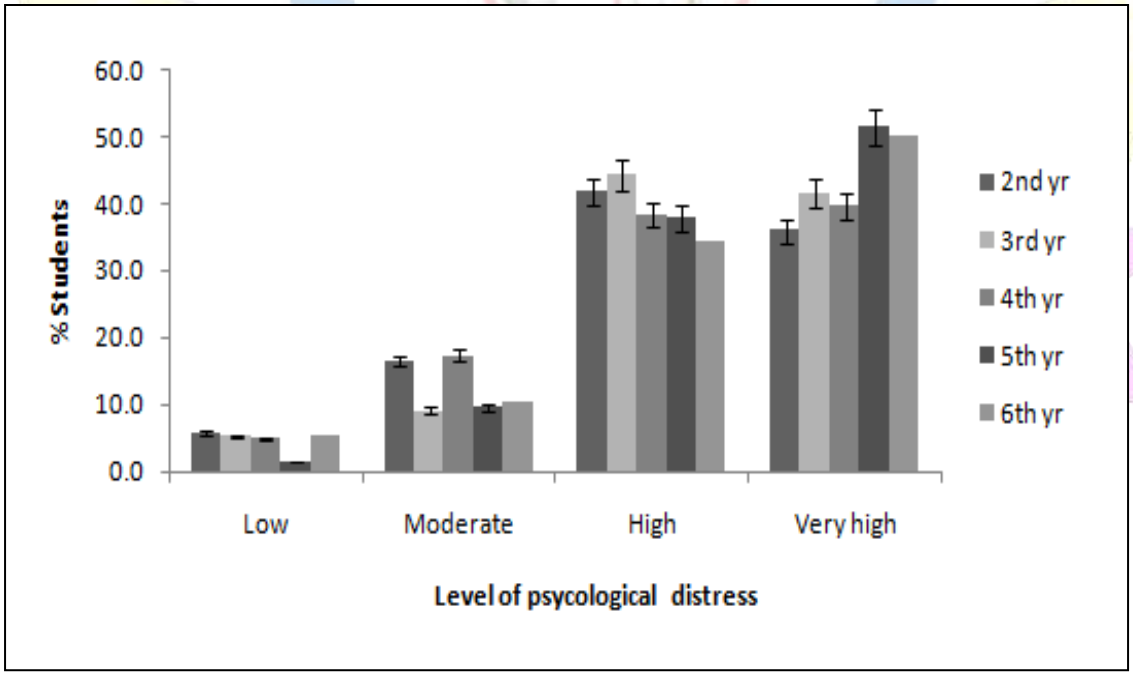

Figure 3: Levels of psychological distress among students with years of study assessed by K-10 scores.

The prevalence rate for increased psychological distress was 81.70% and 86.70% in preclinical and clinical groups, respectively. The overall prevalence of high psychological distress among students was 82.48%. Bivariate Pearson's correlation between psychological distress and study years had a value of r = 0.08 but was statistically insignificant (p = 0.11). Linear regression for psychological distress as dependent variable and year of study as predictor showed the value of B, the unstandardized coefficient to be 0.424; which was also statistically insignificant (p = 0.11).

A moderate to strong correlation (r=0.50) was revealed by Pearson's bivariate correlation test conducted between test anxiety and psychological distress, indicating positive linear relationship between these two variables, with a very high statistical significance (p < 0.01). Statistical analysis for significant difference between preclinical and clinical study years for psychological distress was not significant (p = 0.21). Statistical analysis with independent samples t-test for 'test anxiety' showed statistical significance (p < 0.05) but difference in psychological distress was found to be statistically insignificant (p = 0.07). The plot of 'mean score of psychological distress' vs. 'years of study' showed increase among students in the 5th and 6th year of the course (Figure. 4).

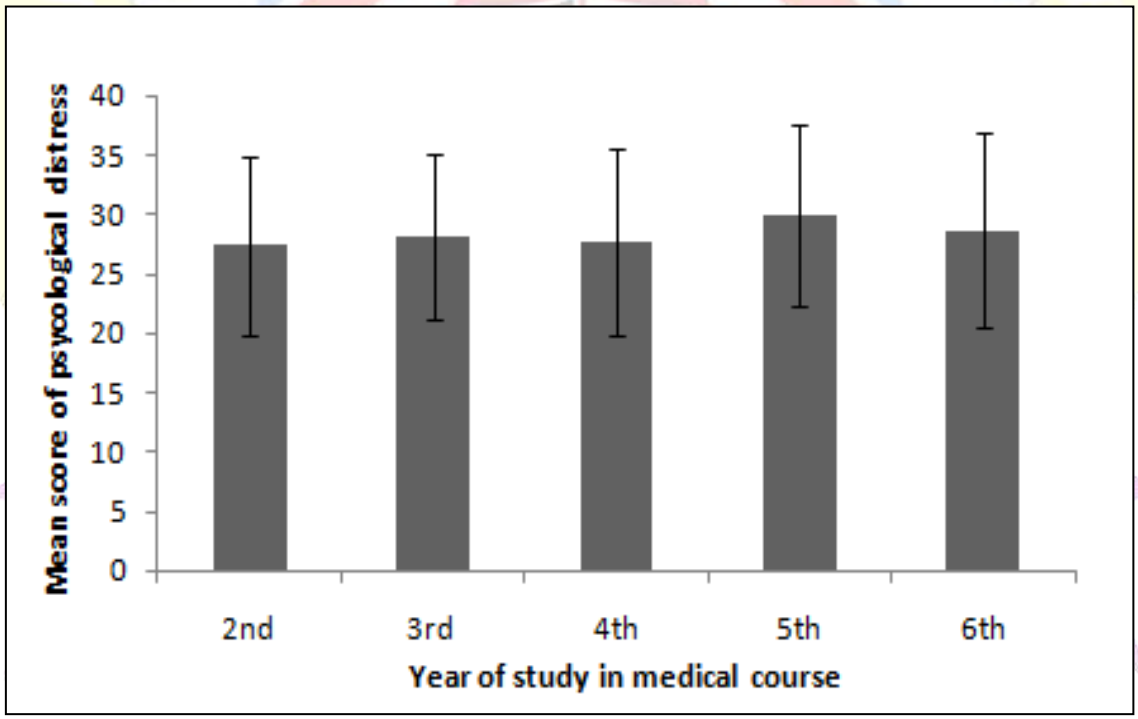

Figure 4: Values of psychological distress among students by K-10 scores.

DISCUSSION

The findings of this study were in compliance with other authors. Medical students in Saudi Arabia have been reported to be under high levels of stress, anxiety and depression than Non-Saudi students [5]. Test anxiety in students could lead to depression, decreased performance during examination and result in student burnout leading to frequent failing in examinations.

This may also induce dropouts from the course. The burnout phenomenon has been observed both in preclinical and clinical settings, and is mainly caused owing to mistreatment by faculty and residents in clinical rotations [26]. A recently conducted meta-analysis involving 77 studies on student depression indicated that Middle Eastern females in 1st Year of medical education were more depressed [27]. Test anxiety is a predictor of psychological distress and amotivation, which can be a result of inability to cope with the examination pressure. The academic causes for stress could be varied such as work overload, phobia of written and viva-voce examinations, insufficient practical exposure, poor clinical skills and lack of proper guidance [28, 29]. These factors in aggregate have a detrimental effect on the academic performance of the students.

The above findings established that increased psychological distress in the medical students when progressing from preclinical to clinical years of the course. In a similar study design on assessment of stress in medical students, a 40% increase in psychological stress was recorded during clinical training [30]. In another study on stress in medical students, a peak in the 4th year of the course corresponding to 5th year of the course in the present study has been reported [5].

There could be multitude of reasons for increased distress among the students. In addition to the stressful situations mentioned in the previous sections, medical students in Saudi Arabia also suffer owing to financial deficit, teaching techniques, curriculum related stress, parental expectations, lack of relaxation, language problems and in testing environments such as those involving clinical skills testing examination (OSCE), which contribute to stress. To critically analyze the stress on medical students, objective structured clinical examination (OSCE) has been employed by few researchers and their findings have shown timed and interactive nature of OSCE causes stress [31]. The findings of the present work therefore establish a highly stressed life of the medical students of the Umm Al-Qura University during examination, by both WTAS and K-10 methods. There was statistically significant positive correlation with $r = 0.50$ and $p < 0.01$ between test anxiety and psychological distress in our study similar to other studies on anxiety and depression in medical students [32, 33].

Similar findings on psychologically distressed students at high risk of depression have been reported by several authors around the globe. Studies conducted in India have shown a prevalence of 49.1% depression in students [14] and 70% anxiety and depression in students of Pakistan [15]. Researchers examining Swedish medical students found 13% prevalence of depression among medical students; in comparison to age and gender-matched population there was only 7.80% prevalence; and approximately one third of the students reporting thoughts of suicide during the course [34, 35]. The findings of the present study were further in

agreement with a study conducted in USA wherein 30% of medical students were reported with high risk suicidal tendencies [17].

Medical students of King Saud University, Riyadh, Saudi Arabia, have also been found to experience 57% overall stress [36] when they were screened for depressive symptoms using the 21-item BDI questionnaire. In Qassim University at Saudi Arabia, the overall prevalence of anxiety and depression among female medical students was found to be higher (66.60%) than among male students (44.40%) [18]. High levels of depression (69.90%), anxiety (66.4%) and stress (70.90%) were indicated in medical and dental students in a study done in Umm Al-Qura University, Makkah, Saudi Arabia using depression anxiety stress scale (DASS-21) [16]. In lines of the above findings, there is an increasing need to define anxiety and depression in terms of test anxiety, assess its magnitude demographically and plan the necessary amendments accordingly.

Fortunately, several measures could be adopted to avoid and avert situations of test anxiety and psychological distress. Reduction in test anxiety by employing techniques of desensitization, self-motivation, progressive muscular relaxation and cognitive therapy have reportedly shown benefits among depression patients [37, 38]. A study in Malaysian medical college showed that psychological intervention in the form of psycho-education, systemic desensitization and relaxation therapy helped to significantly reduce the scores of test anxiety, psychological distress, and lack of motivation [39]. Also, techniques of emotion focused prevention of intervention [40] and use of academic self-concept have been found to reduce stress and improve academic performance of students [41].

The present study can be helpful to professionals of medical education, psychology, academics, behavioral sciences and health sciences in understanding the stress students undergo during examination. This study can be used as a part of efforts to increase student performance and their grades. The students, faculty and counselors in the university are recommended to adopt the counteractive measures to avert anxiety and depression among medical students.

CONCLUSION

Test anxiety and psychological distress are major problems among medical students in Saudi Arabia. The present study was conducted in a cohort of medical students between second year to sixth year of the course, between or after written examination. Assessment of test anxiety and psychological distress were measured by scores of Westside Test Anxiety scale and Kessler Psychological Distress scale (K-10) questionnaire. The scores showed that 53.04% and 82.48% of students suffer from test anxiety and psychological distress, respectively. The scores further established that stress was highest in fifth and sixth year of

the course. Measures for prevention and aversion of stress are recommended for future work to improve the academic performance of the female medical students in Umm Al-Qura University. This study would also help in gaining insights into the problem of test anxiety and psychological distress in female Saudi Arabian medical students, so as to formulate an action plan for the improvement of mental status of students.

Limitations of the Study

This study involved only female medical students it does not study male student population. Vertical analysis of male medical students with calculation of prevalence area of problem in terms of study years could have been done. It does not check academic grades according to test anxiety levels and psychological distress.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest and no financial help was taken from the institution or any other funding department. We thank the students for their co-operation and willingness to participate in the study.

REFERENCES

1. Khan M, Fatima A, Shanawaz M, Fathima M, Mantri A. Comparative study of stress and stress related factors in medical and engineering colleges of a south indian city. Journal of Evolution of Medical and Denatl Sciences. 2016; 5(48): 3153-3156.
2. Saravanan C, Kingston R, Gin M. Is test anxiety a problem among medical students: A cross sectional study on outcome of test anxiety among medical students? International Journal of Psychological Studies. 2014; 6(3): 24-31.
3. Waghachavare VB, Dhumale GB, Kadam YR, Gore AD. A study of stress among students of professional colleges from an urban area in India. Sultan Qaboos University Medical Journal. 2013; 13(3): 429.
4. Omigbodun OO, Odukogbe A-TA, Omigbodun AO, Yusuf OB, Bella TT, Olayemi O. Stressors and psychological symptoms in students of medicine and allied health professions in Nigeria. Social Psychiatry and Psychiatric Epidemiology. 2006; 41(5): 415-421.
5. Kulsoom B, Afsar NA. Stress, anxiety, and depression among medical students in a multiethnic setting. Neuropsychiatric Disease and Treatment. 2015; 11: 1713-1722.
6. Pahwa B, Goyal S, Srivastava K, Saldanha D, Bhattacharya D. A study of exam related anxiety amongst medical students. Industrial Psychiatry Journal. 2008; 17(1): 46-48.
7. Gass CS, Curiel RE. Test anxiety in relation to measures of cognitive and intellectual functioning. Archives of Clinical Neuropsychology. 2011; 26(5): 396-404.

8. Spielberger CD, Vagg PR. Test anxiety: A transactional process model. In: CD Spielberg and PR Vagg (Eds.), *Test anxiety: Theory, assessment and treatment,* pp. 3-14. Taylor & Francis: PA, USA.
9. Hebb DO. Drives and the CNS (conceptual nervous system). Psychological Review. 1955; 62(4): 243-254.
10. Iqbal S, Gupta S, Venkatarao E. Stress, anxiety & depression among medical undergraduate students and their socio-demographic correlates. The Indian Journal of Medical Research. 2015; 141(3): 354-357.
11. Yerkes RM, Dodson JD. The relation of strength of stimulus to rapidity of habit-formation. Journal of Comparative Neurology and Psychology. 1908; 18(5): 459-482.
12. Duty SM, Christian L, Loftus J, Zappi V. Is cognitive test-taking anxiety associated with academic performance among nursing students? Nurse Educator. 2016; 41(2): 70-74.
13. Rana RA, Mahmood N. The relationship between test anxiety and academic achievement. Bulletin of Education and Research. 2010; 32(2): 63-74.
14. Singh SN, Singh SN, Narendra RK. Demographic and socio-economic determinants of birth interval dynamics in Manipur: A survival analysis. Online Journal of Health and Allied Sciences. 2011; 9(4): 1-5.
15. Khan MS, Mahmood S, Badshah A, Ali SU, Jamal Y. Prevalence of depression, anxiety and their associated factors among medical students in Karachi, Pakistan. Journal of Pakistan Medical Association. 2006; 56(12): 583-586.
16. Aboalshamat K, Hou X-Y, Strodl E. Psychological well-being status among medical and dental students in Makkah, Saudi Arabia: A cross-sectional study. Medical Teacher. 2015; 37(1): S75-S81.
17. Moutier C, Norcross W, Jong P, Norman M, Kirby B, McGuire T, et al. The suicide prevention and depression awareness program at the University of California, San Diego School of Medicine. Academic Medicine. 2012; 87(3): 320-326.
18. Inam SNB. Anxiety and depression among students of a medical college in Saudi Arabia. International Journal of Health Sciences. 2007; 1(2): 295-300.
19. Driscoll R. Westside Test Anxiety Scale Validation. 2007; 1-6]. Available from: http://files.eric.ed.gov/fulltext/ED495968.pdf.
20. Rajiah K, Saravanan C. The effectiveness of psychoeducation and systematic desensitization to reduce test anxiety among first-year pharmacy students. American Journal of Pharmaceutical Education. 2014; 78(9): 1-7.

21. Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand S-L, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. Psychological Medicine. 2002; 32(6): 959-976.
22. Abdulghani HM, AlKanhal AA, Mahmoud ES, Ponnamperuma GG, Alfaris EA. Stress and its effects on medical students: A cross-sectional study at a college of medicine in Saudi Arabia. Journal of Health, Population and Nutrition. 2011; 29: 516-522.
23. Dal Granade E. Population research and outcome studies the Kessler Psychological Distress Scale (K10). 2002; Available from: https://health.adelaide.edu.au/pros/docs/reports/br200214_k10.pdf.
24. Brooks RT, Beard J, Steel Z. Factor structure and interpretation of the K10. Psychological Assessment. 2006; 18(1): 62-70.
25. Chan SM, Fung TCT. Reliability and validity of K10 and K6 in screening depressive symptoms in Hong Kong adolescents. Vulnerable Children and Youth Studies. 2014; 9(1): 75-85.
26. Cook AF, Arora VM, Rasinski KA, Curlin FA, Yoon JD. The prevalence of medical student mistreatment and its association with burnout. Academic Medicine: Journal of the Association of American Medical Colleges. 2014; 89(5): 749-754.
27. Puthran R, Zhang MWB, Tam WW, Ho RC. Prevalence of depression amongst medical students: A meta-analysis. Medical Education. 2016; 50(4): 456-468.
28. Deepa R, Panicker AS. A phenomenological approach to understand the challenges faced by medical students. The Qualitative Report. 2016; 21(3): 584-602.
29. Yusoff MSB, Liew YY, Ling HW, Tan CS, Loke HM, Lim XB, et al. A study on stress, stressors and coping strategies among Malaysian medical students. International Journal of Students' Research. 2011; 1(2): 45-50.
30. Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: Causes, consequences, and proposed solutions. Mayo Clinic Proceedings. 2005; 80: 1613-1622.
31. Zartman RR, McWhorter AG, Seale NS, Boone WJ. Using OSCE-based evaluation: curricular impact over time. Journal of Dental Education. 2002; 66(12): 1323-1330.
32. Ahmed I, Banu H, Al-Fageer R, Al-Suwaidi R. Cognitive emotions: Depression and anxiety in medical students and staff. Journal of Critical Care. 2009; 24(3): e1-e7.
33. Ibrahim N, Dania A-K, Lamis E-K, Ahd A-H, Asali D. Prevalence and predictors of anxiety and depression among female medical students in King Abdulaziz University, Jeddah, Saudi Arabia. Iranian Journal of Public Health. 2013; 42(7): 726-736.

34. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. Academic Medicine. 2006; 81(4): 354-373.
35. Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students: A cross-sectional study. Medical Education. 2005; 39(6): 594-604.
36. Abdulghani HM. Stress and depression among medical students: A cross sectional study at a medical college in Saudi Arabia. Pakistan Journal of Medical Sciences. 2008; 24(1): 12-17.
37. Vagg PR, Spielberger CD. Treatment of test anxiey: Application of the transactional process model. In: CD Spielberg & PR Vagg (Eds.), *Test anxiety: Theory, assessment and treatment*, pp. 197-215. Taylor & Francis: PA, USA.
38. Powell DH. Behavioral treatment of debilitating test anxiety among medical students. Journal of Clinical Psychology. 2004; 60(8): 853-865.
39. Saravanan C, Kingston R. A randomized control study of psychological intervention to reduce anxiety, amotivation and psychological distress among medical students. Journal of Research in Medical Sciences: The Official Journal of Isfahan University of Medical Sciences. 2014; 19(5): 391-397.
40. Weems CF, Scott BG, Graham RA, Banks DM, Russell JD, Taylor LK, et al. Fitting anxious emotion-focused intervention into the ecology of schools: Results from a test anxiety program evaluation. Prevention Science. 2015; 16(2): 200-210.
41. Khalaila R. The relationship between academic self-concept, intrinsic motivation, test anxiety, and academic achievement among nursing students: Mediating and moderating effects. Nurse Education Today. 2015; 35(3): 432-438.