

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Prevalence Of Dental Caries On First Permanent Molars Amongst South Canara Population.

Samriti Chawla*, Shishir Shetty, Mithra Nidarsh Hegde, and Nireeksha Shetty.

Department of Conservative Dentistry and Endodontics, A B Shetty Memorial Institute of Dental Science, Nitte University, Mangalore, Karnataka, India.

ABSTRACT

The aim of the study was to analyse the prevalence of dental caries on first permanent molars, correlating the age-gender of the patient and the effect of diet(if any) along with the location of residence, amongst the South West Coastal population of India. The study was conducted on a total population of 2000 patients over a period of three months from May 2018-July 2018 were examined from an Out-patient section of Department of Conservative Dentistry and Endodontics, Nitte University and from rural and satellite caenters of Nitte University. Diagnosis of first molar caries was made by a questionnaire, oral and clinical examination. On the analysis of data, it was found that the prevalence of permanent first molar caries was 60.9%.Males (53.2%) were more affected and age group of 30-45 years (39.4%) showed the highest prevalence rate. People eating vegetarian diet (64.2%) and residing in rural areas (45.32%)were most effected with caries along. On further evaluation it was observed that mandibular arch(59.92%) was more effected with the occlusal surface (51.8%) involving dentin(dentinal caries) (53.8%) being the most commonly involved. Out of the first molar caries detected only 35.46% of them were restored, reflecting on the negligence/unawareness of the people towards cavitation or oral health in genral.

Keywords: first molars, caries, dentinal caries, prevalence, dakshin kanada, diet, rural

**Corresponding author*



AIM

Aim of the study is to analyse the prevalence of dental caries on 1st molars in South West Coastal population of India.

INTRODUCTION

Dental caries remains the most widespread disease globally. It's a health problem globally and has a direct impact on quality of life, also effecting children health and development.[1] A disease which involves factors like diet, tooth morphology, microorganisms, saliva content, time and genetic disposition making dental caries a multifactorial disease.[2] It is also affected by the social and environmental factors.[3]

The prevalence of the disease is the number of population having a disease at a specific point in time. The prevalence of dental caries is a principal subject of many epidemiological research being carried out all over the world. In this study, only the first permanent molars were evaluated since they are the most important tooth in the dental arch.[2] The decay-missing-filled (DMF) index or decayed, missing, and filled teeth (DMFT) index is one of the most common methods in oral epidemiology for assessing dental caries prevalence as well as dental treatment needs among populations. This index is based on clinical examination of individuals by using a probe, mirror and cotton rolls, and simply counts the number of decayed, missing (due to caries only) and restored teeth.[4]

As a child grows its teeth start to change from temporary teeth to permanent teeth around 6 years . A 6 year old child's molar is the first permanent tooth that appears on the dental arcade, erupting distally from the second temporary molar. This molar, also called the first permanent molar (FPM), is named by Kunzel (1988), quoted, as <the early child of infantile dentistry>.

The first permanent molars have an important role in establishing the occlusion. Also, they have a role in delimiting the space where the other permanent teeth will erupt, and their premature loss can disrupt the eruption and the migration of the other definitive teeth. Most of the times, FPMs are mistaken by the parents with the temporary molars, due to the position they have on the arcade and because they erupt without replacing any temporary tooth. This may be a reason why their hygiene is mostly neglected, and caries appear in the early stages of their appearance on the dental arcade.[5]

It becomes the most important tooth of the arch as it helps in mastication. In orthodontic intervention, first molar play a major role in maintaining vertical dimension of face and in anchorage. Angle's postulate is that the key of occlusion is upper first molars. The first molars are at greater risk of caries because of their tooth morphology.[5-6] First permanent molar is more vulnerable to caries due to its morphologic and functional characteristics, as well as to the surrounding conditions the newly erupted permanent molars have to face. The functional and morphological characteristics make the first permanent molar more vulnerable to dental caries and eventually there loss.[3]

The loss of molar teeth leads to drifting of the adjacent teeth into the empty space, supra eruption of the opposing tooth, and if it was an early loss the other permanent teeth are malpositioned leading to disturbed occlusion further on. A special care is given to the caries damage of the first permanent molar, due to the importance this tooth has in the good functionality of the dental-maxillary anatomy.[8-11]

The high frequency of occlusal caries on the permanent first molars for all age groups as by the study of MC Donalds (1980) concludes that the first molars remains the most common site for caries within a short period following its eruption into the oral cavity.[6] In children the dental caries is one of the most prevalent chronic disease, the treatment and prevention of dental caries is important responsibility for dentist.

Considering all these factors study aims at evaluating the prevalence of caries on first molars.

MATERIALS AND METHODS

The study was conducted on a total population of 2000 patients over a period of one month from May 2018-June 2018, out of which 1000 were examined from Out-patient section of Department of

Conservative Dentistry and Endodontics and other 1000 were examined in Rural Health Centers of A.B. Shetty Memorial Institute of Dental Sciences, Nitte University, Deralakatte, Mangalore. Ethical clearance was obtained from the Central Ethical Committee of the Institute. Patients were examined for prevalence of caries in first molars under isolation using sterilized mouth mirror and explorer in a dental chair under good illumination. Presence of caries was recorded when a lesion in a pit or fissure, or on a smooth tooth surface, had an unmistakable cavity, undermined enamel, or a detectably softened floor or wall. A tooth with a temporary filling, or one which was sealed but also decayed, was also included in this category.

Direct assessment consisted of visual examination with a standard mouth mirror, a sharp-ended explorer, and supplementary lighting from a dental operatory lamp. Bite-wing radiographs were taken for examination of proximal surfaces.

The patients who had caries on first molar teeth were questioned with a standard questionnaire to find its relation associated with age, gender, dietary habits and location. Data was recorded on a prepared survey form based on the WHO Oral Health Assessment Form 2013.

A correlation would be established amongst the various factors and tabulated to produce results for the study.

RESULTS

Table 1: Total Prevalence of caries on first molars

TOTAL PATIENTS	PATIENTS WITH MOLAR CARIES	PERCENTAGE PREVALENCE
2000	1218	60.9%

Table 1: A total of 2000 patients were examined out of which 1218 (60.9%) patients were found with first molar caries.

Table 2: Prevalence of first molar caries in various age groups

AGE GROUP	PATIENTS WITH CARIES	PERCENTAGE
15- 30 yrs	208	17%
30-45 yrs	480	39.4%
45-60 yrs	382	31.36%
>60 yrs	148	12.15%

Table 2: Patients were categorized under different age groups and 208 patients (17%) under the age group of 15-30years, 480 patients (39.4%) under the age group of 30-45 years, 382 patients (31.36%) under the age group of 45-60years and 148 patients (12.15%) under the age group of >60 years had caries. The maximum percentage of 39.4% was found to be amongst the middle aged i.e 30-45years of age.

Table 3: Prevalence of first molar caries based on gender

GENDER	PRESENCE OF CARIES	PERCENTAGE
MALE	648	53.20%
FEMALE	568	46.64%

Table 3: out of the total 1218 patients with first molar caries 648 (53.2%) were males and 568 (46.64%) were females. The p value is 0.02 hence not significant results

Table 4: Prevalence of first molar caries based on diet

DIET	PRESENCE OF CARIES	PERCENTAGE
NON VEGETARIAN	362	29.7%
VEGETARIAN	782	64.2%
PESCITARIAN	74	6.07%

Table 4: out of the total 1218 patients with first molar caries 362(29.7%) had a vegetarian diet, 782 (64.2%) had a mixed diet (non vegetarians) and 74(6.07%) were pescitarians.

Table 5: Prevalence of caries based on location

LOCATION	PRESENCE OF CARIES	PERCENTAGE
URBAN	226	18.5%
PERIURBAN	440	36.12%
RURAL	552	45.32%

Table 5: Out of the total 1218 patients with first molar caries 226(18.5%) resided in urban location, 440(36.12%) resided in periurban location while the remaining 552 (45.32%) resided in rural location.

Table 6 : Prevalence of first molar caries based on specific quadrant

QUADRANT	PRESENCE OF CARIES (OUT OF 1218)	PERCENTAGE
1ST QUADRANT	188	15.4%
2ND QUADRANT	300	24.6%
3RD QUADRANT	370	30.37%
4TH QUADRANT	360	29.55%

Table 6: Out of all the quadrants 1st quadrant 188(15.4%) were effected with first molar caries, 300 (24.6%) of the 2nd quadrant, 370 (30.37%) of the 3rdquadrant and 360 (29.5%) of the 4th quadrant were effected with the first molar careis.

Table 7: Prevalence of caries on the specific surface of the first molar

SURFACE INVOLVED	PRESENCE OF CARIES (OUT OF 1218)	PERCENTAGE
OCCLUSAL	632	51.8%
BUCCAL	48	3.9%
LINGUAL/PALATAL	36	2.9%
MESIAL	275	22.57%
DISTAL	227	18.63%

Table 7: Out of all the surfaces of the first molar effected with caries 632 (51.8%) involved occlusal surfaces, 48(3.9%) involved buccal surface, **36 (2.9%)** involved lingual / palatal surfaces, 275 (22.57%) involved mesial while the remaining 227 (18.63%) involved distal surface

Table 8: Prevalence of caries in accordance to the extent of caries

TYPE OF CARIES	PRESENCE OF CARIES (OUT OF 1218)	PERCENTAGE
ENAMEL	70	5.7%
DENTINE	646	53.8%
PIT &FISSURES	174	14.2%
DEEP DENTINAL	294	24.1%

Table 8: Of all the caries effected first molar teeth 70 (5.7%) were limited to enamel, 646(53.8%) extended to dentine, 174 (14.2%) are limited to pits and fissures and 294(24.1%) involved deep dentine.

Table 9: Prevalence of caries restoration

RESTORATION	OUT OF 1218	PERCENTAGE
NOT RESTORTED	786	64.5%
RESTORED	432	35.46%

Table 9: Out of the total first molars detected with caries 786 (64.5%) were not restored whereas 432(35.46%) were restored.

DISCUSSION

This oral health survey was conducted among the people of south west coastal population, Karnataka, India, and patients from A B Shetty Memorial Institute of Dental sciences and the rural centres of dental colleges to assess the prevalence of dental caries in first permanent molars.

A 2000 population was examined, 1218 had caries in first molar which was 60.9% of the total population. This study was supported by a study conducted by Sudhakarn T, Hegde M, Attavar S and Bhat G(2016) in Dakshina Kannada, Karnattaka, India reported that 83.8% of caries present in first molar of total population. A 2000 population was divided into different age groups 15-30, 30-45, 45-60 and >60 years. 30-45 years age group had maximum caries of 39.4 % and 31.36% of caries was noted among 45 to 60 years age group. Sudhakarn T, Hegde M, Attavar S and Bhat G in (2016) reported that the prevalence of caries in the first molar was 26-35 years age group (89%) and 15-25 years age group (81%).

There was no significant difference in prevalence of caries among males and females as the p value was less than 0.05 which was found to be similar in a study conducted by Hegde MN and Shija AS,(2011).7 Prevalence of first molar caries is high in rural area 45.32% as compared to urban area 18.5%. In this study about 64.2% of vegetarians had dental caries followed by Non-vegetarians of about 29.7%. Vegeterians are at a higher risk because of high intake of acidic foods and foods containing natural sugar and also Vegetarian diet is relatively low in protein, vitamin B2,Vitamin B12,Vitamin D as well as calcium and usually rich in carbohydrates, carotenoids, n-6 fatty acids, dietary fiber, folic acid, vitamin E, vitamin C and Mg [Demirci M, Tuncer S and Yucekur AA,2010].13 Sea food forms the major portion of non-vegetarian diet in these study subjects from Dakshina Kannada, located in the southern west coast of India. The probable reason for decreased caries prevalence in the population on mixed diet could be attributed to the higher intake of sea food, rich in fluoride and arginine (amino acid) which is abundant in meat and fish helps in prevention of dental plaque [Shetty R, Sreelatha SVand Shetty P, 2015].14

Mandibular molars were commonly affected than maxillary molars with a prevalence of 59.9% in lower arch, when compared to upper first molars [Hegde MN and Shija AS, (2011)].15In most people, mandibular first permanent molar erupts slightly earlier than its maxillary counterpart, hence mandibular first permanent molar is exposed to the oral environment for a longer period of time, making it more susceptible to

caries than maxillary first permanent molar[Yijie L et al, 2013].¹⁶ Also less caries prevalence in maxillary first molar might be due to the flushing action of saliva from parotid gland opening near maxillary molar [Baginska and Rodakowska, 2014].¹⁷High caries prevalence rate in first molars can be attributed onto the occlusal surface, its large size and the early eruption of the tooth. It leads to more acid accumulation on the occlusal surface compared to other teeth. Occlusal surface had more caries than other surfaces. 38% of the caries were found in occlusal lesions [Demirci M, Tuncer S and Yucekur AA, 2010].¹³ 27% of the population had mesial caries followed by distal caries 25%, buccal caries 6%, and lingual caries 4%.

REFERENCES

- [1] Ali NS, Ali NS, Khan M, Qamaruddin I, Askary H, Sajwani A. Prevalence of dental caries in the first permanent molars in children between 8-12 years. J Pak Dent Assoc. 2013;22(2):119-23.
- [2] Barman M, Tirth A, Tandon V, Chandra S, Ain TS. Prevalence of dental caries in first permanent molars among 12 years school going children in Purba Medinipur City, West Bengal. International Research Journal of Clinical Medicine. 2016;1:12-5..
- [3] Sharma LC, Hegde MN, Sadananda V, Matthews B. Minimal Invasive Techniques in Caries Detection, Diagnosis and Management-A Clinical Study. Global Journal of Medical Research. 2016 Oct 6..
- [4] Desai VC, Reddy RE, Manjula M, Saheb SH. Prevalence of dental caries in first and second permanent molars. International Journal of Research in Medical Sciences. 2017 Jan 23;2(2):514-20.
- [5] Luca R, Stanciu I, Ivan A, Vinereanu A. Knowledge on the first permanent molar-audit on 215 Romanian mothers. OHDMBSC. 2003;2(4):27-32.
- [6] Zhong XM, Jia CM, Duan YF, Duan Y, Qiao X. An epidemiological investigation of caries status of the first permanent molars of children aged 7-9 year in Taizhou City. Shanghai kou qiang yi xue= Shanghai journal of stomatology. 2017 Jun;26(3):328-30.
- [7] Sudhakarn T, Hegde M, Attavar S, Bhat G. Prevalence of Caries of First permanent Molars in South West Coastal Population of India. International Journal of Current Research and Academic Review.2016;4(3):106-113
- [8] McDonald SP, Sheiham A. The distribution of caries on different tooth surfaces at varying levels of caries--a compilation of data from 18 previous studies.
- [9] Stanciu IS, Luca R, Munteanu A, Farcașiu C, Badea VA. Studiu epidemiologic privind caria primului molar permanent la elevii din populatia generala. Revista Română de Medicină Dentară 2011, XIV, 3: 186-202.
- [10] Chirca Em, Rodica Lu, Georgescu De. The prevalence of caries in first permanent molar in a group of school children aged 6 to 7 years in Pitești. Prevalence. 2015;1:4th.
- [11] Demirci M, Tuncer S, Yucekur AA. Prevalence of caries on individual tooth surfaces and its distribution by age and gender in university clinic patients. European journal of dentistry. 2010 Jul;4(3):270.
- [12] Shetty R, Sreelatha SV, Shetty P. Incidence of cervical caries among the adults of south canara, india in relation to the dietary status--an epidemiological study. International Journal. 2015;3(3):990-3.
- [13] Hegde MN, Shija AS. Carious first molars in south canara population-an epidemiological study. JIDA. 2011;5(11):1132-4.
- [14] Ferro R, Besostri A, Olivieri A. Caries prevalence and tooth surface distribution in a group of 5-year-old Italian children. European Archives of Paediatric Dentistry. 2009 Jan 1;10(1):33-7.
- [15] Hong-ru S, Pei-cheng X, Wen-hao Q. Investigation of the first permanent molar caries in primary school students in Xuhui District of Shanghai Municipality. Shanghai Journal of Stomatology. 2012 Jun 1;21(3).