

Research Paper

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Association between Television Viewing and Caries in Children 2-6 Years of Age in Ahmedabad City

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Abstract

This study was aimed to examine the association between early childhood caries and television viewing practices with respect to its duration & frequency. A cross-sectional questionnaire-based survey was conducted among 115 children below 6 years in Ahmedabad City, Gujarat. Fifteen close-ended, validated questionnaires were distributed among the children and their parents in a pre-school. The study included oral examination performed by a single examiner in a classroom using mouth mirror and probe with adequate natural light. In this study, 69 boys & 46 girls participated, among them 11 never watched TV. Out of 104 children, 61.53% children took snacks while watching TV. Longer duration of television viewing was significantly and consistently associated with a greater number for decayed teeth and higher DMFT among pre-school children in Ahmedabad. Television viewing strongly influences children's food preferences and eating habits, resulting in higher caries prevalence. The present study shows a strong link between duration & frequency of screen media use and dental caries in early childhood.

Keywords: - Dental caries; Early childhood caries; Preschool child; Television viewing; Screen binging.

Introduction

Dental caries is one of the most prevalent chronic diseases worldwide. It is the primary cause of oral pain and tooth loss. Oral and dental hygiene are considered so critical to the fulfilment and promotion of health that it has been one of the key areas of medical focus in the 21st century. It is very important to prevent dental caries, but this is not likely to occur unless the available scientific knowledge about changing the etiological factors of the disease is applied. Caries risks include biological, environmental, behavioural, and lifestyle-related factors. The approach to primary prevention should be based on common risk factors.²

Previous studies have found that television viewing is associated with unhealthy dietary behaviours among older children and adolescents, including consumption of high fat foods, fast foods, and sugar-sweetened beverages, and consumption of fewer fruit and vegetables.⁴ The rapid economic changes over the past few decades have been accompanied by changes in behavioural patterns, lifestyle and cultural norms. Television viewing is one of the notable changes in our social environment in the 21st century that has had a particularly detrimental effect on children's wellbeing. The mind of child is like clay, it forms early impressions on what it sees. These early impressions determine how he/she sees the world and affect his future behaviour and television plays an important role in it. Now a days, children spend longer hours watching TV that leads to a reduction in physical activities and an increase in consumption of unhealthy snacks while watching TV resulting in obesity, increased tendency for occurrence of dental caries, sedentary lifestyle and reduction in physical activities.

Television viewing has been associated with dietary practices and other activities in children. The American Academy of Pediatrics (AAP) reports that many negative health effects are associated with television viewing in children, including violent and aggressive behavior, sexuality, school performance, body concept and self-image, nutrition, dieting, obesity, and substance abuse (American Academy of Paediatrics, 2001). Specifically, increased television viewing is associated with an increase in consumption of sugar-sweetened beverages, fast food consumption, and total

energy intake.²

Epidemiological studies have identified television viewing as a possible risk factor for chronic health conditions that are associated with sedentary lifestyle and nutrition intake.⁹ Different pathways have been postulated for the relationship between TV viewing and poorer health. Firstly, long hours spent watching TV leads to a reduction in physical activities and an increase in consumption of unhealthy snacks. Secondly, TV food advertisements affect food choices.¹² Several studies reported that the frequency and the time of food advertisements on TV were directly linked to increased consumption of obesogenic foods and an increase in related health conditions. A number of studies in Western and Asian countries argued that TV advertisements could have a similar impact on dental caries. For example 56% of food advertisement in England and 50% in India were about high sugar food/beverages.¹⁰ The purpose of this study was to assess association between television viewing and dental caries experience in children.

Materials & Method

Institutional ethical committee clearance was obtained prior to the commencement of the study. Approval from the school authorities and informed consent was obtained. Child patients aged 2-6 years studying in government schools in Bopal, Ahmedabad were being selected as the study population to eliminate the study bias. In a short interview with the parent and child during which the study was explained verbally and parents were given a short written description of the study. Informed consent were obtained and documented.

A validated questionnaires consisting of 15 closed ended questions were distributed among parents of 2 to 6 years old children followed by clinical examination by single calibrated examiner. These pre-structured questionnaires elicited the information regarding children's hours of television viewing, frequency of television viewing, their preference of having meals while watching television. The parents were then asked to complete a survey that requested socio demographic, television viewing, and caries related information. Based on the questionnaire, children's favourite channels and their viewing time were also analyzed.

The child's name and date of birth were used as identifiers to match the parent survey with the child's dental chart. Using the child's dental record, caries experiences were documented on the

data collection sheet by the child's dentist. Caries experience was recorded as decayed, missing, and filled teeth (dmf) for primary teeth. Statistical analysis was completed using SPSS 16.0 for Windows (SPSS, Chicago, IL). Statistical analysis used in this study was one way ANOVA. A cross sectional sample study design was implemented.

Results

A total of 115 children, 60% were boys and 40% were girls; 90.43% watched television and 9.56% did not watch television. Results showed that duration of TV viewing time had a significant association with decayed teeth.

In this study, there was significant correlation between duration of TV viewing and caries experience on weekdays. The children, who watched TV for less than 1 hour didn't experience caries and were statistically not significant (Table III). The children, who watched TV for 1-3 hours and more than 3 hours, experienced caries and were a statistically significant (Table III). There was a significant correlation between duration of TV viewing and caries experience on weekends (Table VI) and frequency of meal in front of TV and decayed teeth (Table IX).

TABLE-I Correlation between TV viewing on Weekdays & dmf score

Hours of viewing	N	Mean	Std. deviation	Std. error	95% confidence interval of mean		Minimum	Maximum
					Lower bound	Upper bound		
Less than 1 hour	49	9.16	3.79	0.54	8.08	10.25	2	16
1-3 hours	51	8.55	3.94	0.55	7.44	9.66	2	20
More than 3 hours	4	14.00	5.35	2.68	5.48	22.52	6	17
Total	104	9.05	4.02	0.39	8.27	9.83	2	20

TABLE-II Correlation between TV viewing on Weekdays & dmf score- Intra group comparison

	Sum of Squares	df	Mean Square	F	ANOVA p value
etween Groups	111.438	2	55.719	3.628	.030
Within Groups	1551.321	101	15.360		
Total	1662.760	103			

TABLE-III Correlation between TV viewing on Weekdays & dmf score- Post Hoc Test

Hours of TV viewing		Mean Difference (I-J)	Std. Error	p value	95% Confidence Interval	
					Lower Bound	Upper Bound
Less than 1 hour	1-3 hours	.61	.784	.714	-1.25	2.48
	More than 3 hours	-4.84	2.038	.051	-9.68	0.01
1-3 hours	Less than 1 hour	-.61	.784	.714	-2.48	1.25
	More than 3 hours	-5.45	2.035	.023	-10.29	-0.61
More than 3 hours	Less than 1 hour	4.84	2.038	.051	-0.01	9.68
	1-3 hours	5.45	2.035	.023	0.61	10.29

TABLE-IV Correlation between TV viewing on Weekends &dmf score

Hours of TV viewing	N	Mean	Std. deviation	Std. error	95% confidence interval of mean		Minimum	Maximum
					Lower bound	Upper bound		
Less than 1 hour	6	8.33	3.83	1.56	4.31	12.35	2	13
1-3 hours	73	8.04	3.43	0.40	7.24	8.84	2	15
More than 3 hours	25	12.16	4.20	0.84	10.43	13.89	4	20
Total	104	9.05	4.02	0.39	8.27	9.83	2	20

TABLE-V Correlation between TV viewing on Weekends &dmf score- Intra Group Comparison

	Sum of Squares	df	Mean Square	F	ANOVA p value
etween Groups	319.190	2	159.595	11.997	<0.001
Within Groups	1343.570	101	13.303		
Total	1662.760	103			

TABLE-VI Correlation between TV viewing on Weekends & dmf score- Post Hoc Test

		Difference (I-J)	Std. Error	Sig.	95% Confidence	
					Lower	Upper
Less than 1 hour	1-3 hours	.29	1.549	.981	-3.39	3.98
	More than 3	-3.83	1.658	.059	-7.77	0.12
1-3 hours	Less than 1 hour	-.29	1.549	.981	-3.98	3.39
	More than 3 hours	-4.12	.845	<0.001	-6.13	-2.11
More than 3 hours	Less than 1 hour	3.83	1.658	.059	-0.12	7.77
	1-3 hours	4.12	.845	<0.001	2.11	6.13

TABLE-VII Correlation between taking meal in front of TV & dmfs

No of meals while watching TV	N	Mean	Std. deviation	Std. error	95% confidence interval of mean		Minimum	Maximum
					Lower bound	Upper bound		
1 meal	42	8.57	3.94	0.61	7.34	9.80	2	16
2 meal	25	11.04	4.40	0.88	9.22	12.86	3	20
More than 2 meal	2	6.00	5.66	4.00	-44.82	56.82	2	10
Total	69	9.39	4.29	0.52	8.36	10.42	2	20

TABLE-VI Correlation between taking meal in front of TV & dmft score-Intra Group Comparison

	Sum of Squares	def	Mean Square	F	ANOVA p VALUE
between Groups	119.189	2	59.595	3.471	.037
within Groups	1133.246	66	17.170		
Total	1252.435	68			

TABLE-IX Correlation between taking meal in front of TV & dmft score-Post Hoc Test

		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1 meal	2 meals	-2.47	1.047	.048	-4.98	0.04
	More than 2	2.57	2.999	.669	-4.62	9.76
2 meals	1 meal	2.47	1.047	.048	-0.04	4.98
	More than 2	5.04	13.045	.230	-2.26	12.34
More than 2	1 meal	-2.57	2.999	.669	-9.76	4.62
	2 meals	-5.04	3.045	.230	-12.34	2.26

Discussion

The American Academy of Paediatrics has set guidelines for the amount of television and total screen time per day for children over age two years. Despite these recommendations, many children continue to overuse television and other electronic media. Television viewing has been associated with increased dietary intake of cariogenic foods.³ The commercialization of children's television programs is one of the several concerns raised by child health professionals, regarding the impact of television on children's dentition.⁴ Television is the most efficient and effective promotion tool, especially when the target group is children for propagating such fast food items. Children who watched television commercials & watched TV for longer time had a greater dmft score. Increase of DMFT and dmft score was more among children who asked for the purchase of advertised products (foods, soft drinks).⁷ It would be difficult to prove that long time television

viewing has a direct effect on oral health, given the multifactorial nature of dental caries, but a significant correlation between duration & frequency of Television viewing and dental caries has been shown in the present study.⁵

Television commercials have an effect on the children's food preferences. The aim in developing the diet questionnaire was to obtain information based on actual behavior concerning the association between television viewing & eating habits and its impact on caries occurrence¹⁴. So children and adolescents who watched television for longer were more likely to consume more sweetened beverages and snacks.⁸ Children as tv viewers are exposed to messages that predominantly promote unhealthy confections and drinks high in fats, sugars, and salt and other foods associated with obesity, dental caries, and other chronic diseases.¹¹ About 50% of advertisements on children's favourite channels were for cariogenic food and drinks. Among them, most advertisements were for chocolates and soft drinks. Fruit, vegetables, protein-rich foods such as meat, fish, poultry, beans, nuts, eggs, and dairy products were rarely advertised, whereas foods rich in fats and sweets were advertised frequently, with candy being the most commonly advertised food. 34% of the advertisements were related to food and drink products on children's channels, 95% of these being deemed potentially cariogenic or erosive to teeth.¹⁰

In this study, most common time for watching television was in the morning & in the evening time. On average, children spent 1-2 hours of watching television continuously. Pine and Nash mentioned that children in the United Kingdom spent an average of 2.5 hours per day watching television. Rideout, Roberts, and Foehr 2005 identified that on average, young people spend 6.5 hours a day interacting, often multitasking, with various forms of media, and the majority of time is spent with television and music. Most of the children are fond of cartoon channels and watch them regularly. The Cartoon Network (35.44%), Pogo (20.25%), and Disney (8.86%) were the most favourite channels.² It was found that on an average child consumed 958 kJ while watching TV on weekdays and 916 kJ on weekends indicating that preschool children are regularly eating while watching TV.

The time spent on television viewing has been implicated as a possible risk factor for developing dental caries as they are more likely to consume more sweetened beverages and snacks while viewing TV¹³. In our study out of 104 children, 61.53% children took snacks in front of TV. On

weekdays, 51 children watched TV for 1-3 hours ($p=0.023$) & 4 children watched TV for more than 3 hours ($p=0.023$) having more carious teeth and results were found to be statistically significant ($p=0.030$).

On Weekends, 51 children watched TV for 1-3 hours ($p<0.001$) & 4 children watched TV for more than 3 hours ($p<0.001$) having caries and the results were found to be statistically significant ($p<0.001$).

Out of 69 children, 42 children had caries who snacked once in front of TV ($p=0.048$) & 25 children had caries who snacked twice in front of TV ($p=0.048$) and the results were found to be statistically significant ($p=0.037$).

Several previous studies have examined the relationship between television viewing and snacking in children. Campbell et al in 2006 found that increased television viewing was associated with increased sweet snack intake in children. This cross-sectional study used a linear regression analysis and controlled for predictor variables including maternal education (Campbell 2006). Coon et al in 2001 found a positive relationship between television viewing and consumption of snack foods. Additionally, a study investigating outcomes of television viewing found that for each additional hour of television viewing per day, there was a 10% increase in the amount of snacking by the child (Pagani 2010). The present study found a positive relationship between television viewing and snacking, confirming the results of previous studies.¹

Conclusion

Television viewing as measured by a questionnaire was positively associated with frequency of snacking in children from 1 to 6 years. It is important to develop a better understanding of pre-school children's typical TV viewing behaviour to make a public health recommendation. As a result, healthcare professionals should continue to support the AAP's guidelines for media usage, and should educate parents and patients regarding appropriate usage of television and other media and the possible implications for oral and overall health.

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