

Prevalence of Dental Caries among 12 Year Old School Children in Kashmir, India - A Cross-Sectional Study

Tasneem S. Ain¹, Saima Sultan², Owais Gowhar³, Ravishankar TL⁴, Sumit Kumar⁵

ABSTRACT

Introduction: In order to achieve good oral health in a population, oral health professionals must deliver suitable and relevant dental services to the community; and people must have access to such dental care facilities. However, appropriate and upright information and data with respect to frequency and severity of disease is needed in order to establish the infrastructure of the health care delivery system. The aim of the present study was to assess the prevalence of dental caries among 12 year old school children in Kashmir, India.

Material and Methods: A cross-sectional study was carried out in private and government schools of Kashmir, India. The sample size was estimated to be 1600 at a confidence interval level of 95% and with an allowable error of 5%. A multistage sampling was used for selection of subjects so that they represent the population of 12-year-old schoolchildren of Kashmir, India. Firstly, Kashmir division was divided into four zones; Northeast, Northwest, Southeast and Southwest. From each zone, one district was chosen in which two private and two government schools were selected randomly, using the criteria of a minimum number of 100 students of age 12 years old studying in each school. Then, all 12-year-old children in these schools who fulfilled the eligibility criteria, were examined making a final sample of 1600 subjects. DMFT index scores for each child were computed for all the teeth. An updated Kuppaswami's Classification 2012 was used for determining the socioeconomic status.

Results: Overall caries prevalence was $dmft > 0 = 25\%$ and mean DMFT score was found to be 1.83 ± 1.385 .

Conclusion: The overall prevalence of dental caries among 12 years old school children was found to be 25%. Frequency of dental caries was found to be higher in low socioeconomic class children as compared to that in upper socioeconomic class.

Keywords: Dental caries, socio-economic status, children, schools.

school system. Moreover, all permanent teeth except third molars have been erupted at 12 years of age. Thus, the age of 12 was considered as the age of global monitoring of dental caries for international comparisons and monitoring of disease trends.⁴ Children with poor oral health are more expected to have restricted days of activity, including missing school days.⁵ Petersen⁶ has observed that at the population level, oral health outcomes are related to distal socio-environmental factors and characteristics of the oral health services available. Many previous studies have shown that dental caries is linked to social and behavioral factors.⁷

The major cause of morbidity among the primary school children is the oral health being the overlooked area of health. India is a vast country having different cultures and socioeconomic strata with diverse behavioural traditions. All these factors have a direct bearing on oral health. Differences in oral hygiene practices, dietary habits and fluoride content of water are the main attributes for high dental caries burden.

For taking measures of prevention and control of disease, its coverage and magnitude must be well known beforehand. Children being easily accessible at school, so schools are best centre for executing the broad health care programme efficiently. Health messages can be propagated through school children to their homes and neighbourhood and hence schools can act as source for bringing the overall change.

Hence, a study was conducted in private and Government schools of Kashmir, India to evaluate the Prevalence of dental caries among 12 year old children.

Dental caries indicators

DMFT index (decayed + missing + filled teeth) is a widely used tool to measure dental caries experience.⁸ DMFT score gives the dental caries status at the population level for public health planning and policy-making purposes.⁹ The DMFT (Klein et al., 1938)¹⁰, is a cumulative caries measure, which indicates past and present dental caries experience. The most frequently used index for assessing dental caries is DMFT which has been

INTRODUCTION

Dental caries is the most prevalent of all oral diseases of childhood due to which it has become the main focus of the dental health profession. Dental caries is seen in almost all geographic areas of the World. Despite many scientific advances and the fact that caries is preventable, the disease continues to be the focal public health problem particularly in the developing countries, changing life-styles and dietary patterns are markedly increasing the caries incidence.¹ Children, particularly in their growing period, need proper guidance for healthy growth, preservation and hygiene of their teeth.^{2,3}

Among most of the epidemiological studies carried out previously, age 12 years has been used frequently. World Health Organization (WHO, 2013) gives the importance to this age group because it is at this age that children finish their primary schooling. Thus, in many countries, is the last age at which data can be easily collected through a reliable sample of the

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How to cite this article: Tasneem S. Ain, Saima Sultan, Owais Gowhar, Ravishankar TL, Sumit Kumar. Prevalence of dental caries among 12 year old school children in Kashmir, India - a cross-sectional study. International Journal of Contemporary Medical Research 2016;3(7):2156-2159.

used for more than 76 years.¹¹ The first oral health goal that is “the DMFT of 12 years old children will not be more than 3” was established by WHO and Federation Dentaire International (FDI).¹² The developed countries succeeded in achieving this goal unlike the developing countries.⁸ The Fédération Dentaire Internationale, World Health Organization, and International Association for Dental Research (IADR), in 2003 established “Global Goals for Oral Health 2020”;¹³ which provided guidance for local, regional, and national planners and policy makers for the betterment of the oral health status of the populations. The new oral health goals were not numerically explicit. Instead, each country could state its own targets based on the disease prevalence and severity and oral health structure. To categorize dental caries severity, a scale was formulated by World Health Organization on the basis of DMFT scores. DMFT scores falling between 0.0 and 1.1 were categorized as very low; 1.2–2.6 as low; 2.7–4.4 as moderate, 4.5–6.5 as high, and values more than 6.6 as very high.⁸

MATERIAL AND METHODS

A cross-sectional study was carried out in schools (private and Govt.) of Kashmir, India to evaluate the prevalence dental caries among 12-year-old schoolchildren. Prior to the conduct of study in schools, permission was obtained from Directorate of School Education, Kashmir.

As per Health Research Methodology, WHO; 2nd Edition, 2001; the sample size estimation is done on the basis of a prevalence of 50% in order to obtain the largest sample size; when there is no previous data. Hence, using the same formula in the present study, the sample size of 1600 was estimated; at a confidence interval level of 95% and with an allowable error of 5%.

A multistage sampling was adopted for selection of students so that they represented the population of 12-year-old schoolchildren of Kashmir, India. Firstly, the Kashmir division was divided into four zones; Northeast, Northwest, Southeast and Southwest. From each zone, one district was selected in which two private and two government schools were chosen randomly, using the criteria of a minimum number of 100 students of age 12 years old studying in each school. Then, oral examination of all 12-year-old children in these schools who fulfilled the eligibility criteria making a final sample of 1600, was carried out. 12 year old children, who were permanent inhabitants of Kashmir and gave the consent of participation, were selected for the study. Students who had mental/physical ailments and those who underwent dental treatments like orthodontic ones were excluded from the study.

A single examiner was calibrated in the department of Public Health Dentistry, Kothiwal Dental College and Research Centre, Moradabad. Intra-examiner reliability was calculated using Kappa statistics which was 0.81.

The demographic data of the subjects were entered into a pre-structured proforma by the examiner. The education and occupation of the family head, monthly family income was enquired from the subjects so as to classify them in different socioeconomic strata using an updated version of Kuppaswami's Classification 2012. Their responses were confirmed with school records. To diagnose dental caries clinically among the subjects, the criteria given by WHO, 1997 was used. Teeth were checked in orderly manner using the FDI tooth numbering

system. The oral examination of children was performed on a simple classroom chair using florescent. Dental caries was diagnosed using the DMFT Index (WHO, 1997) as follows: decayed/untreated caries (D); missing teeth/due to caries (M); filled/dental restorations for caries treatment (F), and teeth/index per tooth (T). Those teeth extracted for reasons other than dental caries such as trauma, missing since birth or orthodontic motive, were not considered as missing. Missing teeth (M) were recorded only if the tooth loss was confirmed due to caries.

STATISTICAL ANALYSIS

Data, obtained was put to statistical analysis using Statistical Package for the Social Sciences (SPSS Inc., version 20, Chicago, Illinois, USA). Pearson Chi-square test was used for comparison. Categorical variables were assessed using descriptive statistics.

RESULTS

Out of total 1600 students, 767 (47.9%) were male and 833 (52.1%) were female (Figure-1). The prevalence of dental caries among 12 year old children was found to be 25%. Mean DMFT score was found to be 1.83 ± 1.385 . In girls (25%) dental caries was slightly higher than in boys (24.5%) but this difference of dental caries was not statistically significant ($p=0.686$). Out of total subjects, 47.2% students were studying in private schools and 52.8% were from Government schools (Figure-2). Frequency distribution as per socioeconomic status is given in Figure-3. The highest percentage of dental caries was found in those subjects belonging to the lowest SES (Type V) and it was least in those belonging to Upper Socioeconomic status (TypeI); and a statistical significant difference was found ($p \leq 0.000$) {Pearson Chi-square test} (Table-1).

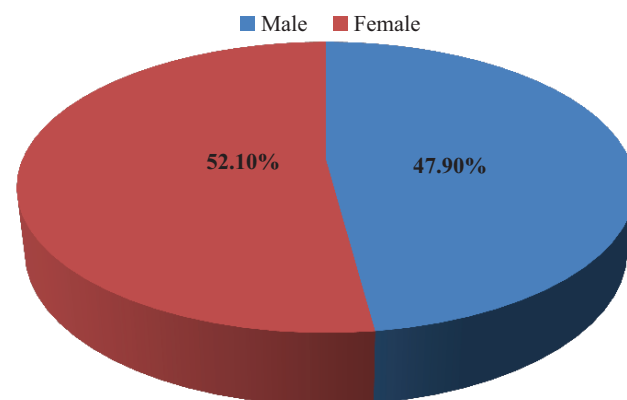


Figure-1: Frequency distribution of subjects as per gender status

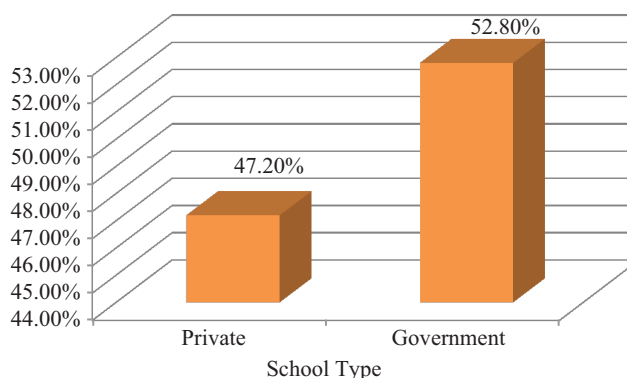


Figure-2: Frequency distribution of children as per school type

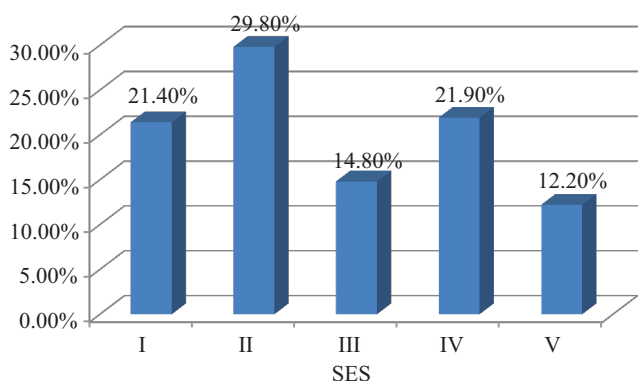


Figure-3: Frequency distribution of subjects as per socioeconomic status

Socioeconomic status	Dental caries		Pearson Chi-Square (P value)
	Present	Absent	
Type I	21.6%	78.4%	0.000*
Type II	22.3%	77.7%	
Type III	22.9%	77.1%	
Type IV	26.6%	73.4%	
Type V	37.2%	62.8%	

*Statistical significance at $p < 0.05$

Table-1: Association of dental caries with socioeconomic status {Cross tabulation}

DISCUSSION

Among all oral diseases, dental caries is the most prevalent disease among the populace. Almost all regions of World exhibit one or the other form of dental caries. People of all age group are affected by dental caries irrespective of the gender and socioeconomic status. Dental caries is found in approximately 90% of school children worldwide and most adults, with the disease being most prevalent in Asian and Latin American countries.¹⁴ A very extensive National Health Survey carried out in 2004 throughout India has shown dental caries in 51.9% in 5 year old children, 53.8% in 12 year-old children and 63.1% in 15 year old teenagers.¹⁵ The factors like diet (sweets and junk foods), low socioeconomic status and high rate of urbanization contribute to the increase in prevalence of dental caries.¹⁶ The present study was conducted in both private and government schools of Kashmir to assess the prevalence of dental caries which was found to be 25%. This finding was similar to the prevalence of dental caries found in Jammu.¹⁷

In the present study, schools were classified as government or private schools depending upon the funding. For Government schools the funds were provided by the government hence the fees are subsidized while for private schools the funds are provided by individual proprietors or non-governmental organization hence the fees are charged. In order that the children should represent all socioeconomic and cultural communities; the subjects from both types of schools (private and government) were included in the present study. This provided the accurate data of dental health condition among the target population.

In the present study the frequency of dental caries was found fairly higher in girls (25%) than boys (24.5%). The higher prevalence of dental caries among females might be ascribed to

early eruption of teeth among girls and hence their teeth being exposed for a longer time to the oral environment compared with males.^{18,19} Similar results have been found by previous authors^{20,21} while low prevalence in females have been reported by Yee and McDonald and Dhar et al.²²

Out of the three components {decayed (D), missing (M) and filled (F)}; the Decayed component constituted the major part of DMFT index which clearly depicts lack of knowledge and awareness among the masses about the importance of oral health, lack of motivation, pessimistic approach and attitude of parents toward dental treatment of their children, financial difficulties and other lacunae within the health care delivery system. Higher Prevalence of decayed teeth compared to filled and missing teeth have been found by several Indian and International authors.^{23,24}

In the present study, percentage of subjects with dental caries was found to be least (21.6%) among those hailing from Upper Socioeconomic class (Class I) and it was highest (37.2%) among those coming from Low socioeconomic status. This result was in accordance to the previous studies wherein the prevalence of dental caries was found in those children belonging to high social class, the reason being, more oral health care awareness among the high socioeconomic class parents and children; and access to dental care by their children at an earlier and appropriate age. However, the high caries prevalence in middle and low social class was associated to greater availability and advertizing of cheap sugar containing products along with low income and inaccessibility to health services and health education.²⁵

It is also mentioned in previous research papers that higher frequency and severity of dental caries among the low socioeconomic status and less educated people is due to their low monthly household income which in turn decreases their access to dental services and oral hygiene products and also keeps them unaware of oral health knowledge and oral hygiene.²⁶ A second explanation relates to the potential mediating role of social exclusion in the relationship between socioeconomic status and dental caries.

It has been found that small minority of children mostly suffer from dental caries. Dental caries being a multi-factorial disease so determination of the specific risk factors for its causal is very difficult but the socioeconomic status has been identified as one of the significant factors associated with occurrence of dental caries among the populace.

Limitations

Dental caries was identified by clinical examinations; no radiographs were taken, which might over- or under-estimate the actual magnitude of the problem. The different types of dental caries like initial, advanced, cavitated and non-cavitated dental caries, were not classified as the diagnostic criteria were based on those given by WHO; this might have influenced the estimation of incidence and severity of dental caries.

Further longitudinal studies are required to correlate dental caries prevalence in the target population with parent’s literacy level and other socio behavioral factors (diet, oral hygiene practices).

CONCLUSION

Dental caries prevalence among 12 years old school children in Kashmir was 25%. Mean DMFT value was 1.83 (S.D. =1.385).

Dental caries was found more in children hailing from Low Socioeconomic status background. Such, epidemiological data be used for designing programs aimed at improving oral health services for school children.

RECOMMENDATIONS

In order to raise the awareness about oral health, a widespread oral health education regarding the dietary habits and oral hygiene practices is required involving the schools as well as community as a whole.

India, being a developing country, has inadequate resources for delivery of oral health care to all, so the school based integrated package consisting of emergency dental treatments, affordable preventive measures like fluoride applications, and atraumatic restorative treatment should be organized for the betterment of oral health situation to a large extent.

For oral health promotion programs, schools as well as primary health care centres should be involved by the health policy makers so as to trim down the dental caries burden. Moreover, oral health related topics should be included in the school curriculum so that the appropriate knowledge and awareness regarding oral health is incorporated among the children at a very early stage which would be carried over by them throughout their life through adolescence to adulthood.

Oral health authorities should also concentrate on policies that increase the accessibility to healthy foods and promote behavioral changes in dietary habits by imposing restrictions on advertising and legislation to control detrimental foods, and bans on the selling of unhealthy food items in and around school premises.

REFERENCES

- Bener A, Al Darwish MS, Tewfik I, Hoffmann GF. The impact of dietary and lifestyle factors on the risk of dental caries among young children in Qatar. *J Egypt Public Health Assoc.* 2013;88:67-73.
- Rao A, Sequeira SP, Peter S. Prevalence of dental caries among school children of Moodbidri. *J Indian Soc Pedod Prev Dent.* 1999;17:45-48.
- Mahesh Kumar P, Joseph T, Varma RB, Jayanthi M. Oral health status of 5 years and 12 years school going children in Chennai city--an epidemiological study. *J Indian Soc Pedod Prev Dent.* 2005;23:17-22.
- WHO. *Oral Health Surveys: Basic Methods.* (5th Edition). Geneva: World Health Organization. 2013;125.
- Pongpichit B, Sheiham A, Pikhart H, Tsakos G. Time absent from school due to dental conditions and dental care in Thai school children. *J Public Health Dent.* 2008;68:76-81.
- Petersen PE. Sociobehavioural risk factors in dental caries – international perspectives. *Community Dent Oral Epidemiol.* 2005;33:274-9.
- Peres MA, de Oliveira Latorre Mdo R, Sheiham A, Peres KG, Barros FC, Hernandez PG, et al. Social and biological early life influences on severity of dental caries in children aged 6 years. *Community Dent Oral Epidemiol.* 2005;33:53-63.
- World Health Organization, 2000. Global Data on Dental Caries Prevalence (DMFT) in Children Aged 12 years. Global Oral Data Bank. Oral health country/area profile programme, Management of noncommunicable diseases. Geneva, May 2000 WHO/NMH/ MNC/ORH/ Caries.12y.00.3.
- Jakobsen, J.R., Hunt, R.J. Validation of oral status indicators. *Community Dent. Health.* 1990;7:279–284.
- Klein, H., Palmer, C.E., Knutson, J.W. Studies on dental caries I. Dental status and dental of elementary schoolchildren. *Public Health Rep.* 1938;53:751–765.
- Broadbent, J.M., Thomson, W.M. For debate: problems with the DMF index pertinent to dental caries data analysis. *Community Dent. Oral Epidemiol.* 2005;33:400–409.
- Aggerud, T. Goals for oral health in the year 2000: cooperation between WHO, FDI and the national associations. *Int. Dent. J.* 1983;33:55–59.
- Hobdel, H., Petersen, P.E., Clarkson, J., Johnson, N. Global goals for oral health 2020. *Int. Dent. J.* 2003;53:285–288.
- Petersen PE, Bourgeois D, Ogawa H, Estupinan- Day S and Ndiaye C. The global burden of oral diseases and risks to oral health. *Bull World Health Organ.* 2005;83:661-669.
- National Oral Health Survey and Fluoride Mapping. An Epidemiological Study of Oral Health Problems and Estimation of Fluoride Levels in Drinking Water. Dental Council of India, New Delhi. 2004;32:67-78.
- Christensen LB, Petersen PE, Bhambal A. Oral health and oral health behaviour among 11-13-year-olds in Bhopal, India. *Community Dental Health.* 2003;20:153-8.
- Gurdeep Singh, Gurmeet Kaur, Vijay Mengi, Bhupinder Singh. A study of dental caries among school children in rural area of jammu. *Annals Of Dental Specialty.* 2014;2:23-30.
- Saravanan S, Kalyani V, Vijayarani MP, Jayakodi P, Felix J, Arunmozhi P, et al. Caries prevalence and treatment needs of rural school children in Chidambaram Taluk, Tamil Nadu, South India. *Indian J Dent Res.* 2008;19:186-90.
- Lukacs JR, Largaespada LL. Explaining sex differences in dental caries prevalence: Saliva, hormones, and “life-history” etiologies. *Am J Hum Biol.* 2006;18:540-55.
- Sunayana G, John J, Saravanan S, Arumugham IM. Prevalence of dental caries among 12 and 15 year old school children in Chennai city. *J Indian Assoc Public Health Dent.* 2009;13:54-9.
- Avinash J, Bhaskar DJ, Mathur A, Khushboo SG. Dental caries status among 12 and 15 year old school going children in urban and rural settlements of Bangalore, India. *J Oral Health Res.* 2010;1:19-25.
- Dhar V, Jain A, Van Dyke TE, Kohli A. Prevalence of dental caries and treatment needs in the school-going children of rural areas in Udaipur district. *J Indian Soc Pedod Prev Dent.* 2007;25:119-21.
- Mahesh Kumar P, Joseph T, Varma RB, Jayanthi M. Oral health status of 5 years and 12 years school going children in Chennai city – An epidemiological study. *J Indian Soc Pedod Prev Dent.* 2005;23:17-22.
- Nurelhuda NM, Trovik TA, Ali RW, Ahmed MF. Oral health status of 12-year-old school children in Khartoum state, the Sudan; a school-based survey. *BMC Oral Health.* 2009;9:15.
- B.O. Popoola, O.O. Denloye, O.I. Iyun. Influence Of Parental Socioeconomic Status On Caries Prevalence Among Children Seen At The University College Hospital, Ibadan. *Ann Ibd. Pg. Med.* 2013;11:81-86.
- Holst, D., Schuller, A.A., Aleksejuniené, J., Eriksen, H.M. Caries in population—A theoretical, causal approach. *Eur. J. Oral Sci.* 2001;109:143–148.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 28-05-2016; **Published online:** 30-06-2016