

Original Article

Examination Anxiety in Integrated Modular Curriculum: Perceptions of Dental Students

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ABSTRACT

Introduction: The universal driving force for learning is assessment, however, it accompanies anxiety, commonly known as exam or test anxiety. There is increasing evidence that exam modality and gender play a significant role in generating anxiety in medical students. This study was conducted to determine the prevalence of exam anxiety in different assessment modalities with same examination standards and criteria among dental students at University College of Dentistry (UCD), The University of Lahore (UOL).

Method: We conducted a cross-sectional questionnaire-based survey of over 250 dental students from years 1 to 4, at UCD to assess the test anxiety in dental students with different exam modalities. Mann Whitney U test was used to compare the variations of perceptions among male and female students of UCD. Chi-square was used to test for analysis of academic years with different modalities of exams.

Results: The analysis suggested that “extensive course load” with highest anxiety mean score of 4 was most anxiety-provoking followed by “studying all night” (mean score=3) in all assessment modalities. The single most test-anxiety provoking modality was “OSCE station with examiner”, with an average combined mean score of 57, followed by “Long-case” (mean score=56). The data revealed that “psychological issues” ($p=0.05$), “OSCE station with the examiner” ($p=0.02$) and “exam taking strategy” ($p=0.00$) were found statistically significant with respect to genders. The combined score of all exam modalities under the domain of “information needs” was highly significant ($p=0.02$) with highest mean rank observed in final year dental students followed by 2nd-year students.

Conclusion: We conclude that face-to-face assessments evoke anxiety in students, especially in females. This may be because it also involves confidence and presentation other than theoretical knowledge as in short answer questions (SAQ). The mock assessments shall be made part of the syllabus as this will increase students’ preparedness and will also be helpful for examiners.

KEYWORDS: Exam, Anxiety, Assessment, Modalities, Dental students

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INTRODUCTION

The academic acumen of medical graduates frames in undergraduate years and flourishes in the subsequent years. In the quest to enhance knowledge, medical students experience a roller-coaster journey, in a five-year programme with continuous assessments. The major contributing factor to test anxiety is fear of failure or low performance. These are well-known predisposing factors for anxiety in undergraduate years (Bramness, Fixdal, & Vaglum, 1991; Dahlin, Joneborg, & Runeson, 2005). The well-evidenced mantra of medical education is ‘assessment drives learning’ nevertheless it also creates extremely stressful situations among medical students and may lead to exam anxiety. Exam anxiety (also referred to as test anxiety) is very common in students of medical schools.

Spielberger and Vagg have defined test anxiety as a part of general anxiety that hinders the performance of students in their academic activities and examinations. It is also defined as “an emotional state that has psychological and behavioral concomitants, and that is experienced in formal testing or other evaluative situations” (Nazir et al., 2021; Spielberger & Vagg, 1995).

In an academic setting, test anxiety reflects the fear level and apprehension to perform low before, during, and/or after the exam (Herzer, Wendt, & Hamm, 2014). Exam anxiety is a collection of reactions to different stimuli from an individual's assessment and result experiences. These responses are in the form of unnecessary worry, depression, fear of failure, nervousness, and irrelevant thoughts. More specifically, exam anxiety is a fear to fail or a danger to one's ego, which could damage one's self-esteem if he/she fails an exam.

Assessment is an essential component of the medical curriculum which includes various modalities to holistically evaluate the cognitive knowledge, psychomotor skills, and clinical

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expertise of the medical student. Several assessment strategies like multiple-choice questions (MCQs), short essay questions (SEQs), short answer questions (SAQs), objective structured clinical examination (OSCE) both observed and unobserved, extended matching questions (EMQs), short case and long case exams, are used in under-graduate and post-graduate medical examination. According to the perception of medical students, different anxiety levels are induced by each assessment tool. This is due to diverse learning goals and complex mechanisms of assessment modalities (Rezazadeh & Tavakoli, 2009). This highlights the importance of probing medical students' experiences of exam anxiety as caused by assessment strategies individually.

During their intensive undergraduate studies, students of medical schools are also exposed to a variety of practical, clinical, viva voce, and written examinations that demand comprehensive academic skills and competencies. They are more likely to be exposed to a variety of academic conditions and tests, all of which can cause anxiety. There is limited literature available on the prevalence of exam anxiety among students of medical schools. Previous studies provide evidence that in the medical field, female students perceived higher exam anxiety as compared to male students. Another study reported that male medical students experience more test anxiety than female medical students, and in a few studies, no significant gender differences were observed in terms of perception of anxiety (Kidson & Hornblow, 1982).

In dental schools, there is a scarcity of research on the objective evaluation of test anxiety induced by each mode of assessment. The main objective of the current study is to determine the prevalence of test anxiety provoked by each assessment modality with the same examination standards and assessment criteria among dental students at UCD, UOL. The observations of the current study will be used to further explore the confounding factors for high stress generating assessment modalities. This may aid educators to focus on overcoming the modifiable stressors in each mode of assessment, thereby reducing stress and anxiety among medical students.

METHODS

The present cross-sectional quantitative study was conducted on dental students of UCD, UOL with the same examination standards and assessment criteria, conducted from August to September 2021. The study was approved by the Ethics review committee of the college. We approached 300 students, based on a convenient sampling method. Out of 300, only 250 (male and female) students from 1st year to final year class of dental college at UOL, voluntarily agreed and provided consent. A pre-validated questionnaire was used to explore student's perceptions of exam anxiety in four domains; lifestyle issues, psychological

factors, specific factors (related to exam preparation, exam-taking strategies and learning styles), and difficulty index. Sixty-one incomplete questionnaires were excluded from the study. We applied the questionnaire used by Guraya et. al. (2018) in their study (freely available on the internet).

The obtained data was entered and analyzed by statistical package for the social sciences (SPSS) version 21. The Mann-Whitney U test was used to compare the variations of perceptions among male and female students of UCD. A p-value of <0.05 was considered significant. We also applied the Chi-square test for analysis of academic years with different modalities of exams. Graphs and tables were made to represent the main findings.

RESULTS

Out of 250 dental students, only 189 filled complete information in the questionnaire (75%). Females were in the majority (61.5%, $n=120$). Our results suggest that in general factors (lifestyle issues), "poor nutrition", "too many stimulants" and "not prioritizing the task" were the only three factors that were reported by 60% of the students, with a mean of 3 (Likert scale 1: minimum anxiety and 5 maximum anxiety). All of the rest were reported by 80% of the participants with a mean of 4, signifying seven remaining factors were a source of anxiety for students (Fig I). Further analysis of data suggested that students have marked extensive course load as the most anxiety-provoking factor in all exam modalities (Mean score 4 in each assessment modalities). The second most common specific factor was "studying all night before the exam" in all exam modalities, except short and long-case (Mean score 3). The least stressing was "course not well covered by faculty", especially in SAQs (mean score 2). The single most test-anxiety provoking modality was "OSCE station with examiner", with an average combined mean score of 57, followed by "Long-case" (Average=56). The remaining modalities were all close in average scores (Fig. II).

The combined effect of four major domains lifestyle issues, psychological factors, specific factors, and difficulty index were analyzed by Mann-Whitney U test to compare the variations of perceptions of exam anxiety among genders (Table I). The psychological factors were statistically significant among genders ($p=0.05$), as more anxiety was perceived by female dental students (mean rank 100.85) compared to male students (mean rank 84.83). Interestingly, in this study, male dental students showed significantly high anxiety in both sub-categories of specific factors ('information needs' and 'learning styles') for OSCE station with examiner (Table I). Our data also report that female students found short essays and the OSCE station with examiner more difficult as compared to male students with the p-value of 0.03 and 0.02 respectively. The analysis of remaining factors in all domains showed an insignificant statistical differences.

Data were also analyzed according to academic years and anxiety

levels associated with different modalities by applying the Chi-square test. An interesting finding among student's perception of anxiety across academic years was found in this study. The combined score of all exam modalities under the domain of "information needs" was highly significant ($p=0.02$) with the highest mean rank observed in final year dental students followed by 2nd-year students. Contrary to this, an insignificant difference was reported in the mean rank from the "learning styles" domain with respect to the academic year (Table II). A significant difference was also observed in the perception of difficulty index in SAQ and short case among all classes. There was no difference in the anxiety perceived by general factors among students of all four years.

DISCUSSION

This study has explained test anxiety according to the exam modality and has also categorized it according to the academic year of dental students. We have replicated the study by Guraya et al (2018), with the difference that our participants are dental students. Research conducted on students of medical and dental colleges reported that test anxiety scores were slightly higher in dental students than in medical students, this also supports our study conducted specifically on dental students (Nazir et al., 2021).

This study has identified that in our sample, students experienced the worst anxiety at OSCE stations with examiners (mean score=57), followed by long case (mean score=56). This is different from the parent study, (Guraya, Guraya, Habib, AlQuiliti, & Khoshhal, 2018) as their result has reported long-case as the point of worst anxiety. Evidence suggests that OSCE stations are not only the test of knowledge or skill but student performance also reflects his confidence and stress management skills. The literature also points out that OSCE is considered as most stressful exam and also students tend to prepare more for this assessment (Brand & Schoonheim-Klein, 2009).

The long case was regarded as the second most anxiety-provoking assessment, as compared to MCQ and SAQ, in our study. The major difference might be of direct observation in the long case. The literature regarding the long case is divided, some suggest that the long case is a valid and productive assessment tool whereas others suggest that it's highly anxiety-provoking (Guraya et al., 2018; Shadab, Noor, Waqqar, & Shaikh, 2021; Tey, Chiavaroli, & Ryan, 2020). The balance statement would be that long cases are still very valid and useful, provided it's structured and examiners are trained before conducting the exam. Our findings are similar to the Guraya et al (2018) interpretation and few of the other older evidence that students less refer to the face-to-face pattern of the exam (Amin, Kaliyadan, & Al-Muhaidib, 2011).

Two important findings in this study are about specific factors

related to test anxiety in all modalities (Fig 2). "Extensive Course overload" was regarded as the most anxiety-provoking factor. Another study by Kamel OM (2018) reported that course overload was negatively correlated with academic adjustment ($r=0.333$) (Kamel, 2018). Another study suggested that academic overload leads to poor performance (Zia-ur-Rehman & Sharif, 2014). Similar findings were also reported by Khoshhal et al (2017) (Khoshhal, Khairy, Guraya, & Guraya, 2017). They pointed out that course overload was associated with anxiety in female students.

In terms of gender, we found no difference in "life-style issues", however contrary to Guraya et al (2018), we found females reporting more anxiety in psychological factors ($p=0.045$). The literature review also suggests that test anxiety is higher in female students (Eman, Eman, Dogar, Khalid, & Haider, 2012). The difference was also marked on an item about 'information needs OSCE with the examiner' ($p=0.02$) and a significant difference was found in the difficulty index in OSCE with the examiner. The pattern of anxiety in unstructured face-to-face assessments was found high across the board in our study. This also suggests that colleges should review the exam process and also conduct mock exams that may help the students.

LIMITATIONS

This study was conducted in a single institution, a better understanding of this phenomenon could be made with a multicenter and qualitative study design. The study was also done specifically on dental students, as the evidence suggested more anxiety in dental students as compared to medical, however, this also limits its generalizability.

CONCLUSION

We conclude that test anxiety is a pertinent factor affecting students' performance. The face-to-face assessments, mainly if unstructured, shall be replaced with structured assessment modalities. Mock exams help reduce exam anxiety and also train the faculty. Reforms should be made to overcome the 'course overload' phenomenon and facilitate female students to actively participate during discussion sessions. This will reduce their performance anxiety and hence may result in better academic grades. Stress management workshops and extracurricular activities shall also be placed in, besides other educational reforms.

DECLARATION OF INTEREST

The authors report no declaration of interest.

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AUTHORS CONTRIBUTION

1. Qasim Mehmood Janjua: Create concept design of research, prepared the initial draft of the manuscript, interpret data, make tables and graphs and finalize the manuscript
2. Faheem Khan: Drafting the whole sequence of manuscript, interpret data, and critically revised the initial draft of the manuscript
3. Sara Mukhtar: Collection of data from students

Table I: Comparison of perceptions of test anxiety causing factors across genders

	Male student mean rank	Female student mean rank	Mann-Whitney U test	P value
Life styles issues	99.72	92.29	3814.5	0.37
Psychological factors	84.83	100.85	3438	0.05
Information needs - MCQ	91.36	97.1	3888.5	0.48
Information needs - SAQ	90.69	97.48	3842.5	0.41
Information needs - short essay	90.69	97.48	1501.5	0.76
Information needs - OSCE with examiner	59.75	57.59	3327	0.02
Information needs - OSCE without exam	83.22	101.78	3726.5	0.25
Information needs - short case	89.01	98.45	1336.5	0.21
Information needs - long case	63.68	55.56	1423	0.40
Learning styles - MCQ	61.62	56.73	3963	0.62
Learning styles - SAQ	92.43	96.48	3989	0.67
Learning style - short essay	92.81	96.26	1323.5	0.18
Learning style - OSCE with examiner	63.99	55.39	3515.5	0.04
Learning style - without examiner	85.95	100.2	3724.5	0.25
Learning style - short case	88.98	98.46	1511.5	0.80
Learning style - long case	57.49	59.07	1410	0.40
Difficulty Index - MCQ	61.93	56.55	4016	0.79
Difficulty Index - SAQ	93.2	95.25	3996.5	0.75
Difficulty Index - Short essay	92.92	95.42	1208.5	0.03
Difficulty Index - OSCE with examiner	50.27	62.45	3476.5	0.02
Difficulty Index - without examiner	85.38	99.79	3736.5	0.29
Difficulty Index - short case	99.85	91.4	1384	0.37
Difficulty Index - long case	54.45	60.04	1489.5	0.80

Table II: Comparison of perceptions of test anxiety causing factors across the academic years

	First year	Second year	Third year	Fourth year	P value
Life styles issues	21.17	20.44	18.63	20.32	0.10
Psychological factors	15.0	14.32	13.23	15.23	0.14
Information needs - MCQ	21.29	23.97	22.33	26.44	0.00
Information needs - SAQ	22.41	23.41	21.83	26.21	0.00
Information needs - short essay	23.2	23.82	21.60	26.13	0.00
Information needs - OSCE with examiner	23.52	26.45	22.73	26.73	0.00
Information needs - OSCE without examiner	21.65	23.63	21.20	25.60	0.00
Information needs - short case	22.2	25.36	21.20	25.62	0.00
Information needs - long case	24.23	25.10	20.83	25.93	0.00
Learning styles - MCQ	23.9	22.94	23.133	25.60	0.28
Learning styles - SAQ	24.30	22.55	23.03	25.76	0.11
Learning style - short essay	23.2	23.02	22.93	25.26	0.17
Learning style - OSCE with examiner	24.76	24.79	22.93	25.71	0.37
Learning style - without examiner	24.50	24.5	23.06	24.9	0.67
Learning style - short case	22.12	23.41	22.63	24.78	0.33
Learning style - long case	21.23	22.11	21.66	24.01	0.28
Difficulty Index - MCQ	3.0	3.36	2.86	3.07	0.50
Difficulty Index - SAQ	3.37	2.712	3.30	3.25	0.04
Difficulty Index - Short essay	2.82	2.742	3.03	3.29	0.16
Difficulty Index - OSCE with examiner	3.91	3.667	3.73	3.76	0.78
Difficulty Index - without examiner	3.67	3.30	3.43	3.12	0.14
Difficulty Index - short case	3.25	3.27	3.43	3.26	0.00
Difficulty Index - long case	2.92	3.03	3.06	2.97	0.94

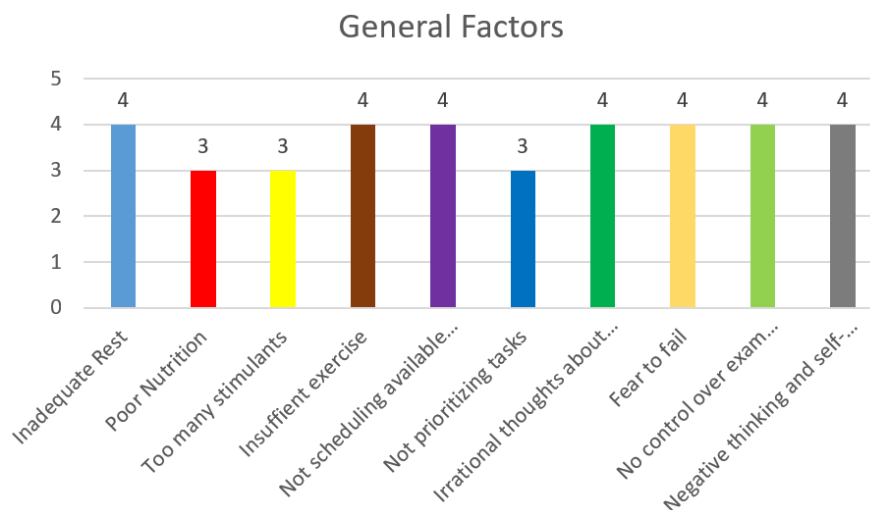


Fig I: Perceptions of dental students (mean scores) about general factors provoking exam anxiety

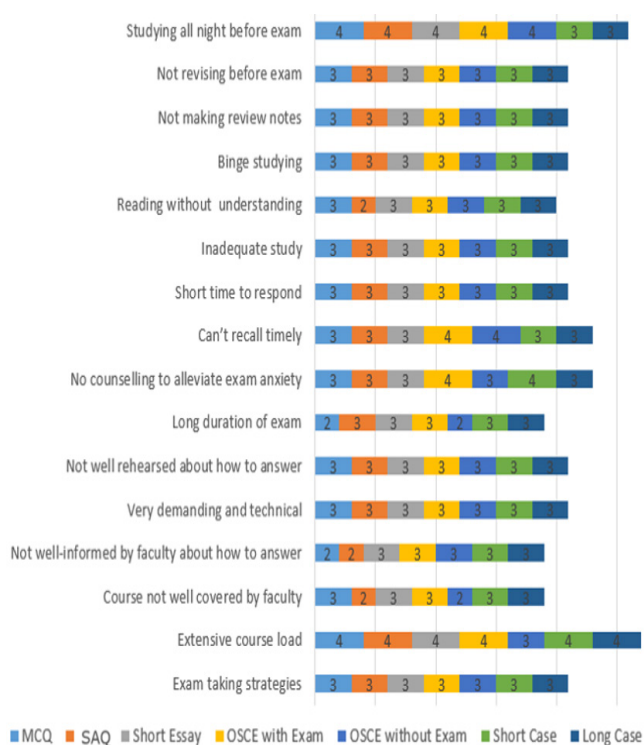


Fig II: Mean scores of specific factors related to all assessment modalities provoking exam anxiety

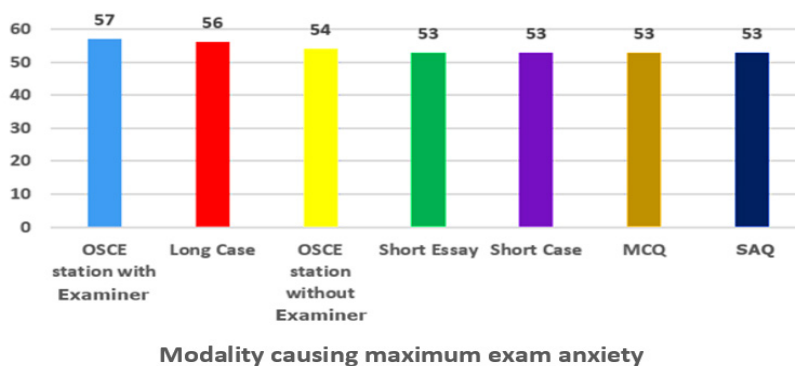


Fig III: Mean scores of exam anxiety caused by different assessment modalities