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Effect of Dental Education on Dental Phobia; A Cross-Sectional Study among the Dental Students of Riyadh, KSA

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Dental anxiety among dental students is an important issue that needs to be examined more thoroughly by the research community. Dental anxiety among dental students could have implications for their future practice, as it may adversely affect their ability to render quality dental care.
Materials and Methods: This was a cross sectional study conducted among the dental students in Riyadh using an online survey. Dental universities in Riyadh were contacted and participants were requested to fill up the survey. 500 students from all six years of dentistry were utilized in this study.
Results: overall 21.6% of clinical students reported that dental education did not reduce their dental phobia at all, whereas 40.4% reported definitely yes. Among various dental procedures that may cause anxiety among patients, root canal treatment (RCT) was accounted for the greatest number of responses (28.6%) in 'high anxiety'.
Conclusion: There is a need to intervene and use certain measures to reduce the dental phobia or anxiety among pre-clinical dental students and not wait until they reach clinical levels.

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Keywords: Dental anxiety; dental phobia; pre-clinical; dental students.

1. INTRODUCTION

Dental fear and anxiety are closely related in the realm of behaviour science, and they are commonly used interchangeably in the literature. The majority of patients suffer from dental phobia. Individuals with a high level of dental phobia require extra care from dental professionals, since poor oral hygiene practises and an odd attitude toward food can raise the risk of oral health deterioration [1,2].

With the advancement of technology and a better understanding of the needs of patients, dentistry has progressed over time. However, these developments have not been able to completely eliminate or significantly reduce patient dental dread and anxiety. The appearance, sound, and vibratory feeling of rotary dental drills, as well as the sight and sensation of a dental local anaesthetic injection, are the most significant causes of dental fear and anxiety, according to research. A significant level of worry and anxiety is also linked to the first dentist visit [3,4].

Some researchers believe that dental students have lower levels of dental anxiety than students in other specialties, which could be owing to a lack of dental health education among non-dental university students, which results in a high degree of dental fear [5]. Twenty-five (4.27 percent) of Bulgarian dentistry students had significant anxiety, while 11 (1.88 percent) had severe anxiety, according to a survey. The average dental anxiety results for the students revealed that dread of dental treatment decreased statistically significantly with each year of education. They concluded that dental students had a considerably higher level of dental anxiety at the start of their training than at its end [6].

Females and pre-clinical students reported higher levels of anxiety than their male counterparts, according to a study conducted among dentistry students in Pakistan. Early in dental education, educational sessions and graded exposure therapy may help to lessen the anxiety associated with dental operations [7]. According to a comparable study conducted in Norway, the makeup of dental programmes may have an impact on dental anxiety levels. When compared to non-dental students, dental students had a lower level of dental phobia. Dental anxiety was lower in senior dental students who had more clinical experience than junior dental students [8].

Dental anxiety in dental students is a serious problem that needs to be investigated more by the research community. Dental anxiety among dental students may have ramifications for their future practise, as it may impair their capacity to provide high-quality care [9]. As a result, the study hypothesis was to see how much dental dread decreases as students go to higher degrees of dentistry. As a result, the study's goal was to assess the prevalence of dental phobia among various levels of dental students, as well as the impact of dental education on dental phobia, by comparing responses by gender and dentistry level.

2. MATERIALS AND METHODS

Study Design: This was a cross sectional study conducted among the dental students in Riyadh using an online survey.

Study Sample: Dental universities in Riyadh were contacted and participants were requested to fill up the survey. 500 students from all six years of dentistry were utilized in this study.

Study Instrument: Online questionnaire was constructed consisting of questions related to personal and demographic data followed by questions linked to dental phobia, previous experiences, aggravating or relieving factors and effect of education.

Instrument Validity and Reliability: A pilot study was conducted by sending the survey to 20 participants and the data will be inserted in SPSS version 22 to determine the reliability by using Chronbach's coefficient alpha (value: 0.926). Validity of the questionnaire was tested by sending it to experienced researchers in REU but no changes were made.

Statistical Analysis: Collected data was analyzed using SPSS version 22, where descriptive as well as inferential statistics were conducted. Comparisons between groups were made with the value of significance kept under 0.05 using Chi-square test.

3. RESULTS

A total of 500 dental students from various universities and levels participated in this study, for which the power of sample was calculated to be 0.83 (Table 1).

Table 1. Power of sample

Mean	2.61
Std Deviation	1.29
Sample size	500
Alpha	0.05
Sample mean	2.76
Standard Error of Mean	0.06
Critical Value	2.70
Beta	0.17
Power	**0.83**

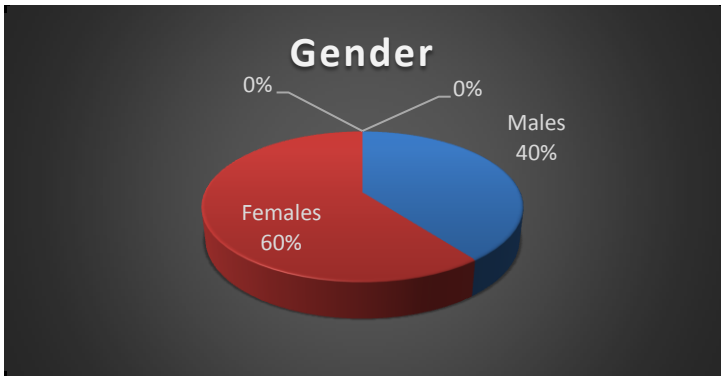

Fig. 1. Gender ratio of study participants

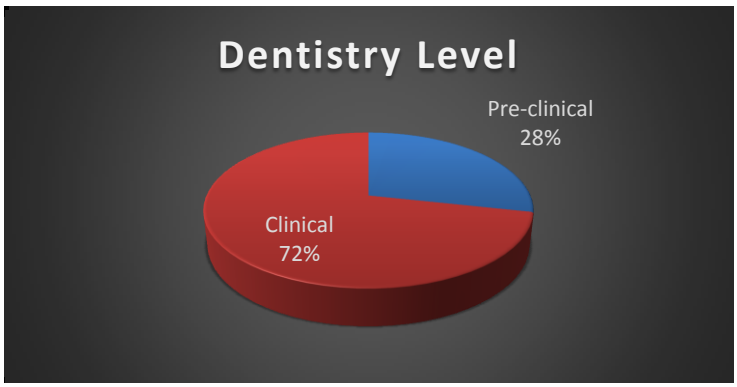

Fig. 2. Dentistry levels of the study participants

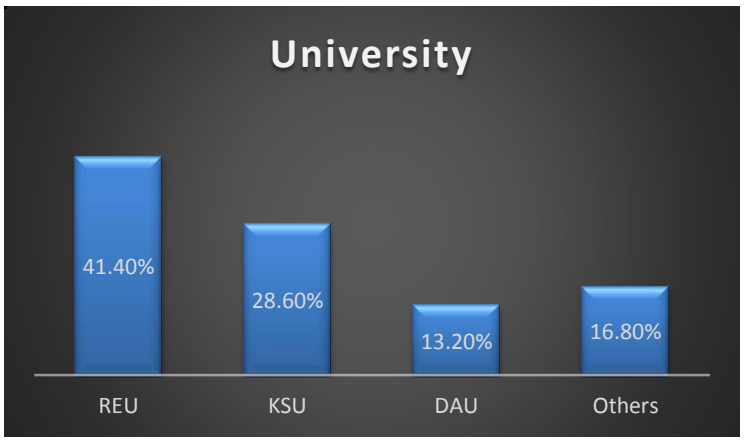

Fig. 3. Universities included in this study

Regarding their gender ratio, 40% were males and 60% females. 28% were from pre-clinical levels whereas 72% from clinical levels. As far as their universities were concerned, 41.4% belonged to REU, 28.6% to KSU, 13.2% to DAU and 16.8% to other institutions (Figs. 1, 2 & 3).

Table 2 shows the overall responses of participants to the survey questions asked about fear and anxiety from different dental procedures. 21.6% of clinical students reported that dental education did not reduce their dental phobia at all, whereas 40.4% reported definitely yes. Among various dental procedures that may cause anxiety among patients, root canal treatment (RCT) was accounted for the greatest number of responses (28.6%) in 'high anxiety'. It was also observed that 'x-rays' was deemed as the least anxious dental procedure as it was responded by 68.2% participants.

Table 2. Survey questions related to fear and their responses

Survey questions	Responses (%)	
Has dental education reduced your dental phobia? (only for clinical students)	Not at all: 21.6% Somewhat yes: 37.9% Definitely yes: 40.4%	
Which procedure you are highly anxious of?		
Needle	Low: 30.2% Moderate: 29.4%	High: 14.8% No: 25.6%
RCT	Low: 17.6% Moderate: 30%	High: 28.6% No: 23.8%
Extraction	Low: 22.6% Moderate: 25.8%	High: 27.2% No: 24.4%
Need for further treatment	Low: 29.2% Moderate: 23.4%	High: 9.2% No: 38.2%
Application of cold air	Low: 23.8% Moderate: 10.4%	High: 4.4% No: 61.4%
Vibration of drill	Low: 31.4% Moderate: 13.8%	High: 9.2% No: 45.6%
Numb feeling	Low: 30% Moderate: 10%	High: 5.8% No: 54.2%
Periodontal probing	Low: 26.2% Moderate: 11%	High: 3.4% No: 59.4%
Sound of scaler	Low: 26.2% Moderate: 5.8%	High: 6% No: 62%
Impression taking	Low: 20.4% Moderate: 13.2%	High: 7% No: 59.4%
X-rays	Low: 26.4% Moderate: 2.6%	High: 2.8% No: 68.2%
Rubber dam	Low: 26% Moderate: 12.4%	High: 5.8% No: 55.8%
Prolonged mouth opening	Low: 26% Moderate: 23%	High: 10.2% No: 40.8%
Panic attacks	Low: 24.4% Moderate: 18.2%	High: 10.8% No: 46.6%
Incapability to stop the dentist	Low: 24.2% Moderate: 16.6%	High: 10% No: 49.2%
Unable to ask questions	Low: 30.4% Moderate: 15.4%	High: 8.2% No: 46%
Not being listened to	Low:31.2% Moderate: 16.6%	High: 12.2% No: 40%
Financial cost of treatment	Low: 24.8% Moderate: 22.6%	High: 18.8% No: 33.8%
Number of appointments	Low: 24.6% Moderate: 22.4%	High: 16.6% No: 36.4%
Feeling ashamed about the condition of the mouth	Low: 27.8% Moderate: 17.2%	High: 16.4% No: 38.6%

Table 3. Comparison of survey responses on the basis of gender

Survey questions	Males		Females		*P*
Has dental education reduced your dental phobia?	No statistically significant association				.495
Which procedure you are highly anxious of?					
Needle	Low: 22% Moderate: 30%	High:17% No: 31%	Low: 35% Moderate: 29%	High: 14% No: 22%	.008
RCT	No statistically significant association				.165
Extraction	Low: 26% Moderate: 31%	High: 25% No: 18%	Low: 21% Moderate: 23%	High: 28% No: 28%	.016
Need for further treatment	Low: 23% Moderate: 30%	High: 4% No: 43%	Low: 33% Moderate: 19%	High: 13% No: 35%	.000
Application of cold air	Low: 16% Moderate: 13%	High: 2% No: 70%	Low: 29% Moderate: 9%	High: 6% No: 56%	.000
Vibration of drill	Low: 26% Moderate: 18%	High: 5% No: 51%	Low: 35% Moderate: 11%	High: 12% No: 42%	.002
Numb feeling	No statistically significant association				.133
Periodontal probing	Low: 17% Moderate: 12%	High: 2% No: 70%	Low: 32% Moderate: 10%	High: 5% No: 53%	.000
Sound of scaler	Low: 17% Moderate: 7%	High: 3% No: 73%	Low: 32% Moderate: 5%	High: 8% No: 55%	.000
Impression taking	Low: 15% Moderate: 9%	High: 7% No: 69%	Low: 24% Moderate: 16%	High: 7% No: 53%	.003
X-rays	Low: 16% Moderate: 4%	High: 0% No: 80%	Low: 33% Moderate: 2%	High: 5% No: 60%	.000
Rubber dam	Low: 14% Moderate: 12%	High: 7% No: 68%	Low: 34% Moderate: 13%	High: 5% No: 48%	.000
Prolonged mouth opening	Low: 23% Moderate: 23%	High: 3% No: 51%	Low: 28% Moderate: 23%	High: 15% No: 34%	.000
Panic attacks	No statistically significant association				.122
Incapability to stop the dentist	Low: 20% Moderate: 20%	High: 4% No: 57%	Low: 27% Moderate: 15%	High: 14% No: 44%	.000
Unable to ask questions	Low: 22% Moderate: 17%	High: 7% No: 55%	Low: 36% Moderate: 14%	High: 9% No: 40%	.002
Not being listened to	Low: 25% Moderate: 15%	High: 19% No: 41%	Low: 25% Moderate: 27%	High: 19% No: 29%	.000
Financial cost of treatment	Low: 25% Moderate: 15%	High: 19% No: 41%	Low: 25% Moderate: 27%	High: 19% No: 29%	.003
Number of appointments	Low: 19% Moderate: 22%	High: 10% No: 49%	Low: 28% Moderate: 23%	High: 21% No: 28%	.000
Feeling ashamed about the condition of the mouth	No statistically significant association				.263

Table 3 shows the difference between males and females when compared the survey responses using Chi-square test. Overall there was a statistically significant association between gender and dental phobia, as 16 out of 20 variables showed statistically significant differences (p-value<0.05). Male students were found to be highly anxious during the use of

needle (p-value: .008) and rubber dam (p-value: .000). Whereas female students were found to be highly anxious during the use of all remaining procedures and methods (p-value<0.05) except RCT, numb feeling, panic attacks and feeling ashamed of mouth condition (p-value>0.05).

Table 4 shows the difference in responses between pre-clinical and clinical dental students regarding their anxiety levels. 9 out of 20 variables were found not to be statistically significant (p-values>0.05). However, pre-clinical students exhibited high level of anxiety when inquired about application of cold air (p-value:0.006), vibration of drill (p-value: 0.037), numb feeling (p-value: .001) and all remaining significant variables so clearly they had higher anxiety levels as compared to clinical students.

Table 4. Comparison of survey responses on the basis of student level

Survey questions	Pre-clinical		Clinical		*P*
Which procedure you are highly anxious of?					
Needle					.231
RCT					.151
Extraction		No statistically significant association			.944
Need for further treatment					.444
Application of cold air	Low: 27% Moderate: 16%	High: 6% No: 66%	Low: 23% Moderate: 8%	High: 4% No: 66%	.006
Vibration of drill	Low: 37% Moderate: 11%	High: 13% No: 39%	Low: 29% Moderate: 15%	High: 8% No: 48%	.037
Numb feeling	Low: 30% Moderate: 15%	High: 7% No: 48%	Low: 25% Moderate: 9%	High: 2% No: 64%	.001
Periodontal probing	Low: 17% Moderate: 12%	High: 2% No: 70%	Low: 32% Moderate: 10%	High: 5% No: 53%	.000
Sound of scaler	Low: 36% Moderate: 4%	High: 14% No: 46%	Low: 22% Moderate: 6%	High: 3% No: 68%	.000
Impression taking	Low: 27% Moderate: 14%	High: 13% No: 46%	Low: 18% Moderate: 13%	High: 5% No: 65%	.000
X-rays	Low: 33% Moderate: 4%	High: 6% No: 58%	Low: 24% Moderate: 2%	High: 2% No: 72%	.005
Rubber dam	Low: 27% Moderate: 12%	High: 11% No: 50%	Low: 25% Moderate: 13%	High: 4% No: 58%	.027
Prolonged mouth opening		No statistically significant association			.262
Panic attacks					.058
Incapability to stop the dentist	Low: 25% Moderate: 20%	High: 17% No: 53%	Low: 24% Moderate: 15%	High: 7% No: 53%	.002
Unable to ask questions	Low: 34% Moderate: 13%	High: 14% No: 39%	Low: 29% Moderate: 16%	High: 6% No: 49%	.008
Not being listened to	Low: 30% Moderate: 16%	High: 19% No: 35%	Low: 32% Moderate: 17%	High: 9% No: 42%	.031
Financial cost of treatment					.110
Number of appointments					.142
Feeling ashamed about the condition of the mouth		No statistically significant association			.271

4. DISCUSSION

This study aimed to determine the anxiety levels of dental students regarding various dental procedures and compare on the basis of gender and dentistry levels and the effect of dental education on these anxiety levels. It can be noted from the findings that a healthy number of clinical students reported that their dental fear has been reduced due to their dental education, which is also evident from the comparison that we made between pre-clinical and clinical students as all dental procedures were feared highly by pre-clinical students and none by the clinical students. Therefore exhibiting a significant improvement due to dental education; similar findings were observed among a group of Norwegian university students where the senior dental students showed significantly lower anxiety levels due to dental procedures as compared to the junior dental students. Their reported reason behind this was practice-oriented dental education [10].

Another investigation done among the University of Malaya students revealed that the highest number of students showed dental fear when came across anesthetic needle. Whereas it was seen that vibration of drill was considered to be the second most fearful procedure happening at a dentist's office [3]. However, our study revealed different findings as the most common cause of dental fear was root canal treatment followed by tooth extraction.

A Pakistani based study having similar aims to that of our study revealed that dental students, particularly in their pre-clinical years were more nervous as compared to the clinical students. From the present study it was observed that female dental students were more anxious as compared to male dental students ($P < 0.05$) when it comes to undergoing various dental procedures [11]. When compared these findings with our study, it can be appreciated that there were significant similarities, as our study participants who belonged to pre-clinical years were significantly more anxious to dental treatment as compared to clinical year students. Moreover, similar findings were observed when compared the gender as well.

Another study conducted among the pre-clinical dental students in India revealed that there was a higher prevalence of anxiety among them when it comes to received local anesthesia as a part of their pre-clinical training. Significant influences are observed in dental practice due to anxiety and injection of local anesthesia. Provision of local anesthesia provides stress not only to the patient, but to the dentist as well. They concluded that theoretical knowledge combined with step-by-step practical assistance may reduce anxiety during the injection procedure [12]. This study also supports our findings as the fear among our pre-clinical dental students was evident.

The clinical importance of dental anxiety must not be underrated. Dental anxiety is first and foremost an oral-health dilemma as it is related with a lower rate of dental visits and a higher incidence of dental caries. It was shown by Patel A et al and Seligman LD et al that in the diagnostic standards for any anxiety disorder or phobia by APA, the evasion linked with the phobic stimulus hinders substantially with the individual's daily routine, occupational or school functioning, and social relationships [13,14].

In a study done by Sharma et al and Muhammad UN et al where comparison to male undergraduate dental students and preclinical students, female undergraduate dental students and preclinical students were more worried and clinical year students, accordingly. There is a requirement for good oral health education, clinic exposure, and Counseling treatment has been used to alleviate anxiety levels since the beginning of dental school [15,16].

There are a few limitations associated with cross-sectional design, which include the inability of generalizability of study sample as it may not represent the whole population. Furthermore, in a cross-sectional study, all the measurements for the test member are achieved at a single point in time, even though recruitment may take place through a longer period of time.

5. CONCLUSIONS

From the present study it can be concluded that there is a significant impact of dental education on the reduction of dental fear among students. Females showed significantly higher level of anxiety as compared to males. Pre-clinical students showed significantly higher level of anxiety as compared to clinical students. There is a need to intervene and use certain measures to reduce the dental phobia or anxiety among pre-clinical dental students and not wait until they reach clinical levels.

7. FUTURE SCOPE

Findings of this study may be helpful in incorporating topics or pre-clinical training regimens in order to reduce the dental anxiety among pre-clinical students.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The research proposal was submitted to the Research Center by titled Effect of dental education on dental phobia; a cross-sectional study among the dental students of Riyadh, KSA has been reviewed and approval to conduct the study was given by the Institutional Review Board (IRB) of Riyadh Elm University (REU).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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