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Frequency of dental caries in 1-5 years aged children and its impact on their quality of life

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ABSTRACT

Oral diseases can vastly depreciate the individual's quality of life. This has been found as a preventable dental and oral health issue which have also been amongst the most prevalent chronic disease.

Objective: To estimate the frequency of dental caries and its impact on the quality of children's life in Hafiz- Abad, Pakistan **Methods:** It was a cross sectional analytics-based study spanning around nine months. Three hundred and seventy children (aged between 1-5 years) were included as subjects, who visited the District Headquarter (DHQ) hospital, Hafiz Abad, Pakistan. Dental caries was measured by using decayed missing filled (DMF) index **Results:** A high prevalence frequency of 243 (65.7%) were found suffering from dental caries. High prevalence of dental caries (70%) in children of low literate parents has been found statistically significant (p=0.035). As far as brushing frequency is concerned 93.8% children were not found brushing their teeth prior to breakfast. The association between brushing frequency prior to breakfast and formation of dental caries was found statistically significant (p<0.001). **Conclusions:** High prevalence of dental caries coupled with high severity level was found associated with the worse dental and oral hygiene awareness levels amongst the preschool children and their parents

INTRODUCTION

Oral health is imperative for the general health of human beings [1]. Dental caries is amongst the most prevalent teeth diseases. It affects the individuals of all age groups including children. These involve the localized dissolution and destruction of the teeth [2]. "Dental caries is a biofilm-mediated, sugar-driven, multifactorial, dynamic disease that results in the phasic demineralization and re-mineralization of dental hard tissues". Dental caries can damage the tooth crown and later in life damage the root surfaces of teeth as well, can occur in both deciduous and permanent dentition. Initiation and progression of tooth caries strongly influenced by the balance between protective as well as pathological factors [3]. Oral diseases can vastly depreciate the individual's quality of life. It can lead to long-term morbidity which would also have significant implications on the functional, mental, and social well-being of the individual. The prevalence of oral diseases could have serious repercussions on the economic prosperity of society at large due to the loss in working days and/or hours. Among these periodontal diseases and dental caries have been recognized as amongst the most prevalent conditions across the globe [1]. A wide geographic spread and a graded severity in dental caries have been reported by various studies [4-6]. Latin America, Middle East, and South Asia are amongst the regions where almost high prevalence (90%) of dental caries cases have been observed [7]. Moreover, unfortunately >95% children residing in developing countries were left untreated [8,9]. A high

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prevalence of almost 51% and 54.1% has also been found by the two India-based studies [10,11]. Various prevalent percentages of dental caries in Brazil, Lithuania and New Zealand have been respectively found as 26.8% [12], 50.6% [12] and 50% [14]. Two Pakistan based studies have indicated the prevalent percentages of 29.1% and 40.1% amongst the school-aged children [15, 16]. However, another study piloted in a Lahore-based army school have shown a very high percentage (60.9%) of dental caries [17].Awareness deficiencies among children regarding good oral hygiene practices have also been found as significant contributing factor in the development of dental caries [18]. This negligence was reportedly found leading to premature tooth-loss, tooth-ache, malnutrition and finally had a greater influence on the development, overall growth and performance of children [19]. An increased risk of (almost twelve times) for the development of oral caries have been found in children with poor socio-economic status as compared to those who have been reportedly found maintaining the satisfactory oral health [20]. It is evident from the data accessed from the World Health Organization (WHO) that children under the age of 5 are amongst the age group which have drawn their frequent interests. Current study was aimed to determine the frequency of dental caries in one to five years aged children and to find out its impact on their quality of life. To the utmost of the author's surprise limited data and knowledge has been found regarding the prevention and treatment of dental caries in Pakistan. There is stringent need for the updated information related to dental health among pre-school children. Current study was planned for the effective data collection and finding out associated factors that contribute in the prevalence of dental caries. The study would enhance the oral health of children to counter the dental issues and assisting the policy makers and health planners to take effective preventive measures.

METHODS

Current study was conducted as an analytical cross-sectional study. The objects of current study were the children under the age group of 1-5 years who visited the dental departments of DHQ hospital Hafiz Abad, Pakistan. Study was conducted for the duration of nine months. Sample size was 370, 1-5 years aged children. Inclusion criteria involved the children belonging to the age group of one to five years. Children of both genders were included. All children visiting the DHQ hospital Hafiz Abad were included in this study. Parents and/or Guardians willing to participate were included in the study. Exclusion Criteria involved the physically and mentally retarded children. Moreover, children suffering from any chronic illness were also excluded from the study.

Measurement Scales

Decayed-Missing-Filled Index (DMF)

DMF was firstly presented by Palmer, Knutson, and Klein in year 1938 and was modified by World Health Organization (WHO). Prevalence of dental caries was measured by using **DMF teeth index (DMFT)**. Where D denotes the "Decayed teeth", M denotes the "missing tooth due to caries", F denotes "filled teeth due to caries and without decay".

Recording Rules and Principles:

1- One tooth is counted although if several restorations are present in the tooth, **F**.
2- Tooth is counted as **D** (decayed) if it had restorations on the one surface & also had caries on the other side.
3- The tooth is counted once for either of the category i.e., sound or D or M or F.

Early Children Oral Health Impact Scale (ECOHIS)

WHO defined the quality of life as an individual's perception for their position in life in the context of their culture and values in which they dwell. This amply satisfies their goals, expectations and standards of life. Quality of life is measured by ECOHIS scale. Above 60% ECOHIS score was considered as good quality of life and >60% ECOHIS score was considered as poor quality of life.

DATA COLLECTION PROCEDURE

The data was collected from the parents/guardians of children age 1-5 years visiting the public sector hospital "DHQ Hospital Hafiz- Abad" during routine working hours. The children were checked clinically on daily basis and asked the questions from their parents/guardians.

After informed consent from parents, the children oral health status was measured using DMFT index and its impact on their quality of life using ECOHIS scale. Socio-demographic and factors data was collected on a structured questionnaire. Researcher interviewed the parents and recorded the data.

Rules & Principle for recoding of DMFT Scale

- A tooth may have several restorations but it counted as one tooth, **F**.
- A tooth may have restoration on one surface and caries on the other; it should be counted as decayed **D**.
- No tooth must be counted more than once, D M F or sound.

The Early Childhood Oral Health Impact Scale (ECOHIS)

The problems associated with mouth, teeth or jaws as well as treatment could affect everyday lives & well-being of the children and also their relatives. The questions must be circled as per the child's experiences as well as parents own

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experience. The important thing to notice is to recall entire events of the child life from his/her birth till the interview time. If question is not related to the child, check "never" option; 1. "Never", 2. "Hardly ever", 3. "Occasionally", 4. "Often", 5. "Very often", 6. "Don't know".

METHODS

The mean age of children was 3.34±1.28 years and their mean family income was 35756.76±19777.77 rupees. The DMFT mean score for the enrolled children was 9.76±9.00. The mean ECOHIS score among enrolled children was 23.92±7.51. Association between ECOHIS Quality of Life and dental caries was observed (Table 1). It has been found that 30% children had age ≤2.5 years and remaining 70% were having >2.5 years. Out of 53.2% were males, while the rest were females (46.8%). In this study, 217 (58.6%) parents had education status below or equal to matric and remaining (41.4%) had qualification above matric. Out of total 370 children, 65 (17.6%) were living in nuclear family while remaining 305 (82.4%) were dwelling in an extended family system. At the time of data collection, the information regarding income showed that 282 (76.2%) were having ≤40,000 rupees and 88 (23.8%) were having >40,000 rupees. Among the respondents, only 3% were found brushing their teeth regularly and 29.7% of them brush their teeth regularly before the breakfast while 3.2% brush teeth before going to bed. It has been found that some respondents were found using tooth-paste (33.2%) and powder (1.4%). Thumb sucking was seen in 24 (6.5%) respondents and oral hygiene was satisfactory among 296 (80%) 1-5 years aged children (Table 2). Out of total children enrolled in the study, 243 (65.7%) were suffering from dental caries. A mere percentage of 2.4% and 33(8.9%) had stained teeth and calculus deposits, respectively. Gum condition was reportedly found satisfactory in 304 (82.2%) children. As far as knowledge among the parents of the respondents is concerned, 308 (83.2%) parents had knowledge regarding the dental caries. They had an idea that these were caused by teeth-eating worms. Some 39.5% parents were of the view that first dental visit must be done at the first year of the children. Only 33 (8.9%) of parents had knowledge about fluoride. Dental caries could affect children oral health was known to 335 (90.5%) parents. Some 40.8% parents were of the view that rotten teeth could be prevented or controlled (Table 3). Dental caries is caused by eating sweets or candies (66.2%), lack of brushing (17.6%), low calcium level (8.6%), and bottle feeding (4.1%).

ECOHIS		Dental Caries		Total	p-Value
		Yes (%)	No (%)		
Quality of Life	Poor	40 (61.5)	25 (38.5)	65	0.439
	Good	203 (66.6)	102 (33.4)	305	
Total		243 (65.7)	127 (34.3)	370	

Table 1: Association between ECOHIS Quality of Life and dental caries among the 1-5 years aged children

Variables		Dental Caries		Total	p-Value
		Yes (%)	No (%)		
Brush Teeth Regularly	Yes	06 (54.5)	05 (45.5)	11	0.430
	No	237 (66.0)	122 (34.0)	359	
Brushing Before Breakfast	Yes	09 (7.5)	108 (92.5)	117	<0.001*
	No	237 (93.8)	16 (6.2)	253	
Brushing Before Going to Bed	Yes	05 (41.7)	07 (58.3)	12	0.075
	No	238 (66.5)	120 (33.5)	358	
Thumb Sucking	Yes	16 (66.7)	08 (33.3)	24	0.916
	No	227 (65.6)	119 (34.4)	346	
Oral Hygiene	Satisfactory	185 (62.5)	111 (37.5)	296	0.010*
	Unsatisfactory	58 (78.4)	16 (21.6)	74	
Staining of Teeth	Yes	07 (77.8)	02 (22.2)	09	0.439
	No	236 (65.4)	125 (34.6)	361	
Calculus Deposit	Yes	27 (81.8)	06 (18.2)	33	0.041*
	No	216 (64.1)	121 (35.9)	337	
Gum Condition	Satisfactory	193 (63.5)	111 (36.5)	304	0.057
	Unsatisfactory	50 (75.8)	16 (24.2)	66	
Total		243 (65.7)	127 (34.3)	370	

Table 2: Association between brushing teeth, before breakfast, before going to bed, Thumb Sucking, Oral Hygiene, Staining of Teeth, calculus deposit and gum condition with dental caries among the 1-5 years aged children ,*Significant (p-value < 0.05)

Variables		Dental Caries		Total	p-Value
		Yes (%)	No (%)		
Worms that Eat Teeth	Yes	210 (68.2)	98 (31.8)	308	0.024*
	No	33 (53.2)	29 (46.8)	62	
First Dental Visit at One Year Age	Yes	79 (54.1)	67 (45.9)	146	<0.001*
	No	164 (73.2)	60 (26.8)	224	
Heard about Fluoride	Yes	14 (42.4)	19 (57.6)	33	0.003*
	No	229 (68)	108 (32)	337	
Dental Caries Affect Health	Yes	216 (64.7)	118 (35.3)	334	0.255
	No	26 (74.3)	09 (25.7)	35	
Rotten Teeth can be Prevented or Controlled	Yes	92 (60.9)	59 (39.1)	151	0.110
	No	151	68 (31.1)	219	
Total		243 (65.7)	127 (34.3)	370	

Table 3: Association between knowledge of the parents with occurrence of dental caries among the 1-5 years aged children ,* Significant (p-value < 0.05)

Early Children Oral Health Impact Scale (ECOHIS) quality of life and dental caries have shown that a respective percentage of 61.5% and 66.6% of children suffering from caries had poor and good quality of life. This difference of ECOHIS quality of life and dental caries was insignificantly associated statistically (p-value = 0.439) (Table 1). Children of some seventy percent parents (70%) having education level below matric were found suffering from dental caries. Whereas, almost sixty percent (59.5%) highly qualified parents were reported as having children suffering from dental caries. The impact of parent's education on the formation of dental caries was found statistically significant (p=0.035). Nuclear family type children showed 56.9% dental caries as compared to extended type family system (67.5%). This difference was statistically insignificant (p-value = 0.102). The impact of income on the prevalence of dental caries among children have shown that 67.7% children with the family income

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≤40,000 rupees were found suffering from caries. Whereas almost sixty percent (59.1%) children with family income greater than forty thousand (>40,000) rupees were found suffering from dental caries. This difference of income and occurrence of dental caries was found statistically insignificant (p-value = 0.136).

DISUSSION

The results from present study have demonstrated that the overall prevalence of caries among 1 to 5 years children was considerably high (65.7%). Current findings are comparable to both the national and international literature. Similar to our findings a study reported in Saudi Arabia has shown that 73% of children aged between 1-5 years were suffering from dental caries [21]. In another oral health survey reported in Qatar has revealed almost fifty percent (49%) cases of dental caries. However, a considerable decrease in its prevalence has also been reported since last two decades [22]. A Philippine-based study has reported the prevalence of dental caries up to seventy percent (69%) [23]. Few other studies carried out in correspondence to our study have reported a respective prevalent percentage of dental caries up to 53%, 65.88%, 68.8%, and 65.3%, respectively [23-25]. Socio-economic conditions could also have been considered as main contributing factors in the development of dental caries. Moreover, economic conditions make it easier for their parents to get access and their affordability for refined sugars. Hence, high prevalence of dental caries in low developing countries could amply be explained by their frequent dietary consumption of unrefined sugar. Another study in line to our study has reported 61.4% incidence percentage of dental caries in the pre-school children of Iran [22]. Another study reported from a north-western province of Pakistan, Khyber Pakhtunkhwa (KPK) has been found reporting the overall prevalence percentage of dental caries as 64.38% [26]. Their findings are also in correspondence to our study. The prevalence percentage of dental caries (71%) reported from a Lahore-based study has been found in line to our study [21]. A Peshawar based study has however indicated a relatively very high percentage (90%) of caries [26] which is different from the findings of Sargodha (45.9%) based study (27). These differences in percentages can be explained on the basis of socio-demography, age distribution, dietary factors, and their rural-urban settings [10].

CONCLUSIONS

High prevalence frequency of dental caries has been found in this study. Severity level was also found significantly associated with the oral hygiene, calculus deposition, prior to breakfast brushing frequency and parent's education level.

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