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Dentistry Section

Maternal Dental Anxiety and its Effect on Caries Experience Among Children in Udaipur, India

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ABSTRACT

Context: Dental caries is a common oral disease among children. There are various factors that influence caries development. Parents and family environment influence oral health behaviours among children. Dental Anxiety is a common hindrance in seeking dental treatment. Mothers' dental anxiety may act as a barrier to seek professional advice about their children's caries experience.

Aim: To evaluate dental anxiety among mothers and its possible relationship with caries experience in their children in Udaipur city, India

Setting and Design: The sample was selected from those attending Darshan Dental College and Hospital, Udaipur for dental treatment. The study period was from June 2014 to November 2014.

Materials and Methods: A cross-sectional survey was designed. A total of 187 mother-child pairs were recruited for the study. The children's age ranged from 3-14 years. Modified Dental Anxiety Scale (MDAS), Hindi version, was used to evaluate dental anxiety among the mothers that categorizes the dental anxiety into five levels. Demographic detail such as age, educational level, and family income was also collected. The World Health Organization (WHO) criteria was utilized for the diagnosis of dental caries in children. DMFT (Decayed, missing and filled teeth) and DMFS (Decayed, missing and filled surfaces) scores were then calculated.

Statistical Analysis: Statistical Package for Social Sciences (SPSS) version 20.0 was used to interpret data. Maternal anxiety scores taken as mean MDAS were compared with various independent variables. Statistical tests were used to compare maternal anxiety and children's caries experience. A p value equal or less than 0.05 was considered as statistically significant.

Results: Almost half (49.7%) of the mothers reported as being 'fairly anxious 'or 'very anxious'. There was a significant (p=.001) difference in maternal dental anxiety level in relation to age of the children. Mothers of younger children reported higher anxiety scores. Similarly, mothers with lesser education and lesser family income reported higher anxiety scores. The mean decayed score in children of very anxious mothers and phobic mothers was significantly (p=.001) higher as compared to the children of the mothers with lower anxiety levels.

Conclusion: There was a strong positive association between maternal dental anxiety and children's dental caries experience.

Keywords: Dental caries, Epidemiology, Oral health, Paediatric dentistry

INTRODUCTION

Dental caries is a common oral disease among children. Dental caries can cause pain, infections, early loss of the teeth and orthodontic problems. It can affect body weight, growth and quality of life in children if left untreated [1]. Several studies have shown positive relationship between early childhood caries and caries in permanent dentition [2,3]. Dental caries must be prevented and treated to avoid the above-stated problems [4]. There are various factors that influence dental caries development [4,5]. According to Keye`s triad; environmental factors also play an important role in dental caries development [6]. Parents and family environment influence oral health behaviours [7,8]. Parental beliefs and attitudes towards oral health affect their child's dental health [5,7-10].

Anxiety has been defined as a "state of unpleasantness with associated fear of danger from within or a learned process of one's own environment" [11].Children may develop anxiety due to presence of anxious people around them [12]. Dental anxiety is a complex phenomenon that is influenced by personality characteristics, fear of pain, traumatic dental experiences in childhood and dentally anxious family members or peers [13,14]. There is a significant relationship between parental and child dental fear [15].

In one study, it was reported that about 11% of children and adolescents had fear of dental treatment [16]. Many factors contribute to dental anxiety; such as illiteracy, lack of dental awareness, irregular dental attendance, parental anxiety and socioeconomic status. However, most common causes of dental anxiety are past traumatic dental experience and attitude of the dentist [17,18].

Few studies are available in literature on parental dental anxiety and caries prevalence in their children [19-24]. However, there is paucity of the literature regarding this topic. Moreover, mothers are supposedly more allied to take care of their children. Early childhood caries has been related to a background of social disadvantage associated with low socioeconomic status and low maternal educational level [25]. In this study, the authors hypothesize that the maternal dental anxiety is related to a higher caries experience among their children. Therefore, a study was carried out in Darshan Dental College, Udaipur City, India among mothers visiting for the dental treatment of their children. The aims of the present study were-

1. To evaluate dental anxiety among mothers of children visiting for dental treatment of their children and relate it to their educational level, socioeconomic status and location.
2. To determine a possible association between maternal dental anxiety and their children's caries experience.

MATERIALS AND METHODS

The study was conducted in the Out Patient Department of Pedodontics and Preventive Dentistry at Darshan Dental College, Udaipur, Rajasthan, India. Prior approval was obtained from the Ethical Committee before commencement of the study. One

hundred and eighty seven (187) mother-child pairs were selected for the study. The study period was six months from June 2014 to December 2014. Modified Dental Anxiety Scale (MDAS) {Hindi version} was used to assess the maternal dental anxiety. The MDAS is a highly consistent and reliable measure which has good discriminant and concurrent validity. The five-item MDAS has been developed by the modification of Corah's Dental Anxiety Scale (DAS) [26]. The MDAS questionnaire asks questions starting from the feeling of having an appointment with the dentist to having a tooth being drilled and lastly having a local anaesthetic injection being injected into the gums. This Likert scale has a score range of 5 to 25, with each item's response ranging from 1 (not anxious) to 5 (extremely anxious). Each mother was asked to complete the MDAS Hindi version questionnaire. Mothers' educational level, location (urban or rural) and family income status were also recorded. The dental caries among the respective children was diagnosed utilizing the World Health Organization (WHO) criteria [27]. Decayed, missing and filled teeth (dmft/DMFT) as well as decayed, missing and filled surfaces (dmfs/DMFS) scores were calculated for each child.

Inclusion criteria

- Mother-child pair, attending for dental treatment.
- Child's age between 3-14 years.

Exclusion criterion

Children with special health needs.

STATISTICAL ANALYSIS

The data were entered into a computer using Statistical Package for Social Sciences (SPSS) version 20.0 (Chicago, IL, USA). ANOVA was used to compare mean maternal anxiety scores with various independent variables. T-test was used to compare maternal dental anxiety and children's caries experience. A p-value equal or less than 0.05 was considered as statistically significant.

RESULTS

[Table/Fig-1] presents the demographics characteristics of the sample. Majority (51.3%) of the mothers were either graduates or had postgraduate education. Less than one-third (31.6%) of the mothers were from low income group. There were more mothers from rural areas (54.5%) than urban dwellers (45.5%). Only about one in ten (11.7%) mothers did not have any dental anxiety. A considerable percentage (14.4%) was either 'very anxious' or 'phobic'.

There was a statistically significant difference ($p < 0.05$) in anxiety level of mothers related to the age of the child, mothers' educational status and family income [Table/Fig-2]. Mothers of younger children had higher mean anxiety score. Similarly, less educated mothers and those with lower family income had higher mean anxiety scores. However, there was no significant difference between urban and rural dwellers.

The caries experience (mean dmft/DMFT and mean dmfs/DMFS scores) of children with highly anxious mothers was significantly ($p<.05$) higher than those with less anxious and non-anxious mothers. The children whose mothers were 'extremely anxious' (phobic) had the highest mean dmft/DMFT and mean dmfs/DMFS scores [Table/Fig-3].

Correlation among various variables showed that higher dental anxiety among mothers was significantly related to higher number of decayed and missing teeth in their respective children. [Table/Fig-4] represents correlation among all variables. MDAS among mothers was inversely correlated to age of the child, maternal education and income of the family.

Sample characteristics	Frequency (%)
Age of the children (in years)	
3-5	24 (12.8)
6-9	72 (38.5)
10-12	53 (28.3)
12-14	38 (20.3)
Mothers' Education	
<High School (HSC)	49 (26.2)
Secondary School (SSC)	42 (22.5)
Graduate	61 (32.6)
Post graduate	35 (18.7)
Family Income	
< 20000	59 (31.6)
20000-50000	76 (40.6)
> 50000	52 (27.8)
Family Location	
Rural	102 (54.5)
Urban	85 (45.5)
Mothers' MDAS	
Not Anxious	22 (11.7)
Slightly Anxious	65 (34.8)
Fairly anxious	73 (39)
Very anxious	20 (10.7)
Phobic	7(3.7)
Total	187

[Table/Fig-1]: Demographic characteristics of the sample

Sample characteristics	Mean ± (SD)	p-value
Age of child (in years)		
3-5[a]	3.33 ± 0.97	0.001*
6-9[a]	2.92 ± 0.82	
10-12	2.71 ± 0.89	
12-14[a]	2.27 ± 0.62	
Education		
<HSC[a]	3.03 ± 1.08	0.01*
SSC	2.84 ± 0.63	
Graduate	2.65 ± 0.64	
Post graduate[a]	2.47 ± 1.05	
Income		
< 20000[a]	3 ± 1.01	0.001*
20000-50000	2.93 ± 0.61	
> 50000[a]	2.3 ± 0.86	
Location		
Rural	2.76 ± 0.54	0.15
Urban	2.71 ± 1.12	

[Table/Fig-2]: Mothers' anxiety level in relation to various demographic variables
Groups with same letter have no statistically significant difference between them
* Statistically significant

DISCUSSION

The impact of dental anxiety on people's oral health behaviour and practices is dynamic and wide-ranging [12]. Parental dental fear is strongly correlated with the behaviour of their children [15]. Several studies have proved that parental anxiety influences the child's anxiety [14,18]. Other studies have established relationship between maternal health related attributes and health related outcomes particularly early childhood caries among their children [25,28]. Dental anxiety has been shown as a significant risk indicator of poor dental and periodontal status [29]. Parents who avoid seeking

MDAS	Decayed Teeth	Missing Teeth	Filled Teeth	Mean dmft/ DMFT	Mean dmfs/ DMFS
	Mean ± (SD)				
Not Anxious (22)	0.68±1.24	0.32± 0.71	0.95±1.17	1.95±2.42	2.95±4.77
Slightly Anxious (65)	0.95±1.37	0.09±0.29	0.12±0.33	1.17±1.70	1.69±2.24
Fairly anxious (73)	0.93±1.37	0.25±0.59	0.34±0.85	1.51±1.71	2.70±3.66
Very anxious (20)	2.25±2.26	0.55±0.51	0.90±1.51	3.70±3.16	5.75±3.41
Phobic (7)	2.29±1.25	0.86±1.06	1.14±1.57	4.86±1.86	9.14±3.84
Total (n = 187)	1.10±1.54	0.26±0.56	0.43±0.95	1.80±2.20	2.95±3.74
p-Value	*0.001	*0.001	*0.00	*0.00	*0.00

[Table/Fig-3]: Mothers' anxiety level and their children's caries experience dmft=decayed, missing and filled primary teeth; DMFT=decayed, missing and filled permanent teeth

and skills attained through education which augments a person's cognitive functioning and communication skills; resulting in better approach to health services [28].

Our study found that dental anxiety score was related to higher number of decayed teeth (D) which was statistically significant. Similarly, Gottems ML et al., found that Children from anxious mothers were more likely to present untreated caries even after covariate adjustment [21]. The effect of dental anxiety on caries prevalence was discussed by other researchers with same agreement [31]. Similar results were found in a study in India [20]. However, Taani DQ et al., demonstrated no association between 'general dental fear' and dental caries or gingivitis in children [22].

Dental anxiety was shown to increase the prevalence of decayed teeth in a group of Jordanian adults [23]. Some studies have shown that the presence of dental caries and dental pain were associated with dental fear regardless of socioeconomic origin and lack of dental service use in childhood [24]. However, the present study showed a correlation between maternal dental anxiety and socioeconomic variables.

	MDAS	Age	Education	Income	location	decayed	missing	filled	DMFT	DMFS
MDAS	1	-.240**	-.231**	-.311**	-.100	.246**	.220**	.095	.293**	.335**
		.001	.001	.000	.173	.001	.002	.196	.000	.000
Age	-.240**	1	-.089	.145*	-.110	-.207**	-.148*	-.082	-.220**	-.202**
	.001		.224	.047	.136	.004	.043	.262	.002	.006
Education	-.231**	-.089	1	.286**	.138	-.060	.017	.037	-.013	.019
	.001	.224		.000	.060	.417	.815	.620	.858	.794
Income	-.311**	.145*	.286**	1	.282**	-.164*	-.039	-.007	-.125	-.109
	.000	.047	.000		.000	.025	.592	.920	.089	.139
location	-.100	-.110	.138	.282**	1	.051	-.035	.121	.082	.019
	.173	.136	.060	.000		.484	.639	.100	.263	.798
decayed	.246**	-.207**	-.060	-.164*	.051	1	.136	.290**	.870**	.652**
	.001	.004	.417	.025	.484		.063	.000	.000	.000
missing	.220**	-.148*	.017	-.039	-.035	.136	1	-.005	.364**	.686**
	.002	.043	.815	.592	.639	.063		.942	.000	.000
filled	.095	-.082	.037	-.007	.121	.290**	-.005	1	.637**	.415**
	.196	.262	.620	.920	.100	.000	.942		.000	.000
DMFT	.293**	-.220**	-.013	-.125	.082	.870**	.364**	.637**	1	.835**
	.000	.002	.858	.089	.263	.000	.000	.000		.000
DMFS	.335**	-.202**	.019	-.109	.019	.652**	.686**	.415**	.835**	1
	.000	.006	.794	.139	.798	.000	.000	.000	.000	

[Table/Fig-4]: Correlation among study scales
Pearson's Correlation. * significant correlation at p < 0.05 ** significant correlation at p < 0.01 N = 187

dental treatment themselves; are also likely not to take their children for dental treatment [30]. The present study found a significant association between maternal anxiety and high caries experience in their children; which was in agreement with other similar studies [19,20]. Milsom et al., in a study of five-year old children found that dental anxiety in these children was closely associated with irregular dental visits, history of extraction and having a dentally anxious parent [31].

The study also correlated maternal dental anxiety levels with socioeconomic factors. This finding is in accordance with other studies performed in Brazilian cities and Mexico [32-34]. The results showed higher mean anxiety scores in mothers from lower income families. The lower income families have been reported to have the highest dental needs and lowest use of dental services [9,10]. Earlier oral health intervention and delivery of culturally sensitive oral care can prevent or delay progression of dental caries [35]. Maternal educational level was also an important factor in maternal anxiety. Maternal education was found out to be inversely correlated to maternal dental anxiety. This could be attributed to the knowledge

LIMITATIONS OF THE STUDY

Although a correlation was found between MDAS and socio-economic indicators, the study did not however take into account the previous dental experience among mothers. It is assumed that the mothers who have had a favourable previous dental experience would report lower on the dental anxiety scale [28]. The MDAS however does not take into consideration the past dental experience. Similarly, the family structure and child's order of birth was not included in the data collection. It is noteworthy that Goettems ML et al., did not find any significant difference in caries experience as related to family structure [21]. Though the present study has investigated an important area of children's oral health, yet it was carried out in a select group of mother-child pairs. Further studies on larger random samples are required.

Measures need to be taken to reduce dental anxiety among the studied mothers. Proper dental health education, good patient-dentist relationship, regular dental visits and effective communication with mothers would help in reducing their dental anxiety. This will not

only improve oral health care of the mothers but in turn will translate into better utilization of preventive and restorative dental services for their children.

CONCLUSION

There was a strong positive association between maternal dental anxiety and children's caries experience. Highly educated mothers had the lowest dental anxiety. Mothers from low family income group showed higher dental anxiety as compared to those with high family income.

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