Positive and Negative Affect, Anxiety, and Academic Achievement among Medical Students in Saudi Arabia

Ahmed M. Alkhalaf*

Faculty of Medicine, Al Baha University, Saudi Arabia

ABSTRACT: *Several studies have proven that an individual's psychological well-being is an essential element of his or her health. Stress and anxiety both play roles in the overall functioning of the individual. They have been shown to have powerful influence on students and their overall academic achievement and performance in their courses. In the present study, we sought to evaluate the effects of anxiety on the academic performance of medical students. The study participants were 185 male medical students in the faculty of medicine at Al Baha University, Saudi Arabia, and in age range from 19 to 25 years (M = 21.6 ± 1.7 years). To investigate students' experiences of positive and negative affect and also their anxiety levels, the Positive and Negative Affect Schedule (PANAS) and the Taylor Manifest Anxiety Scale (TMAS) were administered to medical students and correlation of the PANAS and TMAS measures with Grade Point Average (GPA) was performed. The present study findings revealed that the association of positive affect (p = 0.016) of PANAS is significantly and strongly related to GPA in Saudi medical students, whereas negative affect and the TMAS were not, suggesting that the positive affect component of PANAS enhances the grade performance. To confirm and establish these results, future studies including both males and females with various economic backgrounds are recommended.*

KEYWORDS: *Anxiety, Positive affect, Negative affect, stress. PANAS, TMAS, Saudi arabia*

INTRODUCTION

According to the World Health Organization (WHO), psychological well-being is considered to be an essential component of not just mental health, but overall health (Marcus, Yasamy, van Ommeren, Chisholm, & Saxena, 2012). An individual exhibiting a combination of low mood, showing no interest or pleasure, guilt, low self-esteem, disturbed appetite, disturbed sleep, and disturbed concentration is termed depressed (Marcus et al., 2012). The American Psychological Association (APA) defined anxiety as mixed feelings of tension, worried thoughts, and physical changes associated with autonomic arousal, skeletal muscle tension, and situational aspects, whereas stress is more associated with irritability, impatience, and difficulty in relaxing (APA, 2016). More than 300 studies on stress and immunity in humans confirm that psychological distress can have a negative impact on the immune system and is capable of modifying various features of the immune response. For example, research has shown an association between depression and other ailments such as osteoporosis and cancer (APA, 2016). Academic achievement is generally defined as accomplishments at school, college, or university; in class; in a laboratory, library, or project, evaluated through conducting examinations or continuous assessment, which is measured using grade point average (GPA; Ward, Stoker, & Murray-Ward, 1996).

Correspondence regarding this article should be directed to: Ahmadalkhalaf@hotmail.co.uk

Medical education generally encompasses tiring study and training for five to six years. During this period, medical students should acquire adequate professional knowledge, skills, and attitude to deal with challenges independently. During their education, students are exposed to a lot of pressures that may disturb their psychological and emotional behaviour and subsequently their academic achievements. Several studies have demonstrated that medical students with the strenuous study and trainings usually suffer from depression, anxiety, and stress (Dyrbye et al., 2007; Henning, Ey, & Shaw, 1998; Roberts et al., 2001). This was also confirmed in two separate studies showing that healthy students after commencing their medical education develop depression and stress levels that may have negative effects on their cognitive functioning and learning abilities in medical school (Abdulghani, AlKanhal, Mahmoud, Ponnamperuma, & Alfaris, 2011; Yusoff, Abdul Rahim, Baba, Ismail, Mat Pa, & Esa, 2013).

Positive affect, negative affect, anxiety, and the relationships amongst these experiences are a matter of concern. Anxiety symptoms are associated with impairment of memory and cognitive functions, which might interfere with general well-being, social life, academic performance, learning ability, and development of social relationships (Afolayan, Donald, Onasoga, Babafemi, & Juan, 2013; Mazzone et al., 2007; McDonald, 2010; Neil & Donald, 2010). Generally, a student feels anxious before a test or examination, but it becomes a matter of concern when the condition is severe (Mc Donald, 2010), which may occur as a result

of the student's past experiences with the tests or examination, faculty pressure, course load, inappropriate time management, family issues and beliefs, etc. (Alzahem, Van Der Molen, Alaujan, Schmidt, & Zamakhshary, 2011; Dyrbye, Thomas, & Shanafelt, 2006; Roh, Jeon, Kim, Han, & Hahm, 2010; Sansgiry & Kavita, 2006). The above mentioned indicators of anxiety are seen more frequently in medical students who are in the early years of their education, as compared to more advanced students (Al-faris et al., 2012; Aboalshamat, Hou, & Strodl, 2015). Positive affect was shown to promote positive well-being and satisfaction with life, which may further enhance quality of life as well as medical students' social lives and academic performance (Heather & April, 2009). In a study conducted in the 1980s, Watson, Clark, and Tellegen (1988) discovered that there is an association of positive and negative affect with mental disorders such as anxiety and depression. Later, Cassady and Johnson (2002) clearly documented that the negative components of anxiety have a negative impact on academic performance (Cassady & Johnson, 2002), which was confirmed through a study where they report that the anxiety levels are directly proportional to the academic performance (Samaranayake & Fernando, 2011) indicating that both positive affect and negative affect should be considered when investigating anxiety and academic performance. Studies pertaining to the association between positive and negative affect in the population of Saudi Arabia are limited. Such studies are warranted for the continuous reformation of the Saudi medical education system (Aboalshamat et al., 2015).

Al Baha University trains high calibre medical professionals at undergraduate and postgraduate levels through its innovative, community-based educational approach. Our study aims to assess the relationship between positive and negative affect on anxiety and academic achievements among medical students in Saudi Arabia.

MATERIAL AND METHODS

Participants

A total of 185 medical school students were participated in this study from Al Baha University. All the participants were males and in the age range 19 to 25 years with a mean age of 21.6 (1.7) years. The study was performed in the Year 2015.

Recruitment

The Dean of the Faculty of Medicine at Al Baha University in Saudi Arabia granted permission to conduct the study. The medical curriculum of the School of Medicine at Al Baha University is a six-year program. The medical students in the undergraduate program were approached formally and asked whether they wished to take part in the study. The aim of the study was explained during a one-on-one conversation with each potential participant. Individuals who were willing to participate were given an informed consent form to review and, if comfortable, sign. Students were then given a participant information sheet regarding the study. Data were collected for the study by having students, in small groups of 5 to 10; independently complete the packet of questionnaires. After the study, a debriefing form about the study was distributed to the participants. All participants gave informed consent and

the studies were deemed ethical by University of Al Baha Human Ethics Committee.

Measures

To assess the risk of positive affect and negative affect on anxiety and academic achievements following measures were used:

Taylor Manifest Anxiety Scale (TMAS)

The TMAS was developed by Janet Taylor Spence in 1953 as a self-report measure to assess the individuals level and nature of anxiety (Crisan, Albulescu, & Copaci, 2014). This scale contains 50 items with a dichotomous response category that is true or false, where true = 1 and false = 2. Scores of 0-16 are considered "very low anxiety" and 35-50 "very severe anxiety". The test has been widely studied and used in research, however there are some concerns that it does not measure a single trait but instead measures disparate traits that are weakly.

Positive and Negative Affect Scale (PANAS)

The PANAS is a 20-item self-report scale with two 10-item subscales, Positive Affect (PA) and Negative Affect (NA; Watson et al., 1988), and was developed as a brief measure of positive and negative affect on anxiety. The original research for developing the PANAS was also conducted with a sample of medical students. Items from the PANAS-PA include interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active. Items from the PANAS-NA include distressed, upset, hostile, irritable, scared, jittery, afraid, ashamed, guilty, and nervous. Respondents are asked to indicate to what extent they have experienced each specific emotion in the past week. Each item is rated on a five-point Likert scale ranging from 1 (very slightly or not at all) to 5 (very much or extremely). Previous research has shown the internal consistency of the PA subscale to be $\alpha = 0.92$ and the NA subscale to be $\alpha = 0.89$ (Harmon-Jones, Harmon-Jones, Abramson, & Peterson, 2009). An Arabic scale based on the PANAS was constructed with permission of the authors. Participants were instructed to complete the Arabic form of the PANAS with regards to their experiences during the few weeks prior.

Grade Point Average (GPA)

Finally, medical students' GPAs were obtained from faculties' administration offices. GPA was measured on four-point scale (A+ = 4; A = 3.75; B+ = 3.5; B = 3.0; C+ = 2.5; C = 2.0; D+ = 1.5; D = 1.0; E/F = 0.0).

Analysis of Data

Descriptive statistics (mean, standard deviation, and percentages) were used for summarizing the study outcome variables. The assessments obtained from the TMAS and PANAS and GPA were correlated using Pearson correlations. Correlation significance was set at $p \leq 0.01$ level (two-tailed).

RESULTS

A total of 185 students participated and completed the questionnaire. The characteristics of the study participants and

the percentage of participants from Year 2 to Year 6, mean year of study in the program, overall mean anxiety levels (PANAS, TMAS), and GPA are presented in Table 1.

A Pearson correlation coefficient was used to measure the degree of association between positive affect and negative affect with GPA, year of study and with nature of manifestation of anxiety disorders. There was a significant negative correlation between positive affect and the TMAS in the medical students ($p<0.01$), which indicates that as positivity decreases the anxiety increases. Whereas negative affect has significant positive correlation with TMAS suggesting as the negative component of PANAS increases anxiety increases.

A correlation among of positive affect and negative affect with year level and with GPA showed a significant association of PANAS-PA with GPA ($p = 0.016$) and negative correlation between the PA and year level that only neared significance ($p = 0.094$). However, there is no significant relationship between PANAS-NA and year level and or PANAS-NA and GPA (Table 2).

Furthermore, analysis of the relationship between GPA and TMAS indicated a negative correlation that did not reach significance.

DISCUSSION

A prevalence of anxiety among medical students is a rising concern as it may impair the students' behavioural functions, diminishing learning and causing poor academic performance, which ultimately may impact patient care when these medical students move on in their careers. The study reveals that there are significant positive and negative effects on the level and nature of manifestation of anxiety ($p<0.01$). Positive affect is associated with reduced anxiety disorders, and similarly negative affect is associated with an increase anxiety disorders in medical students. Overall, the analysis showed positive and negative affect (PANAS) both have significant associations with anxiety (TMAS), but only the positive affect of PANAS is significantly associated with GPA.

The negative effects of medical education on students'

psychological well-being have been discussed in several studies. A study from the United Kingdom by Salmons (1983) reported that one-third of psychologically-ill medical students did not graduate from the college, demonstrating the significant association of the students' psychological status with academic performance (Abdulghani et al., 2011; Afolayan et al., 2013; Melaku, Mossie, & Nagesh, 2015; Singh & Jha, 2013).

In the present study, level of anxiety was found to be higher during the early years of medical education, which is consistent with existing research (Abdulghani et al., 2011). One possible reason for anxiety to be higher in early years is that the students may start developing management strategies and coping mechanisms with the help of other students, so that their anxiety is relieved in later years. Coping strategies also help to lower failure rates in the later years of medical education, which helps students to develop confidence and move along with the education easily (Abdulghani et al., 2011). In the early years of their medical educations, students are also less likely to have a clear understanding of expectations and of their performance, because those things come with experience. Thus, it may be the case that students become less anxious as they progress through school because they have a better understanding of what medical school requires from them. Alternatively, it could be the case that the most anxious students are unable to cope with the pressures of medical school and drop out, thus leaving only the less anxious students in the final years of school. Further analyses would be required to answer this question as multiple factors are involved.

Overall, our study results focus on the significant association between anxiety and students' academic achievement, indicating that when the level of anxiety increases, academic performance decreases and vice versa. These results are consistent with findings from other studies (Afolayan et al., 2013; Khodarahimi, Hashim, & Mohd-Zaharim, 2012; Melaku et al., 2015) that were conducted with other populations.

The study does have a few limitations that must be kept in mind. First, the findings cannot be generalized to all university medical students, because the study participants were all male,

Table 1.
Overall and year-wise mean values of anxiety levels and academic achievements measures

	Medical School Year					
	Year 2	Year 3	Year 4	Year 5	Year 6	Total
N (%)	43 (23.2)	37 (20.0)	44 (23.8)	28 (15.1)	33 (17.8)	185
Variables						**Mean (SD)**
PANAS-PA	3.65	3.68	3.67	3.40	3.50	3.60 (0.59)
PANAS-NA	2.19	2.21	2.51	2.48	2.24	2.32 (0.68)
TMAS	0.40	0.42	0.44	0.40	0.28	0.39 (0.20)
GPA	3.08	2.94	2.62	2.82	2.57	2.82 (0.58)

PANAS: Positive and Negative Affect Scale; TMAS: Taylor Manifest Anxiety Scale GPA: Grade Performance Average

Table 2.
Correlation of PANAS with TMAS, Year, and GPA

PANAS Scales	TMAS	Year	GPA
PANAS-PA (p-value)	-0.31** (0.00)	-0.124 (0.094)	0.18* (0.016)
PANAS-NA (p-value)	0.68** (0.00)	0.084 (0.258)	0.01 (0.867)

N=185; *Correlation significant at *p*<0.05 level (2-tailed); **Correlation significant at *p*<0.01 level (2-tailed)

within a single program, and in Saudi Arabia. In addition, GPA, the measure of academic performance in this study, is a cumulative performance over all the years of medical education. Students who performed very badly early in medical school and very well later on could have the same GPA as students whose performance was mediocre through-out. Thus, using cumulative GPA is not useful for obtaining accurate information about current performance.

CONCLUSION

Our study demonstrates a significant association of anxiety level and academic achievement in medical students. i.e., positive affect has good academic performance and on the other hand negative affect have poor academic performance. Specifically, anxiety is greater in the early years of medical education compared to the later years. The study suggests that the academic performance of the medical students can be improved by increasing positive affect and through continuous counselling to combat or manage anxiety during their medical education. Future studies should focus to substantiate these findings by examining the relationships of anxiety with performance and of positive and negative affects with performance in medical students of both sexes and with a variety of programs around the globe.

ACKNOWLEDGEMENT

REFERENCES

Abdulghani, H.M., AlKanhal, A.A., Mahmoud, E.S., Ponnamperuma, G.G., & Alfaris, E.A. (2011). Stress and its effects on medical students: A cross-sectional study at a college of medicine in Saudi Arabia. *J Health Popul Nutr, 29*: 516-522.

Aboalshamat, K., Hou, X.Y., & Strodl, E. (2015). Psychological well-being status among medical and dental students in Makkah, Saudi Arabia: A cross-sectional study. *Med Teach, 37*: S75-S81.

Afolayan, J.A., Donald, B., Onasoga, O., Babafemi, A., & Juan, A. (2013). Relationship between anxiety and academic performance of nursing students, Niger Delta University, Bayelsa State, Nigeria. *Adv Appl Sci Res, 4*: 25-33.

http://www.apa.org/about/gr/issues/health-care/primary-care.aspx.

http://www.apa.org/topics/anxiety/index.aspx.

Al-faris, E., Irfan, F., Van Der Vleuten, C., Naeem, N., Alsalem, A., Alamiri, N., et al. (2012). The prevalence and correlates of depressive symptoms from an Arabian setting: A wake up call. *Med Teach, 34*: S32-S36.

Alzahem, A., Van Der Molen, H., Alaujan, A., Schmidt, H., & Zamakhshary, M. (2011). Stress amongst dental students: A systematic review. *Adv Med Educ Pract, 15*: 8-18.

Cassady, J.C., & Johnson, R.E. (2002). Cognitive test anxiety and academic performance. *Contemp Educ Psychol, 27*: 270-295.

Crisan, C., Albulescu, I., & Copaci, I. (2014). The relationship between test anxiety and perceived teaching style: Implications and consequences on performance self-evaluation. *Procedia Soc Behav Sci, 142*: 668-672.

Dyrbye, L., Thomas, M., & Shanafelt, T. (2006). Systematic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. *Acad Med, 81*: 354-373.

Dyrbye, L.N., Thomas, M.R., Eacker, A., Harper, W., Massie, F.S. Jr., Power, D.V., et al. (2007). Race, ethnicity, and medical student well-being in the United States. *Arch Gen Intern Med, 167*: 2103-2109.

Eysenck, M.W. (2001). Principles of Cognitive Psychology. Philadelphia, PA: Psychology Press, Ltd.

Harmon-Jones, E., Harmon-Jones, C., Abramson, L.Y., & Peterson, C.K. (2009). PANAS positive activation is associated with anger. *Emot, 9*: 183-196.

Heather, L., & April, L. (2009). The relationship between test anxiety and academic performance. Missouri Western State University, Egypt.

Henning, K., Ey, S., & Shaw, D. (1998). Perfectionism, the imposter phenomenon and psychological adjustment in medical, dental, nursing and pharmacy students. *Med Educ, 32*: 456-464.

Keogh, E., Bond, F.W., French, C.C., Richards, A., & Davis, R.E. (2004). Test anxiety, susceptibility to distraction and examination performance. *Anxiety Stress Copin, 17*: 241-252.

Khodarahimi, S., Hashim, I.H.M., & Mohd-Zaharim, N. (2012). Perceived stress, positive-negative emotions, personal values and perceived social support in Malaysian undergraduate students. *Int J Psychol Behav Sci, 2*: 1-8.

www.who.int/mental_health/management/depression/who_paper_depression_wfmh_2012.pdf.

Mazzone, L., Ducci, F., Scoto, C., Passaniti, E., D'Arrigo, G., & Vitiello, B., (2007). The role of anxiety symptoms in school performance in a community sample of children and adolescents (online), obtained from biomedcentral.com, Catania Sicily Italy.

McDonald, A.S. (2001). The prevalence and effects of test anxiety in school children. *Educ Psychol, 21*: 89-98.

Melaku, L., Mossie, A., & Nagesh, A. (2015). Stress among medical students and its association with substance use and academic performance. *J Biomed Educ, 149509*: 1-9.

Neil, R., & Donald, C. (2010). Psychology, the Science of Behaviour. Ontario, Toronto: Pearson Canada, Inc.

Roberts, L.W., Warner, T.D., Lyketsos, C., Frank, E., Ganzini, L., & Carter, D. (2001). Perceptions of academic vulnerability associated with personal illness: a study of 1,027 students at nine medical schools. *Compr Psychiatry, 42*: 1-15.

Roh, M., Jeon, H., Kim, H., Han, S., & Hahm, B. (2010). The prevalence and impact of depression among medical students: A nationwide cross-sectional study in South Korea. *Acad Med, 85*: 1384-1390.

Singh, I., & Jha, A. (2013). Anxiety, optimism and academic achievement among students of private medical and engineering colleges: A comparative study. *J Educ Develop Psychol, 3*: 222-233.

Salmons, P.H. (1983). Psychiatric illness in medical students. *Br J Psychiatry, 143*: 505-508.

Samaranayake, C.B., & Fernando, A.T. (2011). Satisfaction with

life and depression among medical students in Auckland, New Zealand. *N Z Med J*, *124*: 12-17.

Sansgiry, S. & Kavita, S. (2006). Effect of students' perceptions of course load on test anxiety. *Am J Pharm Educ*, *70*: 26.

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *J Pers Soc Psychol*, *54*: 1063-1070.

Ward, A., Stoker, W.H., & Murray-Ward, M. (1996). Achievement and ability tests - definition of the domain, educational measurement. Lanham, MD: University Press of America.

Yusoff, M.S., Abdul Rahim, A.F., Baba, A.A., Ismail, S.B., Mat Pa, M.N., & Esa, A.R. (2013). The impact of medical education on psychological health of students: A cohort study. *Psychol Health Med*, *18*: 420-430.