

## Knowledge, Attitude and Awareness to Dental Caries Among Indian Children and Adolescents: A Case-Control Study

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### Abstract

**Objective:** To assess paternal education, parental occupation, family income, level of knowledge and to determine the attitude and awareness of cases and controls in relation to dental caries and its risk factors in 6-18 years old respondents. **Material and Methods:** A case-control study was carried out in the outpatient Department of Pediatric and Preventive Dentistry. A total of 800 subjects, 400 each in case and control group were enrolled. The cases were subjects in designated age group with dental caries while controls were subjects without dental caries but matched with the cases on three confounding factors – age, sex, and religion. Multivariate logistic regression was used, with a significance level set at 5%. **Results:** Paternal education [illiterate ( $p=0.002$ ), high school ( $p=0.005$ ), intermediate ( $p=0.001$ ), graduate ( $p=0.002$ )], family income per month [2000 INR (30 USD) ( $p=0.016$ ); 5000-10,000 INR (75USD -145 USD) ( $p=0.035$ )], attitude of short visit duration to dentist ( $p<0.001$ ), knowledge about sweets causing dental caries ( $p<0.001$ ), awareness about symptoms of dental caries ( $p<0.001$ ) and need of lifestyle change ( $p<0.001$ ) were significantly associated with dental caries. **Conclusion:** The present research showed that in cases, knowledge was higher as compared to controls whereas contrasting results were observed with attitude and awareness. These results necessitate an urgent need of national programme integrated with primary health care under school health and community outreach programmes, so as to encourage the population to adopt and as well as sustain dental health promoting lifestyles and practices and help in reducing the disease burden.

**Keywords:** Dental Caries; Socioeconomic Factors; Healthy Lifestyle; Logistic Models.

## Introduction

The world is going through an epidemiological transition. Treatment is available for dental caries, but that is not enough to bring down the epidemic distribution of dental caries [1]. To bring it down, we the clinicians have to turn towards the old adage “Prevention is better than cure”.

Assessing the knowledge, attitude and awareness of risk factors and their importance in prevention, treatment and compliance cannot be underestimated; as healthful knowledge when allowed to influence our attitude is capable of reducing the disease occurrence and together with risk factor assessment, is instrumental in the planning and surveillance of oral health promotion and oral disease intervention programme [2].

This aspect needs to be studied in depth to plan Information – Education – Communication (IEC) activities. To the best of our knowledge, we have not come across any such study design approach in relation to dental caries and knowledge, attitude and awareness in India.

## Material and Methods

### Study Design and Sample

A case-control study was developed. With an anticipated population proportion of 44%, absolute precision of 5% at 95% confidence interval, using the World Health Organization manual for sample size determination in health studies [3], a sample of 800 respondents in the age group of 6-18 year old (equally divided between cases and controls) were included on the basis of pre set criteria.

Cases were patients of dental caries consulting the Outpatient Department of Pediatric and Preventive Dentistry, Aligarh Muslim University, either for follow up of already diagnosed cases or for current diagnosis, had turned up for restoration, lost a tooth due to caries. Controls were the patients with some other dental problem but devoid of dental caries. Cases and controls were matched on three confounding factors namely age, sex and religion.

### Data Collection

The information was recorded on a self-prepared questionnaire, which was administered to 10 children for testing the questionnaire and conducting a pilot study to remove intra observer bias. These 10 children were not included in the main study. The study was conducted by a single examiner. Standardization and validity of the observer was done before the conduct of the study. The mean Kappa value was found to be 0.92. The overall internal reliability of the questionnaire was 0.70 according to Cronbach's alpha.

The first part of now pre tested questionnaire dealt with personal details, level of education, occupation of parents and monthly income. The second part was used to assess the level of knowledge regarding dental caries, their risk factor, attitude towards to the treatment.

### Data Analysis

Questionnaires were coded and data analysis was done by employing IBM SPSS Statistics for Windows Software, version 16 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to calculate the absolute and relative frequencies, mean and standard deviation. Multivariate logistic regression was used, with a significance level set at 5%.

## Ethical Aspects

Ethical committee clearance of Faculty of Medicine, Aligarh Muslim University was obtained before the start of the study. Informed consent, (in three local languages) was taken both from the cases and controls. Parents of cases and controls gave written informed consent, as the study age group was from 6-18 years old. The research was conducted in full accordance with the World Medical Association Declaration of Helsinki.

## Results

Table 1 shows that among the controls the proportion of government employed parents was 30.5% as compared to 15.5% in cases. While the proportion of self employed parents was 45% among controls as compared to 60.5% among cases. The difference was statistically significant ( $p < 0.001$ ). Father's of control group had a significantly higher level of education as compared to study group ( $p < 0.001$ ). The mean income of subjects in control group was  $13,891.25 \pm 19,026.50$  (200 USD) and that of subjects in study group was  $9,176.25 \pm 6,340.25$  (133 USD). There was a significant difference between the two groups ( $p < 0.001$ ).

**Table 1. Distribution of sociodemographic variables between control and study groups.**

Variables	Control Group		Case Group		p-value
	N	%	N	%	
Parental Occupation					<0.001
Govt. Employed	122	30.5	62	15.5	
Private	89	22.25	85	21.25	
Self-Employed	180	45.0	242	60.5	
Unemployed	9	2.25	11	2.75	
Paternal Education					<0.001
Illiterate	17	4.25	18	4.5	
Just Literate	4	1.0	11	2.75	
Primary	15	3.75	53	13.25	
Middle	48	12.0	73	18.25	
High School	85	21.25	108	27.0	
Intermediate	60	15.0	46	11.5	
Graduate	147	36.75	71	17.75	
Post Graduate	24	6.0	20	5.0	
Family Income (INR)					<0.001
2,000	12	3.0	13	3.25	
2,000-5,000	69	17.25	111	27.75	
5,000-10,000	149	37.25	185	46.25	
>10,000	170	42.5	91	22.75	
Mean Income (SD)	$13,891 \pm 19,026.50$		$9,176.25 \pm 6,340.25$		

INR: Indian Rupee; 1 USD equivalent to 69 Indian Rupee.

Table 2 shows that the level of knowledge of control subjects were lower as compared to cases for most of the items whereas attitude of the controls were significantly higher ( $p < 0.001$ ) as compared to cases.

**Table 2. Assessment of knowledge, attitude and awareness.**

Knowledge, Attitude and Awareness	Control Group		Case Group		p-value
	N	%	N	%	
Knowledge about dental caries	257	64.3	213	53.3	0.002
Does sweet consumption cause dental caries	373	93.3	386	96.5	0.037
Time elapsed since last visit to dentist	236	59.0	299	74.8	<0.001
Are you aware about the symptoms of dental caries	217	54.3	365	91.3	<0.001
Awareness regarding life style change to prevent dental caries	323	80.8	273	68.3	<0.001

Tables 3 and 4 shows that for the multivariate logistic regression analysis, respondents of study group whose fathers had the following academic qualification - illiterate ( $p = 0.002$ ; OR = 51.057 / CI = 4.422-589.487), High school ( $p = 0.005$ ; OR = 8.391 / CI = 1.912-36.824), intermediate ( $p = 0.001$ ; OR = 11.566 / CI = 2.667-50.151) and graduate ( $p = 0.002$ ; OR = 8.274 / CI = 2.151-31.828) were significantly associated with dental caries.

**Table 3. Multivariate logistic regression analysis: Likelihood ratio tests.**

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-square	df	Sig.
Intercept	467.598 <sup>a</sup>	<0.001	0	.
Paternal Education	494.963	27.364	7	<0.001
Parental Occupation	491.081	23.483	3	<0.001
Family Income	475.846	8.248	3	0.041
Regular visit to a dentist at shorter duration	482.449	14.850	2	0.001
Knowledge about dental caries	469.597	1.998	1	0.157
Sweets causing caries	472.495	4.896	1	0.027
Awareness about need of lifestyle changes	483.430	15.832	1	<0.001
Awareness of symptoms of dental caries	568.489	100.890	1	<0.001

The Chi-square statistic is the difference in -2 log - likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0. <sup>a</sup>This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom. All variables with bold entries were found to be significantly associated with dental caries.

Cases had the knowledge that sweets cause dental caries ( $p = 0.042$ ; OR = 7.711 / CI = 1.077-55.232) and were aware with the symptoms of dental caries ( $p < 0.001$ ; OR = 39.740 / CI = 16.121-97.965), these values were significantly associated with dental caries. The negative (-) B value in parameter estimates of Multivariate logistic regression, further strengthens the odds ratio and hence the association of control group with dental caries. Negative (-) B values were seen with family income [2,000 INR (30USD) ( $p = 0.016$ ); 5,000-10,000 INR (75USD-145USD) ( $p = 0.035$ )], knowledge about regular visit to the dentist (every 6 months;  $p < 0.001$ ) and awareness about the need of lifestyle changes ( $p < 0.001$ ).

**Table 4. Multivariate Logistic regression analysis: Parameter estimates.**

	B	Std. Error	Wald	df	Sig.	Exp(B)	95% CI for Exp(B)	
							Lower	Upper
Intercept	14.341	2.739	27.409	1	<0.001			
Paternal Education								
Illiterate	3.933	1.248	9.929	1	0.002	51.057	4.422	589.487
Just Literate	-0.560	2.623	0.045	1	0.831	0.571	0.003	97.679
Primary	1.718	0.919	3.491	1	0.062	5.574	0.919	33.793
Middle	0.849	0.831	1.045	1	0.307	2.338	0.459	11.917
High School	2.127	0.755	7.946	1	0.005	8.391	1.912	36.824
Intermediate	2.448	0.748	10.698	1	0.001	11.566	2.667	50.151
Graduate	2.113	0.687	9.452	1	0.002	8.274	2.151	31.828
Post Graduate	0 <sup>b</sup>	.	.	0	.	.	.	.
Parental Occupation								
Govt. Employed	-0.077	1.232	0.004	1	0.950	0.926	0.083	10.363
Private	-1.735	1.220	2.024	1	0.155	0.176	0.016	1.925
Self Employed	-0.150	1.201	0.016	1	0.900	0.860	0.082	9.056
Unemployed	0 <sup>b</sup>	.	.	0	.	.	.	.
Family Income/Month (INR)								
2,000	-4.641	1.932	5.767	1	0.016	0.010	0.000	0.426
2,000-5,000	-1.190	0.687	3.006	1	0.083	0.304	0.079	1.168
5,000-10,000	-0.915	0.434	4.439	1	0.035	0.401	0.171	0.938
>10,000	0 <sup>b</sup>	.	.	0	.	.	.	.
Duration of Visit to Dentist								
Every 6 Months	-16.396	0.665	608.764	1	<0.001	7.57E-008	2.06E-008	2.79E-007
Every 6-12 Months	-17.865	0.000	.	1	.	1.74E-008	1.74E-008	1.74E-008
>12 Months	0 <sup>b</sup>	.	.	0	.	.	.	.
Knowledge about Dental Caries								
No	-0.574	0.410	1.965	1	0.161	0.563	0.252	1.257
Yes	0 <sup>b</sup>	.	.	0	.	.	.	.
Sweets Cause Dental Caries								
No	2.043	1.005	4.135	1	0.042	7.711	1.077	55.232
Yes	0 <sup>b</sup>	.	.	0	.	.	.	.
Need of Lifestyle Change								
No	-1.944	0.518	14.107	1	<0.001	0.143	0.052	0.395
Yes	0 <sup>b</sup>	.	.	0	.	.	.	.
Symptoms of Dental Caries								
No	3.682	0.460	63.989	1	<0.001	39.740	16.121	97.965
Yes	0 <sup>b</sup>	.	.	0	.	.	.	.

<sup>a</sup>The reference category is: Case; <sup>b</sup>This parameter is set to zero because it is redundant; <sup>c</sup>Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing. All those entries in bold depict significant association of the variable with the dental caries. INR: Indian Rupee.

## Discussion

The diversity and developmental trends of dental caries across the countries is evident and reflects distinct risk profiles like socio-behavioral and environmental factors. It urgently necessitates the need to explore the knowledge, attitude and awareness and the establishment and worldwide strengthening of public and preventive oral health care programmes rather than the traditional curative means [1]. With this view in mind, the present study with a case-control approach was conducted.

The present study showed no significant difference in prevalence of dental caries between cases and controls as regards their age, gender and religion. Statistically significant difference was

previously ascertained [4] between parental occupation and dental caries ( $p < 0.001$ ) in agreement with the present study. Employment plays a basic defining role in the society as type of employment provides a primary source of status, purpose, income, social support, structure to life and means of participation in the society [5].

Our research was successful in deducing a significant association between paternal education and dental caries, this has been well supported by others authors [6]. Fathers who are well educated are in a better position to cater to the needs of their children. Family income had a statistically significant difference between the two study groups in our study. Families with low household incomes had higher caries prevalence [6]. Income impacts in health through a direct effect on material conditions [7].

In the present study, attitude and awareness were statistically higher in controls as compared to cases; whereas results pertaining to knowledge assessment were significantly higher in cases as compared to controls. Appropriate knowledge of cases, can be attributed to the recall bias and social desirability to give the correct answers; similar views were expressed previously [8-10]. Though the cases had knowledge but did not put that into practice i.e. had no attitude and maintained unhealthy behaviors in their everyday [11] living, similar results were found in Greek [11] and Thai [12] children.

As evident from the data collected from respondents, the present research is successful enough to prove that having knowledge only is not enough but having the right attitude with the correct knowledge is more important, as both together are able to bring about a qualitative and substantial change in the life style and behavior. Attitudes as well as the knowledge are known to be governed by several variables such as sociodemographic, educational, social and behavioral factors. It was previously justified through a risk factor model for dental caries and that socio environmental factors do influence behavioral and attitudinal parameters which in turn have an impact on clinical and subjective oral health outcomes [13].

However, there were limitations in the present research in terms of memory or recall bias and over reporting by the respondents. Berksonian bias was also possible, since the study was conducted in the hospital.

## Conclusion

The present research showed that in cases, knowledge was higher as compared to controls whereas contrasting results were observed with attitude and awareness. These results necessitate an urgent need of national programme integrated with primary health care under school health and community outreach programmes, so as to encourage the population to adopt and as well as sustain dental health promoting lifestyles and practices and help in reducing the disease burden.

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**Conflict of Interest:** The authors declare no conflicts of interest.

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