

Dental Anxiety Among Israeli Postgraduate Pediatric Dental Students and their Instructors

Sigalit Blumer * /Diana Ram**/ Liora Costa***/Benjamin Peretz****

Objective: To measure the dental anxiety levels of post-graduate pediatric dental students (PGS) and their instructors, and their ranking of the most anxiety provoking situations in the dental situation; to investigate gender differences with regard to dental anxiety. **Study design:** Twenty-four PGS and 31 of their instructors completed a three-section questionnaire on socio demographic information, dental anxiety scale (DAS) and dental fear survey (DFS). **Results:** The overall mean DAS and DFS scores were similar for both groups. The scores of the PGS were significantly higher on the DFS for perspiration when dental work was done ($p = 0.032$), the smell of the dentist's office ($p = 0.009$), and seeing the dentist enter the treatment room ($p = 0.005$). The total DAS score was significantly higher among females than among males (8.03 ± 3.08 and 6.63 ± 1.77 , $p = 0.037$), and for item on waiting for the dentist to scrape the teeth, ($p = 0.05$). The DAS and DFS scores were strongly correlated ($r = 0.768$, $p = 0.000$). The highest DAS score was for the item on anticipation of dental treatment before arrival to the clinic and waiting for the drilling. The response pattern for both groups was similar. **Conclusions:** Overall dental anxiety of PGS and their instructors was similar. Female PGS and instructors had higher dental anxiety levels than males.

Key words: dental anxiety, post-graduate pediatric dental students, teachers

INTRODUCTION

Dental anxiety constitutes a major problem for patients and dental care providers alike. Anxious patients tend to avoid treatment, and are difficult to manage once they are in the dental chair. Avoidance of dental treatment due to anxiety is very common and appears to be strongly associated with extreme deterioration of oral and dental health¹. Studies conducted worldwide as well as in Israel have determined that females tend to have higher anxiety levels than males²⁻⁶, and this applies to female medical students as well⁷. Injection was found to lead the anxiety-provoking stimuli in the dental setting, followed by use of the drill^{7,8}. However, drilling and filling were not necessarily the cause of anxiety among all individuals seeking dental treatment⁹. It has been suggested that dental anxiety may partly originate from traumatic experience with dental treatment, dentists' bad attitude, the patients' personality traits or their lack of exposure to dental treatment at all¹⁰. A patient's dental behavior may be largely influenced by the attitudes of the caregiver. For example, an attitude which ignores the pediatric patient's feelings and emotions or belittles the child will make the child anxious and set a pattern that could very well be maintained into adulthood.

In pediatric dentistry, one of the basic approaches to the management of the anxious child patient is "tell-show-do"¹¹. It is based on the assumption that knowledge about a procedure prior to carrying out the actual treatment may reduce dental anxiety. The technique aims to desensitize children to the dental environment and to the various dental procedures. The authors of one study¹³ that showed a gradual reduction of

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dental anxiety among Israeli undergraduate dental students over their last three years of clinical studies concluded that the change could be explained by increased professional knowledge and clinical experience that the students acquired over time, which acted as “tell-show-do” for the students themselves. Similarly to undergraduate students, postgraduate dental students (PGS) may experience a change in their feelings, perceptions and attitudes towards professional issues during their training. It would, therefore, be logical to hypothesize that dental anxiety of PGS will decrease over the course of years of specialization.

The aims of the present study were to measure the dental anxiety levels of PGS and their instructors, and their ranking of the most anxiety-provoking situations in the dental setting, and to investigate gender differences among students with regard to dental anxiety.

Population And Method

The study population included 24 PGS and 31 of their instructors. All the instructors were specialists in pediatric dentistry. After receiving approval of the ethical committee to conduct this study, all 55 participants were asked to complete an anonymous three-section questionnaire. The first part dealt with some sociodemographic information (age, gender, having undergone dental treatment in the past and time of last visit to the dentist), the second section was a dental anxiety scale (DAS)¹⁴ (Figure 1), and the third part was a dental fear survey (DFS)¹⁵ (Figure 2).

Figure 1. Dental Anxiety Scale (DAS)

1. If you had to go to the dentist tomorrow, how would you feel about it?
 - a) I would look forward to it as a reasonably enjoyable experience.
 - b) I wouldn't care one way or the other.
 - c) I would be a little uneasy about it.
 - d) I would be afraid that it would be unpleasant and painful.
 - e) I would be very frightened of what the dentist might do.
2. When you are waiting in the dentist's office for your turn in the chair, how do you feel?
 - a) Relaxed
 - b) A little uneasy
 - c) Tense
 - d) Anxious
 - e) So anxious that I sometimes break out in a sweat or almost feel physically sick.
3. When you are in the dentist's chair waiting while he gets his drill ready to begin working on your teeth, how do you feel?
(Same alternatives as # 2.)
4. You are in the dentist's chair to have your teeth cleaned. While you are waiting and the dentist is getting out the instruments which he will use to scrape your teeth around the gums, how do you feel?
(Same alternatives as # 2.)

Measures

The DAS contains four multiple choice items dealing with the patient's subjective reactions to the dental situation: (a) anticipating the visit to dental clinic, (b) waiting in the dentist's waiting room, (c) waiting in the dental chair for drilling, and (d) waiting in the dental chair for scaling the teeth. Five possible answers in an ascending order from 1 to 5 are provided, each carrying a maximum score of 5, with a total possible maximum score of 20 for the entire scale. The DFS consists of 20 questions divided into three sections: (a) avoidance of dental treatment, (b) somatic symptoms of anxiety, and (c) anxiety caused by dental stimuli. Each question has a maximum score of 5.

A standard computer program for statistical analysis (SPSS 512+, Brain Power Inc, Calabasas, CA 92302, USA) was utilized. Student's t-test was used to compare the scores of DAS and DFS between the PGS and the instructors, and to determine differences between them for the other items in

Figure 2. The Dental Fear Survey (DFS)

1. Has fear of dental work ever caused you to put off making an appointment?
 2. Has fear of dental work ever caused you to cancel or not to appear for an appointment?
- When having dental work done:*
3. My muscles become tense
 4. My breathing rate increases
 5. I perspire
 6. I feel nauseated and sick to my stomach
 7. My heart beats faster
- Situations:*
8. Making an appointment for dentistry
 9. Approaching the dentist's office
 10. Sitting in the sitting room
 11. Being seated in the dental chair
 12. The smell of the dentist's office
 13. Seeing the dentist walk in
 14. Seeing the anesthetic needle
 15. Feeling the needle injected
 16. Seeing the drill
 17. Hearing the drill
 18. Feeling the vibrations of the drill
 19. Having your teeth cleaned
 20. All things considered, how fearful are you of having dental work done?
- Respondents have to rate their feelings, or reactions to these items by circling the number (1, 2, 3, 4, 5)* on a linear scale.
- *-1- represents never, not at all
 2- represents once or twice, or a little
 3- represents a few times, or somewhat
 4- represents often, or much
 5- represents nearly every time, or very much

the questionnaires as well as those based on gender. Pearson correlation was used to examine correlations between the DAS and the DFS scores. Analysis of variance (ANOVA) with Scheffe's multi-comparison procedure was used to compare the items within the DAS scores of the two study groups. The level of significance was set at a *p*-value ≤ 0.05.

RESULTS

The mean DAS and DFS scores (with standard deviations [SD]) of the PGS and the instructors are shown in Table 1. There were no significant differences between the PGS and the instructors in the DAS and DFS scores (DAS = 7.33 ± 3.16 and 7.71 ± 2.45, respectively, and DFS = 30.42 ± 15.11 and 26.87 ± 8.59, respectively). Visiting the dentist within the last year or having previous dental treatment did not affect any differences in the DAS or DFS scores between the two groups.

Table 2 lists the DFS scores of the PGS and the instructors. The PGS responded with higher scores for all the items, and the differences reached a level of significance for items #5 (perspiration when dental work was done; *p*-value = 0.032), #12 (the smell of the dentist's office; *p*-value = 0.009), and #13 (seeing the dentist walk into the treatment room; *p*-value = 0.005).

Table 3 shows the means and SD of the DAS and DFS scores with regard to gender. The PGS and the instructors were pooled since there were no differences between them. There were 19 males and 36 females, and the total DAS scores were significantly higher among females than among males (8.03 ± 3.08 and 6.63 ± 1.77, respectively, *p*-value = 0.037), as was the mean score for item #4 (waiting for the dentist to scrape the teeth: 1.81 ± 0.98 and 1.32 ± 0.58, respectively, *p*-value = 0.05). The scores were also higher among females for the first three items of the scale, but the differences did not reach a level of significance. There were also no significant

gender differences in the total DFS scores, but the females reported higher scores for item #10 (the feeling while in the waiting room: 1.47 ± 0.85 and 1.05 ± 0.23, respectively, *p*-value = 0.039). There was, however, a strong gender-based correlation between the DAS and the DFS scores (*r* = 0.768, *p*-value = 0.000).

An analysis of the specific items in the DAS among the PGS and the instructors revealed that the highest score was recorded for item #1 (anticipation of undergoing dental treatment before arriving to the dental setting), followed by item #3 (waiting to undergo drilling), item #4 (waiting for the dentist to scrape the teeth), and item #2 (waiting in the dentist's waiting room). The difference between item #1 and the other three items was significant (*p*-value = 0.000) (Table 4). Figure 3 graphically demonstrates item #1 as being the most anxiety-provoking item. It also shows the similarity between the response patterns of both study groups.

Table 3. Means and SD of the DAS and DFS scores according to gender*

	Males (N=19)	Females (N=36)	p-value
DAS item			
1-Anticipating visit to dental clinic	2.26 ± 0.74	2.53 ± 0.88	NS
2-Waiting in the dentist's waiting room	1.37 ± 0.60	1.69 ± 0.82	NS
3-Waiting in the dental chair for the drilling	1.68 ± 0.67	2.00 ± 0.99	NS
4-Waiting in the dental chair for scaling	1.32 ± 0.58	1.81 ± 0.98	0.05
Total DAS	6.63 ± 1.77	8.03 ± 3.08	0.037
DFS Item			
10 - in the waiting room	1.05 ± 0.23	1.47 ± 0.85	0.039

*T-test

Table 1. Means and SD of the DAS and DFS scores of the PGS and their instructors.

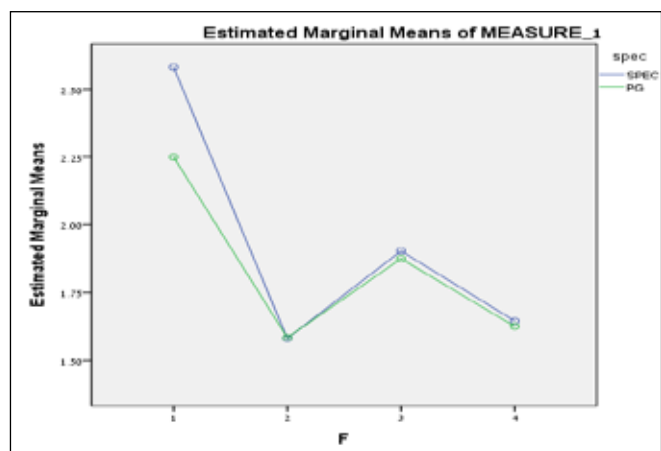
	Total (N=55)	PGS (N=24)	Instructors (N=31)	p-value
DAS total	7.55 ± 2.76	7.33 ± 3.16	7.71 ± 2.45	NS
DFS total	28.42 ± 11.89	30.42 ± 15.11	26.87 ± 8.59	NS

Table 2. Means and SD of the PGS' and the instructors' DFS scores on the 3 items for which the group difference was significant*.

DFS item	PGS	Instructors	p-value
5 - Perspiration when dental work done	1.29 ± 0.62	1.03 ± 0.18	0.032
12-The smell of the dentist's office	1.38 ± 0.77	1.00 ± 0.00	0.009
13-Seeing the dentist walk in	1.46 ± 0.88	1.00 ± 0.00	0.005

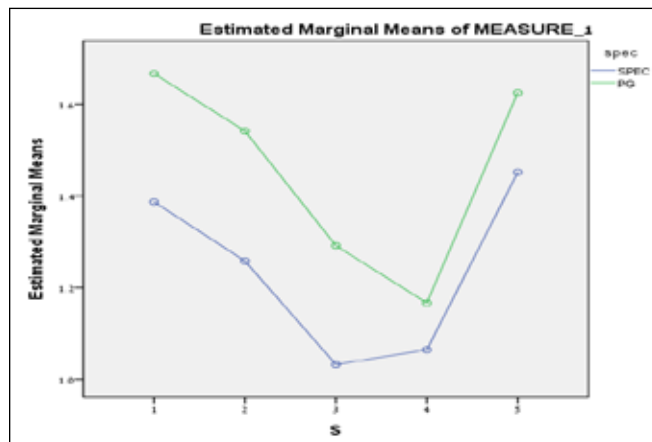
*T-test

Figure 3. A schematic representation of the responses of the PGS and the instructors to the DAS *.



* On the X axis F represents DAS items: 1=DAS item 1; 2=DAS item 2; 3=DAS item 3; 4=DAS item 4.

Figure 4. A schematic representation of the responses of the PGS and the instructors to the somatic DFS *.



* On the X axis S represents DFS items: 1=DFS item 3; 2=DFS item 4; 3=DFS item 5; 4=DFS item 6; 5=DFS item 7.

The highest score in an analysis of the specific physical items in the DFS was observed for item #7 (heart beating faster), followed by items #3 (muscles becoming tense), #4 (breathing rate increasing), #5 (perspiring), and #6 (feeling nauseated and sick) (Table 5). The differences between items #3 and #5, #3 and #6, #5 and #7, and #6 and #7 were significant. Figure 4 graphically demonstrates item #7 as being the most frequent physical sign reported by both the PGS and the instructors, with higher responses observed in the PGS group.

DISCUSSION

The aims of this study were to compare the dental anxiety levels of a group of PGS with those of their instructors, and determine both groups' ranking of the most anxiety-provoking situations in the dental situation. We also investigated whether there were gender-based differences in dental anxiety among PGS. Our results demonstrated similar overall patterns of responses of both groups to DAS and to DFS, although the PGS scores for some items in DFS, specifically #5 (perspiration when the dental work was done), #12 (the smell of the dentist's office), and #13 (seeing the dentist walk into the treatment room) were significantly higher than those of their instructors. An earlier study had shown a reduction in the levels of dental anxiety over time among undergraduate dental students during their fourth, fifth and sixth year of studies, from a mean DAS score of 10.4 in the third year to 9.27 in the fifth year and 8.00 in the sixth year¹³. In our study, the mean DAS scores of the PGS (7.55 ± 2.76) were much lower than the scores of the undergraduate students, possibly indicating a continuing reduction of dental anxiety levels over time. Furthermore, the PGS had developed a response pattern similar to that of their instructors in our present study, possibly indicate a leveling out in anxiety reduction during the postgraduate years.

The finding that females reported higher levels of dental anxiety is in accordance with many previous reports²⁻⁶. In an analysis of the relative influence of gender, type of treatment and age on anxiety levels, Stabholz and Peretz⁶ showed that gender had the strongest influence on overall dental anxiety, suggesting that dental anxiety may have a strong innate

Table 4. Analysis of the specific items in the DAS among the PGS and the instructors.

DAS item	Mean ± SD			Significance *
	PGS	Instructors	Total	
1- Anticipating visit	2.25 ± 0.90	2.58 ± 0.76	2.44 ± 0.83	α α α μ
2- In the waiting room	1.58 ± 0.78	1.58 ± 0.76	1.58 ± 0.76	
3- In dental chair for drilling	1.88 ± 1.03	1.90 ± 0.79	1.89 ± 0.80	
4- In dental chair for scaling	1.63 ± 1.01	1.65 ± 0.80	1.64 ± 0.90	

* ANOVA with repeated measures, $\alpha - p=0.000$, $\mu - p=0.012$

Table 5. Analysis of the specific five somatic items in the DFS.

DFS somatic item	Mean ± SE			Significance*
	PGS	Instructors	Total	
3-Muscles become tense	1.67 ± 1.00	1.39 ± 0.80	1.51 ± 0.90	α β μ Ω
4-Breathing rate increases	1.54 ± 1.10	1.23 ± 0.58	1.38 ± 0.85	
5-Perspiration	1.29 ± 0.62	1.03 ± 0.18	1.15 ± 0.45	
6-Feeling nauseated and sick	1.17 ± 0.48	1.07 ± 0.36	1.12 ± 0.42	
7-Heart beats faster	1.63 ± 1.01	1.45 ± 0.85	1.54 ± 0.92	

* ANOVA with repeated measures, $\alpha - p = 0.009$, $\beta - 0.002$, $\mu - p=0.006$, $\Omega - p=0.004$

origin. These gender differences in dental anxiety support psychopathologic studies, which revealed that women are over-represented in neurotic categories involving anxiety, worry and fear, a phenomenon that, regardless of its basis, is widely found in different cultures¹⁶. It should, however, be noted that gender differences in self-reported questionnaires, although significant, must always be taken with some degree of caution because males may tend to not fully expose their feelings while females more easily express their anxieties^{17,18}, even when the survey is anonymous.

The change (reduction) in the level of dental anxiety, mainly among female students, along the years of dental studies that was observed in the previous study¹³ may be explained by the extensive professional education and clinical experience that the students acquire throughout their studies in the dental school¹³. The dental education may change perceptions of dental treatment that younger students may have carried with them from childhood or from previous experiences later on, thus desensitizing them to even innate components of dental anxiety. Being continuously exposed to so many basic dental procedures (such as local anesthetic injections to children) may help pediatric PGS and their instructors to be habituated or to adopt coping strategies when dealing with their personal dental anxiety⁵.

The DFS scores in our study demonstrated that physical signs (perspiration when dental work was done, the smell of the dentist's office and seeing the dentist walk into the treatment room) were significantly higher among the PGS compared to the instructors. This may reflect that some physiologic signs remain unchanged despite greater exposure over time during their training.

The anticipation of undergoing dental treatment appears to be the strongest stimulus in generating dental anxiety among both of our study groups. The pattern of response to the DAS item #1 (anticipation before arrival to the dental clinic) had significantly higher scores than items #2, #3, and #4, and it was similar among the PGS and the instructors alike (Figure 3). Anticipation of undergoing dental treatment also yielded higher anxiety scores among females compared to males, while waiting for treatment in the dentist's waiting room provoked a significant level of anxiety among females compared to males (Table 3, Item #10).

While having the dental work done, both the PGS and the instructors reported that the item "heart beating faster" was the most prevalent somatic sign, followed by "muscles becoming tense", "breathing rate increasing", "perspiration", and "feeling nauseated and sick".

The strong correlation between the DAS and the DFS ratings demonstrates that meaningful and reliable information can be obtained from the DAS, while the DFS can serve to complement that information. The DAS has been used extensively in epidemiology and in clinical research. It is brief and claimed to have good psychometric properties, despite its lack of references specific to a given procedure, such as local anesthetic injection in the mouth in preparation for the administration of dental care.

CONCLUSIONS

Our findings on an admittedly small sample of PGS and their instructors indicate that the overall level of dental anxiety among PGS and their instructors is similar, and that it should not affect pediatric dental treatment provided by one group or the other. These results help to provide a better understanding of an important aspect affecting all caregivers of dental treatment to pediatric dental patients, and delineate another role of the dental school instructors, that of desensitizing the dental anxiety of their PGS.

ACKNOWLEDGMENTS

We would like to thank to Dr. Ziyet Cinar for her statistical advices.

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