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Existing Knowledge, Attitude and Practices on the use of Fluoride Toothpaste of Mothers of Pre-School Children in Panadura, Sri Lanka

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Abstract: ***Dental caries in Sri Lanka appears to be a significant problem, especially among preschool children. The effect of caries prevention in the primary teeth of preschool children through the use of fluoridated dentifrices and prevention programs has not been widely addressed. A descriptive cross sectional study was carried out by recruiting 635 mothers and their children in Panadura, Sri Lanka. Multi-stage cluster sampling technique was used and preschools considered as clusters to select the sample. A pre-tested interviewer-administered questionnaire was used to assess the knowledge, attitudes and practices. Only 66% (n=418) of mothers had fair knowledge and 2.8% (n=18) had good knowledge and the mean of the total knowledge score was 3.2 (SD ± 1.7) out of 7. Seventy four point six (n=472) had favourable attitude towards fluoridate toothpaste.83.1% of mothers and 76.6% children were using fluoridated toothpaste. 83.6% of mothers and 83.6% of children brushed their teeth twice or more than twice daily. A pea sized amount or more of toothpaste was used by 79.2% of children and 52.3% of children's teeth were cleaned by a parent or a grandparent.81.8% of children had started using toothpaste at the age of one year or before. The results of the present study highlight the importance of giving instructions on caring for baby's teeth during pregnancy including the selection of toothpaste for the child, time of initiation of using toothpaste, amount of toothpaste that should be used for the particular age group.***

Keywords: Fluoride toothpaste, Knowledge, Attitude, Brushing Practices, Dental Caries

1. Introduction

Global disease pattern is rapidly changing and burden of chronic diseases and injuries have overtaken communicable diseases. This is closely related with the changing life style, unhealthy dietary patterns, wide spread use of tobacco and increase consumption of alcohol. These modifiable risk factors have significant effect on oral health as well(Petersen & Erik, 2004)which are preventable.

Dental caries is an important public health problem worldwide affecting people in all ages. However modern studies have shown that the tendency of dental caries is increasing again after many years of decline. This trend can be seen in all ages ,on primary teeth as and permanent teeth, including coronal and root surfaces (Robert, Bagramain, & Garcia-Godoy, 2009).Dental caries is simply defined as "Demineralization of dental hard tissues by organic acids, formed by the bacteria in the dental plaque through the anabolic metabolism of dietary sugar" (WHO)and it is a infectious and transmissible disease. Caries and its complications and the consequences affect the quality of life, both physically and psychologically.

Early Childhood Caries (ECC); presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger is caused mainly by the high consumption and frequency of sugar intake and inadequate exposure to fluoride.ECC increases the risk of future dental caries as well as causing nutritional deficiency especially in children less than five years (Maharani & Rahardjo, 2012).It also causes anxiety, sleepless nights there by loss of school hours which indirectly effect on children, family as well as the society.Even though ECC can be prevented by simple methods such as simple fluoride therapy and proper brushing with fluoride toothpaste, ECC has become one of the most prevalent childhood diseases in Sri Lanka.

Researchers have shown that the exposure to optimal level of fluoride for a long time and maintaining a regular low level of fluoride in the oral cavity play an important role with the prevention of dental caries on both children and adults(Petersen & Erik, 2004).Fluoride has three main actions. The most important action is at the tooth – plaque interface by promoting remineralisation and reducing demineralization (Marinho, Higgins, Logan, & Sheiham, 2003).More than hundred clinical trials have confirmed the preventive action of the fluoride on dental caries (Marinho et al., 2003).

The trend of dental caries had declined drastically after the introduction of fluoride (F) toothpaste which is a self applied topical fluoride therapy, in 1960s in the western world and in 1980s to the Sri Lanka(Robert et al., 2009).Fluoride toothpaste is the most commonly used method of fluoride globally as well as in Sri Lanka as it is convenient, and has proven in the reduction of dental caries. (Marinho et al., 2003).

2. Literature Survey

Knowledge is the major vehicle for developing health in people, mainly in developing countries (Petersen & Erik,

2004).Assessment of oral health knowledge is an important tool for clinical research and for the development of health policies(Francisco, Sundefeld, & Moimazi, 2012). Knowledge about oral health influences attitudes and practices. Various studies have identified Dental caries as a multifactorial disease and the acid formed by metabolising the polysaccharides in the plaque by cariogenic bacteria initiate tooth demineralization (Abdul & Ghazal, 2013). An epidemiological systemic reviews have shown that there are more than 50 risk factors for dental caries of children less than 5 years. Oral hygiene factors such as frequency of tooth brushing and plaque level, and the use of fluorides as well as mothers' education level which related to their knowledge on oral health, the way they look after their children's teeth and the oral hygiene behaviour of their child (Maharani et al., 2012). A quasi-randomized controlled trials with blind outcome assessment, comparing fluoride toothpaste with placebo in children up to 16 years during one year of follow up had suggested that dental caries increment is reduced clearly with use of fluoride toothpaste and it is more with high concentration of fluoride use, increased frequency of use and supervised brushing (Marinho et al., 2003). However there are several factors associated with the preventive action of fluoride. Those are the brushing frequency; F concentration in the toothpaste; amount of toothpaste on the brush; brushing time; and post-brushing behaviour or subsequent rinsing with water(Zero et al., 2010).Mothers appear to be the primary source of child's dental knowledge. Therefore failure to educate mothers in an early stage can lead to dental caries in children. A study done in UK had shown that dental health education by regular home visits to mothers with infants, commencing soon after the eruption of first deciduous teeth, was shown to be effective in preventing the occurrence of ECC (Kowash et al., 2000). High prevalence of dental caries is related to the low level of knowledge and behaviour of mothers towards dental health, is one of the conclusions made by a study done in Indonesia by recruiting 152 mother-child pairs (Maharani et al., 2012).

In Sri Lanka Level of dental caries in children less than five years is associated with age of the child, parental level of education and the social class, family income, presence of childhood disease, average total consumption of sugar per day (Hettiarachchi, 2007; Shahim, 2003) and not brushing teeth of child and delay in commencement to brush teeth after eruption are considered significant risk factors (Shahim, 2003).The study done in 2003 revealed poor knowledge on the age at which infants teeth brushing should be started (mean score 1.74, SD=2.385) and knowledge on brushing infants teeth (mean score of 2.4, SD=2.501) (Shahim, 2003).

3. Problem Definition

Of the 20.7 million of Sri Lankan population, 8.6% are children under five years of age. According to the National Oral Health Survey 2015-2016, (Ministry of Health, 2018), 63% of 5 year old children had dental cariesas they are the most vulnerable group for dental caries. Therefore prevention of dental caries in children is considered as a priority of dental services and it is considered cost-effective than its treatment (Marinho et al., 2003).

Even though children at this age go to preschool, they spend more time at home with their mothers. Mothers appear to be the primary source of child's dental knowledge. Therefore failure to educate mothers in an early stage can lead to dental caries in children. A study done in UK had shown that dental health education by regular home visits to mothers with infants, commencing soon after the eruptionof first deciduous teeth, was shown to be effective in preventing the occurrence of ECC (Kowash et al., 2000).

Therefore mothers of the preschool children were selected for the study as they are the main care providers of these children and play a major role in primary socialization of the children. Study of Knowledge, Attitude and Practices (KAP) help us to find out how much people are aware of fluoride, what are the believes which influence their behaviours and what are the correct practices that are prevailing. Since children less than five years mainly depend on their parents' knowledge, attitude and practices on good oral health of parents have a great effect on maintaining good oral health in children.

However knowledge is very limited as to whether people in the community are aware of the benefits of fluoride toothpaste and whether they use fluoride toothpaste efficiently.

This will help in planning out the preventive programs with available information which aims to correct misinformation, increase awareness and the knowledge of the subject, changing negative attitudes to positive and incorrect practices to correct which are conducive to maintaining good oral health.

Therefore this study was conducted with the general objective of to assess the existing knowledge, attitude and practices on the use of fluoride toothpaste in mothers of children attending pre-schools in the Medical Officer of Health region, Panadura, Sri Lanka.

4. Methodology

This was a descriptive cross sectional study to explore mothers' knowledge, attitude and practices on the use of fluoride toothpaste of pre-school children. Preschools in the Panadura MOH area were selected as the study setting.

Panadura MOH area is situated in the Kalutara district, in the Western Province in Sri Lanka. It is an urban setting with an estimated population of 2, 50, 740. People of all ethnicities and religions live in the area. Panadura MOH area consisted of 107 Grama Niladari (GN) Divisions which allocated to 64 PHM areas. Dental public health services are provided by the dental surgeons attached to the Adolescent Dental Clinics and the Community Dental Clinics. Dental care for children between the ages 3-13 years is provided by the School Dental Therapists.

There were 121 preschools in the study area. This study was conducted in the months of November and December 2014.All children attending pre-schools in the MOH area Panadura and their mothers were selected as the study population excluding Mothers who were not capable of

answering questions due to impaired hearing and/or speech and mothers of children who were absent on the day of data collection.

Minimal sample size was 634 which calculated using the formula for calculating the prevalence using absolute precision (Lawanga and Lemeshw, 1991)with allowance for 10% none response with design effect of 1.5 as cluster sampling method was used. Since no published local data on the subject was available proportion was taken as 50% to obtain maximum sample size. Multistage cluster sampling technique was used. Preschools were considered as clusters. Since all the preschool were having children more than 20, cluster size was taken as 20. According to the sample size of 634, minimum of 32 clusters and the sample within the clusters were chosen using systematic random sampling technique.

A pre-tested structured interviewer administered questionnaire was used to assess knowledge, attitudes and practices on the use of fluoride toothpaste of mothers.All interviews were conducted by one female IT diploma holder who had been thoroughly trained by the researcher to avoid information bias by influencing the responses.

Ethical clearance was obtained by the Ethical Review Committee at the Post Graduate Institute of Medicine (PGIM), Medical Faculty, University of Colombo and Permission from administrative authorities was obtained prior to the study from the relevant institutions..

5. Results

Table 1: Frequency distribution of mothers by selected socio-demographic characteristics

Socio-demographic factor	Number (n=633)	%
Age*		
20-30 Years	206	32.5
31-40 Years	370	58.5
41-50 Years	57	9.0
Total	633	100.0
Ethnicity		
Sinhala	511	80.7
Tamil	5	0.8
Muslim	117	18.5
Total	633	100.0
Education level of the mother		
No schooling	23	3.6
Up to grade 5	30	4.7
Up to GCE O/L	315	49.8
Up to GCE A/L	220	34.8
Degree/Diploma holder	45	7.1
Total	633	100.0
Monthly family income**		
Rs. 15,000 or less	84	13.3
Rs.15,001-30,000	421	66.5
Rs.30,001-45,000	96	15.2
Rs.45,001 and above	32	5.0
Total	633	100.0

*Mean age 33years (SD=5.4) ** Mean income Rupees 27265 (SD=10985)

Majority of mothers were Sinhalese 80.8% (n = 513) and 58.3% (n = 370) were in the age category of 31- 40 years. The highest proportion of mothers had studied up to G.C.E. Ordinary Level Examination (49.6%, n =315) and only 3.6% of mothers (n = 23) had not received any formal school education. Majority (66.5%, n=421) were in the monthly income category of Rupees 15,001-30000 (Table 1).

Tables 2: Frequency distribution of mothers by the response to the questions on knowledge

Knowledge on fluoride toothpaste	Aware		Not aware	
	No	%	No	%
Availability of fluoride in toothpaste	435	68.7	198	31.3
Availability of fluoride in water	57	9.0	576	91.0
Action of fluoride present in toothpaste	342	54.0	291	46.0
Main consideration when buying toothpaste for a child is caries prevention	313	49.4	320	50.6
Availability of fluoride toothpaste in the market	520	82.1	113	17.9
Correct method of finding out the presence and the concentration of fluoride in the toothpaste	340	53.7	293	46.3
Optimal concentration of fluoride in the toothpaste	13	2.1	620	97.9

Sixty eight point seven percent (n=435) of mothers were aware that the fluoride is available in toothpaste while 54.0% (n=342) of mothers correctly identified the action of fluoride toothpaste as prevention of tooth decay and only 49.4% (n=313) considered caries prevention action when buying a toothpaste for the child.

Majority of mothers (82.1%, n=520) had identified that the fluoride toothpastes are available in the market but only 2% (n=13) had known the optimal concentration of fluoride that should be present in a toothpaste in Sri Lanka and 53.7% (n=340) stated that they have found out the presence of fluoride and the concentration of fluoride in a toothpaste by reading the content displayed in the packet.

There were seven questions regarding the knowledge on fluoride toothpaste. A correct answer to a question on knowledge of fluoride was coded as a 1 and incorrect answer as zero. Therefore the total score was taken as 7. Level of knowledge was categorized in to three levels as low level (score 0-2), fair level (score 3-5) high level (score 6-7) when analysing the data.

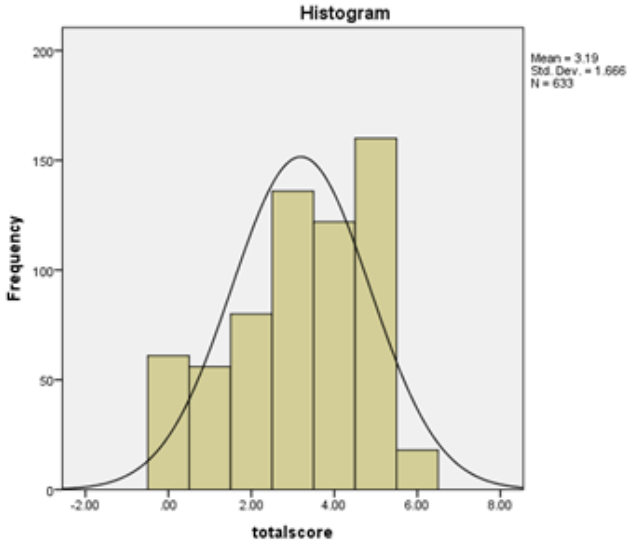

Figure 1: Frequency distribution of mothers by total score obtained on knowledge

The mean score of the marks obtained by the study unit was 3.2 (SD = 1.7) while the median score of the marks was 3 with the inter-quartile range of 3 (5-2).

Table 3: Frequency distribution of mothers by knowledge category

Knowledge category	No	%
Poor (0-2)	197	31.2
Fair (3-5)	418	66.0
Good (6-7)	18	2.8
Total	633	100.0

Majority of mothers (66%, n = 418) mothers had fair knowledge on fluoride toothpaste while 31.2% (n = 197) had poor knowledge and only 2.8% (n = 18) had good knowledge.

When considering attitudes, majority of mothers (74.6%, n=472) had a favourable attitude on fluoride toothpaste whereas nine out of those who had heard about fluoridate toothpaste (9/497) showed an unfavourable attitude.

The majority of respondents were brushing twice or more than twice daily (83.6%, n=538) and 98.7% (n=625) were using brush and toothpaste as the mode of brushing and 83.1 % (n=522) stated that they use fluoridated toothpaste. Among all only 10.4% (n=66) had changed their toothpaste during last two years.Out of 66 mothers who had responded that the brand of toothpaste was changed,35 had changed from fluoridated to another fluoridated toothpaste, 11 had changed from fluoridated to non fluoridated toothpaste, 17 of mothers from non-fluoridated to fluoridated toothpaste and 3 of them from non fluoridated to non fluoridated brands.

Table 4: Distribution of mothers by the reason for changing their toothpaste

Reason for changing the type of toothpaste	Type of toothpaste used before	Type of toothpaste currently use		Total	
		Fluoride	Non-fluoridate	No	%
		No	No		
Influence by peers	Fluoride	7	0	9	13.6
	Non-fluoride	2	0		
Influence by media	Fluoride	9	3	18	27.3
	Non-fluoride	6	0		
No good effect from the earlier toothpaste	Fluoride	7	5	17	25.8
	Non-fluoride	3	2		
earlier toothpaste was expensive	Fluoride	2	0	2	3.0
	Non-fluoride	0	0		
Other	Fluoride	10	3	20	30.3
	Non-fluoride	6	1		
Total		52	14	66	100.0

Twenty seven point three percent of mothers (n=18) who had changed their brand of toothpaste had stated it was due to the influence of media and 25.8% (n=17) had stated that they had not got any good effect from the earlier brand.

According to the mothers' responses on cleaning their children's teeth, all the children's teeth were cleaned daily. Majority of the children's teeth were found to be cleaned twice or more than twice (n= 529, 83.6%) a day and all were using brush and toothpaste. Fluoridated toothpaste was being

used by the majority of the children (76.6%, n= 485) while 9.5% (n=60) were using children's toothpaste with low fluoride. Seventy one point one percent of children (n=450) claimed to be using the recommended amount of toothpaste (the size of a pea) for their age group for brushing teeth.

Fifty two point three percent (n=331) of children's teeth had been cleaned by their parents or a grandparents while 47.7% (n=302) of children had their teeth cleaned by themselves with or without the supervision of a parent.

Out of 633 children, 213 (33.6%) had started toothpaste for cleaning their teeth at the age of one year and 48 .2% (n=305) of them had started before one year. Majority (50.4%, n=319) had started cleaning teeth with the eruption of the first tooth and 66.4% (n=420) had cleaned using a piece of cloth with clean water at the beginning.

6. Discussion

Fluoride toothpaste is available in Sri Lanka since 1980s at an affordable price. At present many brands of non fluoridated toothpastes are also available in the market. This has given the public a choice to select their preference. The selection of the fluoridated toothpaste by the public could take place with or without the knowledge on dental caries preventive action of fluoride.

Some of the studies concluded that the participants lacked knowledge about how to use toothpaste effectively and its positive effects on oral health (Jensen et al., 2012).Therefore the main purpose of this study was to find out whether the study population have a good knowledge on fluoride toothpaste and whether the use of fluoride toothpaste was due to their awareness about the advantage of using it or just because fluoride toothpastes are freely available in the market.

Containing of fluoride in toothpaste alone cannot prevent caries. There are several other factors associated with the preventive action of fluoride. Those are the brushing frequency; F concentration in the toothpaste; amount of toothpaste on the brush; brushing time; and post-brushing behaviour or subsequent rinsing with water (Zero et al., 2010).

Therefore practices related to tooth brushing, such as mode of brushing, brushing frequency, amount of toothpaste used and the time of initiating the usage of toothpaste were also assessed in the current study. Using an interviewer administered questionnaire helped to overcome the error caused by differing levels of the ability to read and understand the questionnaire by the mothers.

Despite the grand scale advertising campaigns carried out in mass media, comparatively high percentage (21.5%) of mothers had never heard about fluoride before. This may be due to lack of awareness of the public.

Approximately 82% of mothers knew about the availability of fluoride toothpaste in the market and 68.7% knew that fluoride could be present in toothpaste whereas only 9% knew that fluoride could be present in water. This is may be due to the radio and television commercials on fluoridated toothpaste as televisions are freely available in households nowadays. They had fair knowledge on use of fluoride for prevention of dental caries and the way of finding out the presence and the method of finding out the concentration of fluoride in toothpaste.

Only 54% of mothers had identified the caries prevention action as the main usefulness of fluoride toothpaste, which was lesser than the study (73%) done in Beijing, China to assess the oral hygiene practices, current knowledge and practices on fluoride toothpaste of school children, their parents and school teachers and to describe attitudes of parents and teachers regarding improvement of their children's oral health(Min Liu et al., 2007). This may be because the oral health education programs conducted for the public are not well focused on giving the reasons behind the use of fluoride toothpaste. Therefore it is recommended to have targeted health education programmes giving the rationale of using fluoride toothpaste.

Mothers had very poor knowledge on the optimal concentration that should be in toothpaste in Sri Lanka. The brands of fluoride toothpaste available in Sri Lanka have the fluoride concentration between 850ppm-1450ppm which is the recommended level in Sri Lanka. Yet the children's toothpaste which has fluoride concentration of 500ppm is not considered containing the recommended levels of fluoride. Therefore the majority of the public who use fluoride toothpaste get the optimal concentration even without any knowledge on the usefulness and the concentration of fluoride in toothpaste. Even though 54% of mothers had identified the caries prevention action as the main usefulness of fluoride toothpaste, only 49.8% considered this fact when buying toothpaste for their children. Irrespective of the knowledge of mothers on caries preventive action of fluoride, fluoride containing toothpaste was used by 76.6% of children may be due to free availability of fluoride toothpaste. Majority of mothers had a favourable attitude towards fluoride may be due to the well developed and organized oral health promotion and education programs on aetiology of fluorosis, prevention methods specifically on the proper use of fluoridated toothpaste. 83.6% of mothers and their children were brushing their teeth twice or more than twice daily which was more or less the same with the study done in MOH area Nugegoda in 2007 (87.3%). But according to a study done in Beijing, China in 2007(Min Liu et al., 2007) , only 74-78% were brushing twice or more than twice daily and in Kenya in 2002, 48% had a similar practice (Okemwa et al., 2010).

It is recommended to brush teeth by a parent or caregiver in children less than 6 years of age and brushing teeth by themselves is not recommended even with the supervision. In the present study comparatively high percentage of children (47.7%) were brushing teeth by themselves. This may be due to the busy life style of the parents nowadays and lack of knowledge and the awareness of the parents. Although it is recommended to use adult toothpaste after the age of two years, because of the high caries prevalence in this age group in Sri Lanka, mothers are advised to start using adult toothpaste probably after first year as soon as the child is able to spit out. According to the

results given by the present study, majority of mothers were aware about that.

As the results obtained from the present study, majority had not changed the type of toothpaste used. From the mothers who had changed, large proportion had changed from fluoride toothpaste to another fluoride toothpaste or non-fluoride type to fluoride toothpaste. This could be identified as a good trend in oral health in the future. However a small percentage (1.7 %) had changed the type of toothpaste used from a fluoridated to a non-fluoridated toothpaste and the main reasons given for that were media influence and the belief that no proper effect with the fluoridated toothpaste.

7. Conclusions

As 21.5% of mothers have never heard about fluoride, it indicates that the importance of fluoride in prevention of dental caries is not gone to the society yet. Majority of the mothers use fluoride toothpaste because, fluoride toothpastes are freely available in the market in Sri Lanka and not due to the fact that they have proper knowledge on effective use of it. Mothers are aware of cleaning baby's mouth at the beginning but less aware of the brushing practices after one year such as time start using the toothpaste, amount of toothpaste should be taken for the particular age of the child, type of toothpaste that should be use.

8. Future Scope

1) Achievement of better knowledge on the caries preventive action of fluoride and the effective usage and to increase the awareness to adapt to the desired practices, more intense health education programs should be implemented. This could be carried out by the School Dental Clinics, Mobile clinics, outreach programs, community dental clinics, anti-natal clinics and well-baby clinics.
2) Workshops and seminars should be conducted for Dental Surgeons, School Dental Therapists and Primary Health care staff to update and educate them where they are able to help and educate mothers and inculcating healthy practices among parents and children
3) Conduct well organized mass media campaigns to increase knowledge on proper use of fluoride toothpaste.

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