

Association between Dental Caries and Multimedia Habits amongst Institutionalized and Non-Institutionalized Children

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Abstract

Aim: To assess and compare the relationship between dental caries and multimedia habits amongst institutionalized and non-institutionalized children.

Methods: A cross-sectional survey was conducted amongst 350 institutionalized and non-institutionalized school children aged 12-15 years of Pune district to assess the relationship between dental caries and multimedia habits. The 12-item closed questionnaire was framed to collect data on multimedia habits and diet history. Guardians were interviewed for institutionalized children and parents answered for non-institutionalized school children. Intraoral examination was done for dental caries.

Results: The mean age of the children from institutionalized and non-institutionalized schools was 13.5 + 3.2. Mean decayed teeth for institutionalized children were found to be 1.69+1.202 and non-institutionalized was 2.48+1.286 respectively which showed a statistically significant difference between the two groups. Mean DMFT scores for institutionalized children were found to be 1.93+1.21 and non-institutionalized was 2.66+1.27 respectively which showed a statistically significant difference between the two groups. There was a statistically significant difference (p-value <0.05) seen with all questions on multimedia habits in relation to DMFT scores for non-institutionalized school children.

Conclusion: There is an association between dental caries and multimedia habits amongst non-institutionalized children. Higher caries prevalence was seen amongst non-institutionalized school children. Hence, there is a greater likelihood of having increased decayed teeth with increasing multimedia habits.

Keywords: Dental caries, multimedia habits, children, institutionalized.

Introduction

Dental caries constitutes a major public health problem worldwide.¹ Children form the most vulnerable group with 60% to 90% of them experiencing it.² Current concept of dental caries emphasizes social and behavioral factors influencing an individual for its susceptibility.³ Currently, most of the children have relatively increased access to Television (TV) along with portable handheld devices (computer, smartphone, laptop, tablet, iPad) and they also routinely engage in two or more forms of screen viewing at the same time.⁴

Television has become a major part of children's lives and children spend most of their leisure time either watching TV or browsing through the internet. Epidemiological studies have identified

television viewing as a possible risk factor for chronic health conditions that are associated with a sedentary lifestyle and nutrition intake. The impact of television advertising on viewers is incomparable to any other media, as it is one of the most common and effective media sources.⁵

Advertising presents information regarding a product or service in a reliable and impersonal manner. Children, being future consumers constitute a profitable section to advertisers, as they also influence their parent's purchase habits.⁶ McNeal reported that the number of parents influenced by children on advertised product purchases has been gradually increasing.⁷ Powerful marketing strategies are being employed to influence the eating habits of children through portrayal of fun, live-action, music, emotion, etc. Watching television advertisements and buying advertised food does influence a child's oral health. Cariogenic food advertisements account for more than 95% of food advertisements on children's favorite channels.⁸

The time spent on viewing television has been implicated as a possible risk factor for developing dental caries as they are likely to consume more sweetened beverages and snacks while watching TV.⁹ According to the associated chamber of commerce industry of India (ASSOCHAM), the average child watches more than 5 hours of TV each day (or 35 hours/week).¹⁰ Numerous studies have shown a relationship between TV watching time and caries occurrence. Higher caries prevalence was found among children who watched television and asked for more food and soft drinks.¹¹

The children residing in institutions differ from children living with parents as they might have limited hours for multimedia and also they do not have access to advertised food. On reviewing the literature, the authors did not come across any study which compares the relationship of multimedia habits and dental caries amongst institutionalized and non-institutionalized children.

Materials and Methods

The present study was approved by the institutional ethical committee and concerned school authorities prior to the commencement of the study. A cross-sectional survey was conducted amongst institutionalized and non-institutionalized school children aged 12-15 years of Pune district to assess the relationship between dental caries and multimedia habits. The study protocol was explained to the parents/guardians of the children to be included in the study, and written informed consent was obtained.

Children belonging to a similar socioeconomic background from institutionalized and non-institutionalized schools were included in the study. Children who are on long-term antibiotics in the past 3 months, had ulcerative gingivitis and stomatitis, and who were suffering from any known systemic diseases were excluded from the study. Based on the previous literature and using the sample size formula, a total of 350 school children were selected for the study who were equally divided into two groups (institutionalized and non-institutionalized), with 175 children in each group.

The 12-item closed questionnaire was framed to collect data on multimedia habits and diet history. Before the commencement of the study, the training and calibration exercise of the examiner was done in the Department of Public Health Dentistry for the DMFT index under the guidance and supervision of an expert. 10 children were examined on two occasions over 2 successive days. Inter-examiner reliability was evaluated with Kappa statistic which was found to be 0.7.

A schedule was prepared for data collection based on an average time of 10 minutes for questionnaire and clinical examination per child. Guardians were interviewed for institutionalized children and parents answered for non-institutionalized school children. A total of 60 sets of instruments were carried per day to avoid the need to interrupt the examination procedure. Autoclaved instruments were used to examine the participants. The examination of the children was conducted by the investigator who was assisted by a trained intern. Examination of the participants was undertaken on the premises of the respective schools. The examination of all the study subjects was done by a single calibrated examiner standing with the participants sitting in an upright position. Before the examination, each child was asked to rinse the mouth thoroughly. Intra-oral examination for dental caries began from the maxillary right quadrant in a clockwise direction in the maxillary and mandibular region. Children were examined for dental caries using the DMFT index. (WHO 1997)¹²

Statistical analysis

The data was entered and analyzed using the Statistical Package for Social Sciences (SPSS) for Windows 26.0. (SPSS, Inc. Chicago, Illinois) Confidence intervals were set at 95%, and a p-value \leq of 0.05 was considered statistically significant. Chi-squared test was applied to associate multimedia habits in relation to dental caries for non-institutionalized school children. DMFT scores were categorized into ≥ 3 and < 3 . Unpaired t-test was applied to compare DMFT scores amongst institutionalized and non-institutionalized school children.

Results

The mean age of the children from institutionalized and non-institutionalized schools was 13.5 ± 3.2 . (Table 1) Mean decayed teeth for institutionalized children were found to be 1.69 ± 1.202 and non-institutionalized was 2.48 ± 1.286 respectively (t value: -5.9, p-value < 0.001) which showed a statistically significant difference between the two groups. Mean DMFT scores for institutionalized children were found to be 1.93 ± 1.21 and non-institutionalized was 2.66 ± 1.27 respectively (t value: -5.5, p-value < 0.001) which showed a statistically significant difference between the two groups. (Table 2) There was a statistically significant difference (p-value < 0.05) seen with all questions on multimedia habits in relation to DMFT scores for non-institutionalized school children. (Table 3)

Discussion

Dental caries is the most prevalent disease amongst children. *Several studies undertaken in different parts of the country show that dental caries have been consistently increasing in their prevalence and severity.*¹³ Multifactorial nature of caries occurrence and progression necessitates address of every possible risk factor. The time spent on television viewing has been implicated as a possible risk factor for developing dental caries.⁴ Television (TV) is one of the greatest multimedia inventions which can effectively, efficiently influence the attitudes, behaviors, and values of viewers. The time spent watching television, coupled with the content presented along with its repetitive nature ensures that television's messages will be observed, practiced, and eventually learned.¹⁴

TV is the most efficient and effective promotion tool, especially when the target group is children.¹⁵ TV food advertising has attracted criticism for its potential role in promoting unhealthy dietary practices among children which are associated with caries prevalence.¹⁴ Child viewers are exposed to a TV environment that predominantly promotes unhealthy food high in fat, sugar, and salt nutrients associated with obesity, dental caries, and other chronic diseases.^{10,16} Television viewing, especially during high school, may have long-term effects on eating choices and contribute to poor eating habits in young adulthood.¹⁷ Recently multimedia offers a set of programs and activities that be watched or used at any time. These days multimedia habits lack parental control which can be one of the anticipated reasons for increased usage amongst non-institutionalized children. Children who spend more time with multimedia devices such as TV, computer, cell phones, and tabs results in a significantly shorter amount of time with their friends and family causing poor peer relationship and thereby increase the risk for social isolation.¹⁸ The current study was undertaken to assess the association between multimedia habits and dental caries amongst institutionalized and non-institutionalized children.

The current study population is comprised of 350 children within the age group of 12-15 years. Institutionalized refer to resident children whereas non-institutionalized refer today scholars or non-residents. Males were predominant amongst the two groups. The whole study population was categorized based on DMFT¹⁹ into high (>3) and low (<3) caries groups to assess the relationship between dental caries and multimedia habits amongst institutionalized and non-institutionalized schools. The present study shows that the mean DMFT of non-institutionalized children was significantly higher than institutionalized. This might probably be due to differences in multimedia usage allowance, patterns, dietary preference intakes, and various other influential factors amongst non-institutionalized children. Parents nowadays especially in cities avoid telling children to go outside and play, keep themselves busy and not come inside until dark. Today's parents appear to be shifting their focus away from providing physically active free-play opportunities for their kids.

The majority of the families are nuclear and parents being more protective, they want their children always to be under supervision while playing, which is not possible every day, so they opt for multimedia for recreation.

Multimedia habits for all institutionalized school children were similar and hence the association with dental caries was not possible. However, there was a statistically significant difference between dental caries and multimedia habits amongst non-institutionalized children. Children spend 1250 hours annually watching tv which surpasses their school hours.²⁰ Television watching interferes with regular activities and influences the consumption of highly advertised low-nutrient density foods along with persuasion of parents to purchase such foods, development of poor eating habits and their sequel such as increased caries.^{4,10,21} Children of high caries group spent significantly more time watching tv (>2hours) when compared with low caries group.²² Higher caries group children reported a higher frequency of multimedia usage on weekdays and weekends when compared to low caries children. These current study findings corroborate the strong link between multimedia habits and caries prevalence.

High caries group children preferred to consume snacks during multimedia usage when compared to the low caries group with significantly less preference. This finding was in concordance with the previous literature^{22,23} on school children who watched television advertisements and asked for food items and soft drinks were found to have more caries and DMFT/dmft index. This might be probably due to an increased tendency among children to consume food while using multimedia due to constant diversion.

Purchase demand frequency of advertised products was significantly higher among the high caries group (DMFT score >3) which is in agreement with other study findings.^{24,25} Advertisements might mislead children who are fond of trying new things with inquisitive child-oriented ads depicting frequent high-calorie, low nutrient food snacking as healthy concealing real-life consequences such as obesity and dental caries. It was found that 91% of heavy viewers of commercial television preferred to purchase advertised products that included toys, food products, and others.⁸ In the present study, children asked their parents to buy advertised products. Current study findings reveal that advertisements during multimedia usage do influence children's character, behavior, and eating habits. These findings are in concordance with previous literature.²⁴ It would be difficult to prove that television advertising has a direct effect on oral health, given the multifactorial nature of dental caries, but children with a high frequency of multimedia usage are more prone to dental caries and resultant high caries prevalence.²²⁻²⁴ There was a significant difference seen between kind of snacks consumed while watching or using multimedia and dental caries. Cariogenic food advertisements were found to be popular on children's favorite channels.^{24,25}

A total ban on multimedia would not be practically possible. A more reasonable approach would be to limit the number of hours for multimedia like in institutionalized schools. Children should be encouraged for healthy food and education in schools. Regulation of child-oriented advertisements and multimedia usage patterns of children might reduce caries burden among particular age groups being targeted. The ultimate goal should be a complete ban on child-oriented marketing but positive aspects of marketing can be explored as advertising oral health care strategies.

Recommendations

Both medical and dental examinations of any pediatric patient should include assessment of leisure time activities dietary patterns and habits of pre-adolescents. Further, the pre adolescents' general and dental health should be supported by holistic health promotion strategies, including the empowerment of families to adopt healthy lifestyles, both in economically developing and developed countries. Future research should examine the pathways linking multimedia habits and dental caries in institutionalized and non-institutionalized school children.

Conclusion

The present study demonstrated that there is an association between dental caries and multimedia habits amongst non-institutionalized children. Higher caries prevalence was seen amongst non-institutionalized school children. Hence, there is a greater likelihood of having increased decayed

teeth with increasing multimedia habits.

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Conflicts of interest

There are no conflicts of interest.

Tables

Table 1: Demographic details of the participants

Demographic information (n=350)	
Age (Mean \pm Std. Deviation)	13.5 \pm 3.2
Gender	
Male	235 (67.1%)
Female	115 (32.9%)

Table 2: Comparison of DMFT scores amongst institutionalized and Non-Institutionalized school children

Caries	School	Mean	Std. Deviation	t-value	p-value
D	Institutionalised	1.69	1.202	-5.9	<0.001*
	Non-institutionalised	2.48	1.286		
M	Institutionalised	0.03	0.182	1.4	0.15
	Non-institutionalised	0.01	0.107		
F	Institutionalised	0.2	0.514	0.5	0.62
	Non-institutionalised	0.17	0.496		
DMFT	Institutionalised	1.93	1.21	-5.5	<0.001*
	Non institutionalised	2.66	1.27		

* Statistically significant (p-value \leq 0.05)

Table 3: Association with multimedia habits in relation to DMFT scores for non-institutionalized school children

Questions	Options	DMFT \geq 3	DMFT < 3	Chi-square value	p-value
Maximum time spent on?	Television	40	25	7.01	0.03*
	Computer	30	33		
	Cell phones / Tab	34	14		

How much time do you spend on multimedia per day?	1 – 2 hours	40	35	6.41	0.01*
	More than 2 hours	73	27		
When do you watch/use more multimedia?	Weekdays	35	33	6.83	0.03*
	Weekends	45	22		
	Both	30	10		
Do you prefer consuming snacks while watching/using multimedia?	Yes	69	27	5.49	0.01*
	No	40	35		
How many times a day do you consume food while watching/using multimedia?	Once	44	23	5.75	0.05*
	Twice	33	32		
	Thrice	30	13		
Kind of snacks while watching/using multimedia	Fast food	40	35	6.41	0.01*
	Sugar-sweetened beverages	73	27		
	Fruits and vegetables	113	62		
Do you watch advertisements in between watching / using multimedia?	Yes	67	20	9.72	0.001*
	No	47	41		
Do you demand to purchase eatables after watching/using multimedia?	Yes	53	44	10.13	0.001*
	No	23	55		
Items you bought or asked your parents to buy after watching/using multimedia?	Chocolates	44	23	9	0.01*
	Drinks	33	32		
	Food	36	10		
Do you buy oral health care products (toothbrushes, toothpaste) being advertised on multimedia?	Yes	57	44	4.35	0.03*
	No	54	20		

* Statistically significant (p-value ≤ 0.05)