

Toothpaste Utilization Profiles among Preschool Children

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ABSTRACT

Background: Oral healthcare for pre-school children is given due priority, as their oral health will determine the oral health status of future generations. Generally, the type, frequency and quantity of toothpaste used by children are based purely on parental preferences.

Methodology: A descriptive, cross-sectional study was conducted among mothers of preschool children by using a questionnaire.

Results: Sixty two percent (n=154) mothers started brushing their children's teeth more than one year after eruption of their teeth. A majority of the mothers used adult toothpaste to brush

their children's teeth and supervised their children while brushing. Fiftytwo percent mothers were aware about presence of fluoride in tooth paste but its clinical significance. Half the mothers applied full length of tooth paste to their children's brushes and most mothers made their children brush their teeth twice daily.

Conclusion: Based on the findings of this study, it appears that there is still much lack of awareness on the proper guidelines on the selection and usage of toothpastes in children. Dental professionals should use this knowledge to help and motivate parents to properly supervise and assist their children's brushing, with the goal of reducing the potential risk of fluorosis.

Keywords: Toothpaste, Fluoride, Mothers, Preschool children

INTRODUCTION

The health of the mouth and dentition plays a major role in the life of the child, through facilitating nutritional intake, providing a non verbal means of expressing happiness and sadness and allowing vocal communication. Therefore, a healthy mouth with a full complement of teeth should be the goal for all children [1]. Healthy mothers and children are the bedrock of healthy and prosperous communities and nations. Effective knowledge and tools exist for reducing suffering and death.

Pre-school children are one of the major target groups under the primary oral healthcare programme. Oral healthcare for pre-school children is given due priority, as their oral health will determine the oral health status of future generations.

Tooth brushing is an aid for oral hygiene care. Effective brushing with selected toothpastes helps in removing dental plaque that contributes to dental caries. Now-a-days, different types of tooth brushes and pastes are available in market, which are specially designed for children. Generally the type, frequency and quantity of toothpastes which are used by children are based purely on parental preference. Children who are below the age of six are often closely scrutinized in many dental researches, especially in relation to usage of fluoridated toothpaste [2,3]. Over the years, overzealous usage of fluoride has been linked to dental fluorosis [4,5].

Fluoride ingestion in "low but excessive" quantities during tooth formation or early use of fluoride has been documented in a number of studies, as a risk factor for dental fluorosis in both fluoridated areas and non fluoridated areas [5-10]. Fluorosis affects developing, unerupted and erupted permanent teeth of children who are below the age of six years [11], which again affects appearance of teeth and causes emotional disturbance. American Association of Poison Control Centers reported 21, 513 calls which were related to fluoride tooth patse ingestion [12].

Numerous guidelines have been published regarding the usage of fluoridated toothpaste in dentistry [13-15]. The aim of this study was to assess parental pattern of toothpaste usage among young children who were under six years of age.

MATERIALS AND METHODS

This descriptive, cross-sectional study was conducted on the mothers of preschool children in Mysore city. Ethical clearance was obtained from ethical committee of J.S.S. Dental College and Hospital, Mysore, India. Permission for carrying out this study was taken from the school authorities and mothers of the participating children. A pilot study helped in sample size determination and final designing of questionnaire.

Study sampling design and method

Mothers of children who attended both government sponsored and private preschools, who belonged to age group of 3-6 years, formed the study group, which was selected on the basis of a stratified, random sampling technique.

The selection of the participants for this study was based on the following inclusion criteria:

Parents who had one or more children who were below six years of age.

Parents who had children with one or more teeth.

Parents who were able to understand the purposes, risks and benefits of this study. Parents who were able to give written consents if needed. As per Child Development Project Officer (CDPO), Mysore city is divided into five sectors; N.R. Mohalla, Mandi Mohalla, Chamaraj Mohalla, Devaraj Mohalla and Kyathamaranhalli. The names and addresses of government aided preschools were obtained from the Child Development Project Office and those of private preschools were obtained from the Block Education Offices in Mysore. In each sector, preschools were selected randomly (government and private). To get 50 preschool children, 25 government and 25 private school attending children were selected from each sector, to thus make a total sample size of 250.

The survey design

Questionnaire was designed in both in English and Kannada and it included.

I. **General information:** About their education, socio-economic status, etc.

II. Patterns of toothbrushing and toothpaste usage among children who were below six years of age and the level of parental knowledge on their children's oral health care.

[Table/Fig-1] depicts B.G. Prasad's classification, 1961 – which was modified for the present socio-economic status. Consumer price index for urban workers as per 2007 was 541 and the modifying factor/percent change was 6.90. (Source: Reserve Bank of India, Government of India).

STATISTICAL ANALYSIS

The data were coded and entered manually in a computer, tabulated and analyzed. The Statistical Package for Social Sciences (SPSS), version 16 was used.

RESULTS

The study comprised 248 mothers of preschool children. Mothers' education and socio-economical statuses have been depicted in [Table/Fig-2].

[Table/Fig-3] shows mothers' knowledge and behaviours regarding utilization of toothpastes among their children.

When the mothers' educational and income levels were analyzed with reference to the types of toothpastes which were used, the results showed that there were no obvious differences [Table/Fig-4,5]. A majority of mothers used adult toothpastes regardless of their

Per capita family income (Rs.)	SES Category
3697 and above	Upper Class
1830-3696	Upper Middle
1084-1829	Lower Middle
560-1083	Upper Lower
Less than 560	Lower Class

[Table/Fig-1]: B.G. Prasad's classification 1961 - Modified for the present socio-economic status

Education of Mothers	Socio-economic Status					Total
	Upper Class	Upper Middle	Lower Middle	Upper Lower	Lower Class	
Primary school	0	0	11	8	1	20 (8%)
High school / Secondary level	45	67	4	0	0	116 (47%)
Degree / Tertiary level	62	49	1	0	0	112 (45%)
Total	107 (43%)	116 (46.7%)	16 (6%)	8 (3%)	1(0.4%)	100%

[Table/Fig-2]: Distribution of mothers according to their education and socio-economic status

educational backgrounds or earning capacities. A small percentage of upper class and highly educated mothers used herbal and child tooth pastes for their children separately.

DISCUSSION

The best way of motivating preschoolers towards good oral health is through the parents. Children's preventive practices tend to be controlled by their parents' knowledge, attitudes and actions. For the implementation of preventive attitudes, knowledge on the existing standards of oral health and existing practices and attitudes of that particular population is essential. Since parents are usually the caretakers of children, it was precisely for this reason that parents of the children were included in this study. Parents of preschool children are the primary decision makers with regards to their children's health related behaviours and health care, who can shape children's behaviours by means of selectively encouraging and discouraging particular habits.

A low level of awareness on oral health among the parents will ultimately reflect on children's oral health.

Questions	No. of Responses	Percentages
Commencing time of toothbrushing with toothpaste after eruption of first primary tooth		
Immediately after eruption	39	16
Few months to a year after eruption	54	22
More than one year after eruption	154	62
Type of toothpaste used		
Children's toothpaste	62	25
Adult's toothpaste	178	72
Herbal or other toothpastes	8	3
Aware of fluoride presence in the toothpaste used		
Aware	128	52
Not aware	32	13
Not sure	88	35
Quantity of toothpaste placed on toothbrush bristles during toothbrushing		
Pea-sized	51	21
Half-length	73	29
Entire length	124	50
No of times toothpaste used for toothbrushing per day		
Once	59	24
Twice	180	73
More than twice	9	3
Supervised toothbrushing		
Not supervised	41	17
Supervised	207	83
Method of helping child while brushing		
Hold the tooth brush with the child and make brushing movements together	110	44
Watching the child and instructing him /her	67	27
Checking the child's teeth after brushing	12	5
Brushing her own teeth at the same time	5	2
Brushing the child's teeth herself.	110	44
Immediate post toothbrushing behaviour		
Rinse with plenty of water and spit out	208	84
Spit out without rinsing	0	0
Swallow toothpaste while brushing	40	16
Main criteria for selection of toothpaste for children by parents		
Price	58	23
Brand	78	31
Taste	67	27
Colourful packing	34	14
Fluoride concentration	30	12
Family, Friends, Advertisement	130	52
Based on believes	69	29
Dentist's advice	47	19

[Table/Fig-3]: Responses of mother's knowledge and behaviour regarding utilization of tooth paste among their children

Mothers included in the present study were unaware regarding timing of brushing of their children's teeth. This was consistent with findings of other studies which were conducted by Nagarajan et al., [16]. The reason might be that some children may not tolerate the presence of toothbrushes or toothpastes in their mouths. For small children, plaque removal should be carried with either a washcloth or a soft, small headed toothbrush in combination with smear layer of children's fluoridated toothpaste, as the child's first tooth erupts [13-15]. Oral hygiene care should be started as early as possible (three months), well before the first tooth erupts. Gums have to be cleaned or massaged gently using a wet cloth or gauze or cotton. Thereafter, early introduction to tooth brushing activity, such as using a soft finger tip tooth brushing aid which is

Type of Toothpaste	Education Status			Total
	Primary School/ Primary Level	High School / Secondary Level	Degree / Tertiary Level	
Adult	20(100%)	96(83%)	62(55%)	178
Children	0	20(17%)	42(38%)	62
Herbal / others	0	0	8 (7%)	8
Total	20	116	112	248

[Table/Fig-4]: Distribution of mothers according to their education and type of tooth paste used

Type of Toothpaste	Socio-economic Status					Total
	Upper Class	Upper Middle	Lower Middle	Upper Lower	Lower Class	
Adult	49 (46%)	108 (93%)	12 (75%)	8(100%)	1(100%)	178
Children	50 (47%)	8 (7%)	4 (25%)	0	0	62
Herbal / others	8 (7%)	0	0	0	0	8
Total	107	116	16	8	1	248

[Table/Fig-5]: Distribution of mothers according to their socio-economic status and type of tooth paste used

either dipped in warm water or smear layer of fluoridated children's toothpaste, if the child can tolerate it, should commence as soon as the first tooth starts to erupt. This process which begins in early infancy may be a useful aid which provides a learning curve for a child to accustom to tooth brushing with toothbrush and toothpaste as it grows older [16].

In the present study, most of the mothers used adult tooth pastes to brush their children's teeth, which was in agreement with findings of other studies [17]. Studies which were conducted by Tay and Jaafar [18] and Nagarajan et al., [16] showed usage of child toothpastes. According to the recommendations of European Academy of Paediatric Dentistry (EAPD) [13] and American Academy of Pediatric Dentistry (AAPD) [14], children who are below the age of six should use toothpastes with low fluoride concentrations (less than 500 ppm). This study's results revealed an alarming situation of fluorosis caused by usage of adult tooth pastes which contained about 1000 ppm of fluoride. So, education of mothers in the area of selection of tooth pastes for their children, is essential. Mothers should be cautious when they select appropriate children's toothpastes, as not all children's toothpastes which are marketed have fluoride in them. Some may even have a higher than the recommended concentration of fluoride. Of late, there is also a growing dilemma against early use of fluoride toothpastes in infants who are below the age of two years. There are two schools of thought on this issue; one argues that children who are below the age of two years are at a higher risk for enamel fluorosis than children who begin to use fluoride toothpastes later/ not use them at all [19-22]. Therefore, they recommend use of gauze and water or non fluoride toothpastes for cleaning of infants' teeth. Another school claimed that use of smear layer children's fluoride toothpastes may be beneficial in preventing caries. One cannot deny the role of fluoride in caries prevention and this has been proven clinically through various studies [23]. Therefore, recommendations made by EAPD [13] and AAPD [14] on fluoride toothpaste usage in children who are below six years of age should be used as guidelines, until it is proven otherwise [16].

In this study, mothers were aware that toothpastes used to brush their children's teeth contained fluoride in it and they also knew that it would prevent tooth decay. Similar findings were observed in studies which were conducted by Nagarajan et al., [16]. But they were unaware about the other side of coin, that is fluorosis. So, one should focus on educating the public on what the ill-effects of fluoride are, if it is taken excessively and also its anti caries action. It is very important to ensure that preventive and remedial steps are instituted, to prevent untoward incidents of

fluoride overdose that may be detrimental to health [24]. Even though ayurveda is indigenous system in India, use of herbal tooth pastes was less popular among our study population. This might be because, children may not like their colours, odours and tastes. Our study showed that a majority of mothers used tooth pastes to brush their children's teeth twice daily, which was in line with the findings of Tay and Jaafar [18] and Nagarajan et al., [16]. However, tooth brushing twice daily with fluoridated toothpastes is a common practice which is often recommended as a routine practice. Multiple tooth brushing episodes each day, probably can result in ingestion of excess fluoride, especially by children [25]. Commonly, it is recommended that tooth brushing should be done twice daily, at least to maintain good oral health and also we should not ignore the fact that effectiveness of tooth brushing is much more important than frequency of tooth brushing. Young children lack complete mastery of the swallowing reflex [21,25-27] and children under the age of six years may ingest 25-65% of the dentrifice which is placed on the tooth brush [28,29]. Parents should be educated regarding total fluoride ingestion and its ill effects in children.

In present study, a majority of mothers used entire length of tooth paste on toothbrushes, which was not in agreement with findings of other studies [16,17] where most of the mothers used pea sized length of toothpastes. A pea sized amount of fluoride dentrifice has been more consistently recommended for preschoolers [6, 13-15]. The findings of this study showed that mothers lacked knowledge regarding quantity of toothpaste that could be used or they may have been influenced by seeing the advertisements on toothpastes. It is prudent to suggest that children who are between six months to two years of age should use small smears of low fluoride toothpastes for cleaning their teeth. Children who are between two and six years of age should use pea sized quantities of less than 500 ppm of fluoride containing toothpastes, unless it is recommended otherwise by their dentists [13-15,30].

A majority of mothers supervised their children during brushing and helped their children by holding the tooth brushes along with them and by making brushing movements together. Similar findings were observed in other studies also [18,31,32]. But in some of studies [16,17] more than half of the children brushed their own teeth without any supervision. Studies which were conducted by Steven M Levy et al., [6] showed that parental assistance in brushing was associated with the duration of brushing. The fact that children who received parental assistance during brushing, ingested more fluoride than children who brushed by themselves, may have been seen, due to longer brushing done with help of parents, as parents desired to achieve excellent oral hygiene and caries prevention for their children, coupled with their lack of knowledge regarding fluorosis and fluoride ingestion. Young children usually lack fine manual dexterity required for carrying out brushing effectively and also, inability in expectorating. Parents must ensure that they supervise their children's tooth-brushing or brush their toddlers' teeth, especially by standing or kneeling behind the children in front of the sink or mirror. This is important, in order to avoid over-ingestion of toothpaste and to make sure that their children's teeth were effectively cleansed [15,16].

Children in present study rinsed their mouths with plenty of water after brushing, while few children swallowed tooth pastes while brushing. This may not be a good practice, as it tends to wash away the fluoride which is needed for caries prevention activity [33,34]. According to studies [35,36], for seeing beneficial effect of fluoride in caries prevention, one has to ensure a continued presence of fluoride orally for a considerable period, for it to assert its effect on the teeth. Therefore, children who are below the age of six years should be encouraged to either rinse briefly with a small amount of water or to spit out the oral contents without rinsing, in order to retain more fluoride in the mouth [16].

Most of the mothers selected toothpastes which were based on others' likings or suggestions, like those of friends, family members, advertisements, etc. Most advertisements on toothpastes in India show toothbrushes with a full brush heads of toothpastes, which is against dentists' instructions. This amount of toothpaste is equal to four times the amount which is recommended by dentist [5].

A very small percentage of mothers gave importance to fluoride concentrations and dentists' advices while selecting toothpastes for their children. This showed lack of knowledge on fluorides among mothers of this study. Study results, with regards to the knowledge on fluorides, types of toothpastes which were used for children, were not in agreement with findings of other studies done by Nagarajan et al., [16]. This showed lack of knowledge, regardless of either their educational backgrounds or earning capacities.

CONCLUSIONS AND RECOMMENDATION

Based on the findings of this study, it appears that there is still much lack of awareness on proper guidelines for the selection and usage of toothpastes in children. In relation to oral hygiene care in young children, greater emphasis should be directed towards educating the ante-natal mothers, in order to prepare them psychologically to face the challenges of oral healthcare that they may encounter later with respect to their children. Professionals should use this knowledge to help and motivate parents to properly supervise and assist their children's brushing, with the goal of reducing the potential risk of fluorosis. Parents should be provided sufficient knowledge on using small amounts of dentifrice and trying to avoid their children from ingesting dentifrice. Additional studies with larger, more varied samples should be conducted, to better understand the factors that affect dentifrice ingestion in young children and to monitor changes in behaviour which result from laying an increased emphasis on use of small quantities of dentifrice.

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