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ORIGINAL RESEARCH

CHILDREN'S DENTAL ANXIETY IN RELATION TO PARENTAL DENTAL ANXIETY, CHILD'S AGE, GENDER AND CARIES EXPERIENCE (A CROSS-SECTIONAL STUDY)

Ghadeer Jaafar Ali[1] , Ola Moustafa Mohamed Omar[2], Hanaa Abd-Al-Moniem[3]

[1]Master degree candidate at Paediatric Dentistry and Dental Public Health, Faculty of Dentistry, Cairo University, Cairo, Egypt

[2]Professor of Paediatric Dentistry and Dental Public Health, Faculty of Dentistry, Cairo University, Cairo, Egypt
Vice Dean for Graduate Studies and Research, Faculty of Dentistry, Cairo University, Cairo, Egypt

[3]Lecturer of Paediatric Dentistry and Dental Public Health, Faculty of Dentistry, Cairo University, Cairo, Egypt

Corresponding Author: Ghadeer Jaafar Ali, Department: Paediatric Dentistry and Dental Public Health Department, Faculty of Dentistry, Cairo University, Cairo, Egypt Phone numbers: +20 1220262599 E-mail address: ghadeer.jawad@dentistry.cu.edu.eg

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ABSTRACT

Background: The aim of this study was to evaluate the relation between parental dental anxiety, child age, gender and caries experience on child dental anxiety in a group of Egyptian children.

Subjects and Methods: A total of Seventy-Four Egyptian children, aged six-eight years, and their mothers were recruited from the outpatient clinic of Paediatric Dentistry and Dental Public Health Department, at Cairo University. Child dental anxiety was assessed using the Abeer Children Dental Anxiety Scale (ACDAS) comprising a child self-reported part and a cognitive part with six questions (four answered by the child and two answered by their mothers) and heart rate measurement via a fingertip pulse oximeter. Mother's anxiety was evaluated using the Corah Dental Anxiety Scale (CDAS) answered by the mothers. Caries experience was recorded using Decayed, Missed, Filled Teeth (DMFT) index for permanent teeth and decayed, extracted, filled teeth (deft) indices for primary teeth. All clinical examinations and data collection were performed by a single calibrated examiner. Data were analysed using SPSS version 28, employing appropriate correlation tests and significance was set at $p<0.05$.

Results: Among seventy-four children, the mean ACDAS score was 18.39±6.54, with only 13.5% (n=10) classified as anxious. A moderate significant positive correlation was found between child anxiety (ACDAS) and mother anxiety. Age had a significant effect on anxiety, with anxiety increasing with age. No statistically significant associations were found between child dental anxiety and gender or caries experience.

Conclusions: Most children in this study showed low levels of dental anxiety, suggesting that there was a positive dental experience and proper management techniques.

***Keywords*:** Dental anxiety, Abeer dental anxiety scale, Corah Dental Anxiety Scale

INTRODUCTION

Dental fear and anxiety (DFA) are one of the biggest challenges in Paediatric dentistry. Many risk factors were identified by having impact on the development of children's dental fear and anxiety. DFA was the main cause that many paediatric patients avoided or delayed their dental visits. This had a negative impact on their oral health and increased the need for complex treatments rather than preventive appointments[1].

Dental anxiety affects the patient-dentist relation and result in delayed or incorrect diagnosis. Dental professionals believe that anxious patients were a significant source of stress in the workplace. Managing patients with dental anxiety in the office is always very challenging. Patients experience less anxiety and fear if their dentists were sympathetic and understanding. Understanding the dental state of anxious and non-anxious individuals is essential in dentistry as it could have shed light on the impact of dental anxiety on patients' daily lives[2].

A paediatric dentist is a specialist trained in the skills and methods needed to manage children's anxiety and encourage a positive attitude toward dental care. Evaluating dental anxiety in children is important both for providing high-quality treatment and for

understanding their level of anxiety and its causes before care begins. Such assessment facilitates the early recognition of anxious children, allowing for effective management and promoting favourable perceptions of dentists and dental visits. Therefore, behavioural science plays an essential role in dentistry by emphasizing the evaluation and interpretation of patient behaviours in relation to dental treatment[3].

Questionnaires are the most accurate means of measuring anxiety in children who are cognitively capable of self-reporting their emotions on a scale. Questionnaires have long been the only tool used in dental anxiety research. Even though there were many self-reported measures available, none of them are perfect or appropriate for assessing dental anxiety in children around the entire world. As a result, The Abeer Children Dental Anxiety scale (ACDAS) was introduced. This approach had cognitive, behavioural, and psychological characteristics. This new dental anxiety scale was found to be appropriate for children and adolescents to solve all the limitations of previously used scales [4].

Therefore, this study was designed to investigate the relationship between parental dental anxiety and its effect on child's dental anxiety, while considering the child's age, gender, and caries experience. The aim was to determine if a connection exists between the level of a parent's dental anxiety and their child's dental anxiety within an Egyptian population.

SUBJECTS AND METHODS

Study design

This observational Cross-sectional study was conducted between September 2024 to October 2024, to evaluate the relationship between mother's dental anxiety, child age, gender, caries experience, and child dental anxiety among a group of Egyptian children aged six to eight years. The study was carried out at the Outpatient Clinic of the Paediatric Dentistry and Dental Public Health Department, Faculty of Dentistry, Cairo University, Egypt. The study protocol was registered on ClinicalTrials.gov under the identifier NCT06437249. Based on a two-tailed significance level of 0.05 and a study power of 80%, and assuming an expected correlation coefficient of 0.32 between maternal and child dental anxiety as reported in previous study by (Coric et al., 2014)[5]. A minimum sample size of seventy-four child–mother pairs was required.

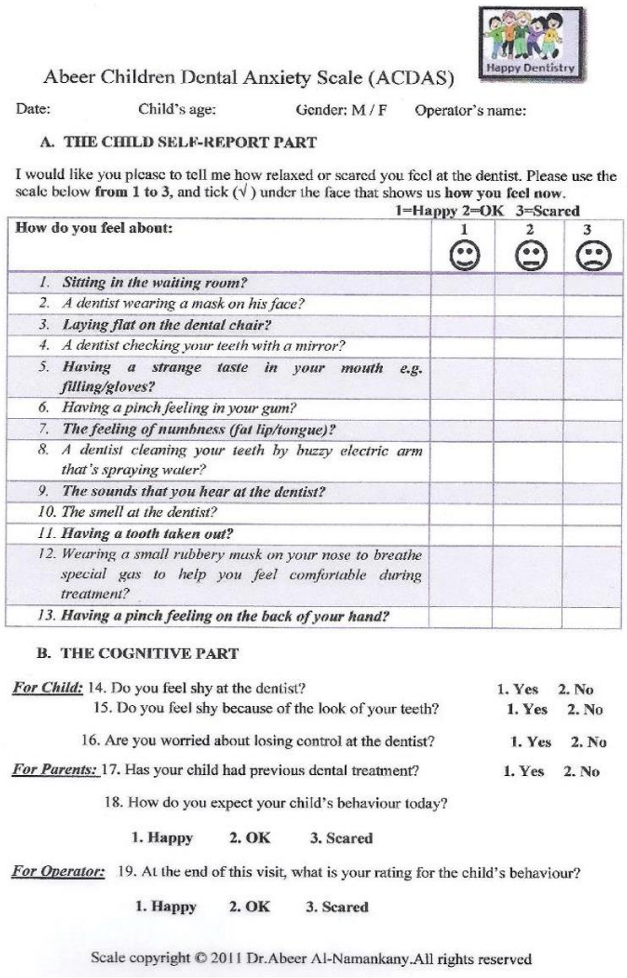
From September 1st to September 30th, children attending their first dental visit were included in the study. Inclusion criteria included the children with the written consent form of their mothers were included in the study, and the child's assent had to be obtained before a clinical oral examination was performed. Children with physical or mental disabilities and those who refused to participate were excluded.

Data collection

Demographic data was first collected including name, age and gender. The data collection process involved clinical examination and administration of two questionnaires to assess mother and child dental anxiety.

Dental anxiety assessment

Two separate questionnaires were used to assess dental anxiety in children and their mothers. The Child dental anxiety was assessed using the Arabic version of the Abeer Children Dental Anxiety Scale (ACDAS) [6–8]. This scale consisted of three distinct sections designed to assess the child's dental, cognitive, and overall behavioural responses (Figure 1).



Abeer Children Dental Anxiety Scale (ACDAS)

Happy Dentistry

Date: Child's age: Gender: M / F Operator's name:

A. THE CHILD SELF-REPORT PART

I would like you please to tell me how relaxed or scared you feel at the dentist. Please use the scale below **from 1 to 3,** and tick (√) under the face that shows us **how you feel now.**

1=Happy 2=OK 3=Scared

How do you feel about:	1	2	3
1. *Sitting in the waiting room?*			
2. *A dentist wearing a mask on his face?*			
3. *Laying flat on the dental chair?*			
4. *A dentist checking your teeth with a mirror?*			
5. *Having a strange taste in your mouth e.g. filling/gloves?*			
6. *Having a pinch feeling in your gum?*			
7. *The feeling of numbness (fat lip/tongue)?*			
8. *A dentist cleaning your teeth by buzzy electric arm that's spraying water?*			
9. *The sounds that you hear at the dentist?*			
10. *The smell at the dentist?*			
11. *Having a tooth taken out?*			
12. *Wearing a small rubbery mask on your nose to breathe special gas to help you feel comfortable during treatment?*			
13. *Having a pinch feeling on the back of your hand?*			

B. THE COGNITIVE PART

For Child: 14. Do you feel shy at the dentist? 1. Yes 2. No

15. Do you feel shy because of the look of your teeth? 1. Yes 2. No

16. Are you worried about losing control at the dentist? 1. Yes 2. No

For Parents: 17. Has your child had previous dental treatment? 1. Yes 2. No

18. How do you expect your child's behaviour today?

1. Happy 2. OK 3. Scared

For Operator: 19. At the end of this visit, what is your rating for the child's behaviour?

1. Happy 2. OK 3. Scared

Figure 1. Abeer Children Dental Anxiety Scale (ACDAS)[6]

The dental anxiety section of the ACDAS comprised 13 questions. For each question, children were presented with three facial expressions corresponding to different emotional states (happy, ok, scared) and were asked to select the face that best represented how they would feel in each described dental situation. Responses were scored on a scale from 1 to 3, resulting in a total possible score ranging from 13 to 39 for this section. A total score of 26 or higher was classified as indicative of a dentally anxious child. The remaining sections of the ACDAS, which included

cognitive and overall behavioural evaluation items, were completed by the attending paediatric dentist and the child's mother. The scale was administered during the child's initial visit, prior to any clinical or radiographic dental treatment being performed.

Mother's dental anxiety was assessed using the Corah Dental Anxiety Scale (CDAS)[9,10]. This scale employed a five-point scale for its responses, where a score of 1 corresponded to 'not anxious' and a score of 5 indicated the respondent was 'extremely anxious'. The cumulative score for the scale was derived from the sum of the responses to its four items, yielding a potential range of 4 to 20. In accordance with established literature, a predetermined cutoff score of greater than 13 was implemented to identify individuals with high levels of dental anxiety. CDAS questionnaire was translated into Arabic, using the standard method as recommended by Beaton et al., (2000)[11]. A pilot study was conducted by interviewing mothers to test their acceptance and understanding of the items of the CDAS translated form, and minor modifications were made on the translated version accordingly. Based on their total scores, participating mothers were subsequently divided into one of three distinct categories indicating their level of dental anxiety. Scores from 4 to 8 were classified as no or low dental anxiety. A result falling between 9 and 12 points indicated a moderate level of dental anxiety. Finally, participants scoring between 13 and 20 points were categorized as experiencing severe dental anxiety[12].

Clinical examination

A single examiner performed all clinical examinations to minimize examination bias. Oral examination of children was conducted on the dental unit using a disposable mouth mirror and blunt ball-ended probe (0.5 mm) after the child rinsed his mouth under tap water. The dental caries status was assessed according to DMFT/ deft index [13], which recorded decayed, missing, and filled teeth in permanent (DMFT) and primary (deft) dentitions.

The heart rate of each child was also measured using a fingertip pulse oximeter as an indicator of their anxiety level. Then, the assessment charts of children and questionnaires were collected into an excel sheet to facilitate manipulation of the data.

Statistical analysis

Statistical analysis was performed using Medcalc software, version 22 for windows (MedCalc Software Ltd, Ostend, Belgium). Chats were created using Microsoft Excel for windows version 2404 (Microsoft 365, Microsoft Egypt, Giza, Egypt). Categorical and binary data were presented as frequency and percentage. Comparison of responses within each question and categorical variables was performed using chi-square test. Continuous data were presented using mean and standard deviation. Spearman's test was used to correlate between ACDAS and CDAS. Association between age, gender, caries experience and children dental anxiety was performed using the chi square test. The significance level was set at $P \leq 0.05$ and all tests were two tailed.

RESULTS

A total of seventy-four participants were included in the final analysis, comprising forty-two boys (56.8%) and thirty-two girls (43.2%). The mean age of the children was 7.11±0.77 years. The average heart rate was 96.66±14.05 beats per minute (BPM), and the mean DMF index was 4.57±2.89 (Figure 2).

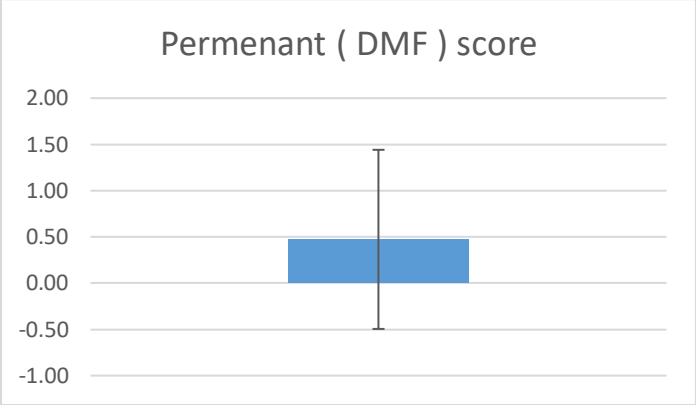


Figure 2. Bar chart showing mean and SD of DMF

Regarding the child self-reported section in ACDAS questionnaire, a statistically significant difference was observed in the distribution of responses ('happy,' 'OK,' 'scared') for all items (Table 1).

The mean total ACDAS score was 18.39 ± 6.54. Based on the established clinical cutoff (≥26 indicating anxiety), most children (86.5%, n=64) were classified as not anxious. A significantly smaller proportion (13.5%, n=10) were classified as anxious (Table 2).

Regarding the children cognitive part, 17.6% reported feeling shy at the dentist, while the majority (82.4%) did not. This distribution was statistically significant. Concerning the appearance of their teeth, 10.8% indicated this was a source of shyness, compared to 89.2% who did not. Regarding worry of the dentist about losing control during dental treatment, 35.1% responded affirmatively and 64.9% negatively (Table 3). Regarding previous dental experiences, all mothers reported that their children had not received prior dental treatment. When asked to predict their child's anticipated behaviour, mothers' expectations were distributed as follows: 55.4% predicted 'Happy', 31.1% predicted 'OK', and 13.5% predicted 'Scared'. This distribution of responses was statistically significant (Table 3).

The operator's assessment of the child's actual behaviour at the end of the visit found that 52.7% of children were rated as 'Happy', 29.7% as 'OK', and 17.6% as 'Scared'. This observed distribution was also statistically significant (Table 3).

Table 1. Child anxiety using the ADAS (N=74).

ADAS Variables		n (%)	P-value
How do you feel?			
1. Sitting in the waiting room	Happy	46 (62.20%)	P < 0.0001
	Ok	21 (28.40%)	
	Scared	7 (9.50%)	
2. A dentist wearing a mask on his face?	Happy	65 (87.80%)	P < 0.0001
	Ok	7 (9.50%)	
	Scared	2 (2.70%)	
3. Lying flat on the dental chair?	Happy	59 (79.70%)	P < 0.0001
	Ok	9 (12.20%)	
	Scared	6 (8.10%)	
4. A dentist checking your teeth with a mirror?	Happy	60 (81.10%)	P < 0.0001
	Ok	10 (13.50%)	
	Scared	4 (5.40%)	
5. Having a strange taste in your mouth?	Happy	61 (82.40%)	P < 0.0001
	Ok	10 (13.50%)	
	Scared	3 (4.10%)	
6. Having a pinch feeling in your gum?	Happy	48 (64.90%)	P < 0.0001
	Ok	21 (28.40%)	
	Scared	5 (6.80%)	
7. The feeling of numbness (fat lip/tongue)?	Happy	50 (67.60%)	P < 0.0001
	Ok	17 (23.00%)	
	Scared	7 (9.50%)	
8. A dentist cleaning your teeth using by buzzy electric arm that's spraying water?	Happy	48 (64.90%)	P < 0.0001
	Ok	16 (21.60%)	
	Scared	10 (13.50%)	
9. The sounds that you hear at the dentist?	Happy	44 (59.50%)	P < 0.0001
	Ok	24 (32.40%)	
	Scared	6 (8.10%)	
10. The smell at the dentist?	Happy	63 (85.10%)	P < 0.0001
	Ok	9 (12.20%)	
	Scared	2 (2.70%)	
11. Having a tooth taken out?	Happy	9 (12.20%)	P = 0.0006
	OK	33 (44.60%)	
	Scared	32 (43.20%)	
12. Wearing a small rubbery mask on your nose to breath special gas to help you feel comfortable during treatment?	Happy	53 (71.60%)	P < 0.0001
	OK	10 (13.50%)	
	Scared	11 (14.90%)	
13. Having a pinch feeling on the back of your hand?	Happy	55 (74.30%)	P < 0.0001
	Ok	16 (21.60%)	
	Scared	3 (4.10%)	

Table 2. Table showing the frequency and percentage of total ACDAS scores

Total ACDAS	Frequency (n)	Percentage (%)
≥ 26	10	13.5%
< 26	64	86.5%
Total	74	100.00%
P value	P < 0.0001	

Table 3. Total Child's Cognitive Assessment and Dentist's Behaviour Assessment score using the ACDAS (n= 74)

ADAS Cognitive Variables		**n (%)**	p-value
Child's Cognitive Assessment			
14. Do you feel Shy at the Dentist?	Yes	13 (17.60%)	P < 0.0001
	No	61 (82.40%)	
15. Do you fell shy because of the look of your teeth?	Yes	8 (10.80%)	P < 0.0001
	No	66 (89.20%)	
16. are you worried about losing control at dentist?	Yes	26 (35.10%)	P = 0.0105
	No	48 (64.90%)	
Parent's Behaviour Assessment			
17. has your child had previous dental treatment?	Yes	0 (0.00%)	P < 0.0001
	No	74 (100.00%)	
18. How do you expect your child's behaviour today?	Happy	41 (55.40%)	P = 0.0001
	Ok	23 (31.10%	
	Scared	10 (13.50%)	
Dentist's Behaviour Assessment			
19. At the end of this visit, what is your rating for the child's behaviour?	Happy	39 (52.70%)	P = 0.0009
	OK	22 (29.70%)	
	Scared	13 (17.60%)	

Based on CDAS questionnaire for parents, the categorical distribution of mother anxiety levels was 55.4% mild, 12.2% moderate, 5.4% high, and 27.0% severe. This difference was statistically significant **(Table 4).** Mean Corah's dental anxiety scale of mothers in the present study was 9.89±5.41, which was considered moderate.

Table 4. Table showing the frequency and percentage of responses using Corah's dental anxiety scale (Categorical)

Corah's dental anxiety scale	**Frequency (n)**	**Percentage (%)**
Mild	41	55.40%
Moderate	9	12.20%
High	4	5.40%
Severe	20	27.00%
Total	74	100.00%
P value	P < 0.0001	

There was moderate positive correlation between ACDAS and CDAS, rho= 0.365 (**Figure 3**). This indicated that as the parental CDAS increased, the ACDAS of their child increased and vice versa.

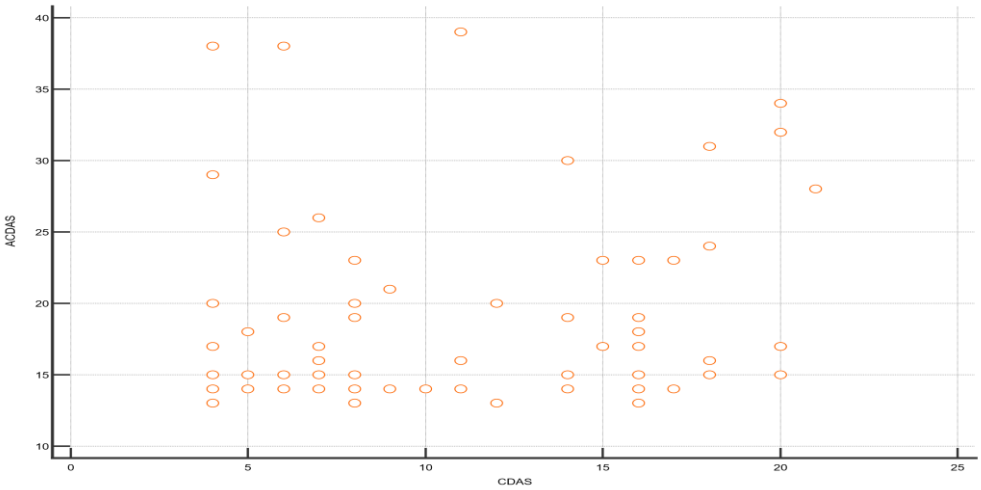


Figure 3. Scatter diagram of correlation between ACDAS and CDAS

There was no statistically significant effect of gender on children's dental anxiety. 54.8% of boys were happy and 50% of girls were happy at the end of visit according to the operator's opinion. A statistically significant association was observed between age and dental anxiety. The proportion of children categorized as 'Scared' increased with age, from 5.6% (6-year-olds) to 10.0% (7-year-olds) and 34.6% (8-year-olds). Despite this trend, the 'Happy' response was the most frequent in all age groups, reported for 50.0%, 56.7%, and 50.0% of 6-, 7-, and 8-year-olds, respectively. There was no statistically significant effect of caries experience on children's dental anxiety. 66.7% of caries free children were happy, 41.7% of low caries index children were happy and 42.9% and 60.5% of moderate and high caries risk children respectively were happy according to the operator's opinion at the end of the visit (**Table 5**).

Table 5. Table showing the association between gender, age, DMF and children's dental anxiety (Q19)

	Q19			**Row total (RT)**	**Significance level**
	Happy	**Ok**	**Scared**		
Gender					
Boy	23	13	6	42 (56.8%)	P = 0.6968
	54.8% RT	31.0% RT	14.3% RT		
	59.0% CT	59.1% CT	46.2% CT		
Girl	16	9	7	32 (43.2%)	
	50.0% RT	28.1% RT	21.9% RT		
	41.0% CT	40.9% CT	53.8% CT		
Column total (CT)	39	22	13	74	
	52.70%	29.70%	17.60%		
Age					
6	9	8	1	18 (24.3%)	P = 0.0380*
	50.0% RT	44.4% RT	5.6% RT		
	23.1% CT	36.4% CT	7.7% CT		
7	17	10	3	30 (40.5%)	
	56.7% RT	33.3% RT	10.0% RT		
	43.6% CT	45.5% CT	23.1% CT		
8	13	4	9	26 (35.1%)	
	50.0% RT	15.4% RT	34.6% RT		
	33.3% CT	18.2% CT	69.2% CT		
Column total (CT)	39	22	13	74	
	52.70%	29.70%	17.60%		
DMF					
Caries Free (0)	2	1	0	3 (4.1%)	P = 0.1128
	66.7% RT	33.3% RT	0.0% RT		
	5.1% CT	4.5% CT	0.0% CT		
Low (1-2)	5	3	4	12 (16.2%)	
	41.7% RT	25.0% RT	33.3% RT		
	12.8% CT	13.6% CT	30.8% CT		
Moderate (3-4)	9	5	7	21 (28.4%)	
	42.9% RT	23.8% RT	33.3% RT		
	23.1% CT	22.7% CT	53.8% CT		
High (≥5)	23	13	2	38 (51.4%)	
	60.5% RT	34.2% RT	5.3% RT		
	59.0% CT	59.1% CT	15.4% CT		
Column total (CT)	39	22	13	74	

DISCUSSION

This study was conducted to determine child dental anxiety in relation to age, gender, parental dental anxiety, and caries experience in children aged six to eight years old, attending the Outpatients' Clinic of the Paediatric Dentistry and Dental Public Health Department, Faculty of Dentistry, Cairo University. To our knowledge this study was one of the first studies done to reveal the relation between child dental anxiety and parental dental anxiety using ACDAS in local population in Egypt.

The participants in the present study were selected with an age range from six to eight years old as ACDAS scale is a valid cognitive scale to measure dental anxiety for children who are at least six to eight years old [6]. This age range was also chosen because children in middle childhood exhibit the highest levels of dental anxiety and undergo rapid cognitive development, enabling them to better articulate experiences and emotions[14].

For this study, the ACDAS was used due to its high validity and reliability[15]. The ACDAS demonstrated superior characterized capabilities in assessing dental anxiety compared to the Children's Fear Survey Schedule–Dental Subscale (CFSS-DS[16] . Furthermore, the ACDAS scale could assess anxiety based on responses from parents or legal guardians, children, and dentists. In our study, the ACDAS was used as it is the first Arabic version for a dental anxiety scale[7].

The present study aimed to demonstrate the association between mother dental anxiety and child dental anxiety using CDAS. CDAS is one of the most widely used measures that had been tested and proved to be reliable [17].

Mothers were surveyed as they are typically the primary caregivers, important in shaping their children's health behaviours[18,19].

In this study, heart rate was measured using pulse oximeters, as the assessment of heart rate was recognized as a valid indicator of dental anxiety in paediatric patients. Pulse oximeter provides enhanced accuracy and reliability in evaluating dental anxiety [20].

In the current study preoperative pulse measurement resulted in a mean heart rate of 96.66 BPM, which was within the normal paediatric range (70-100 BPM). Conversely, Shekhar et al. (2022)[21], indicated a significant increase in heart rate immediately preceding a dental procedure. This finding suggested that the methods used to prepare children for treatment, such as creating a welcoming atmosphere, using clear, gentle instructions were effective in minimizing anxiety of children.

In our study, 62.2% of children felt happy in the dental waiting area, 28.4% were okay, and 9.50% were scared. These results aligned with Alshuaibi et al., (2021)[22] and Alabdullatif et al., (2023)[23] who reported that children generally felt comfortable and safe in waiting areas. However, the presence of a small percentage of scared children (9.50%) indicated that anxiety remains a concern, consistent with the study by Fux-Noy et al., (2019)[24] highlighting the effect of waiting time and visit purpose on dental anxiety.

When asked about a doctor wearing a mask, only 2.70% were scared. These findings aligned with Alshuaibi et al., (2021)[22]and Alabdullatif et al., (2023)[23], that also reported a largely positive or neutral response to masked doctors. This was further supported by Cristea et al., (2025)[25], who found that only 5% of participants experienced mask-related anxiety. The minimal scared responses suggested that wearing masks did not generally provoke anxiety in children.

Regarding children's emotional responses when lying in a dental chair, 79.70% of children were happy, 12.20% were okay, and 8.10% were scared which might be attributed to curiosity and excitement children have toward new experiences. This result aligned with Alshuaibi et al., (2021)[22] and Alabdullatif et al., (2023)[23], who suggested that many children may feel excited about the new experience.

Our study found that during dental examinations using a mirror (Q4), most children (81.10%) were happy, 13.50% were okay, and 5.40% were scared. This aligned with Alabdullatif et al., (2023)[23]. Pui Ying et al., (2024)[26] further indicated that children demonstrated greater compliance during dental examinations when only a mirror was utilized.

Our findings regarding children's responses to Q5 a "strange taste in their mouth" revealed that most of children were happy which aligned with Alshuaibi et al., (2021)[22]. In response to Q6 regarding a "pinch feeling in your gum and Question 7 (feeling of numbness), 64.90% and 67.60% respectively were happy. These results conversed with Alabdullatif et al., (2023)[23] who observed a higher prevalence of ok responses, which might be attributed to those children accepting pinch feeling and perceiving numbness as a new experience, particularly during first-time dental visit. This suggested that effective behavioural management strategies positively could reduce children anxiety.

Regarding dentist cleaning teeth with an electric arm and sounds heard at the dentist (Q8 and 9), 64.9% and 59.50% of children, respectively, were happy. This aligned with Gao et al. (2021)[27], potentially because the sounds were associated with recognizable daily activities

or games, eliciting indifferent or favourable responses. However, contrasting the results reported by Alabdullatif et al. (2023)[23], where a neutral response was predominant regarding sounds while majority reported fearing dental procedures.

Most children (85.10%) reported a positive experience of the smell of dental materials and instruments which aligned with Alabdullatif et al., (2023)[23], who also reported a high prevalence of positive or neutral responses. It might be due to the use of pleasant or neutral-smelling products.

Responses to tooth extraction varied significantly where only 12.20% of children were happy, 44.60% were okay, and 43.20% were scared, indicating that the procedure remained a major source of anxiety for many children. This was partly in accordance with the finding of Rafatjou et al., (2019)[28] which found a higher percentage of relaxed children (57.9%) in a similar age group. However, our findings contradicted Alabdullatif et al., (2023)[23], where most children reported being scared. These differences might be due to variations in preoperative preparation and pain management techniques, and our patients were attending their first dental visit.

Children reporting shyness in the clinic (Q14), or (Do you feel shy about the way your teeth look?) (Q15), only 17.6% and 10.80%, of participants respectively answered "Yes," which was consistent with Alabdullatif et al., (2023)[23]. This might be attributed to the fact that shyness in dentist office and regarding dental appearance was uncommon at a young age. Instead, children's primary emotional responses during their initial dental visit were typically anxiety or fear related to the procedure itself as stated by Jain et al., (2019)[29].

The mean ACDAS score was 18.39 ± 6.54, indicating that most children were not anxious (<26). Only 10 children (13.5%) were anxious (ACDAS ≥26), while 64 (86.5%) scored below 26. In the cognitive section, parents and dentists provided nearly identical ratings of children's emotional states (happy, ok, scared). These findings were consistent with Sabbagh et al. (2021)[30].

Regarding mothers' expectations of child behaviour (Q18) 55.40% anticipated that their child would be happy during a dental visit, 31.10% expected an OK response, and 13.50% anticipated fear. These findings aligned with Aslan et al. (2021)[15], where 47.5% of children were expected to be happy, 47.5% OK, and 7.4% scared. Consistent with Dua et al. (2023)[31], a secure mother-child attachment promoted cooperative behaviour (exhibited by 55-67% of children) and increased maternal expectation of a positive reaction. Secure attachment improved communication, reduced separation anxiety, and enhanced maternal confidence in the child's adaptability, likely explaining why most mothers anticipated a happy response.

Based on Question 19 (Dentist's rating of the child's behaviour during the dental visit), operator assessments indicated that 52.70% of children were perceived as happy, 29.70% as OK, and 17.60% as scared, similar findings were reported by Alabdullatif et al., (2023)[23]. Conversely Helal et al., (2025)[32]'s findings showed that 44.9% exhibited fear, while 54.1% displayed no signs of fear. Our findings for questions 18 and 19 aligned with a study by Sabbagh et al., (2021)[30] which found that both parents and dentists provided similar ratings regarding children's emotional responses in the dental setting.

Regarding the mothers who participated in the study, 55.40% exhibited mild anxiety, 12.20% moderate, 5.40% high, and 27% severe. The mean Corah's Dental Anxiety Scale score was 9.89 ± 5.41, indicating moderate anxiety, as with Srinivasan et al., (2022)[33].

Our results showed that there was a moderate positive correlation between ACDAS and CDAS. This indicated that as the parental CDAS increased, the ACDAS of their child increased and vice versa. This was in accordance with AlAzmah et al., (2024)[34]; Dorterler and Sahin, (2025)[35], which suggested that parents may unconsciously transmit their dental anxiety to their children in clinical settings.

The child's gender had no statistically significant effect on dental anxiety levels. Post-operative assessment showed a comparable prevalence of positive states between boys (54.8%) and girls (50%). This finding was consistent with Passos De Luca et al., (2021)[36]; Bayón et al., (2025)[37]; Cristea et al., (2025)[25]. Conversely, Kebriaei et al., (2022)[38]; Petrović et al., (2024)[39] found a significant correlation between dental anxiety and the female gender. This variance could be due to that girls might be more responsive to anxious behaviour, better emotional expression and greater pain sensitivity.

The findings demonstrated that a child's age had a statistically significant effect on dental anxiety, which increased with age. However, most children in all groups exhibited a happy attitude by the end of the visit. A similar age-related increase was reported by Soares et al. (2017)[40]. The observed increase in dental anxiety prevalence with age might be attributed to psychosocial factors rather than biological maturation. As children grow older, they become more susceptible to external influences, such as negative stories from siblings, and develop an improved awareness of social evaluation, leading to feelings of embarrassment and a perceived loss of control in the clinical setting.

The present findings contrasted with Passos De Luca et al. (2021)[36], who reported that older children were less affected, potentially due to greater cooperation. The results also opposed Helal et al. (2025)[32], who found increased age correlated with decreased anxiety, possibly due to accumulated positive dental experiences.

Concerning caries experience, in our study the results showed there was no statistically significant effect of caries experience on children's dental anxiety, 42.9% and 60.5% of moderate and high caries risk children respectively were happy according to the operator's opinion at the end of the visit. This finding agreed with Saba and Katirci, (2023)[41]. A possible explanation is that a child with a high caries index might have been cooperative and appeared happy due to effective management by the dental team during a simple examination, which does not necessarily mean they were less anxious about future, potentially invasive, treatment. However, other studies by Padmanabhan et al., (2024)[42] reported a positive correlation between caries and anxiety, attributing it to caries' multifactorial nature. Dental anxiety can cause appointment postponement, reduce preventive care and increase caries risk.

A key limitation of this cross-sectional study was that its findings demonstrate association but cannot confirm a cause-and-effect relationship. Additionally, while the findings of this survey were specific to the Egyptian paediatric population, they might offer valuable insights for other societies with similar cultural and socioeconomic setting.

CONCLUSIONS

Within the limitations of this study, the following conclusions can be drawn:

- Most children in this study showed low levels of dental anxiety (measured by the ACDAS).
- A statistically significant, moderate positive correlation was found between mother dental anxiety (measured by CDAS) and child dental anxiety (measured by ACDAS).
- Association between a child's gender and their dental anxiety levels showed no statistically significant correlation.
- Child age demonstrated a statistically significant effect on anxiety, with older children showing higher reported anxiety levels than their younger counterparts. Caries experience of children did not show a significant correlation with anxiety

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Competing and conflicting Interests
The authors report there are no competing interests to declare.

Ethical approval
The study was reviewed and approved by the Dental Research Ethics Committee, Faculty of Dentistry, Cairo University with approval number 31-7-24.

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