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ASSESSING THE KNOWLEDGE OF FLUORIDE TOOTHPASTE BY SCHOOL CHILDREN, PARENTS AND SCHOOL TEACHERS IN BANGALORE, INDIA

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ABSTRACT

Background: In a life cycle perspective, childhood and adolescence are crucial periods for the development of health practices. Both parents and schoolteachers have a great potential to influence this process. As a platform, school can provide both a supportive environment for promoting oral health and important networks to the local community and families. Thus, the aim of the present study was to assess the knowledge of fluoride toothpaste by school children, parents and school teachers in Bangalore, India.

Methodology: A self-administered structured questionnaire was used to collect information about oral self-care practices, use of toothpaste, consumer preferences, fluoride knowledge, and dental visiting habits. In all, 1,228 school children, 896 parents and 158 school teachers were recruited by a stratified random sampling procedure in Bangalore district, India.

Results: Most school children, parents and school teachers claimed that they had heard about the concept of fluoride toothpaste; however, only one third of them confirmed the statement that “fluoride toothpaste is a kind of toothpaste which contains fluoride”. Two thirds of school children, parents and three fourths school teachers reported that brushing the teeth with fluoride toothpaste can prevent dental caries, and similar figures were found for the item that fluoride toothpaste can strengthen resistance of tooth surfaces.

Conclusion: The study showed that, although toothbrushing with fluoride toothpaste was a priority, there was paucity of knowledge about how to use fluoride toothpaste effectively and its positive effects on oral health. In addition to mass communication comprehensive school-based oral health programmes are needed to continuously promote the use of fluoride toothpaste among school children.

KEYWORDS: Fluoride; school student; school teacher

INTRODUCTION

According to the World Oral Health Report, oral disease is the fourth most expensive disease to treat in most industrialized countries and it is estimated that these countries spend 5 to 10% of their national public health resources on dental care. Affecting 60 to 90% of school children and the vast majority of adults, dental caries remains a major public health problem in most industrialized countries. This disease remains largely untreated. It is also anticipated that caries has increased in many of the developing countries over recent years, mostly due to changing living conditions and dietary habits, i.e. growing sugar consumption and the vast consumption of soft drinks, but also inadequate exposure to fluorides.^[1] The role of Fluoride (F) is well documented in the caries process when it is present in the oral cavity. The topical effect on the tooth surface had been studied both clinically and in laboratory experiments. There is a consensus that F is mainly effective by inhibiting

Table 1: The distribution (%) of schoolchildren, parents and schoolteachers with different tooth brushing practices

	School Children	Parents	School Teachers
Toothbrushing everyday during the past week	97	100	100
<i>Frequency of tooth brushing yesterday</i>			
No brushing	1	0	0
Once	72	76	78
2 times or more	24	21	20
Try carefully to brush all surfaces of every tooth	83	86	81
<i>Amount of toothpaste used for brushing</i>			
Less than 1/4	8	7	9
1/4-1/3	23	28	24
1/2	29	23	26
More than 1/2	32	34	37
Full head of a toothbrush	9	13	12

Table 2: The percentages of participants who responded differently to statements on fluoride knowledge and the distribution (%) of participants by additive index of fluoride knowledge level

		School children	Parents	School teachers
Heard about the word 'fluoride toothpaste'	Yes	84	98**	91
Fluoride toothpaste is a kind of toothpaste which contains fluoride	Right	28	39**	35
	Wrong	31	24	27
	Do not know	48	39	31
Tooth brushing with fluoride toothpaste can prevent caries	Right	62	69	82**
	Wrong	9	7	5
	Do not know	38	19	23
Tooth brushing with fluoride toothpaste can reverse early-stage caries	Right	34	43	54**
	Wrong	16	23	24
	Do not know	42	35	27
Tooth brushing with fluoride toothpaste can strengthen resistance of tooth surfaces	Right	49	61	69**
	Wrong	8	7	4
	Do not know	32	19	17
Proper amount of fluoride is helpful, but excess amount of fluoride may be harmful to health	Right	49	57	62**
	Wrong	11	10	7
	Do not know	37	24	19
The amount of fluoride toothpaste should be less than pea-size for 3-7 year old children	Right	-	41**	38
	Wrong	-	9	12
	Do not know	-	48	49
<i>Fluoride knowledge level</i>				
	Low (score 0-2)	39**	19	23
	Medium (score 3-5)	43	49	44
	High (score 6-7)	26	28	29

demineralization that could lead to caries initiation and progression, by enhancing remineralisation of initial caries lesions, and by inhibiting bacterial metabolism. However, bacterial metabolism is affected only by fluoride concentrations exceeding about 10 ppm and in the

oral cavity such levels are limited to a very short period of time after using F products. WHO emphasises the prevention of dental caries through the effective use of F, for example, water fluoridation and the use of F toothpaste. Research about the effect of F on dental caries started more

than 100 years ago. Today, there are a large number of studies carried out on the positive effects of using F toothpaste when brushing. The consensus among experts is that the use of F toothpaste has significantly reduced the prevalence of caries. However, according to the WHO, only 20% of the global population knows that F in toothpaste has a caries preventive effect. WHO continues to emphasize as an important public health measure the need to strengthen the effective use of fluoride for the prevention of dental caries in the 21st century, and highly recommends the introduction of affordable fluoride toothpastes in developing countries.^[2-4] Both parents and school teachers have a great potential to influence this process. As a platform, school can provide both a supportive environment for promoting oral health and important networks to the local community and families.^[4] Thus, the objectives of the present study were to describe the oral hygiene practices, current use and knowledge of fluoride toothpaste among schoolchildren, parents and schoolteachers, and to describe the attitudes of parents and schoolteachers in relation to improving schoolchildren's oral health.

MATERIALS AND METHODS

The present cross-sectional study was conducted to evaluate the knowledge of fluoride toothpaste among schoolchildren, parents and schoolteachers in Bangalore, India. Investigation took place in Bangalore district, India. Schoolchildren were recruited by a stratified random sampling procedure. Three strata consisting of primary schools (class 1 to 5), middle schools (class 6 to 7), and high schools (class 8 to 10) were identified based on the actual education system of Bangalore, India. Schools within each stratum were chosen through a probability sampling procedure (proportional to size) and schoolchildren were then chosen by simple random sampling within each sampled school. All schoolteachers responsible for training of the sampled schoolchildren were selected together with the mother or father of these schoolchildren. In all, 1,228 schoolchildren (response rate 82%, mean age \pm SD: 12 \pm 2.2 yrs), 896 parents (response rate 58%, mean age \pm SD: 34 \pm 10.2 yrs), and 158 schoolteachers (response rate 84%, mean age \pm SD: 46 \pm 14.1 yrs) participated in the study. A self-administered structured

questionnaire was used to collect information about oral self-care practices, use of toothpaste, consumer preferences, fluoride knowledge, and dental visiting habits. The wording of the questions was identical to provide valid comparisons of the responses given by schoolchildren, parents and schoolteachers. Items addressing attitudes towards promoting schoolchildren's oral health were included in the questionnaires for parents and schoolteachers. The participants were asked to provide the brand name of the toothpaste used at time of the study. Whether or not the reported toothpaste contained fluoride was collected through information available from the manufacturer or the market and the result was recorded as 'actual use'. Furthermore, the participants were asked to report the type of toothpaste (fluoridated, non-fluoridated, do not know) currently being used and the answers were recorded as 'self-reported use'. Data from the questionnaires were processed and analyzed by means of the Statistical Package for the Social Sciences (SPSS 17.0). Description and analysis of the data were carried out by frequency distributions. Bi-variate frequency distributions were computed and the differences in proportions were evaluated by the Chi-square test. A correct answer to a statement on fluoride knowledge was coded as a 1 and an incorrect answer as a 0. Composite variables of fluoride knowledge were then constructed based on additive indices and the scales were subsequently categorized into three levels according to empirical distributions: low level (scores 0-2); middle level (scores 3-5); and high level (scores 6-7). Spearman correlation coefficients confirmed moderate to strong associations between the final composite variables and the original component variables.

RESULTS

The present cross-sectional study showed no substantial difference in the response of primary, middle, and high school students with regard to tooth brushing practices, use of fluoride toothpaste, fluoride knowledge, and consumer preference. The tooth brushing habits of schoolchildren, parents and schoolteachers is depicted in Table 1. Most of the respondents reported having brushed their teeth every day during the past week and more than half of the respondents claimed to have brushed their teeth

once or more on the previous day. The amount of toothpaste used each time varied markedly $\frac{1}{2}$ to more than $\frac{1}{2}$ among all the respondents. Most schoolchildren, parents and schoolteachers claimed that they had heard about the concept of fluoride toothpaste (Table 2); however, only one third of them confirmed the statement that “fluoride toothpaste is a kind of toothpaste which contains fluoride”. Two thirds of schoolchildren, parents and three fourths schoolteachers reported that brushing the teeth with fluoride toothpaste can prevent dental caries, and similar figures were found for the item that fluoride toothpaste can strengthen resistance of tooth surfaces. Meanwhile, the statement “fluoride toothpaste can reverse early-stage caries” was confirmed by less than half of school children, parents and more than half of school teachers. More than half of the parents and school teachers reported that a proper amount of fluoride is helpful, whereas an excess amount of fluoride may be harmful to dental health. Less than half of the parents and schoolteachers answered that the amount of fluoride toothpaste should be less than pea- size for children 3-7 years of age.

DISCUSSION

This present cross-sectional study was to assess knowledge of fluoride toothpaste among schoolchildren, parents and schoolteachers. Knowledge about fluoride, considering use of fluoride toothpaste important and rating one's own oral health as good increased the odds of having good caries-preventive behavior. Most of the respondents reported having brushed their teeth every day during the past week and more than half of the respondents claimed to have brushed their teeth once or more on the previous day and this was in accordance with the study reported by Jensen OI,^[5] Hedman E *et al.*,^[6] Hugoson A *et al.*^[7] In the present study most schoolchildren, parents and schoolteachers claimed that they had heard about the concept of fluoride toothpaste and was in accordance with studies reported by Min Liu & Ling Zhu,^[8] Zhu L,^[9] Jiang H.^[10] Two thirds of schoolchildren, parents and three fourths schoolteachers reported that brushing the teeth with fluoride toothpaste can prevent dental caries. The present study went accordingly with studies reported by S Chachra *et al.*,^[11] S kumar *et al.*^[12] The statement “fluoride toothpaste can reverse early-stage caries” was

confirmed by less than half of school children, parents and more than half of school teachers and was in the line with studies reported by Bratthall D *et al.*,^[13] Marinho VC *et al.*^[14] Toothbrushing with fluoride toothpaste is significant for the prevention of caries, and the respondents appears to have embraced this practice to a large extent. However, there are several areas where improvements can be made, such as brushing time, amount of toothpaste and post-brushing procedures. Less than half of the parents and schoolteachers answered that the amount of fluoride toothpaste should be less than pea- size for children 3-7 years of age and the present study was not in accordance with the study reported by Min Liu.^[9] According to the actual results most of the respondents were not particularly clear about the concept of fluoride toothpaste and a high proportion of them did not know whether their toothpaste actually contained fluoride. As toothbrushing with fluoride toothpaste is the most important tool for people in self-care, oral health promotion must include the transfer of knowledge of the most effective toothpaste technique.

CONCLUSION

The study showed that, although toothbrushing with F toothpaste was a priority and behavior was good or acceptable, there was paucity of knowledge about how to use F toothpaste effectively and its positive effects on oral health. Health education has been described as having many aims, including “closing the gap between what is known about desired health practice and what is practiced”, but the main concern seems to be health behavior. The intervention archived the goal of closing this “gap” between desired oral health practice (i.e. good toothpaste behavior) and actual practice (i.e. the effective use of F toothpaste when brushing). People need to be motivated significantly by health concerns while buying toothpaste as they seldom considered the content of fluoride. The accreditation of products by professional oral health organizations, informing about the clinical effect of fluoride toothpaste, may contribute to effective promotion of the use of fluoride toothpaste. Mean- while, several domestic products are labelled fluoride toothpaste but have none or little efficacious fluoride content and establishment of appropriate quality assurance mechanisms is urgently needed.

CONFLICT OF INTEREST & SOURCE OF FUNDING

The author declares that there is no source of funding and there is no conflict of interest among all authors.

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