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Evaluation Of Knowledge, Attitude and Practice Of Pediatricians Towards Long-Term Liquid Medicaments And Its Association With Dental Health

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ABSTRACT
Background: A regular practice following child birth is interaction with the pediatrician for routine medical examination, who administers children with a variety of medicines. Heavily sweetened liquid pediatric medicines has been a well accepted risk factor for the development of dental caries and dental erosion.
Aim: To evaluate pediatricians' knowledge, attitude and practice about the long term use of liquid pediatric medicines and their relationship with dental caries and dental erosion.
Methods: A cross-sectional survey was undertaken among the pediatricians in Chennai. Total subjects included in the survey were 55 pediatricians, through the method of convenience sampling. Data was collected by pre-tested, structured and self administered questionnaires handed out in hospitals, medical clinics and offices. The data on qualitative responses of the respondents was presented in percentage and statistical significance was tested using Chi-square test for independence of attributes.
Results: No statistical difference was seen in the practice of advising dental checkup. Statistically significant difference was seen in awareness of PLM and association with caries, Prescription time for PLM, Practice on advising of rinsing mouth with water, brushing and chewing gum ($P<0.001$)
Conclusion: Pediatricians in this study did not adequately perceive the relationship between the presence of fermentable carbohydrates in pediatric liquid medications and dental caries. But, they had moderate knowledge and lacked proper attitude and practice regarding the various preventive measures . Further studies with a larger sample are necessary.

Keywords: long term liquid medications, awareness, pediatricians, dental caries, dental erosion.

INTRODUCTION

A pediatrician is a primary care physician who deals with the medical care of infants, children and adolescents. Hence, following child birth, interaction with pediatrician for routine medical examination is a regular practice until adolescence. Also, during childhood, children often take a lot of medication, especially chronically sick children, which may be either prescribed or self-medicated.[1]
Oral health is essential for children's general health, growth and development. Pharmaceutical companies use sugars, especially sucrose in large quantities, as a vehicle and to mask the unpleasant taste of certain active ingrediants.[2] Many pediatricians and parents are unaware of the hidden added sugars in pediatric medicines, which are widely available as over the counter drugs.[3,4] Several studies have addressed this issue and it is now widely accepted that sugared medicines increase dental caries in chronically sick children due to longer duration of administration.[5] To overcome this danger, sugar-free preparations have been introduced but is rarely prescribed by medical practitioners.[4]
Apart from the association of fermentable carbohydrates in liquid medications and dental caries, in vitro studies and clinical evidence has shown the dentally erosive effects of medicaments like aspirin, anti-asthmatic drugs, medicines used in the treatment of phenylketonuria and renal disease, iron tonics and vitamin preparations in chewable tablet, lozenge form and effervescent preparations. Dental erosion is a product of the endogenous pH of the various liquid medications.[7-9]
Dental caries and dental erosion secondary to long-term administration of liquid pediatric medications are influenced by factors like frequency and time of administration, proper oral hygiene measures following intake and timely referral to a pedodontist. Pediatricians are in a good position to begin the process of prevention of dental diseases if they recognize and encourage good preventive habits.[1]
The purpose of the current study is to evaluate the knowledge, attitude and practice of pediatricians toward long-term liquid medicaments and its association with dental health.

MATERIALS AND METHODOLOGY

This cross-sectional analytical study, was conducted among pediatricians practicing in the surrounding hospitals of Chennai, with the aim of evaluating their knowledge, attitudes and practice on the long term use of liquid pediatric medicines and their relationship with dental caries and dental erosion.A sample of fifty five random pediatricians were selected via consecutive sampling technique, from the surrounding hospitals of Chennai after obtaining informed consent from institutional review board.

Permission to conduct the study and collect data was obtained from the concerned authorities. A voluntary written consent was obtained from each participant. The structured questionnaire was handed out in person to the selected samples, in order to assess knowledge, awareness and practice of the topic of interest. The questionnaires was filled by the pediatrician with due instructions and explanation given by the investigator. The questionnaire was prepared in English. The questionnaire consisted of two parts, i.e, personal details and specific information. The former part of the questionnaire consisted of questions, including number of years of practice, number of patients seen per day and academic affiliation, if available. The mentioned information was noted to rule out any confounding variable association. The latter part of the questionnaire contained specific questions regarding the use of pediatric liquid medicaments, awareness of their detrimental effects on oral cavity in long-term use, oral hygiene instructions and timely referral to a pedodontist.

The relevant information as per proforma was recorded. All the above mentioned parameters and the information collected was then investigated by a single calibrated examiner. The study data was then subjected to Statistical analysis.

was statistically analyzed using SPSS version 17.0(IBM Inc., Chicago, USA)

RESULTS

The questionnaire was distributed to 55 pediatricians, all of whom filled and returned the form (100%). 18% had experience less than 5 years, 18% had experiences less than 10 years, 18% had experience between 10- 25 years and 45% had experience greater than 25 years. 36% of the practioners saw more than 50 patients a day and another 36 % saw 25-50 patients a day. 21% of respondents saw 10-25 patients per day while only 5% saw less than 10 patients a day. 73% of the participants were teaching faculty in medical colleges whereas remaining 27% were full time practioners. The distribution of general information has been summarized in Table 1.

Table 2 represents the distribution of awareness and practice profile of the respondents. No statistical difference was seen in the practice of advising dental check up. Statistically significant difference was seen in awareness of PLM and association with caries, Prescription time for PLM, Practice on advising of rinsing mouth with water, brushing and chewing gum ($P<0.001$)

DISCUSSION

Pediatricians are considered to be in a unique position to provide preventive oral information and to diagnose oral diseases in their patients early on, because of the early age at which children are brought to their offices.[10] Studies have revealed that number of children (infants and 1-year-old) seen by pediatricians is around 89% as compared to only 1.5% who had dental visits annually. Consequently, ratio of visits to physicians versus visits to dentists is around 250:1.[11] Hence, if pediatricians posses sound knowledge about pathogenesis of oral diseases, they can work with their dental peer cohorts in early detection and interception of oral diseases in child population.

Infancy and childhood are marked by recurrent short and long spans of illness, for which, children are administered frequent medications. However, extremely important to treatment success is their adherence to therapeutic regimen. Among pediatric patients, crucial for adherence to therapeutic regimen is medication palatability. Many active pharmaceutical ingredients, by their very nature, taste bitter and thus are aversive to children.[12] Hence, oral liquid medicines manufactured for administration in children are usually coloured, flavoured, and sweetened with various additives.[13] Pharmaceutical companies use sweeteners (such as sucrose, fructose and glucose), in large quantities, as a vehicle and to mask the unpleasant taste of the active ingredients.[2] Pediatric Liquid Medications (PLM) not only contain sweetening agents, but also acids. These acids are added as buffering agents to maintain chemical stability, control tonicity or to ensure physiological compatibility. They also improve flavor to consequently enhance the patient compliance.[8]

The drugs thus consumed by infants and children, with added sugars and surplus acid may ensure palatability of liquid preparations, but may inadvertently produce unwanted dental side effects.[14] It can be pointed out that a high concentration of fermentable carbohydrates and their acidogenicity contribute towards the cariogenic and erosive potential of these pediatric syrups.24 In a recent study, Sahgal J et al., noted significantly higher caries scores in 2-6 years old children on long term liquid oral medicines in comparison to children not on medication.[15]

In order to overcome this danger, sugar-free preparations have been introduced in many western countries.4 Non fermentable sugar substitutes, commonly sorbitol and xylitol, replace the highly fermentable carbohydrates and thus reduce the frequency of cariogenic impulses.[16] Mentes A (2001)4 examined a new pediatric sugar-free

(saccharine, cyclamate and sorbitol) acetaminophen (Ekosetol®) in comparison to its sucrose containing version for plaque pH changes, by the method of a micro pH electrode and a pH meter. Results reported a significant difference between the two with respect to pH drops after rinsing. However, sugar-free preparations that have been introduced are rarely prescribed by medical practitioners.[4] Apart from sugar substituted liquid medicines, the importance of oral hygiene measures like rinsing with water and tooth brushing, after taking medication, has been suggested to prevent the drop in plaque pH.

Pediatrician being the primary care giver and the source of such liquid medication, it is expected that they educate caregivers of child patients regarding oral health maintenance and practices. However, the same does not happen in a routine scenario since the compeers have unsatisfactory knowledge to express the highlights for oral health care. Moreover, children consuming long-term liquid oral preparations have detrimental effects but majority in similar regards do not receive preventive instructions from the presumptive peers. In the prolonged run, the child presents with dental caries and erosion detailed at an advanced stage.[1] Conflicting results have been presented by various surveys until date on the subject of knowledge, attitude and practice (KAP) of pediatricians and the results can be divergent based on the geographical variations.

In the present study, 70% of the participants were aware of the association between PLM and caries. However only 50% practiced advising dental check up for patients visiting their clinics. Majority of the participants(70%) prescribed PLM between meals, whereas equal number of participants(18%) prescribed PLM at mealtime and bedtime. A high number of respondents (81%) advised their patients to rinse their mouth and chewing gum. However only 18% of the doctors advised their patients to brushing to their patients. Despite of knowing PLM can cause caries, only 18% prescribed sugar free syrups to their patients.

A large number of pediatricians included in this survey were aware of the dental defects that could be caused by long-term use of pediatric liquid medicaments. However, still some did not advise regular dental checkups. The possible rationale could be lack of substantial skills in delivering oral hygiene instructions. Time constraints due to increased number of patients' consultations per day could also be an additive factor.[1-4]

The pediatric liquid medicaments are sweetened to improve their palatability and thus acceptance with children.[13] The consumption of pediatric liquid medicaments in between meals, increases the total number of sugar exposures in the child in a day which is associated with increased risk of developing dental caries.[14] In this study, half of the respondents prescribed the liquid medicines to be taken in between two meals. This indicates lack of knowledge amongst pediatricians regarding the factors causing dental caries and its associated risks. Another reason could be inability to control the time of administration as it depends on its properties like rate of absorption, amount absorbed when given along with food and its respective frequency as per the half-life of drug. Prescribing the pediatric liquid medicament to be consumed just before bedtime also increases the risk for dental caries as the rate of flow of saliva is reduced during night time and the medicine remains in contact with teeth for a longer time

There is a need to include some aspects of oral health risk assessment, early detection and referral services in the medical education program. The outcome could be positive for dentists and medical professionals that work in both the public and private sectors. The role of pediatricians in oral health was formalised in a policy issued by the American Academy of Paediatrics in 2003 and reinforced in another policy in 2008.[18] As a pediatrician is in ideal position to orient parents regarding prevention of oral diseases, oral health information programs should be included in their curriculum and residency.

CONCLUSION

The response from participants of the present cross-sectional study indicated that they had a moderate knowledge regarding the demerits of long-term administration of sugar containing liquid pediatric medications on dental tissues. However this knowledge was incomplete and was not reinforced with information programs. Hence practice of the group of pediatricians on prescribing sugar substituted medicines and on counseling patients and care-takers regarding oral hygiene measures following administration of liquid formulations were lacking. In order to develop this skill, it is recommended that pediatricians shall undergo adequate training specifically to better understand delivery of proper oral care instructions.

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Tables 1. Distribution of general information of the respondents

Characteristics	Number	Percentage
Years of practice		
<5 years	10	18.18
5-10 years	10	18.18
10-25 years	10	18.18
>25 years	25	45.45
Number of patients seen per day		
<10	3	5.45
10-25	12	21.81
25-50	20	36.36
>50	20	36.36
Teaching Faculty		
Teaching	40	72.72
Non teaching	15	27.27

Table 2: Distribution of awareness and practice profile of the respondents.

Awareness / Practice	Years of Practice			P value
	<10 year	>10 year	Total	
Awareness of PLM and association with caries				<0.001
Yes	15	30	45	
No	5	5	10	
Practice on advising dental check up				0.981
Yes	10	17	27	
no	10	18	28	
Prescription time for PLM				<0.001
Meal time	5	5	10	
Between meal time	10	25	35	
Bedtime	5	5	10	
Anytime	0	0	0	
Practice on advising of rinsing mouth with water				<0.001
Yes	15	30	45	
No	5	5	10	
Practice on advising brushing				<0.001
yes	5	5	10	
no	15	30	45	
Practice on advising chewing gum				<0.001
Yes	15	30	45	
no	5	5	10	
Practice on prescribing sugar free medicine				
yes	5	5	10	<0.001
no	15	30	15	