Dental Anxiety, Fear and Anxiety of Performing Dental Treatments among Dental Students during Clinical Studies

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Purpose: *Dental student's dental anxiety may negatively affect patient's attitude towards dental treatment. We evaluated dental anxiety among dental students in different clinical stage of their studies. We assessed the student's anxiety prior to treating patients.* ***Study design:*** *A cross-sectional study. Fourth to sixth-year dental students completed questionnaires containing: 1) Dental Anxiety Scale (DAS); 2) Dental Fear Survey (DFS); and 3) visual analogue scale questions relating to the student's anxiety when performing dental treatments in children and adults.* ***Results:*** *124 dental students completed the questionnaires (mean age, 26.4±3.1 years, 59.7% women). Average DAS in the study population was 7.55±2.15 with similar scores observed across the years. Average DFS score was highest among fourth-year students (1.62±0.65) and lowest among sixth year students (1.36±0.32). DFS scores decreased as the students progressed through the clinical years (p=0.059). The students' average anxiety scores prior to treating children were significantly higher than the anxiety scores prior to treating adults (3.82±2.42 vs. 2.67±1.9, p<0.001). Fifth-year students had significantly higher anxiety scores prior to treating children and adults compared to fourth and sixth-year students.* ***Conclusion:*** *Dental anxiety among dental students is relatively low and decreases gradually as they progress through the clinical years. Anxiety prior to treating patients, particularly children, is at its highest just before starting to treat patients for the first time. As dental students are future healthcare providers, it is important that they learn techniques to help them manage their own dental anxiety and fear as well as deal with anxiety related to treating patients.*

Keywords: *Dental students, dental anxiety, dental fear, pediatric patients*

INTRODUCTION

Dental anxiety is defined as an abnormal fear or dread of visiting the dentist for preventive care or therapy and unwarranted anxiety over dental stimuli and procedures such as the look and feel of the dental needle or the noise and feel of drilling. [1-3] It is very common phenomenon, with 10 to 50% of the population reporting moderate to high levels of dental anxiety.[4-8]

Dental anxiety constitutes a major problem for those who suffer from it. Avoidance of dental care and necessary treatments due to anxiety is very common and is associated with the exacerbation of dental problems and symptoms and the deterioration of oral and dental health [9-12] When they do attend treatments, it is often difficult to successfully accomplish dental treatments in such patients.

Several studies have reported an association of age and gender with dental fear and anxiety, with younger patients and women more likely to experience fear and anxiety.[1-3, 13-16] Among adolescents, girls reported higher levels of anxiety and fear compared to boys.[1] Dental anxiety may also result from a traumatic experience during dental treatment,[15] dentists' bad attitude, personality traits or lack of exposure to dental treatments.[17]

A positive correlation between parental and children's dental anxiety was reported,[16,18] indicating that parents who

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are overly involved cause higher anxiety in their children, a behavior pattern that may continue during adulthood. Male and female dental students perceived their mothers' dental anxiety as significantly higher than that of their fathers.[15]

The relationship between the dentist and the patient is of paramount importance, as the patient tends to be more relaxed if the dentist projects confidence.[19] Treatment providers, including dental students, may also suffer from dental anxiety.[3, 15, 16, 20] Among Brazilian dental students, 27.5% reported fear when they become dental patients.[20]

Dental students' personal dental anxiety and fear could negatively affect patients' attitude towards dental treatment and cause rejection and elimination of necessary treatments. Morgan et al. reported that dentally anxious children aged 11-16 years placed considerable value on communication with dental professionals, with poor communication having a negative influence on dental anxiety and the dentist-patient relationship.[21]

The Dental School at Tel Aviv University trains dentists in a 6-year university program. The first 3 years comprise premedical subjects. Clinical studies begin in the fourth year. Fourth-year students study and acquire their first manual skills in the phantom lab, while fifth-year students begin treating patients for the first time. Therefore, sixth-year students have relatively more experience in treating patients compared to students in the previous years.

We aimed to evaluate dental anxiety and fear levels among dentistry students during the clinical years of their studies (years 4-6) and to examine if their dental anxiety and dental fear levels change during these years. In addition, we assessed the students' anxiety scores prior to treating adult and pediatric patients.

MATERIALS AND METHOD

This was a cross-sectional survey performed in the School of Dental Medicine, Tel Aviv University. The study was approved by the institutional ethics committee.

During the first trimester of the 2017 academic year, fourth, fifth and sixth year dental students were approached and asked to complete a questionnaire comprising 3 parts: 1) dental anxiety scale (DAS); 22) dental fear survey (DFS); and 23) questions relating to the student's anxiety when performing dental treatments in adult and pediatric patients.

Outcome measures

The DAS contains 4 multiple-choice items dealing with the patient's subjective reactions to the dental situation: a) anticipating a visit to dental clinic; b) waiting in the dentist's office for treatment; c) anticipating the drilling of teeth; and d) anticipating the scaling of teeth. The response options follow a rating scale ranging from least anxiety (score = 1) to highest anxiety (score =5). The maximum score for the questionnaire is 20 points. A patient is defined as anxious when the total score of all four questions is between 13-14 points and very anxious when the total score is 15 points or more.[22]

The DFS is composed of 20 items comprising three dimensions: avoidance (8 items), physiological arousal (5 items), and fears of specific stimuli/situations (7 items). The response options follow a rating scale ranging from "never" or "not at all" (score = 1) to "nearly every time" or "very much" (score = 5).[23]

The participants were also asked to complete 2 questions on a visual analogue scale (VAS) describing the level of anxiety prior to treating a child and an adult. The VAS scale ranges from 0 to 10, where '0' indicates 'no anxiety' and '10' indicates 'high anxiety'.[24]

Data analysis

Data analysis included Pearson correlation chi-squared test to compare the difference in gender and DAS across the 3 clinical years.

Mean DFS was calculated as the average DFS for each student's quaternary.

Analysis of Variance (ANOVA) was used to compare the difference in age, mean DFS and students' anxiety prior to treating children and adults across the 3 clinical years. Paired t-test was used for comparing between the students' anxiety prior to treating children and their anxiety prior to treating adults. Results were considered significant if the p value was <0.05.

RESULTS

A total of 124 dentistry students completed the questionnaires. The mean age of the participants was 26.4 ± 3.1 years and 74 of them (59.7%) were women. Forty-four of the participants (35.5%) were fourth year students, 41 (33.1%) were fifth year students and 39 (31.5%) were sixth year students. There was no statistically significant difference in the male to female ratio across the years (Table 1).

The DAS results are presented in Table 2. The average DAS in the study population was 7.55 ± 2.15. No statistically significant differences in average DAS were observed among the years.

The results of the DFS are presented in Table 3. The overall mean DFS score was highest among fourth years students (1.62 ± 0.65) and lowest among sixth year students (1.36 ± 0.32), with a trend toward statistical significance for the decrease in DFS scores along the clinical years (p=0.059). When assessing the dimensions of the DFS, the average scores for the avoidance and for fears of specific stimuli/situations were also highest in the fourth year and

Table 1: Distribution of gender and age among dental students in the clinical years

Variable	Year			All participants N=124	P value
	4 N=44	5 N=41	6 N=39		
Gender, n (%)					
Males	15 (34.1%)	20 (48.8%)	15 (38.5%)	50 (40.3%)	0.37
Females	29 (65.9%)	21 (51.2%)	24 (61.5%)	74 (59.7%)	
Mean age ± SD (years)	24.98±2.72	26.49±2.69	27.9±3.26	26.4±3.11	<0.05

lowest in the sixth year with a trend toward statistical significance for the decrease along the clinical years (p=0.067 and p=0.075, respectively), while the average score for physiological arousal was not statistically significantly different among the years.

Of the list of fears of specific stimuli/situations in the DFS, the highest average scores were for needle sensation (2.17 ± 1.03), needle sight (1.93 ± 0.9) and drill sensation (1.88 ± 0.92).

The average anxiety scores perceived by the students prior to treating adults and children are shown in Table 4. Overall the students' average anxiety scores prior to treating children were significantly higher than the anxiety scores perceived prior to treating adults (3.82 ± 2.42 vs. 2.67 ± 1.9, p<0.001). Fifth-year students felt significantly more anxiety prior to treating children and adults compared to fourth and sixth-year students (p=0.007 and p=0.023, respectively).

DISCUSSION

Our findings show that during the clinical stage of their studies, dental students have moderate dental anxiety which remains within the same range between the fourth and sixth year. No difference in anxiety scores was noted between men and women. Some studies did not report a difference in anxiety scores of men as compared to women [9, 20, 25], while other studies reported that women were more likely to suffer from dental anxiety compared to men.[1-3, 13-16, 26] In a previous study we found that female postgraduate dental students and female instructors have higher dental anxiety compared to their male counterparts.[26]

Studies that evaluated dental students' dental anxiety reported decreasing levels of anxiety as the students progressed through their studies. Peretz and Mann assessed dental anxiety over 4 years in a group of 30 dental students. The student's highest dental anxiety

Table 2: DAS scores by clinical year

DAS score, mean ± SD	Year			All participants	P value
	4	5	6		
Anticipating a visit to the dental clinic	2.41±0.75	2.49±0.81	2.23±0.74	2.38±0.77	0.32
Waiting in the dentist's office for treatment	1.59±0.73	1.49±0.64	1.67±0.66	1.58±0.67	0.5
Anticipating the drilling of teeth	1.84±0.75	1.95±0.71	1.77±0.58	1.85±0.68	0.49
Anticipating the scaling of teeth	1.73±0.59	1.76±0.66	1.72±0.51	1.73±0.59	0.95
Total score	7.57±2.21	7.68±2.26	7.38±1.98	7.55±2.15	0.82

Note: DAS rating scale ranged from score 1=least anxiety to score 5=highest anxiety foe each question. The maximum score for the questionnaire is 20 points. A patient is defined as anxious when the total score of all four questions is between 13-14 points and very anxious when the total score is 15 points or more

Table 3: DFS scores by clinical year

DFS score, mean ± SD	Year			All participants	P value
	4	5	6		
Avoidance	1.43±0.83	1.19±0.5	1.14±0.34	1.26±0.61	**0.067**
Physiological arousal	1.53±0.73	1.37±0.47	1.30±0.39	1.4±0.56	**0.168**
Fears of specific stimuli/situations	1.68±0.68	1.57±0.43	1.42±0.38	1.56±0.53	**0.075**
Total score	1.62±0.65	1.49±0.4	1.36±0.32	1.5±0.5	**0.059**

Note: DFS rating scale ranged from score 1="never" or "not at all" to score=5 "nearly every time" or "very much".

Table 4: Perceived anxiety of dental students prior to treating adults and children

Anxiety prior to treating VAS score, mean ± SD	Year			All participants	P value for the difference between years
	4	5	6		
children	3.68±2.21	4.71±2.67	3.05±2.11	3.82±2.42	**0.007**
adults	2.55±1.86	3.29±1.93	2.15±1.79	2.67±1.9	**0.023**
P value for the difference between adults and children				<0.001	

Note: VAS range 0='no anxiety' to 10='high anxiety'.

levels were reported in their third year, while they were still in their preclinical years, and decreased during their fifth and sixth (clinical) years. Although anxiety levels of female students decreased between the third and sixth year, their anxiety levels were significantly higher than those of the male students.[15] Similar results were reported by Storjord *et al* whereby higher anxiety levels were reported by students during the first two years of their studies, compared to the last two years of their studies.[25] These results can be explained by the fact that the sixth year students have greater clinical experience and more extensive professional knowledge in dentistry.[3, 15]

Past exposure to a painful and traumatic experience in the context of dental care was found to induce dental anxiety.[27] Accordingly, behavioral anxiety management techniques including good communication and establishing rapport, use of systematic desensitization, hypnosis [28] and computer-based tools [29] may be used to reduce dental anxiety and fear/avoidance of dental procedures. As dental students are gradually exposed to potential situations that can trigger anxiety, dental education can change the perception of dental care that students carry from childhood or previous experiences. Accordingly, by de-sensitization, gradual and controlled exposure to conventional components of dental anxiety (e.g. local anesthesia) can help these anxious students become accustomed to or use strategies to deal with dental anxiety.[15, 30] This may explain the decreased dental anxiety reported by dental students as they advance through their clinical years.[13]

The moderate anxiety scores reported by the dental students in the current study are similar to those reported by dental students in other studies. These studies reported that dental students had the lowest levels of dental anxiety compared with students majoring in other fields.[2, 3, 25, 31] Students in other fields other than dentistry may lack sufficient education and exposure to the field of dentistry and accordingly have higher dental anxiety levels. It is also possible that the personal characteristics of dental students are different from those of students in other fields, and as a result they have different levels of their dental anxiety. In addition, individuals with high dental anxiety may choose not to learn a profession that will expose them to anxiety.

DFS helps to assess patients' anxiety quickly and accurately. [23, 32] We observed that dental fear scores were highest among fourth-year students and decreased by each clinical year. Specifically, avoidance and fears of specific stimuli/situations were highest in the fourth year and lowest in the sixth year. In a study comparing dental fear among dental students and their patients, both students and patients had dental fear, but the prevalence of fear was higher in patients.[20] Negative dental experiences in childhood were reported to increase dental fear among students.[33] Similar to other studies, the students in the current study ranked needle sensation, needle sight and drill sensation as the most fear-inducing stimuli, [2, 3, 15, 20, 34] so it can be assumed that these constitute the source of dental fear. However, the gradual decrease in dental fear observed as the students advance through the clinical years may be attributed to the exposure to these procedures, the professional experience and the greater theoretical knowledge that the students acquire during their clinical years. Interestingly, among postgraduate students and their instructors, the anticipation of undergoing dental treatment was the strongest stimulus in generating dental fear followed by waiting to undergo drilling, waiting for the dentist to scale the teeth waiting in the dentist's waiting room.[26]

During the course of their studies, the students learn how to deal with anxious patients, with an emphasis on preventing the development of dental anxiety in children. Before performing dental treatments in children the approach is first to explain and show what is going to be done (the "tell, show, do" method).[35, 36]

We also evaluated the students' anxiety scores prior to treating adults and children. Our findings showed that overall, the students' average anxiety scores prior to treating children were significantly higher than the anxiety scores perceived prior to treating adults. This finding can be explained by the fact that children are perceived by students as more difficult and sensitive patients. Children's dental anxiety levels are often high, and several pre-treatment techniques must be performed to reduce their anxiety to allow the necessary treatments. The very act of causing pain, particularly to children, has been identified as a source of concern among dentists.[37] Another study has reported local anesthesia administration as a major cause of stress among dentists.[38] Regardless of the procedure's location, treatment of children with dental anxiety, increases stress levels among dental students[39] and dentists.[40]

Interestingly, fifth-year students felt significantly higher anxiety prior to treating children and adults compared to fourth and sixth-year students. It is possible that fifth-year students perceive the highest levels of anxiety because they are about to perform their first clinical treatments in adults and children, compared to students in the sixth year who already have a year's experience. Fourth-year students are still far from treating actual patients, as they are at the stage of performing manual techniques on lab phantoms and therefore report lower anxiety for treating patients. Apparently, experience and training play an important role in reducing stress in dentists while performing various treatments.[40] As reports on the anxiety of dental students when treating children and adults are lacking, further studies are warranted.

A limitation of this study is its cross-sectional design which only evaluates the students' anxiety and fear at one time-point and unlike studies that examined dental anxiety levels over a number of years in the same students.[15] However, our findings are in line with other reports indicating that there is an association between progress in dental studies and the enrichment of theoretical and practical knowledge and decreased dental fear and anxiety scores.

CONCLUSIONS

Postgraduate dental students have relatively low dental anxiety that gradually decreases as they progress along the clinical years. Anxiety prior to treating patients, particularly children, is at its highest just before starting to treat patients for the first time. As dental students are future healthcare providers, it is important that they learn techniques to help them manage their own dental anxiety and fear as well as deal with their anxiety relating to treatment of patients. Increasing their confidence as caregivers and overcoming their anxiety would allow them to become better doctors.

CONFLICT OF INTERESTS

The authors declare no conflict of interests.

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