

Does test anxiety and gender have an impact on OSCE Performance among medical students?

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Abstract

Objective: to determine the association of test anxiety on OSCE performance of medical students in Taif Medical College.

Study Design: The survey research design was used to conduct the research.

Place and Duration of study: This was a comparative cross sectional study conducted on the 3rd, 4th and 5th year medical students in Taif Medical College of Taif University KSA.

Materials & Methods: A ten item questionnaire developed by Nist and Diehl (1990) for determining mild or severe levels of TA experienced by students was used in the study.

Results: A total of 518 students participated in the survey. The majority of the sample population was male 319 (61%) and 199 (39%) were females. Our results showed that a greater proportion (21%) of the male students, as compared to their counterparts, were in the group having high level of anxiety during test. It was observed that the 3rd year students performed poorly on TA and scored high on the scale. The difference observed in proportions was also statistically significant (Chi square 65.97, p value 0.000001). There was a significant negative correlation between the test anxiety and students performance in oral structured examination (OSCE). Pearson correlation coefficient of -0.45 and a p value < 0.0001 was observed.

Conclusion: We conclude that test anxiety is experienced by a large number of undergraduate medical students of Taif Medical University. Anxiety has a negative effect on overall academic performance; female students were also more affected compared to their male counterparts.

Key Words: Test anxiety, gender, medical students, academic performance

Introduction

Medical education exposes students to a highly stressful environment (1). Numerous reasons have been attributed, however tests and examinations are considered to be amongst the top stressors related to anxiety being experienced by the graduating students (2,3).

Tests, on one hand offer continuous feedback on the student's progress which provides an opportunity to improve, for both the teachers and the graduates. On the other hand examinations are considered a significant predictor of student performance and propensity, hence can result in causing test anxiety (TA) in medical students (4).

It has been argued that anxiety and stress are factors which can tremendously hinder the performance level of students whenever they are examined for their competence, promotion to higher grades and propensity irrespective of their age, and the field they are working in (3,5). An important component of test anxiety which might also influence student's performance is its behavioral aspect which alludes to the poor learning and exam taking strategies, inattention and distraction while taking exams (6).

Test anxiety (TA) is a social phobia which makes the students very doubtful about their ability. As a result, students are less able to deal with test situations (6). Exams produce an anxiety state when a student who has the knowledge is not able to recall or apply it properly. This also explains that anxiety scores and test scores are inversely related. However test associated anxiety might also play a double role where it is perceived as a factor which prepares the students for the stress they will come across subsequently later in the course of their academic career (7).

TA is considered as a persistent trait of one's personality by some, whereas for others it is the extreme reaction or anxiousness of some individuals when they are exposed to an exam situation (8). It has been argued that the extreme level of anxiety in test anxious students triggers the concerns, fears of failing and forgetfulness stored in a person's memory. The student becomes more preoccupied with the insinuations and consequences of failure to meet a situational challenge and loses their focus on the exam task thus leading to impeding their performance in the exam (6,9).

It is also worth mentioning that although test associated anxiety and stress might have a negative influence on the academic performance of some students, a moderate level of stress is considered normal, beneficial and contributes positively in successful performance (10,11). It has been identified that anxiety greatly influences the grades of the students, the type of test and their performance in it (12). TA results in disturbance and distress which can be disastrous for the students as it may impair their performance (5). TA is reported to be a common type of performance anxiety. Many countries from the Arabian peninsula have students experiencing TA due to greater stakes involved in the test scores (13,16).

In an effort to introduce excellence and accountability to medical education the use of standardized tests has increased which has also led to an increase in the TA amongst students. This anxiety can affect any student, regardless of the gender, ethnicity, socio-economic status; grade level, and intellectual capacity (17). Worldwide, women are in the majority in terms of getting admission to medical schools (18). Female medical students are competing and trying to be at par with the male medical students as regards to academic competence, clinical communication and patient-centered care. However literature shows that they are more anxious and less confident in their abilities than their male counterparts (19).

A review of literature shows that researchers have focused on the relationship between the TA and academic performance. It has been revealed that there exists a negative relationship between the two constructs. TA hinders mental and physical abilities of students which results in low scores in exams (20).

It is shown that in low test anxious students' exam associated anxiety positively influences their exam preparation and performance. Whereas in high test anxious students, TA is reported to prevent them from functioning normally (10,12). It has been reported that these students do not adopt proper study skill and also give inadequate time to their studies (12).

TA is a vigorous process and a contentious area that if not handled seriously might become severe with the passage of time (20). High test-anxious students were also found to have poorer study skills. For the high test-anxious group, quality of study habits and amount of study time were also positively related to academic performance. A negative relationship between TA and academic performance has also been reported (20).

Findings from a study have indicated that level of TA did not differ much in students exposed to different systems of education (21). However some studies done to determine the relationship of gender with TA highlighted greater TA levels in female students. One of the main reasons for this high TA could be the different role expected of females to play causing them to face some very conflicting situations (22).

The introduction of objective structured clinical examinations (OSCEs) in medical schools led the researchers to investigate the differences in performance of male and female OSCE examinees and the anxiety level of these students. In this regard little data is available that can identify the gender impact on clinical and communication skills during OSCE (23,24). However from the available data it could be summarized that the effect of gender on the anxiety levels and on OSCE ratings is inconsistent, with some researchers finding no gender difference in performance on the basis of their gender whereas others showing a definitive difference (25,27). The finding of this study will be noted for the benefit of society considering that medical students are assuming a vital part in society. The more noteworthy interest for

more sensible and effective teaching methodology and the approach towards the assessment results. Medical colleges adopting the recommended approach derived from the results of this study will be able to better train their medical students thus producing more confident and competent graduates.

The findings of the study will also suggest several ways for medical educators that can be adopted to minimize the detrimental effect of TA and also propose possible directions for future research in the area.

Research Questions

The current research explores the following research questions:

- i. Is there any gender difference in TA and academic performance of medical students?
- ii. Is there any difference in TA level of medical students of different academic years (3rd, 4th, 5th years).
- iii. What is the relationship between TA and academic performance of medical students?

The present study therefore attempts to enrich the understanding of TA in the local context by examining the nature of TA and medical students' attainment of education goals in Taif, Saudi Arabia.

Hypothesis

- i. There is a significant difference in association of TA and OSCE scores between male and female medical students.
- ii. There is a significant difference in anxiety levels among 3rd, 4th and 5th year medical students
- iii. There is a significant negative association of TA with performance of students in OSCE.

Method

Research Design

The survey research design was used to conduct the research.

Sample and Sampling Strategy

A convenience sampling method was used to select study participants from each stratum.

Inclusion Criteria

Students with the following criteria were recruited in this study

- Age greater than 20 years
- Currently enrolled in 3rd, 4th or 5th year in Taif Medical College
- Agreeing to participate in the study.

Exclusion Criteria

- Medical students with speech defects which considerably affects the clarity and content of the speech

Research Design and Setting

This was a comparative cross sectional study conducted on the 3rd, 4th and 5th year medical students in Taif Medical College of Taif University, KSA. Using a convenience sampling technique a total of 450 medical students (sample size calculated using the finding of the study by Fallahzadeh, 2011) were included in the study. 75 students each from both genders (total 150) meeting the inclusion criteria were enrolled.

TA level of 450 students was measured using a TA questionnaire. Medical student's performance was identified using the marks scored by them in the OSCEs of the last high stakes examination (modules). Statistical analysis was done to test all hypotheses. P value < 0.05 was considered significant to accept or reject the null hypothesis.

Instrument:

Test anxiety questionnaire

A ten item questionnaire developed by Nist and Diehl (1990) for determining mild or severe levels of TA experienced by students was used in the study. Student's responses were calculated based on a 5 point rating scale with 1, 2, 3, 4 and 5 points allocated to Never, Rarely, Sometimes, Often, and Always respectively.

Scores obtained on the ten item questionnaire ranged from 10 – 50. A score of <10 was considered as having no test anxiety, a score ranging from 10 to 19 was graded as low, 20 to 35 as moderate and that from 36 to 50 as a high test anxiety level.

Academic grades:

Marks scored by the students in the OSCEs of the last two modules (final semester) were considered for comparison with their TA levels. The modules included were Psychiatry & Surgery 1 for 3rd year, Obstetrics & Gynaecology 1 and Family medicine for 4th year and Surgery 2 and Obstetrics & Gynaecology 2 for 5th year, respectively.

Operational

definitions:

Test –Anxiety

TA is defined as a state of uneasiness and distress before and during a test that often lowers performance.

Academic performance

Student's academic performance was based on cumulative marks scored by them in the OSCEs conducted at the end of the final semester.

Ethical Procedure:

Research ethics committee of Taif University KSA approved the study. After an informed consent participants (both male and female) were asked to fill in a TA questionnaire. Anonymity and confidentiality was maintained throughout the research.

Participants' OSCE scores were then compared with their anxiety levels. The effect of anxiety on both male and female medical students of 3rd, 4th and 5th year was also analyzed.

Statistics:

Descriptive statistics were performed. Categorical/Qualitative variables were presented as frequencies and percentages while quantitative variables were presented as Mean ± Standard deviation.

Correlation analysis was carried out to identify the association between anxiety and its domains with academic performance.

- Hypothesis one was tested by t-test.
- Hypothesis two was tested by one-way ANOVA.
- Hypothesis three was tested by Pearson correlation.

P value < 0.05 was considered to accept or reject the null hypothesis.

Results

A total of 518 students participated in the survey. The majority of the sample population was male 319 (61%) and 199 (39%) were females. The mean age of the students was 23 years SD+ 1.3 years (Table 1). Almost an equal proportion of students from third year (n=204, 39%) 4th year (n= 137, 26%) and final year (n= 177, 34%) participated in the study.

Table 1: Demographic characteristics of study participants

Age	23 years	SD± 1.3 years
Gender		
Male	319	61.58%
Female	199	38.42%
Level of study		
3rd year students	204	39.38%
4th year students	137	26.45%
5th year students	177	34.17%
TOTAL	518	100.00%

The mean academic scores (OSCE) among three levels of undergraduate students were closer to each other. The 3rd year scored 80+ 7, 4th year students scored a mean score 83 + 6 and final year scored 83.1 + 9.

Table 2: Academic performance among different levels of study

OCSE Score * year	No.o.s	Mean	StdDev
3rd	204	80.4081	7.0024
4th	137	83.0266	6.2002
5th	177	83.1727	9.0322

The reliability index measured by Cronbach's alpha on 10 items is 0.85 which showed a good reliability of scale.

Our results showed that a greater proportion (21%) of the male students as compared to their counterparts were in the group having high level of anxiety during test. The findings were however statistically insignificant (Chi 7.2, p value 0.06). Therefore, anxiety scores do not vary by gender.

Table 3: TA levels among male and female students

Gender/TA Level	No TA<10	Low TA (11-20)	Moderate TA (21-35)	High TA (36-50)	Total	P-Value
Male	27(8.5)	99(31)	126(39.5)	67(21)	319	0.064
Female	15(7.5)	63(31.7)	96(48.2)	25(12.6)	199	
Total	42(8.1)	162(31.3)	222(42.9)	92(17.8)	518	

To find out the effect of level of study on student's anxiety level it was observed that the 3rd year students performed poorly on TA and scored high on scale. The difference observed in proportions was also statistically significant (Chi square 65.97, p value 0.000001).

Table 4: Distribution of TA scores among different years of education

Academic levels	No TA <10	Low TA (10-19)	Moderate TA (21-35)	High TA (36-50)	Total	P-Value
3th year	9(4.4)	53(26)	100(49)	42(20.6)	204	<0.0001
4th year	20(14.6)	67(48.9)	49(35.8)	1(0.7)	137	
5th year	13(7.3)	42(23.7)	73(41.2)	49(27.7)	177	
Total	42(8.1)	162(31.3)	222(42.9)	92(17.8)	518	

Effect of anxiety levels on academic performance was also tested and there was a significant negative correlation between the anxiety and students' performance in academics. Pearson correlation coefficient of -0.45 and a p value < 0.0001 was observed.

Figure 1: Relationship of anxiety levels on academic performance

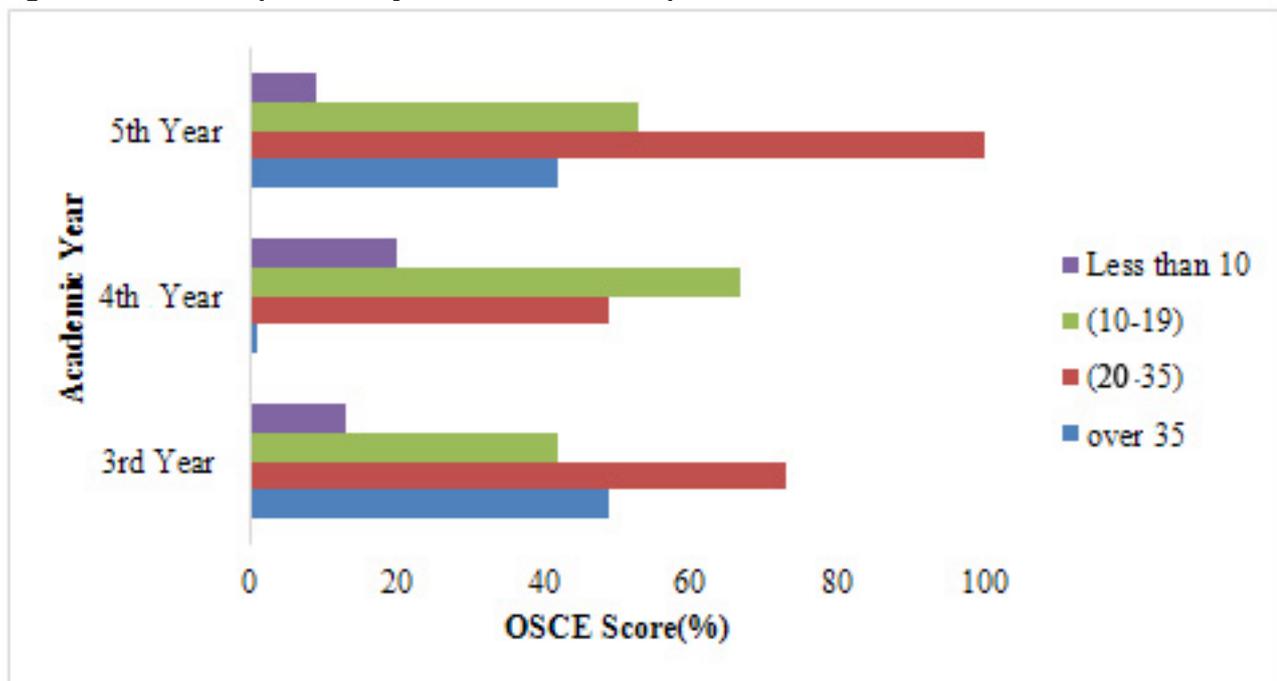


Table 5: Pearson's Correlation Analysis

Coefficient	T Statistic	P-Value
-0.4597	11.7579	<0.0001

Correlation Coefficient: $r^2 = 0.21$

Discussion

Our study found multiple aspects interplay in stress of examination on student's performance. This study conducted on three levels of undergraduate students of Taif University-KSA showed that all the students, irrespective of their level of study, faced anxiety when taking examinations. Though varying levels were observed and also the level of anxiety also differed, every level of studentship was facing stress. This finding is in line with many of the studies from around the world. The reason being the students perceive examination as a source of anxiety (28). Studies from around the world and from across all disciplines explained this phenomenon (29,30).

To have a deeper understanding the study looked into the differences of anxiety level among various parameters like level of study, across gender and direct impact on academic performances. When observing the anxiety levels across genders we found that the medical college female students were more commonly stressed before and during examination when tested on the scale. This difference is observed in other studies also (30). The reason for this is females are emotionally more vulnerable to fall prey to anxiety than their male counterparts (31,32). This explains careful and planned interventions for mitigating the stress must focus on females particularly.

The pattern of distribution of stress when observed across the level of study showed that its effects were marked in juniors i.e. the 3rd year students were more severely affected by stress. The reason may be that seniors are more tuned in to type of assessment i.e OSCE examination and its pattern. Their previous exposures in previous levels have oriented them and hence their severity was not as extreme as the juniors. The fact is supported by a study on medical students (33) where they were asked about management of test anxiety, where students described that after experiencing the anxiety they devise their own strategies for coping with it hence proving that previous exposures may lead to lower levels of anxiety as evident in our study. This explains that strategies to mitigate this stress must focus on earlier level students and freshmen.

This study also explored the direct effect of test anxiety on academic performance of students and not surprisingly supported the hypothesis that anxiety has a significant and profound negative impact on student's performance. The overthinking, negative emotions and depression associated with test anxiety lead to an overall decreased academic performance and limits students' critical thinking ability especially in those who are severely affected. The literature also supports this observation where a study from Iran described the role of motivation and positive emotions on academic performance (34).

Conclusion and Recommendations

- We conclude that test anxiety is experienced by a large number of undergraduate medical students of Taif Medical University.
- We also conclude that anxiety has a negative effect on overall academic performance of medical students.
- The female students were also more affected as compared to their male counterparts.
- Stress was predominantly more apparent in the third year students. They experienced moderate to high level of stress.

The alarming levels of TA prevalent in students of all levels of medical studentship are worrisome. The contributing factors other than reported in our study must be carefully determined. Targeted mitigation strategies must be implemented by the university to help students overcome their TA and demonstrate their true achievement.

Limitations:

- The study only analyzed the relationship between TA and students' academic performance i.e. apparent competencies as opposed to an insight built.
- Impact of individual's anxiety measurements and other instructive develop were also not measured.

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