Oral Health Status of School Children (5-7 Years) in Fishing Communities of Thiruvananthapuram District

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Abstract

Context: Oral health is an important part of general health. Children of age 5 to 7 years is considered as index age group, as caries in primary dentition can exhibit changes in short time than in permanent dentition. Few studies address this problem in an Indian context. Furthermore, children of generally underprivileged coastal communities may be affected disproportionately.

Aims: To assess the oral health status of school children (5-7years) of fishing community in Thiruvananthapuram district of Kerala.

Settings and Design: A cross-sectional study was conducted among 5-7 year old school going children from the 14 active fisher folk areas of Thiruvananthapuram District of Kerala.

Methods and Material: Data was collected from parents using a structured pre-tested interview schedule. Oral health of children was assessed through dental examination and measured using deft index.

Statistical analysis used: Variables were analysed quantitatively. Both univariate and bivariate analysis was carried out. The prevalence of dental caries and the average deft/DMFT index were calculated.

Results: Mean deft score was 3.99. Dental caries prevalence was 61.3%, which was associated with sweet intake. About 20% had the habit of grinding teeth and majority of them used tooth brush for cleaning teeth. Majority of parents neglect dental caries as it is in primary dentition, and do not seek professional care due to inaccessibility of nearby dental facilities and cost.

Conclusions: Dental caries is a prevalent oral health problem in this vulnerable group. Improving oral health awareness and access to dental health care especially in public sector is needed.

Keywords: Oral health; Dental caries; Deft index; Coastal area; Fishing community; Dental pain; Primary dentition; Thiruvananthapuram; Cross sectional.

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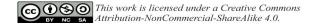
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INTRODUCTION

Oral health is an important component of public health.[1,2] Dental caries is the important oral health condition affecting 60-90% of children.[3] Dental cavities in children if neglected, can affect the developing permanent tooth bud and in later-life; the permanent teeth. Children of 5-7 years of age are considered as an index age group as recommended by the World Health Organization.[4] Oral health

depends on food intake[5], oral hygiene practices and access to dental health care. Carbohydrates or sugars are the major contributing factors in development of dental caries; and its frequent intake can have a detrimental effect on oral health.[6] The use of toothbrush, frequency of toothbrushing and frequency of changing toothbrush have a positive impact on oral health.[7] Use of appropriate dental hygiene methods (like toothbrush) can have positive effect on tooth and its structures.[1]

This study focused on socio economically disadvantaged vulnerable coastal community whose main occupation is fishing and related activities. They work for prolonged hours and have no spare time to take care of their health as well as their children's health.[8-10] Studies show strong association between good oral health and access to regular oral health care facilities and service utilization among children.[11] Majority of population in our country still uses home remedies rather than consulting a dentist due to high treatment expenses and lack of nearby dental facilities.[12] Hence this study aims to assess the oral health status of school children (5-7 years) of fishing community in Thiruvananthapuram district of Kerala as in past few years fewer studies have been conducted on this age group at coastal area. And also, to assess the predictors of oral hygiene like brushing habits and consumption of sugar and access to dental care services.

Subjects and Methods

We conducted a cross-sectional survey using quantitative method of data collection. In Kerala, Thiruvananthapuram district has the highest number of fishing villages, spread across six taluks with Thiruvananthapuram taluk which has the highest number of active fisher folk areas.[13-15] From these 14 active fisher folk areas 95 schools were enumerated. From these 95 schools 12 schools were selected randomly. The 10 schools within five kilometres of shore line were selected (two schools did not provide permission). We were able to acquire permission from 10 school authorities to conduct study. The sample size of the study population was 282 with an assumed prevalence of 40%[16] and a confidence interval of 95% and a design effect of 1.5. All children who were in the age group 5-7 years and was present in class on the day of data collection were included in the study and children not in this age group (5-7 years) and who were absent in class on the day of data collection were excluded from the study.

The study protocol was approved by the Institutional Ethical Committee of Ananthapuri Hospitals and Research Institute (AHRI) on 2nd of June 2018 with Reference no: (AHRI/EC/70/May/2018). Permission was taken from the Directorate of Public Instructions (DPI) to gain access to schools. Furthermore, consent of the concerned school principal and the written informed consent of each parent or guardian was taken, prior to the interview with the parent and oral examination of the students. Data was collected by interviewing the parent or guardian using a pre tested structured interview schedule. A copy of the information sheet regarding the study was given to the parent or guardian of the child. The oral health status of the school children was assessed using mouth mirror and explorer using the deft index for primary dentition and both deft and DMFT index for mixed dentition. A pilot study was carried out with a sample size of 25 to check the feasibility of the study. The oral health examination was conducted according to WHO criteria and done by a single trained examiner for uniform diagnosis. The oral health status was assessed by clinical examination of the oral cavity using probes and mirrors in natural light. The oral health status was assessed based on the decayed-extracted and filled teeth index (deft) and decayed -missing and filled teeth index (DMFT) in case of permanent teeth. (Mixed dentition) Data collection was for three months (December 2018 - February 2019).

Data was entered in MS Office Excel. After rectifying data entry errors data was analysed using the Statistical Package for Social Sciences (SPSS version 16.0) software. The variables of interest were analysed quantitatively. Univariate and bivariate analysis was carried out. The prevalence of dental caries, the average deft/DMFT index was calculated. The predictors of oral health status of the children (like the brushing habits, frequency of sweet consumption, and the use of toothbrush) were analysed with the deft index as the dependent variable. Deft index (outcome variable) in the study was a continuous variable and all independent variables were categorical. Therefore, for bivariate analysis, independent sample t-test (used for two categories) and ANOVA (for more than two categories) were used and a p value less than 0.05 was considered to be significant.

RESULTS

Of the 282 children, 63.8% were girls. The mean age of the study population was 6.24 ± 0.7 years. Majority of the children were from the aided schools (67.4%). Majority of fathers had education up to middle school (51.5%) and 63.5% of mothers

Table 1: Socio Demographic characteristics of the study population (N=282)

Demographic characters	Categories	Frequency (n)	%
Age (in years)	5	45	16.0
	6	125	44.3
	7	112	39.7
Gender	Male	102	36.2
	Female	180	63.8
Type of school	Government	11	4.0
	Aided	190	67.4
	Unaided	81	28.7
Religion	Hindu	38	13.5
	Muslim	62	21.9
	Christian	182	64.5
Place of residence	Rural	18	6.4
	Urban	19	6.7
	Coastal	245	86.9
Fathers'educational qualification (completed)	Illiterate	20	7.1
	Up to middle school	151	53.5
	High school and above	111	39.4
Fathers' occupation	Fishing and fishing related work	153	54.3
	Non fishing	129	45.7
Mothers'educational qualification (completed)	Illiterate	11	3.9
	Up to middle school	92	32.6
	High school and above	179	63.5
Mothers' occupation	Working women	70	24.8
	Home maker	212	75.2
Ration card	Below poverty line	225	79.8
	Above poverty line	57	20.2

Table 2: Mean deft of the study population (N=282)

Variables	Categories (In years)	No of children	Mean deft	Dental caries n (%)
Age	5	45	5	29 (64.4)
	6	125	4	81 (64.8)
	7	112	3	63 (56.3)
Gender	Male	102	4	60 (58.8)
	Female	180	4	113(62.8)
Total		282	4	173(61.3)

had high school or more educational qualification. Most of the children belonged to below poverty line (79.8%) (from ration card) households (Table 1).

The main outcome variable of my study was deft index. The mean deft score of the study population was 3.99 with a standard deviation of 3.313 (Table 2).

In this study, only 7.9% (n=22) children in the study population have caries in the permanent teeth. Conversely, majority (92.2%) of the children had a DMFT score of zero. Hence, all further analysis was done using deft as dependent variable. The DMFT score is only applicable to children with permanent dentition, which usually starts at the age of six. The primary teeth are more prone to caries than permanent teeth as the permanent enamel (and possibly primary enamel) undergoes post-eruptive maturation, accumulating fluoride, becoming harder, less porous and less caries-prone. So overall the primary teeth are more vulnerable to caries than permanent teeth.[17] So, I did not further explore DMFT index. The overall prevalence of dental caries in the study population was 61.3%. Caries prevalence in age 5, 6 and 7 year olds were 64.4%, 64.8% and 56.3% respectively. The deft index for assessing oral health status of children was considered as the outcome variable. The age

group 5, 6 and 7 were highly significant with the deft index (p value = 0.000). There was no gender difference in dental caries in the study population.

One of the major predictors of oral health was the diet of the children. More than 95% of children had the habit of taking sweets, sweetened foods and sweetened drinks. Majority of the children do not have the habit of brushing teeth after taking these types of food items. Most of the children 84.4% (n=238) had rice as their main food and 15.6% (n=44) had wheat and other grains as their main food. Up to 93.6 % (n=264) of the children had the habit of eating fruits, 74.5 % (n=210) of the children ate vegetables and 92.9 % (n=262) of the children ate fish. Majority of the children 97.5% (n=275)

consumed sweets, 95.7% (n=270) of the children consumed sweetened food items and 96.1% (n=271) of the children consumed sweet drinks in the twenty-four hours preceding the survey. In the preceding 24 hours to the survey, 51.4% (n=145) of children consumed sweet items one to three times, 48.6% (n=137) children consumed sweetened food items one to three times and 51.4% (n=145) children consumed sweetened drinks for one to three times. The number of times sweets, sweetened foods and sweetened drinks taken in the 24 hours preceding the survey were significantly associated with mean deft index. Furthermore, about 99.3% (n=280) of the children did not brush their teeth after taking sweets and sweet items. (Table 3).

Table 3: Dietary habits of the study population   **(N=282)**

Variables	Categories	n (%)	p value
Regular consumption of food items			
Main food	Rice	238 (84.4)	0.268
	Wheat and others	44 (15.6)	-
Fruits	Yes	264 (93.6)	0.784
	No	18 (6.4)	-
Vegetables	Yes	210 (74.5)	0.174
	No	72 (25.5)	-
Fish	Yes	262 (92.9)	0.517
	No	20 (7.1)	-
Sweet consumption in the past 24 hours			
Sweets	Yes	275 (97.5)	0.899
	No	7 (2.5)	-
Frequency	1-3 times	145 (51.4)	0.000*
	≥ 4 times	81 (28.7)	-
	Do not eat sweets	56 (19.9)	-
Habit of brushing teeth after taking sweets	Yes	2 (0.7)	0.836
	No	280 (99.3)	-
Sweetened food consumption in the past 24 hours			
Sweetened foods	Yes	270 (95.7)	0.187
	No	12 (4.3)	-
Frequency	1-3 times	137 (48.6)	0.000*
	≥ 4 times	80 (28.4)	-
	Do not eat sweetened foods	65 (23.0)	-
Habit of brushing teeth after taking sweetened foods	Yes	5 (1.8)	0.900
	No	277 (98.2)	-
Sweet drink consumption in past 24 hours			
Sweet drinks	Yes	271 (96.1)	0.864
	No	11 (3.9)	-
Frequency	1-3 times	145 (51.4)	0.000*
	≥ 4 times	75 (26.6)	-
	Do not drink sweet drinks	62 (22.0)	-
Habit of brushing teeth after taking sweet drinks	Yes	3 (1.1)	0.386
	No	279 (98.9)	-

#multiple options possible

Oral hygiene practices using oral hygiene aids like tooth brush and tooth paste are important for a better oral health. Majority of the children had shifted from traditional oral hygiene aids to modern oral hygiene aids. Almost all children in the study population used brush and tooth paste as the materials for cleaning their teeth. Along with this, around 17% of the children still used traditional cleaning material likeumikari (orrice husk ash or charcoal,which is a fine quality odourless, black powder used for cleaning teeth). There is significant association of deft index with materials used for cleaning teeth such as charcoal, salt, salt and pepper. About 64.5% of children change their tooth brush within 1 to 3 months. About 26% of children clean their teeth twice daily. About 76% of children had the habit of cleaning their teeth only in the morning.

Parents' self reported awareness about oral health of their children may be linked to their likelihood of seeking healthcare of dental problems. About 46.1% of the parents were satisfied with appearance of their children's teeth and 65.2% of parents reported that their children had dental problems in last one year. The most common dental problem was dental caries (61.3%) followed by pain (37.2%), bleeding gums (7.4%) and halitosis (7.8%). Henceforth, as numbers were small, we are presenting further results for dental caries and dental pain. For dental caries and pain in children the parents did not seek any professional care.

Considering the health care seeking pattern for oral health and access to health care, among the 173 children who had dental caries; only 35.3% (n=61) sought professional care. Around 55% (n=96) did not seek any care. (Table 4).

Table 4: Self-Reported Dental Health Problems and Health Care Seeking Pattern#

Variables	N %	
Satisfied with appearance of teeth	130 (46.1)	
Last 1 year any dental problem	184 (65.2)	
Main Dental Problems:	**Caries (n=173)**	**Pain (n= 105)**
Sought professional care	61 (35.3)	48 (45.7)
Did not seek any care	96 (55.5)	34 (32.4)
Self-care with medicines bought from medical store without prescription	6 (3.5)	9 (8.6)
Home remedy	13 (7.5)	21 (20)
Reasons for Not Seeking Any Professional Care (Did Not Seek Care, Medicine from Medical Store and Used Home Remedies):	**Caries (n=112)**	**Pain (n=57)**
	n (%)	**n (%)**
Primary teeth therefore neglected	78 (69.6)	25 (43.8)
Lack of government dental facilities nearby	69 (61.6)	27 (47.4)
Cannot afford treatment	59 (52.8)	25 (43.9)
Used home remedies	7 (6.3)	15 (26.3)
Used medicine from medical store (problem solved with medicine from medical store)	6 (5.5)	7 (12.3)
Fear of	-	-
Treatment	10 (8.9)	5 (8.8)
Side Effects	5 (4.5)	4 (7.0)
Time constraints	8 (7.1)	3 (5.3)

#multiple options possible

Among them 61.6% (n=69) did not seek any professional care due to the lack of government dental facilities and 52.8% (n=59) did not seek care as they could not afford the treatment. About 7.1% (n=8) did not seek any professional care due to the time constraints of parents. Furthermore, 97.5% (n=78) children did not seek care because of the parent's notion that dental caries in milk tooth is of no importance as it will be shed and replaced with a new set of teeth in due course of time. About 6.3% (n=7) of children who did not

seek any professional care used home remedies and 5.5% (n=6) used medicine from medical store. Around 8.9% (n=10) children had fear of treatment. With respect to dental pain, among the study population 57 children (54.3%) did not seek any professional care for dental pain. Of these, 47.4% (n=27) did not seek any professional care due to the lack of government dental facilities, 43.9% (n=25) cannot afford the treatment. About 26.3% (n=15) of children who did not seek any professional care used home remedies, 12.3% (n=7) used medicine

from medical store. Furthermore, 47.4% (n=27) children had other reason for not seeking care, of which 92.6% (n=25) neglected as the pain was in the primary teeth (Table 4).

DISCUSSION

The mean deft index of the study population in the coastal area was high (3.9) indicating high prevalence of dental caries. A study conducted by Goenka et al in 2018 among 5 to 7 year age in Bihar found a score of 2.7 which is less when compared to our study population.[18] Another study conducted in coastal area of Goa had a deft index of 4.7 in 6 years of age and 4.9 in 7 years of age.[19]

The prevalence of dental caries in this study was 61.3% which is similar to a study conducted by Goenka et al in Bihar showed caries prevalence of 65.1%.[18] Another study conducted by Sreekumar et al in Karnataka showed caries prevalence of 71.8% in 5 to 7 year olds.[20] In the study population only 37% children were suffering from dental pain. The result is almost similar to a study conducted in Bangalore where 35.1% of children suffer from dental pain.[21]

The high prevalence of dental caries and dental pain in children in this study may be due to the habit of taking more sweets, sweetened food items and sweetened drinks. So, the increased frequency of carbohydrate rich food and eating patterns is strongly associated with the development of dental caries and dental pain. This is similar to the studies conducted by Kandelman[6] and Parasuraman *et al*.[22] Almost all children involved in the study who had the habit of taking sweets, sweetened food items and sweetened drinks did not brush their teeth after taking these items.

Majority of study population had shifted from using traditional oral hygiene aids to modern oral hygiene aids like tooth brush and tooth paste as it is easily accessible and available. The only difference is in the time of cleaning teeth, the number of times cleaning the teeth and the frequency of changing the tooth brush. Regular cleaning of mouth after every meal will prevent dental caries, bad breath (halitosis), bleeding gums and loosening of teeth.[23] In the present study there is no significant association of dental caries and using brush for cleaning teeth and the number of times brushing the teeth. In this study as children belong to 5 to 7 years there was increased use of sweetened food items which can easily stick to tooth surface. To remove sticky food items from the teeth regular washing and brushing of teeth is required which can lead to a good impact on tooth and its structures.[1] About 78.4% of children in this study washed their teeth after eating, but it is self-reported by the parents.

More than half of our study participants were suffering from dental caries and around half of them did not seek any professional care. The reasons cited were related to both lacks of awareness and poor socio economic status of the community. The majority of parents were unaware of the importance of primary teeth. Parents opined that caries was in the primary teeth which will exfoliate naturally, and hence it does not require much care. Financial constraint was another reason for not seeking professional care, as most of the children (80%) in our study came from poor households. In this context, the lack of accessible government dental care in the coastal area and non-affordable private dental care sparsely distributed in the community leads to treatment avoidance. Similar findings were reported by Boban *et al* from a study conducted in a socio-economically backward community in Ernakulam, Kerala.[23] Time constraints of the parents was another reason for not seeking professional care in this study population. Due to these constraints, the parents mostly managed dental problems at home using home remedies (like rinsing with warm saltwater and chewing a clove for relieving dental pain). The need is to generate dental awareness as studies show that dental health care awareness programmes and periodical dental visits can reduce the incidence of dental caries and reinforce good oral habits in children.[24]

The study has a few limitations. For instance, in this study the prevalence of dental health problems like bleeding gums, halitosis, abscess, trauma, gum swelling and stains could be an underestimate as it is self-reported by the parents or guardian. Most of the government schools have lesser number of children when compared to the infrastructure they have. The number of absentees and drop outs in government schools was more when compared to private and aided schools. Therefore, the study results must be an underestimate from the actual situation.

CONCLUSION

From our study we could conclude that the prevalence of dental caries was high among 5–7 year old school going children of a coastal fishing community and the main reason for not seeking any professional care was parental neglect. The number of times sweets, sweetened foods and sweetened drinks taken in the 24 hours preceding the survey were significantly associated with the deft index.

Most of the children in the study had shifted from traditional oral hygiene aids to modern oral hygiene aids like tooth brush and tooth paste; however, some do continue to use umikkari as a tooth cleaning substance. Further research is needed to address the issue of permanent dentition and other dental health problems of the coastal children. We suspect many social determinants like poor socio-economic statusas the reason for parental neglect towards primary dentition. Furthermore, the inaccessibility of the government dental facilities around the coastal area and the expensive dental treatment in the private sector adds to the problem. This needs to be studied more in-depth to help in formulating better policies to address the health of children in vulnerable coastal communities.

The need of the hour is to empower children and parents about the importance of primary dentition and oral health. Strengthening government dental facilities in coastal area by appointing dental surgeon in primary health centres (PHC) and community health centres (CHC) will also help to improve access to dental healthcare in this vulnerable coastal community.

ACKNOWLEDGMENT

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