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Practices and awareness of the paediatricians regarding syrups and sugar free medicines in Chennai City

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ABSTRACT

Introduction: Paediatricians and paediatric health care professionals should develop the knowledge base to perform oral health risk assessments on all patients beginning at 6 months of age Dentist are not the only health professionals to see children at high risk for tooth decay. Paediatricians have a key role in helping young patients before tooth decay becomes a reality.
Aim: 1. To assess Practices of the paediatricians regarding syrups and sugar free medicines in Chennai City. 2. To assess Awareness of the paediatricians regarding syrups and sugar free medicines in Chennai City.
Materials and Methods: The study consisted of 65 males and 45 females which totally comprised of 110 study subjects. The subjects were of age ranging between 28 and above 57 years old. The source of data was primary and was obtained through a questionnaire survey. The resulting data was coded and statistical analysis was done using SPSS (Statistical Package for Social Sciences) version 17.0 software, Chi-square test was applied to compare the percentages and the level of significance was set at 0.05.
Results: Though there was a difference in responses given by Paediatricians regarding their practices and awareness on syrups and sugar free medicines according to year of practices there was no marked difference noted between them.
Conclusion: In the present study, most paediatricians recognize that paediatric medicines can cause teeth problems, a high percentage are able to establish a relationship with the dental caries. Paediatric formulations without added sugar should be available to those responsible, and professionals could provide better and more intensive teaching on the proper oral hygiene care after use of these medicines.

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1. Introduction

The American Academy of Paediatrics (AAP) published a policy statement in May 2003 addressing the role that paediatricians can play in the oral health risk assessment of children.[1] Paediatricians need more knowledge and skill in addressing children's oral health because of the prevalence of dental disease, the racial and socioeconomic disparities in disease burden, and the limited access to dental care for many children.[1]

Tooth decay is initiated when simple carbohydrates in the mouth are fermented by bacteria, which collect in a dense matrix called ''plaque''. Nearest to the tooth surface, salivary buffers are blocked out by the adherence of the growing plaques. This process causes a drop in the plaque pH adjacent to the tooth surface and the ionic dissolution of hydroxyapatite crystals. *Streptococcus mutans*, the major plaque-forming organism, grows rapidly at pH below 5.7, further fermenting any remaining carbohydrate substrate. Between meals, salivary buffering returns oral pH to more neutral levels. If carbohydrates containing snacks or medications are ingested between meals, oral pH has no opportunity to recover.[2]

Children's teeth are unlikely to be harmed by occasional brief courses of sugar containing medicines. Asthma, convulsions, and recurrent urinary tract infections, however, are examples of common disorders that provide a sizable number of children liable to be exposed to long term treatment with drugs. As a general rule, paediatricians are responsible for either beginning such treatment or for setting local standards for family practitioner guidance. Faced with the challenge of promoting compliance in a culture that has grown to demand that all tastes be inoffensive, paediatricians have passively promoted the manufacture and use of sucrose containing medicines.[3]

While dentists say that the kind of extensive tooth decay seen in children taking long-term medications is not as severe as that caused by putting an infant to bed every night with the nursing bottle, the decay is nonetheless serious enough to require extensive dental restorations. Sucrose, traditionally an inexpensive substance used to lend bulk and viscosity to medications, is what's causing the problem.[4]

Studies have shown that 50–60% prevalence of early childhood caries is seen in our country and further studies have indicated that this rate was more than other countires.[5] This increased prevalence has to been taken into consideration for the use of alternative medicines.

2. Objectives

1. To assess Practices of the paediatricians regarding syrups and sugar free medicines in Chennai City.
2. To assess Awareness of the paediatricians regarding syrups and sugar free medicines in Chennai City.

3. Materials and methods

An epidemiological survey was carried out to assess Practices and awareness of the paediatricians regarding syrups and sugar free medicines in Chennai City.

3.1. Source of data

The source of data was primary and was obtained through a questionnaire survey.

3.2. Study population

The survey was conducted among the paediatricians to assess their practices and awareness regarding syrups and sugar free medicines in Chennai City.

3.3. Ethical clearance

Ethical clearance was obtained from institutional review board

3.4. Sample size

Sample size was calculated from the values obtained from the key article using the following formula

$$n = z^2 pq/L^2$$

Awareness of paediatricians that medicated syrup are sweet $p = 45\%$.
Paediatricians not aware that medicated syrup are sweet $q = 100–45 = 55\%$.
Level of significance $z = 1.96$.

Allowable error $L = 10\%$ final sample size was estimated to be 95.

3.5. Sampling methodology

Cluster sampling methodology was used. Among the hospitals in Chennai city which were providing exclusively health care for the children, 3 hospitals were selected randomly and all paediatricians employed in these hospitals were invited to participate to reach the required sample size.

3.6. Collection of data

A specially designed open and closed ended questionnaire which consisted of 15 questions was used to assess Practices and awareness of the paediatricians regarding syrups and sugar free medicines in Chennai City.

The questionnaire was pilot tested on a small group of (50) Paediatricians who were requested to complete it and to indicate any questions that they found unclear to answer.

The paediatricians were approached personally and the purpose of the study was explained to them and informed

consent was obtained. The questionnaire was distributed to them and was assured of the confidentiality. The filled questionnaire was collected on the same day immediately after completion.

3.7. *Statistical analysis*

The resulting data was coded and statistical analysis was done using SPSS (Statistical Package for Social Sciences) version 17.0 software, Chi-square test was applied to compare the percentages and the level of significance was set at 0.05.

4. Results

1. The study consisted of 65 (59%) males and 45 (41%) females which totally comprised of 110 study subjects (Table 1).
2. The subjects were of age ranging between 28 and above 57 years old (Table 2).
3. Practices of the paediatricians regarding syrups and sugar free medicine (Table 3).
4. Awareness of the paediatricians regarding syrups and sugar free medicines (Table 4).
5. Practices and awareness of the paediatricians regarding syrups and sugar free medicines according to year of practice .

Though there was a difference in responses given by Paediatricians regarding their practices and awareness on syrups and sugar free medicines according to year of practices the differences noted were not statistically significant (Tables 5 and 6).

Table 1 – Distribution of study subjects according to sex.

Gender	Frequency (*n*)	Percentage (%)
Males	65	59.0
Females	45	41.0
Total	110	100.0

Table 2 – Distribution of study subjects according to age.

Range of age in years	Frequency (*n*)	Percentage (%)
28–37	53	48
38–47	36	32
48–57	16	15
Above 57	5	5
Total	110	100

5. Discussion

A cross sectional survey was carried out to assess the practices and awareness of the paediatricians regarding syrups and sugar free medicines in Chennai City. The study consisted of 65 (59%) males and 45 (41%) females which totally comprised of 110 study subjects. The subjects were of age ranging between 28 and above 57 years old.

Table 3 – Practices of the paediatricians regarding syrups and sugar free medicines.

Questions	Options	*n*	%
1. What form of medicines do you commonly prescribe?	a) Tablets	18	16.4
	b) Syrups/liquids	92	83.6
2. What is the most commonly used frequency for prescription of medicated syrups?	a) Once a day	2	1.8
	b) Twice a day	28	25.4
	c) Thrice a day	76	69
	d) Four times a day	4	3.8
3. For how many days do you commonly prescribe medicated syrups?	a) 3 days	12	11
	b) 5 days	90	81.8
	c) 7 days	3	2.7
4) For which age group do you commonly prescribe medicated syrups?	a) Up to 5 years of age	97	88.2
	b) Up to 8 years of age	11	10
	c) Up to 10 years of age	1	0.9
	d) Up to 12 years of age	1	0.9
5) Prescription of the medicines depend commonly on which of the following?	a) Socio-economic factors	2	1.8
	b) Child characteristics (age, acceptance of the medication)	13	11.2
	c) Characteristics of the disease	79	72
	d) Medication features.	16	14.4
6) Of the following which oral hygiene instructions you give after prescribing medicated syrups?	a) Brushing twice daily	9	8.1
	b) Rinsing their mouth after taking medicated syrups	52	47.2
	c) No oral hygiene instructions given	47	42.75
7) Do parents request you to prescribe sugar free medicines?	a) Yes	4	3.7
	b) No	106	96.3
8) Do you support the principle of prescribing sugar free medicines for children?	a) Yes	79	71.8
	b) No	31	28.2

Table 4 – Practices of the paediatricians regarding syrups and sugar free medicines according to year of practice.

Questions	Options	Year of practice								P value
		1–10		11–20		21–30		31–36		
		n	%	n	%	n	%	n	%	
1. What form of medicines do you commonly prescribe?	a) Tablets	10	55	6	33	1	6	1	6	0.413
	b) Syrups/liquids	53	57.8	29	31.5	9	9.7	1	1	
2. What is the most commonly used frequency for prescription of medicated syrups?	a) Once a day	–	–	1	50	1	50	–	–	0.283
	b) Twice a day	18	64.5	8	28.5	1	3.5	1	3.5	
	c) Thrice a day	45	59.3	20	26.3	8	10.5	3	3.9	
	d) Four times a day	3	75	1	25	–	–	–	–	
3. For how many days do you commonly prescribe medicated syrups?	a) 3 days	4	33.4	2	16.6	4	33.4	2	16.6	0.298
	b) 5 days	25	28	27	30	30	33	9	9	
	c) 7 days	1	33.3	1	33.3	1	33.3	–	–	
4) For which age group do you commonly prescribe medicated syrups?	a) Up to 5 years of age	30	30.9	30	30.9	18	18.6	19	19.6	0.952
	b) Up to 8 years of age	4	36.3	4	36.3	2	18.4	1	9	
	c) Up to 10 years of age	1	100	–	–	–	–	–	–	
	d) Up to 12 years of age	1	100	–	–	–	–	–	–	
5) Prescription of the medicines depend commonly on which of the following?	a) Socio-economic factors	2	100	–	–	–	–	–	–	0.549
	b) Child characteristics (age, acceptance of the medication)	4	30.7	4	30.7	4	30.7	1	8.8	
	c) Characteristics of the disease	27	34.1	35	44.3	10	12.8	7	8.8	
	d) Medication features.	8	50	3	18.8	5	31.2	–	–	
6) Of the following which oral hygiene instructions you give after prescribing medicated syrups?	a) Brushing twice daily	5	55.6	2	22.2	2	22.2	–	–	0.672
	b) Rinsing their mouth after taking medicated syrups	20	38.4	17	32.8	10	19.2	5	9.6	
	c) No oral hygiene instructions given	2	46.8	2	44.8	22	4.2	21	4.2	
1) Do parents request you to prescribe sugar free medicines?	a) Yes	2	50	2	50	–	–	–	–	0.461
	b) No	45	42.4	35	33	20	18.8	6	5.8	
2) Do you support the principle of prescribing sugar free medicines for children?	a) Yes	35	44.5	23	29.1	15	18.9	6	7.5	0.253
	b) No	4	12.9	7	22.5	8	25.9	12	38.7	

5.1. *Practices of the paediatricians regarding syrups and sugar free medicine*

In present study 92 (83.6%) of paediatricians responded that they prescribe syrups/liquids commonly than tablets and 90 (81.8%) of paediatricians responded that they prescribe medicated syrups for 5 days as a protocol. The reason could be because most of the children find difficult to swallow tablets. Similar studies conducted by *Shilpa Shree et al. (2010)* in Bangalore and by *Nikita Agrawal (2010)* in Bhopal found that when frequency of use of medicated syrups increases they cause dental caries because the syrups sweetened with sucrose or fructose produces a long and marked drop in pH. These readily fermentable carbohydrates in thick liquid preparations may add significantly to the dental caries potential in children.[6,7]

97 (88.2%) of paediatricians responded that they prescribe medicated syrups up to 5 years of age. Similar study conducted by *Anne Maguire et al. (1994) in* England in which 33% of the children received medicated syrups up to 5 years of age.[8] The reason could be Children of less age find difficult to swallow tablets and mothers also dispense the syrups easily in sleeping children.

While, 52 (47.2%) of the paediatricians responded that they instruct the child to rinse their mouth and 47 (42.75%) of them do not give any oral hygiene instructions to the child after taking medicated syrups. Similar study conducted by *Valdenice Aparecida Menezes et al. (2010)* in Brazil concluded that 28.8% of the mother cleans their child mouth after drugs ingestion and around 80% did not receive any oral hygiene instructions from their paediatricians. When the child does not drink or rinse water after taking the medicated syrups the sucrose will alter the pH which makes the teeth more caries potential.[9]

Our study resulted in 4% of the paediatricians responding that the child's parents request them to prescribe sugar free

Table 5 – Awareness of the paediatricians regarding syrups and sugar free medicines according to year of practice.

Questions	Options	Year of practice								P Value
		1–10		11–20		21–30		31–36		
		n	%	n	%	n	%	n	%	
1) Are sugar free medications for children available in the market?	a) Yes	44	47.5	33	35.4	11	11.8	5	5.3	0.052
	b) No	6	35.3	2	11.7	4	23.5	5	29.4	
2) What is your frequency of prescribing sugar free medicines?	a) Always	1	100	–	–	–	–	–	–	0.091
	b) Sometimes	12	33.5	15	41.6	6	16.6	3	8.3	
	c) Seldom	24	42.8	17	30.5	8	14.2	7	12.5	
	d) Never	5	29.6	8	47	3	17.6	1	5.8	
3) Are you updating yourself regularly on the latest medicated syrups in the market?	a) Yes	45	45	28	28	20	20	7	7	0.758
	d) No	2	20	5	50	2	20	1	10	
4) What is your source of update on sugar free medicated syrups?	a) Drug company representatives	43	55.8	20	25.9	10	12.9	4	5.4	0.858
	b) Journals	15	51.7	8	27.5	3	10.4	3	10.4	
	c) Advertisements	4	100	–		–		–		
5) Do medicated syrups cause dental caries	a) Yes	53	75.8	14	20	2	2.8	1	1.4	0.191
	b) No	10	25	5	12.5	7	17.5	18	45	
6) Have you referred children with dental caries to dentist?	a) Yes	65	62.7	33	31.7	3	2.8	3	2.8	0.098
	b) No	–	–	–	–	4	66.7	2	33.3	
7) If given opportunity would you like to update yourself on relationship of medicated syrups with oral health?	a) Yes	40	36.6	50	45.8	10	9.4	9	8.2	
	b) No	–	–	1	100	–		–		

medicines. Similar study conducted by *M. Bradley et al. (1996)* in Northern Ireland around 50% responded that the child parents do request them to prescribe sugar free medicines. This shows the parental interest have however influenced them to prescribe the sugar free preparations .9 Though 79 (71.8%) of the paediatricians responded that they support the principle of prescribing sugar free medicines, there is lack of awareness among our city population on these sugar free medicines which is clearly indicated in our results.

On awareness of the paediatricians regarding syrups and sugar free medicines 93 (84.5%) of the paediatricians were aware that sugar free medications for children are available in the market. This clearly shows they are very much aware about the present market scenario on sugar free medications.

Table 6 – Awareness of the paediatricians regarding syrups and sugar free medicines according to year of practice.

Questions	Options	Year of practice								P Value
		1–10		11–20		21–30		31–36		
		n	%	n	%	n	%	n	%	
8) Are sugar free medications for children available in the market?	a) Yes	44	47.5	33	35.4	11	11.8	5	5.3	0.052
	b) No	6	35.3	2	11.7	4	23.5	5	29.4	
9) What is your frequency of prescribing sugar free medicines?	a) Always	1	100	–	–	–	–	–	–	0.091
	b) Sometimes	1 2	33.5	1 5	41.6	6	16.6	3	8.3	
	c) Seldom	24	42.8	17	30.5	8	14 2	7	12.5	
	d) Never	5	29.6	8	47	3	17.6	1	5.8	
10) Are you yourself regularly on the latest medicated syrups in the market?	a) Yes	4	45	28	28	20	20	7	7	0.758
	d) No	2	20	5	50	2	20	1	10	
11) What is your source of update on sugar free medicated syrups?	a) Drug company representatives	43	55.8	20	25.9	10	12.9	4	5.4	0.858
	b) Journals	15	51.7	8	27.5	3	10.4	3	10.4	
	c) Advertisements	4	100	–		–		–		
12) Do medicated syrups cause dental caries	a) Yes	53	75.8	14	20	2	2.8	1	1.4	0.191
	b) No	10	25	5	12.5	7	17.5	18	45	
13) Have you referred children with dental caries to dentist	a) Yes	65	62.7	33	31.7	3	2.8	3	2.8	0.098
	b) No	–	–	–	–	4	66.7	2	33.3	
14) If given opportunity would you like to update yourself on relationship of medicated syrups with oral health?	a) Yes	40	36.6	50	45.8	10	9.4	9	8.2	
	b) No	–	–	1	100	–		–		

100 (90.9%) of the paediatricians update themselves regularly on latest medicated syrups in the market and 70% of them update it through drug company representatives. In a similar study conducted by *M. Bradley et al. (1996)* in Northern Ireland 60% of the practitioners update themselves though drug company representatives.[10] Many of the paediatricians are busy at their practice and find time hardly to spent on CME programmes and reading other journals. Drug company representatives frequently visit their clinic and update them.

In present study 70 (63.6%) of the paediatricians responded that medicated syrups cause dental caries. Similar study conducted by *Shilpa Shree et al. (2010)* in Bangalore in which 42.6% of the paediatricians responded that medicated syrups cause dental caries.[6] The paediatricians were very much aware about the sugar in the medicated syrups are culprits for dental caries.

Regarding relationship between practices and awareness of the paediatricians' regarding syrups and sugar free medicines according to year of practice, the present study revealed that there was no marked difference found in either practices or awareness in between them. The group consisted of practitioners from 1 year to 36 years of experience. All of them were equally updated and ready to prescribe sugar free medications to the children.

Sucrose which is present in medicated syrups are not present in medications which contain sugar substitutes. So these substitutes are not fermented in the microflora of dental plaque. Doctors recommended these sugar substituted medications whenever possible.[11] The use of these sugar substitutes in medications has been documented. They are used in weight loss and diabetes commonly and are proved to be hypoglycaemic, non mutagenic, non carcinogenic and safe.[12]

Many of the medications are acidic and combination of theses with the sugar present in the medication also leads to dental erosion which eventually leads to dental caries.

The eroded enamel is soft and permeable and allows the acid to the next layer leading to decalcification, the erosion process progresses into the dentin leading to destruction of the tooth core.[13]

To minimize this risk most medication should be considered equivalent to a sweet snack for the purpose of dental hygiene. Sucrose in medication should be replaced by less cariogenic sweeteners, and sucrose-containing medications should be given with meals if this is possible.[2]

6. Conclusion

Most paediatricians recognize that paediatric medicines can cause teeth problems, a high percentage are able to establish a relationship with the dental caries. Paediatric formulations without added sugar should be available to those responsible, and professionals could provide better and more intensive teaching on the proper oral hygiene care after use of these medicines. Therefore, the pharmaceutical industry needs to be more aware of this problem and should prepare paediatric medicines without the presence of sucrose.

This study was carried out only in Chennai City; an elaborate study through the country is required for attaining a better result in this subject.

Conflicts of interest

The authors have none to declare.

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