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Faiza Awais

Department of Community and Preventive Dentistry, Rashid Latif Dental College, Pakistan

Kiran Naheed

Department of Oral Biology, University Medical and Dental College, Pakistan

Hazik B. Shahzad

Department of Community and Preventive Dentistry, Rashid Latif Dental College, Pakistan,
hazikshahzad@hotmail.com

Ayyaz A. Khan

Department of Oral Health Sciences, Sheikh Zayed Medical Complex, Pakistan

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Feeding and oral hygiene habits of preschool children in Pakistan and their caregivers' attitudes

Faiza Awais¹, Kiran Naheed², Hazik B Shahzad^{3*}, Ayyaz A Khan⁴

1. Department of Community and Preventive Dentistry, Rashid Latif Dental College, Lahore, Punjab 54600, Pakistan
2. Department of Oral Biology, University Medical and Dental College, Punjab 38000, Pakistan
3. Department of Community and Preventive Dentistry, Rashid Latif Dental College, Lahore, Punjab 54600, Pakistan
4. Department of Oral Health Sciences, Sheikh Zayed Medical Complex, Lahore, Punjab 38000, Pakistan

*E-mail: hazikshahzad@hotmail.com

Abstract

Background: Early childhood caries remains a problem in both developed and developing countries. Several maternal determinants are involved in early caries development. This study aimed to identify feeding and oral hygiene practices associated with childhood caries in Lahore, Pakistan. **Methods:** A questionnaire-based survey was conducted in paediatric outpatient department of Sheikh Zaid Hospital, from January to March 2016. A total of 435 children aged 12–15 months were enrolled in the study. **Results:** Children who were fed milk with added sugar, were 30% more likely to have decayed teeth than those fed without sugar. Children who received on demand night-time feeding were 50% more likely to have carious lesions than those who were fed once or twice at night. Children eating sweet snacks multiple times a day were on average 80% more likely to have caries, compared to those who were given sweets once or twice a day. **Conclusions:** Higher tooth cleaning frequency, and teeth cleaning at night were associated with lower risk of childhood caries, whereas the use of milk with added sugar, on-demand night feeding, and high frequency of sweets taken per day contributed to increased caries. Thus, improved maternal counseling may help prevent early childhood caries in Pakistan.

Keywords: deciduous tooth, dental caries, preschool children, pediatricians, oral health, oral hygiene

Introduction

Dental caries in young children can affect growth and quality of life negatively.¹ Since dental decay is a preventable disease, oral care should ideally start with the eruption of the very first tooth to prevent dental decay in deciduous teeth.¹ Since the child develops teeth several months after birth, and it is well known that these teeth will be replaced later in life, the emphasis on their care is minimal.² This may contribute to poor care of deciduous teeth leading to higher caries in young children.²

Previous studies show that 12 to 15 year old children in Pakistan are largely caries free (national survey 2003),³ the majority of 2 to 5 year olds are not.⁴ Dental service utilization is minimal in Pakistan (ref to national survey 2003).³ Furthermore the costs of dental care hinders the use of services heavily.⁵ Paediatricians, doctors, or antenatal healthcare workers are the first persons to come in contact with a child and her mother and therefore may be in a better position than a dentist to impart awareness on oral health as well as screening and referral for treatment.⁶

This study is the first of a series of connected studies aiming to improve the oral health of preschool children

in Pakistan. The aim of the current study was to find out which feeding and oral hygiene practices are associated with caries in young children. The results obtained will help inform health policy makers on how to target oral health issues in children. Furthermore, it would guide healthcare professionals caring for very young children. If the child's doctor is aware and provides proper oral hygiene information, or referral for early treatment for decay, a child can avoid oral health related problems which will improve their growth and quality of life.

Methods

This research was conducted in the Paediatrics Department of Sheikh Zayed Hospital, Lahore. It was completed in 3 months (January 2016 to March 2016) with a sample size of 435 children aged between 12–15 months. This study was a convenient sample survey of all children attending the outpatient department of paediatrics for vaccination of measles. This was a questionnaire-based study in which the questionnaire was first made in English language, then was translated to Urdu and then back translated to check its validity. After complete validation it was applied for the study. Inclusion criteria comprised all healthy children of 12-15 months of age, visiting paediatrics outpatient department, having at least 10

deciduous teeth. Children with mental growth deficiencies, and or having any systemic illness were excluded from the study. Also, mother/guardian/accompanying person refusing to take part in the study were excluded.

Apart from the demographic profile containing the age of subject there were questions about brushing habits, feeding habits of children and knowledge given by the paediatricians of the child about oral health. Brushing habits included six variables. First was tooth brushing frequency which contained 4 items stating brushing teeth twice or more, once, never or seldom. Next was if the teeth were cleaned at night which could be answered as yes, no or seldom. Time of starting tooth cleaning was inquired, and it had options of; started a month ago, not started yet or do not remember. Tooth brushing time was asked next, either before or after breakfast, any time of day or at night. Tools used for cleaning teeth included toothbrush, finger/cloth, rinsing and not started yet. Supervised tooth brushing was asked that either the mother herself cleaned her child's teeth, child him/herself, some other elder except mother or yet not started to brush teeth.

Feeding habits were examined with three variables. Night feeding was recorded as child being fed after falling asleep, answered as never, once/twice or many times. Contents of the feeding bottle included choices of milk with and without sugar, milk with some other ingredients and some extra ingredient other than milk. Frequency of sugary food intake was next in the questionnaire which included never, seldom, once, twice and many times a day. Oral examination under natural light and with the help of wooden spatulas and toothpicks was carried out to determine the number of decayed (d) teeth. Inter-examiner calibration was done prior to the start of this study to eliminate any bias (kappa score 0.9). The threshold of dental decay for this project was defined as a black lesion on the tooth which got a catch by tooth pick.

Ethical permission was obtained from Sheikh Zayed Hospital executive committee. Verbal consent was taken from the accompanying person (mothers) with the children before the questionnaire was completed by interviewing them. All the data collected were entered in SPSS version 20. Frequencies were calculated for tooth brushing frequency, feeding habits and sugar consumption at night. Analysis was run on this data. Logistic regression was applied to assess the association between various feeding and oral hygiene habits to having caries.

Results

One primarily important factor of interest for the current study was information from the child's doctor. When asked whether physician/paediatricians gave information

about oral health to mothers or not, out of 435 mothers only one mother reported that her paediatrician informed her about oral health care for her child. Hence, this question was not included in the analysis.

With regards to the brushing habits, and in particular to the first variable, "Brushing Frequency": only 40% of mothers/guardians reported to brush the teeth of their child (35.9% "once a day", 5.1% "twice or more"), while 54.0% of them responded that they "never" brush their child's teeth (Table 1). With regards to the variable "Brushing Time", 53.6% replied to "never" clean their child's teeth. on asking about how long ago they started brushing their child's teeth 53.3% mothers/guardians have not even yet started. When mothers were questioned about brushing timings, 53.6% were those who did not clean at all. A total of 80.9% of parents responded that they do not brush their child teeth at night. Only 22.1% mothers reported using a toothbrush for brushing purposes. 32.6% of mothers were found to take out time and clean their child's teeth themselves. For feeding habits mothers/guardians who feed their child once or twice at night were found to be 62.1%. While 20.5% females feed whole night. The use of refined sugar in milk bottles was found to be at 58.6%. Mothers/guardians who give their child sweets many times a day were 35.9%. Caries score (d) taken for individual children showed that 46.7% had no caries at all. 17.9% had single tooth with caries in their mouth, while 35.4% of children were found to have two or more carious teeth (Table 1).

Logistic regression analysis was applied to find a relation between presence of caries and its contributing factors (Table 2). When caries was compared with the variables, *p* value for brushing frequency was significant. It indicates that increased brushing frequency decreases risk for caries. A *p* value for brushing teeth at night was significant. According to this value, children whose mothers brush their teeth at night had less number of decayed teeth or no caries while those who never or seldom brush/clean their teeth at night were found with more number of decayed teeth. When mothers were questioned about time since they started cleaning their child's teeth most of them did not remember. That is why *p* value for this variable was highly insignificant.

We did not find any significant relation between the caries progression and time/age since started cleaning teeth. The *p* value for time of day when mother cleans her child's teeth was also insignificant, because what matters is that you brush/clean teeth twice a day instead of some specific time. Most mothers responded they brush/clean their child's teeth at any time of day specifically when their child had some sticky food/sweet. Cleaning teeth after sticky meals, it is prevention from tooth decaying itself. Hence there was no relation of decayed tooth with either brushing/cleaning before breakfast, after breakfast, any time of day or at night.

Table 1. Characteristics and frequencies of study sample (n = 435)

| Variable | n (%) |
|-------------------------------------|------------|
| Brushing Habits | |
| Brushing frequency | |
| Twice or more | 22 (5.1) |
| Once a day | 156 (35.9) |
| Never | 235(54.0) |
| Seldom | 22 (5.1) |
| Brushing at Night | |
| Yes | 29 (6.7) |
| No | 352 (80.9) |
| Seldom | 54 (12.4) |
| Time since Brushing | |
| A month ago | 135 (31.0) |
| Not started yet | 232 (53.3) |
| Do not remember | 67(15.44) |
| Brushing time | |
| Before breakfast | 44 (10.1) |
| After breakfast | 18 (4.1) |
| At night | 24 (5.5) |
| Any time of Day | 116 (26.7) |
| Never | 233 (53.6) |
| Brushing tool | |
| Toothbrush | 96 (22.1) |
| Finger/cloth | 40 (9.2) |
| Rinse | 59 (13.6) |
| Not started yet | 240 (55.2) |
| Supervision | |
| Mother herself | 142 (32.6) |
| Child in Supervision of An Adult | 50 (11.5) |
| Some other Elder Except | 3 (0.7) |
| Mother | |
| Do not clean teeth | 240 (55.2) |
| Feeding habits | |
| Night feeding | |
| Never | 76 (17.5) |
| Once/twice | 270 (62.1) |
| Whole night | 89 (20.5) |
| Bottle ingredients | |
| Milk with Sugar | 255 (58.6) |
| Milk without sugar | 122 (28.0) |
| Anything except milk | 1 (0.2) |
| Milk with Something Extra | 26 (6.0) |
| Extra ingredient than milk | 31 (7.1) |
| Sweets frequency | |
| Seldom/never | 55 (12.6) |
| Once a day | 81 (18.6) |
| Twice a day | 143 (32.9) |
| Many times a day | 156 (35.9) |
| Frequency of Caries (n =435) | |
| Number of Carious teeth (d) | |
| 0 | 203 (46.7) |
| 1 | 78 (17.9) |
| 2 or more | 154 (35.4) |

Table 2. Association of brushing habits, feeding habits and supervision with caries in children

| Variables | Odds Ratio | 95%CI | p |
|------------------------|------------|-----------|-------|
| Brushing Habits | | | |
| Brushing Frequency | 0.56 | 0.35–0.89 | 0.01* |
| Brushing at Night | 0.56 | 0.34–0.92 | 0.02* |
| Time Since Brushing | 1.02 | 0.63–1.65 | 0.92 |
| Brushing Time | 1.22 | 0.89–1.66 | 0.20 |
| Brushing Tool | 0.85 | 0.62–1.17 | 0.32 |
| Supervision | 0.94 | 0.69–1.28 | 0.71 |
| Feeding Habits | | | |
| Night Feeding | 1.52 | 1.05–2.19 | 0.02* |
| Bottle Ingredients | 1.30 | 1.07–1.60 | 0.00* |
| Sweets Frequency | 1.81 | 1.45–2.26 | 0.00* |

* $p < 0.05$

This study found an insignificant p value for “tools for cleaning teeth”. Decayed tooth value was independent of tool for cleaning. There was no effect on decaying of teeth with either the use of tooth brush, cloth or rinses. For feeding habits, bottle ingredients had a significant p value. It showed an inverse relation with sugar. Child who was given milk with sugar, had higher caries in their teeth and children who drink milk without sugar had no decayed teeth. This shows that sugar consumption is associated with decaying of teeth. Feeding at night has a significant p value. Child who feeds whole night had more decayed teeth in their mouth than those who never feed at night. Night feeding basically left milk sugar sticking to tooth, more time the sugar stays on teeth, more time available for bacteria to produce acid and hence causes more tooth decay. We found a very high significant p value for frequency of sweets. There was an inverse relation between caries and frequency of sweets. Children who eat sweets many times a day had higher number of decayed teeth and more risk for caries than those who do not take sweets or once/twice a day.

Discussion

It was seen in this study that majority of mothers have not started to clean their child’s teeth. Also, considerable number gave sweets more than twice and on demand night feeding was also seen in many children. This study found that brushing once a day or more, brushing at night and fewer feeding episodes during the night have less dental decay. On the other hand, higher consumption of sweets and adding extra sugar in any form in the bottle-fed infants increases the chances of decay. The person brushing child’s teeth, time of day teeth brushed and since when brushing started was not found to have a significant link with the dental decay.

A study published in British dental journal shows that 52% of 1.5 years old children clean their teeth at night.

Our study indicates that 80.9% do not brush at night. Oral hygiene behaviour changes reduce the severity of cariogenic bacteria,⁷ so supervised tooth brushing, frequency of brushing and tooth cleaning aids/tools were analysed in this study. Recent research^{8,9} reported just 5% and 4.1% children used to brush their teeth twice or more which is in accordance with ours where 5.1% children brushed teeth twice daily. However, this is much lower than a study from Sri Lanka. Study² reported 67% of total sample brushed teeth twice daily. A reason for this could be the much higher literacy rate in Sri Lanka as literacy of the mother has been found to affect cleaning habits positively.¹⁰ Children who never brushed their teeth were 38% in Iran and 33% in Sri Lanka, our findings give a higher percentage of children who never brush their teeth (54%).

Night feeding was reported 83% in Sri Lanka² which is almost similar to this study (21% on-demand whole night fed and 62% fed once/twice). Moreover the same study showed 75% children having sugary contents in their feeding bottles while our results reported 59% children with same practice.² A relationship between on-demand overnight feeding and presence of dental decay was found in our study, 20% children having night time feeding had caries. This is similar to a study conducted in India which stated that dental decay was present in 30% of sample having on-demand night time feeding. Children who added sugar to their feeding bottles were at more risk of developing dental decay like shown in our study (OR:1.3; 95%CI 1.07–1.60). Suffia, in 2009 from Lahore reported 72% children consuming sweets more frequently which is almost same as that of our results (69%) among which 40% consumed sugar many times a day while 33% had sugary food once or twice a day.¹¹ On-demand feeding practices enhance the risk of developing caries by more exposure of the teeth to fermentable carbohydrates.⁹ The findings are similar to a study conducted in India in 2012 where on-demand feeding is directly associated with increased dental decay.⁹

The use of regular tooth brushing has a positive effect on dental decay and its positive effect is shown in several studies.¹² There was no difference in caries risk for children who used tooth brush, cloth or fingers as tools for cleaning. This is an interesting finding considering tooth brushes are costly and most people in Pakistan cannot afford it. They even cannot comprehend the effectiveness of more indigenous methods for caries prevention.

Past experiences and studies have shown that preschool children are unable to understand the correct method and importance of cleaning of teeth.^{9,12,13} So, adult supervision mainly mother is important to reduce risk of developing dental caries.¹⁴ A direct association of supervised tooth cleaning and less chances of dental decay was found in

our study. Similar results were reported in a study from India in 2009. Due to its cross-sectional nature, this study is not suitable to evaluate causal relationships. There is no information regarding timeline to exposure and its effects. Having multiple variable and caries being a multifaceted phenomenon, there is a chance that this study may be under-reporting the results.

No prior data on the knowledge imparted by the health care provider giving oral health instructions to the mothers is available from Pakistan so the data obtained cannot be compared. Mothers educational status was not included, which is another factor affecting a child's oral health.¹¹ Use of fluoride toothpaste while brushing and variable tooth eruption are also limitations to this study. Further research is needed to confirm these findings, using longitudinal studies. A study comparing effectiveness of oral health education by doctors/ health workers against that done by dentists is also required.

Conclusions

The tooth cleaning frequency, teeth cleaning at night, feeding bottles with added sugar, on demand night feeding and frequency of sweets taken per day play a major role in early childhood caries. From the present survey, we did find that the physicians/or paediatricians either did not have adequate knowledge about the oral health and its impact on general health of a child or were not dispensing it. Lastly, the last thing to do at night should be brushing your teeth along with any other time in a day, and brushing should be reinforced and encouraged.

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Conflict of Interest Statement

Authors declare no conflict of interest in this research.

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