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Dental caries prevalence in the children of age group 6 and 12 years on the basis of various oral hygiene factors in the Himachal Population: A Cross Sectional Study

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Abstract

Aim: Dental caries prevalence determination among 6 and 12 year old children in relation to oral hygiene aids, brushing frequency and dental visits.

Materials and Methods: To determine dental caries prevalence, a cross sectional study was conducted among 6 and 12 year old children in relation to oral hygiene aids, brushing frequency and dental visits. 1004 children participated in the study out of which 437 belonged to 6 year and 567 belonged to 12 year old children.

Results: Dental caries prevalence was found to be higher in children of 6 years of age (63.6%) than that of 12 years (53.6%) (p = 0.001). Mean DMFT was 2.47 ± 2.75 for 6-year-old children and 1.18 ± 1.33 for 12-year-old children. Decayed teeth prevalence was significantly more among children with no brushing (92.9%) and 2-3 times a month (100%) as compared to those who brush daily (57.9%) or twice a day (55.2%) (p=0.039). Decayed teeth prevalence was significantly more among children with no aid in comparison to using any aid for cleaning teeth (p=0.048). A non-significant difference was found in the decayed teeth prevalence among children who had never been to a dentist, visited within last 12 months and who visited > 12 months ago.

Conclusion: This study gives a brief insight into the dental caries in relation to various factors among 6 and 12 year old children. It is however important to carry out an in-depth screening survey on a larger population to draw definite conclusions about dental caries.
Keywords: Age, Fluoridated, Oral hygiene, Visits

INTRODUCTION

The World Health Organization (WHO) evaluates the influence of various risk factors on health and pays great attention to monitoring of oral health status and its worsening because these factors can cause worse quality of life and overall health.[1] Dental pain has been used to explore the impact of pain on the psychosocial wellbeing of the child patient and the parents. After the eruption of permanent dentition, if dental caries develop and proper care is not taken, permanent damage may occur and the infection might spread throughout the body.[2] Increase in dental caries in many developing

countries resulted from limited use of fluoride, unhealthy dietary habits and poor access to oral health services. Dental caries affects 60-90% of schoolchildren in most developed countries, and in several developing countries the prevalence rates are increasing.[3] Epidemiological surveys can improve the monitoring of population-level trends of important oral health conditions, so that morbidity and treatment needs can help tailor oral health programs to meet real-life health needs.[4] So, the present study was done to determine the association of prevalence of dental caries with brushing frequency, oral hygiene aids and dental visits among 6 and 12 year old school children of Himachal Pradesh.

MATERIALS AND METHODS

Aim

To assess dental caries prevalence among 6 and 12 year old school children in relation to brushing frequency, oral hygiene aids and dental visits.

Sample selection

A list of various schools of Himachal Pradesh were obtained from the government office and then, random sampling was done using lottery method to select various schools. After that, children of age group 6 and 12 were selected for the study and the age of children were confirmed using school data.

Inclusion Criteria

Children resident of Paonta Sahib

Children aged 6 and 12 years

Children without any developmental defects

Exclusion Criteria

Children undergoing orthodontic treatment

Children with chronic disease and on long-term medication

Medically compromised children

Sample size calculation

The sample size was calculated on the basis of the pilot study which was done on 50 cases. Dental caries prevalence among the study population in the pilot study was 70%. Sample size was calculated as follows using the following formula:

$$\text{Sample size} = \frac{Z^2 * (p) * (1-p)}{c^2}$$

where,

Z = Z value (e.g., 1.96 for 95% confidence level)

p = expected prevalence of dental caries

For the present study, this was 70% and expressed as 0.7.

c = precision level

So,

$$\text{sample size was} = \frac{(1.96)^2 * (0.7) * (0.3)}{(0.03)^2}$$

The sample size was calculated to be 896. Taking into consideration 10-15% non response and including the available children, we examined 1004 children for our study.

Armamentarium

- Sterilized Plane dental mouth mirror
- Sterilized CPITN/WHO Probe
- Sterilized Tweezer
- Sterilized Kidney Tray
- Disposable Gloves
- Disposable Masks
- Sterilized Cotton
- Sterilizing solution SAVLON
- Self prepared questionnaire
- WHO Oral Health Assessment Form, 2013
- Children examined under natural light at school site only

Examination of Children

Children in the selected age group who agreed to participate in the study were examined at their respective schools in predetermined time schedule, as arranged by the school authorities. In this study, caries was recorded as per WHO criteria (2013) and data recorded on the WHO oral health assessment form (2013). At the time of examination, DMFT and DMFS index (Decayed, Missing, Filled teeth and surfaces index) were recorded for

each child. All erupted teeth surfaces were assessed for recording the indices. In posterior teeth, buccal, palatal or lingual, mesial, distal and occlusal surfaces were examined. In anterior teeth, facial, lingual or palatal, mesial and distal surfaces were examined. The recording of caries was done by visual and tactile examination using a mouth mirror and explorer in which D (decayed), M (missing) and F (filled) scores were filled in the respective columns of the teeth involved.

Under natural light conditions, examination was carried out using the sterilized instrument kits. Sufficient number of instruments were autoclaved and packed for each day work. Strict cross – infection control measures were adopted and spot disinfection was done during survey using disinfectant solution- Savlon. WHO Oral Health Assessment form 2013 was used to record the status of decayed, missing and filled teeth status. The presence of a treated or untreated dental caries in any teeth was recorded and taken into account to calculate the dental caries prevalence. All the signs (pain, discoloration etc.) were taken into account that relates to dental caries in the tooth or teeth. At the end of data collection from each school, the students were counselled about the sequalae of dental caries and methods to avoid it. All the students suffering from dental caries were advised to get the treatment done as soon as possible to avoid future complications.

STATISTICAL ANALYSIS

Data analysis was done using SPSS (Statistical Package for Social Sciences) version 21.0 and epi – info version 3.0. The statistical test used was Chi – square test for difference between the proportions. Significance for all statistical tests was predetermined at a probability value of 0.05 or less.

RESULTS

Graph I shows that out of the total 1004 children, 437 were 6 years old and 567 were 12 years old.

Table I shows that dental caries prevalence was found to be 63.6% in 6-year-old children whereas it was 53.6% in 12-year-old children. The prevalence of decayed teeth was significantly more among 6-year-old children as compared to 12year old children and the difference was found to be statistically significant (p=0.001).

Graph II shows the prevalence of decayed teeth between children with no brushing and 2-3 times a month, once a week, several times a week, once a day and twice or more a day. The prevalence of decayed teeth was significantly more among children with no brushing (92.9%) and 2-3 times a month (100%) as compared to those who brush daily (57.9%) or twice a day (55.2%) (p=0.039).

Graph III shows that of the 1004 children, 17 children do not use any aid for cleaning teeth and 987 use any other aid for cleaning teeth. Decayed teeth were present in 15 (87.5%) children who do not use any aid for cleaning teeth and 567 (57.4%) who use any other aid for cleaning teeth. The prevalence of decayed teeth was significantly more among children with no aid in comparison to using any aid for cleaning teeth (p=0.048).

Graph IV shows that Decayed teeth was present in 49 (68.1%) children who used non fluoridated toothpaste for cleaning teeth and 507 (56.0%) children who used fluoridated toothpaste for cleaning teeth. The prevalence of decayed teeth was significantly more among children without fluoride containing toothpaste in comparison to children with fluoride containing toothpaste (p=0.028).

Graph V shows that of the total 1004 children, 735 had never visited a dentist, 167 had visited within last 12 months and 102 > 12 months ago. The prevalence of decayed teeth was 421 (57.2%) in children who had never been to a dentist, 98 (58.7%) in children who visited within last 12 months and 63 (61.8%) in children who visited > 12 months ago. This difference was found to be non significant (p=0.675).

DISCUSSION

Dental caries is most prevalent oral disease in several Asian and Latin countries. In many developing countries, access to oral health services is limited and teeth are often left untreated or are extracted because of pain or discomfort. Throughout the world, tooth loss

is still seen as a natural consequence of ageing. There has been a positive trend of reduction in tooth loss in some industrialized countries among adults in recent years.[5]

In the present study, dental caries prevalence was 63.6% in children of 6 year age group and dental caries prevalence was 53.6% in children of 12 year age group. The mean number of decayed teeth, DMFT score and DMFS score was significantly more among 6 years. Similar study conducted by Nuca C et al[6] in Constanta district, Romania found caries prevalence of 88.3% and 77.2% in 6 and 12 year old children respectively. In the present study, dental caries prevalence was higher in primary dentition (mean deft 2.47, 63.6%) when compared to permanent dentition (mean DMFT 1.18, 53.6%). The reason behind this high caries in 6 years old could be the difference in thickness of enamel in the deciduous and permanent teeth. In deciduous teeth, it is less than that of permanent teeth being 1mm and 2.5mm, respectively. Thin layer of enamel combined with other factors, such as a high sugar diet and/or the inability of a younger child to properly brush their teeth, cumulate the effect. Structural differences and lower calcium content may increase caries susceptibility in deciduous teeth along with lack of preventive measures. Another reason could be that the WHO index record caries only when the caries involves the dentin and not the incipient caries which results in slight underestimation of caries in 12- year age group.[7]

According to our study, the prevalence of decayed teeth was significantly more (p=0.039) among children who did not brush or brush 2-3 times a month in comparison to those who brush regularly. The results of our study are similar to the study conducted by Tadakamadla K S et al[8] in Udaipur in 2012 respectively where they found that decayed teeth prevalence was more among children who do not brush their teeth daily or less often daily when compared with those who brush daily or twice a day. Similar study was conducted by Chu C H et al[9] in Hong Kong and it was found that children who brushed their teeth twice a day had a lower mean deft score than those who brushed only once a day or less often. In our study, the explanation to the brushing frequency can be given as oral diseases are clearly related to behaviour, and dental caries prevalence has decreased with improvements in oral hygiene. Poor oral hygiene was a risk factor for developing dental caries.[10] For plaque removal from tooth surface, tooth brush is more effective. The low dental caries prevalence in tooth brush users may be due to the reason that tooth brush bristles could reach and clean those inaccessible areas of oral cavity that might not be accessible to the finger and other materials.[11]

In the present study, a significant association (p=0.048) was found between decayed teeth prevalence and aid used for cleaning teeth among children. Also, the decayed teeth prevalence was more among children with use of toothpaste without fluoride in comparison to children with use of fluoride containing toothpaste. The results of our study are in accordance with the study conducted by Bhayade S S et al[12] where caries prevalence was found to be more among more in children who were cleaning their teeth using a toothpowder and finger. Mafuvadze T B et al[13] found that fluoridated toothpaste use significantly reduced the risk of developing dental caries.

High dental caries prevalence in those who do not use any aid is due to the reason that they do not maintain their hygiene, as a result, more plaque accumulation, so more caries prevalence.

In the present study, no significant difference was observed among children who visited their dentist regularly and those who do not. The results of our study are similar with the study conducted by Kumar S et al[14] where no significant association was found in caries prevalence among children in relation to dental visits. In a study conducted by Tadakamadla K S et al[8] it was found that children who visited dentist sometime in their life had almost one half times less dental caries than those who never visited a dentist and this difference was statistically significant.

Poor economic level is believed to be linked to a reduced frequency of dental visits, with an associated lack of prevention and treatment of caries.[15]

CONCLUSION

This study thus gives a brief insight into the dental caries in relation to various factors among 6 and 12 year old children. Besides, this is an important period for instituting preventing programmes because as the teeth erupt, bacteria colonize tooth surfaces and dental behaviour starts to develop during this time. It is however important to carry out an in-depth screening survey on a larger population to draw definite conclusions about dental caries.

BIBLIOGRAPHY

1. **Saldunaite K, Bendoraitiene AE, Slabsinskiene E, Vasiliauskiene I, Andruskeviciene V, Zubiene J**. The role of parental education and socioeconomic status in dental caries prevention among Lithuanian children. Medicina 2014: 156-61.

2. **Sahito N, Sahito AM, Fazlani AK.** Prevalence of dental caries among school children in Hyderabad, Pakistan. Int J App Sci Res Rev 2015;2(2): 34-38.

3. **Ahmed AMN, Astrom NA, Bergen SN, Petersen EP.** Dental caries prevalence and risk factors among 12 year old school children from Baghdad, Iraq: A post war survey. Int Dent J 2007;57: 36-44.

4. **Valladares BRP, Tun CH, Rosado CFJ, Sanchez VAA, Solis MEC, Maupome G.** Caries prevalence and some associated factors in 6-9 year old school children in Campeche, Mexico. Rev Biomed 2006;17(1): 25-33.

5. **Petersen PE.** The World Health Oral Report 2003. Continuous improvement of oral health in the 21st century-the approach of the WHO Global Oral Health Programme.

6. **Nuca C, Amariei C, Borutta A, Petcu L.** Prevalence and severity of dental caries in 6 and 12 year old children in Constanta District (Urban Area), Romania. Oral Health Dent Management 2009;8(3): 19-24.

7. **Reddy SK, Reddy S, Ravindhar P, Balaji K, Reddy H, Reddy A.** Prevalence of dental caries among 6-12 years school children of Mahbubnagar district, Telangana State, India: A cross sectional study. Indian J Dent Sci 2017;9: 1-7.

8. **Tadakamadla KS, Tadakamadla J, Tibdewal H, Duraiswamy P, Kulkarni**

   S. Dental caries in relation to socio – behavioral factors of 6 year old school children of Udaipur district, Dent Res J 2012;9(6): 681-87.

9. **Chu CH, Fung DSH, Lo ECM.** Dental caries status of preschool children in Hong Kong. British Dent J 1999;187(11): 616-20.

10. **Soroye OM, Braimoh BO.** Oral health practices and associated caries experience among secondary school students in Lagos state, Nigeria. J Oral Res Rev 2017;9(1): 16-20.

11. **Praveena S, Thippeswamy HP, Nanditha K, Chakravarthy KP.** Relationship of oral hygiene practices and dental caries among school children of Sullia Taluk, Karnataka, South India. Global J Med Res Dent Otolaryn 2013;13(2): 9- 14.

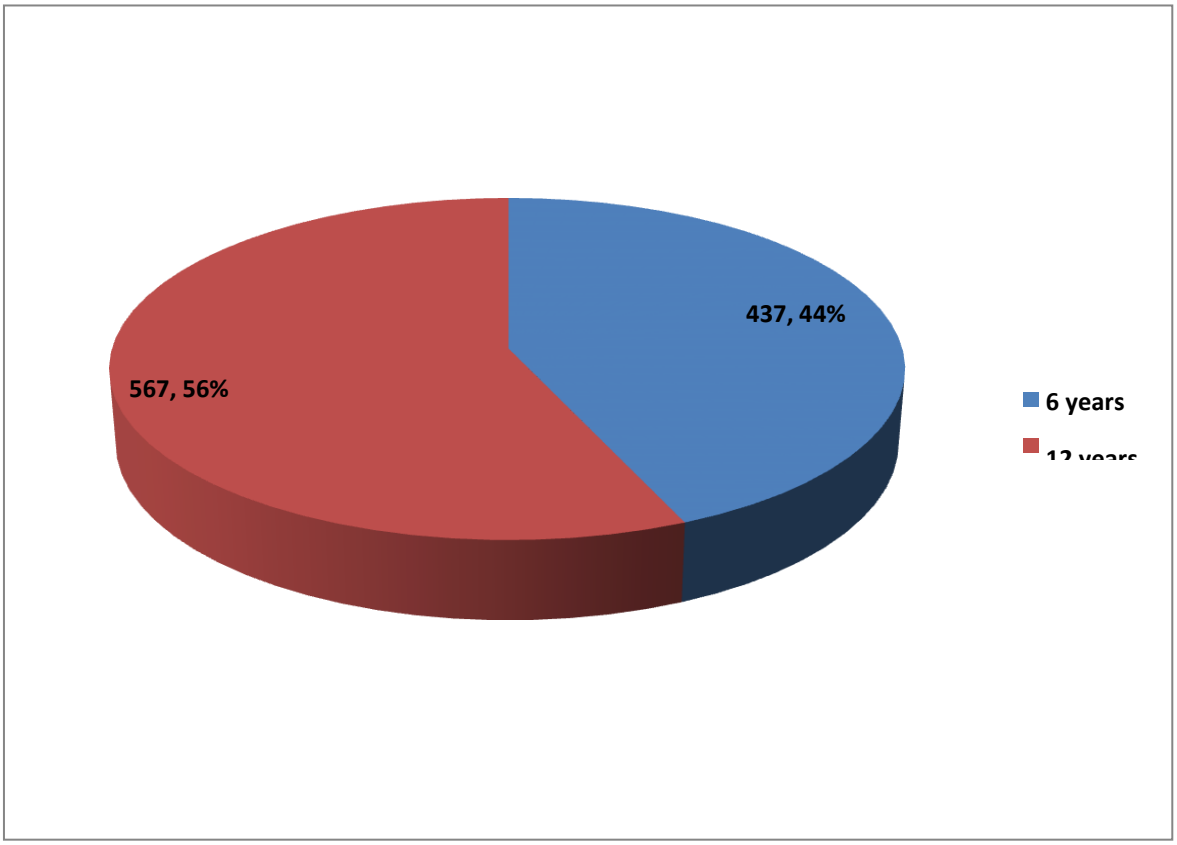
12. **Bhayade SS, Mittal R, Chandak S, Bhondey A.** Assessment of social, demographic determinants and oral hygiene practices in relation to dental caries among the children attending Anganwadis of Hingna, Nagpur. J Indian Soc Pedod Prev Dent 2016;34(2): 124-27.

13. **Mafuvadze BT, Mahachi L, Mafuvadze B.** Dental caries and oral health practice among 12 year old school children from low socio economic status background in Zimbabwe. Pan African Med J 2013;14: 1-6.

14. **Kumar S, Tadakamadla J, Duraiswamy P, Kulkarni S.** Dental

caries and its socio-behavioral predictors- An exploratory cross-sectional study. J Clin Pediat Dent 2016;40(3): 186-92.

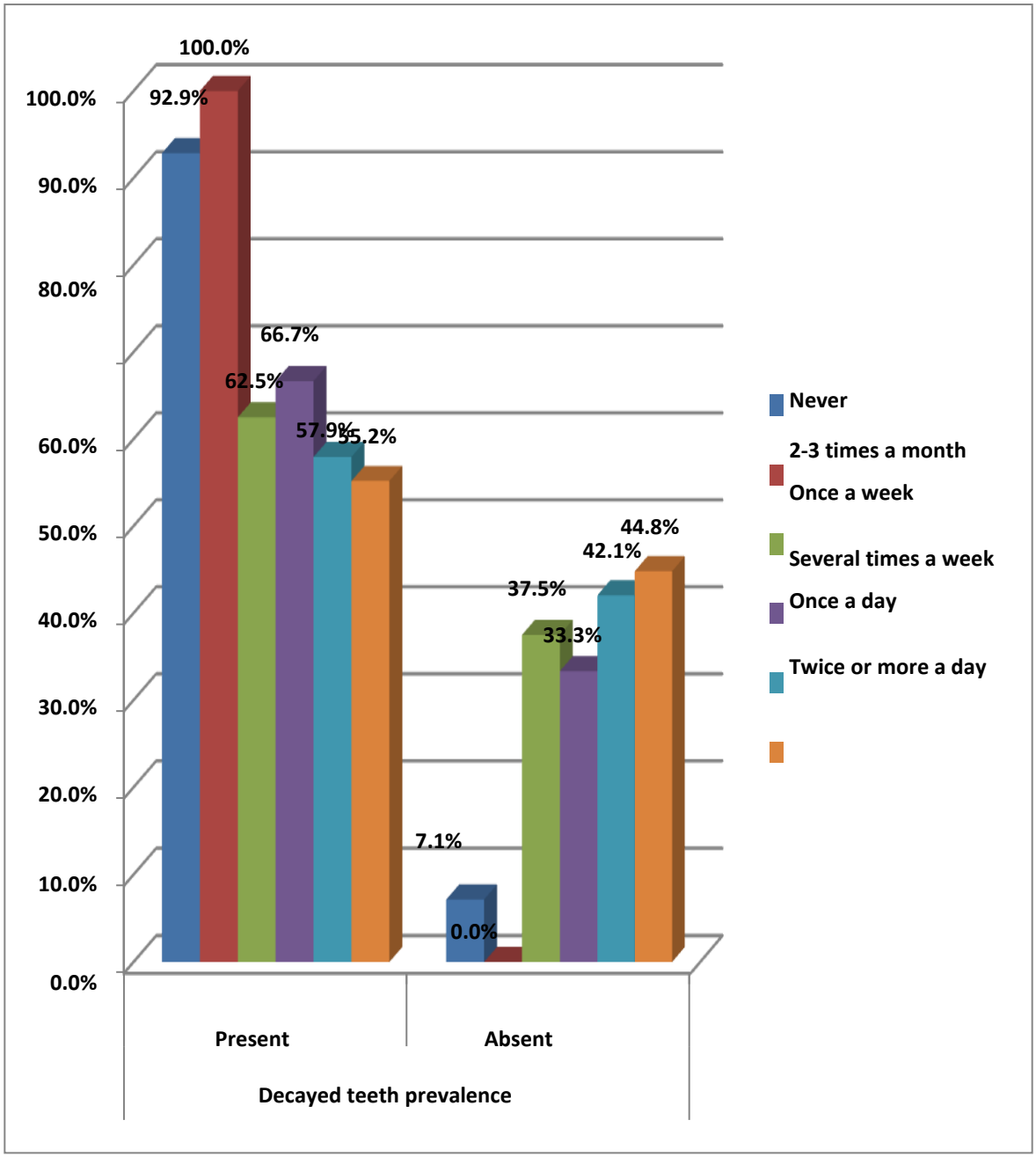
15. **Dyer TA, Brocklehurst P, Glenny AM, Davies L, Tickle M, Issac A, Robinson PG.** Dental auxiliaries for dental care traditionally provided by dentists. Cochrane Database Syst Rev 2014 Aug 20;8:CD010076.



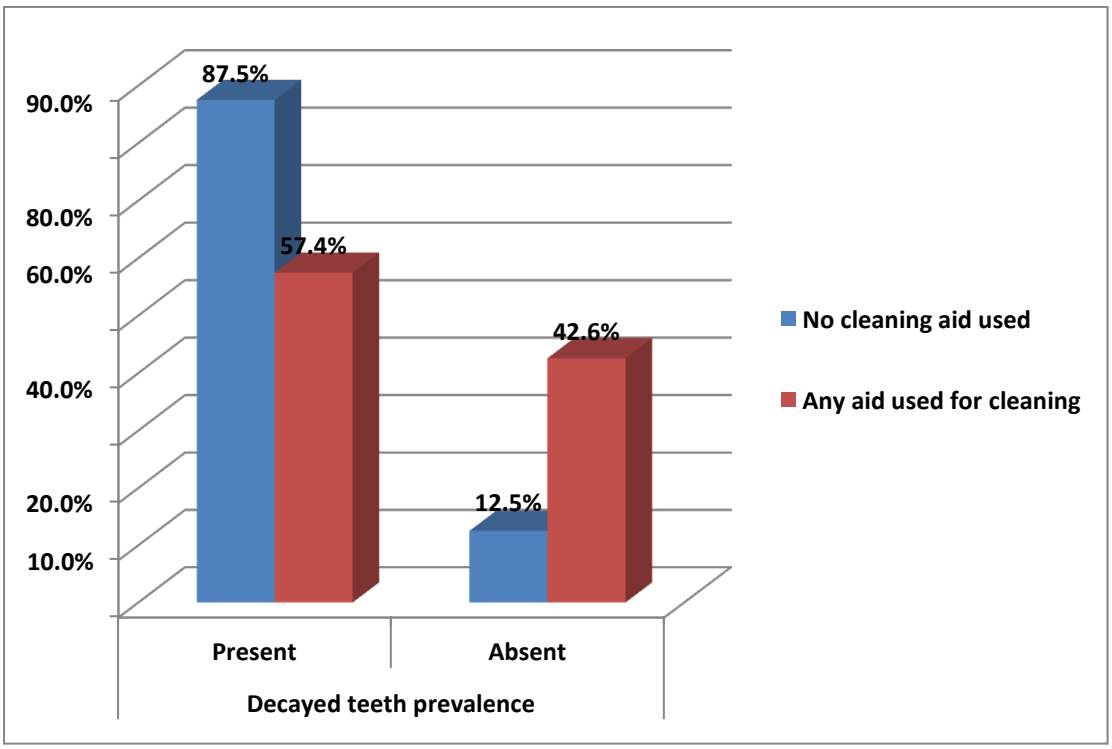
Graph I: Distribution of sample size according to age of children

Decayed teeth prevalence	Age		Total
	6 years	12 years	
Present (n)	278	304	582
(%)	63.6%	53.6%	58.0%
Absent (n)	159	263	422
(%)	36.4%	46.4%	42.0%
Total (n)	437	567	1,004
(%)	100.0%	100.0%	100.0%

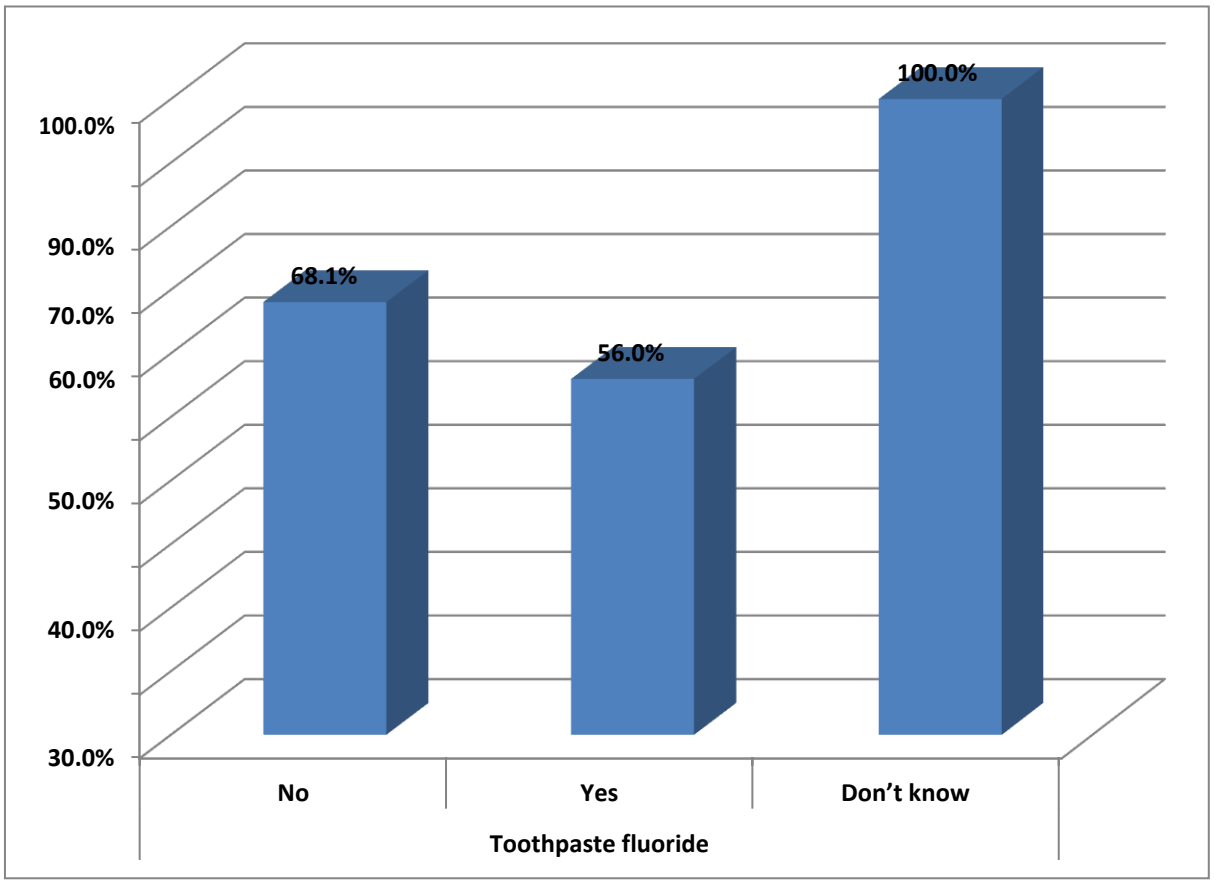
Table I: Prevalence of decayed teeth in 6 and 12 year old children



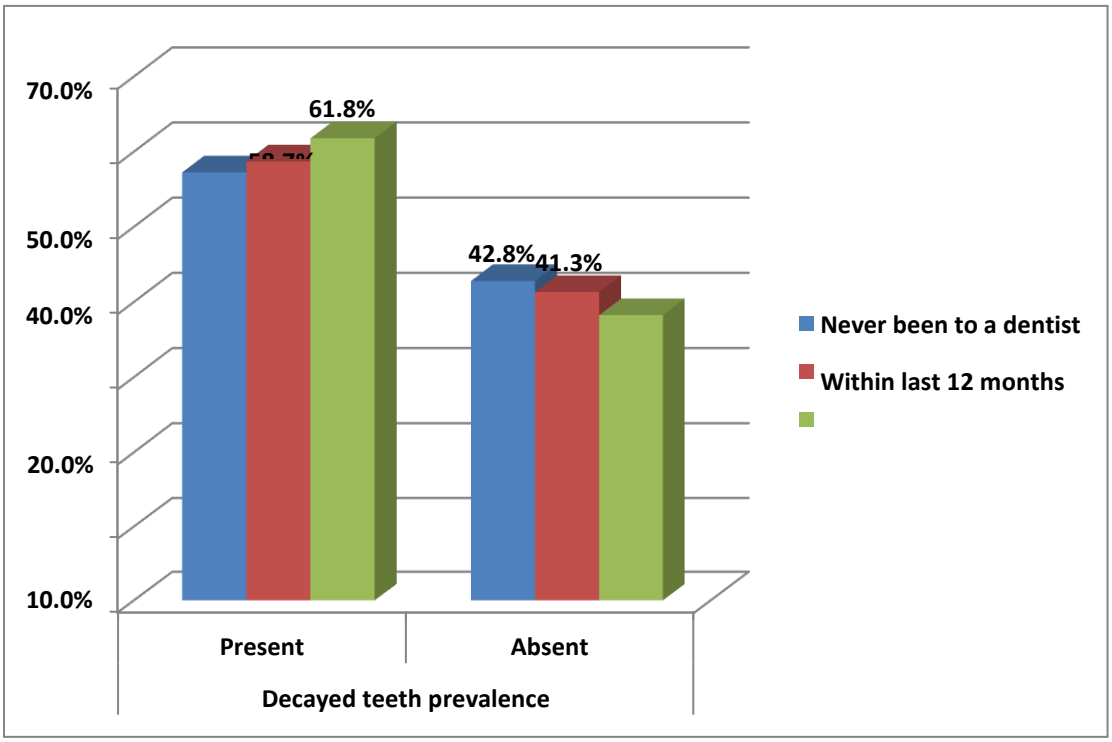
Graph II : Relationship between decayed teeth prevalence and brushing frequency



Graph III: Relationship between decayed teeth prevalence and oral hygiene aid used



Graph IV : Relationship between decayed teeth prevalence and use of fluoridated/ non fluoridated toothpaste



Graph V : Relationship between dental visits and decayed teeth prevalence