

PREVALENCE OF FIRST PERMANENT MOLAR CARIES AMONG 6-10 YEAR OLD SCHOOL GOING CHILDREN IN NAGPUR REGION

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ABSTRACT

Dental caries is a multi-factorial disease involving various factors such as diet, microorganisms, tooth morphology, saliva, as well as genetic predisposition. The present study is to determine the prevalence of dental caries in first permanent molar among 6-10 year old school going children in Nagpur Region Aim: The aim of the present study is to determine the caries prevalence of first permanent molar in 6-10 year old school going children in Nagpur region Objectives: 1) To determine the caries prevalence of first permanent molar in 6-10 year old boys and girls. 2) To determine the frequency of simultaneous presence of first permanent mandibular molar caries and its antimere in 6-10 year old school going children Methodology: A cross sectional study was done in government and private schools of Nagpur district of Maharashtra. Around 800- 1000 school going children between 6 to 10 years of age in the government and private schools of Nagpur were examined for first permanent molar caries. Results: The prevalence of dental caries in first permanent molars among 6-10 year old school going children was 47.48% Prevalence of caries in first permanent molars and DMFT increased with age. Caries Prevalence in girls

(48.63%) was significantly higher than boys (46.68%). Prevalence of caries in Government School children (57.90%) was higher than Private School Children (35.71%). Simultaneous presence of dental caries in first permanent mandibular molar and its antimere was more than its absence.

Keywords: *Dental Caries, Permanent First Molar, Decayed Missing and Filled Teeth (Dmft), School Children*

INTRODUCTION:-

Dental caries is a multi-factorial disease involving various factors such as diet, microorganisms, tooth morphology, saliva, as well as genetic predisposition. Apart from these factors other related factors such as social, environmental and cultural factors are also responsible. Oral health surveys gives an idea about the population's oral health status, treatment needs as well as provides baseline information to establish oral health plans as per the actual needs of their population.¹

Dental caries is among the most common dental diseases with high prevalence in humans. It is critical to control the disease process by assessing and rendering the treatment required along with spreading awareness regarding prevention. Several prevalence studies have been conducted and reported on different occasions on the dental caries and the treatment needs in developing countries such as India.²

DMFT is considered to be an important index to determine the caries status in an individual.³ Dental caries is a global health problem and has a direct impact on the quality of life, particularly on children's health and development. By WHO estimates, one third of the world's population has no access for health care.⁴ It is the children who mostly experience tooth decay.⁵ World Health Organization (WHO) in 2000 had a global goal for dental caries of no more than an average of 3 DMFT (decayed, missing, filled teeth) at 12 years of age.⁶ Dental caries prevalence in developed countries has declined in the early 1970s.^{7,8} In 2007 the WHO reported that 60-90% of school children worldwide have dental caries⁹. In 1997, 22.7% of Indian population having caries was estimated to be 5-14 yrs.¹⁰

The prerequisites for dental caries include a susceptible host with cariogenic bacteria such as *Streptococcus Mutans*. Another important contributing factor is the dietary intake of refined sugar.¹¹ Quality and quantity of saliva affects the resistance of the host to dental caries. The niches responsible for protecting the microorganisms anatomical features of the pits and fissures allows the necessary substrate for the cariogenic bacteria to grow in a protective environment.¹²

According to National Oral Health Survey¹³ caries prevalence in India was 51.9, 53.8 and 63.1% at ages 5, 12 and 15 years, respectively. First permanent molar is more vulnerable to caries due to its morphologic and functional characteristics, as well as to the surrounding conditions that the newly erupted permanent molars have to face. McDonald (1992) pointed out a high frequency of occlusal caries on the permanent first molar for all age groups, concluding

that occlusal surface of first permanent molar remains the most common site for caries within a short period following its eruption.¹⁴

The present study is to determine the prevalence of dental caries in first permanent molar among 6-10 year old school going children in Nagpur Region

AIM:-

The aim of the present study is to determine the caries prevalence of first permanent molar in 6-10 year old school going children in Nagpur region

OBJECTIVES:-

- 1) To determine the caries prevalence of first permanent molar in 6-10 year old school going children
- 2) To determine the caries prevalence of first permanent molar in 6-10 year old boys and girls.
- 3) To determine the frequency of simultaneous presence of first permanent mandibular molar caries and its antimere in 6-10 year old school going children.

METHOD OF COLLECTION OF DATA:-

- **SAMPLE SIZE:** 1550 children were selected
- **STUDY TYPE:** Cross section study
- **AGE GROUP:** Between 6-10 years of both the gender.
- **STUDY AREA:**
 1. Government and Private schools of Nagpur, Maharashtra
 2. Department of Pedodontics and Preventive dentistry, Swargiya Dadasaheb Kalmegh Smruti Dental College & Hospital, Nagpur, Maharashtra

INCLUSION CRITERIA:-

1. Private school going children 6-10 years
2. Government school going children 6-10 years
3. Erupted permanent 1st molar

EXCLUSION CRITERIA:-

1. Children with missing first permanent molars.
2. Uncooperative children.

MATERIAL AND METHODS:-

Armamentarium

- Gloves and mouth mask.
- Diagnostic Instruments: Mouth Mirror, Probe, Explorer.

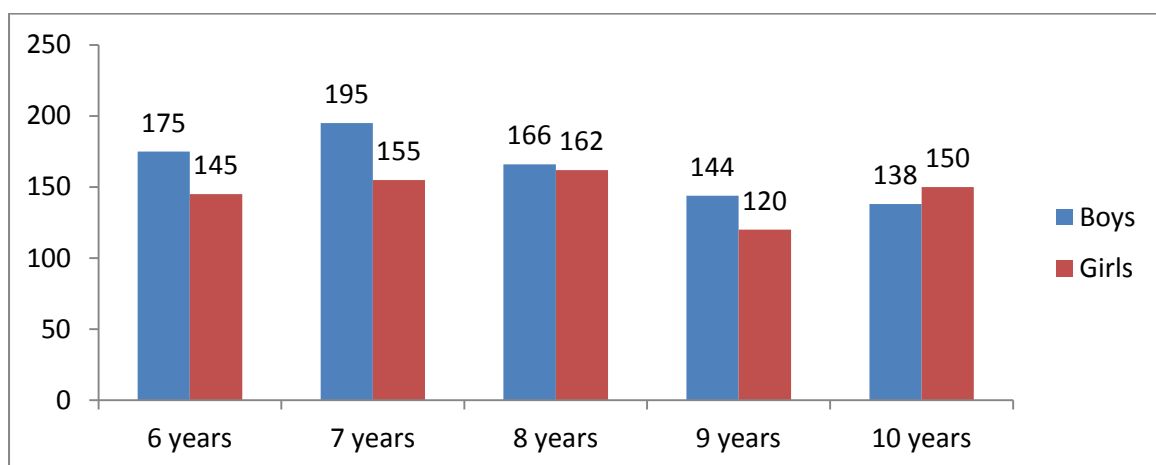
METHODOLOGY:-

A cross sectional study was done in government and private schools of rural areas of Nagpur district of Maharashtra. After taking consent from school authorities and guardians, examination was carried out with all aseptic measures. The examination was carried out in classrooms and performed under normal lighting using mouth mirror, Probe and Explorer to record Decayed, Missing and Filled teeth (DMFT) in the first permanent molar.

Table no. 1:- Distribution of Boys and Girls according to age groups

Age groups	Boys		Girls		Total
	No.	%	No.	%	
6 years	175	21.39%	145	19.80%	320
7 years	195	23.83%	155	21.17%	350
8 years	166	20.29%	162	22.13%	328
9 years	144	17.60%	120	16.39%	264
10 years	138	16.87%	150	20.49%	288
Total	818		732		1550

X²-value=5.35,p-value=0.25,NS,p>0.05

Graph no. 1:- Distribution of Boys and Girls according to age groups**Table no. 2:- Prevalence of dental caries according to age groups**

Age groups	Total		
	No.	With Caries	Prevalence
6 years	320	123	38.43%
7 years	350	155	44.28%
8 years	328	151	46.03%
9 years	264	141	53.40%
10 years	288	166	57.63%
Total	1550	736	47.48%

Graph no. 2:- Prevalence of dental caries according to age groups

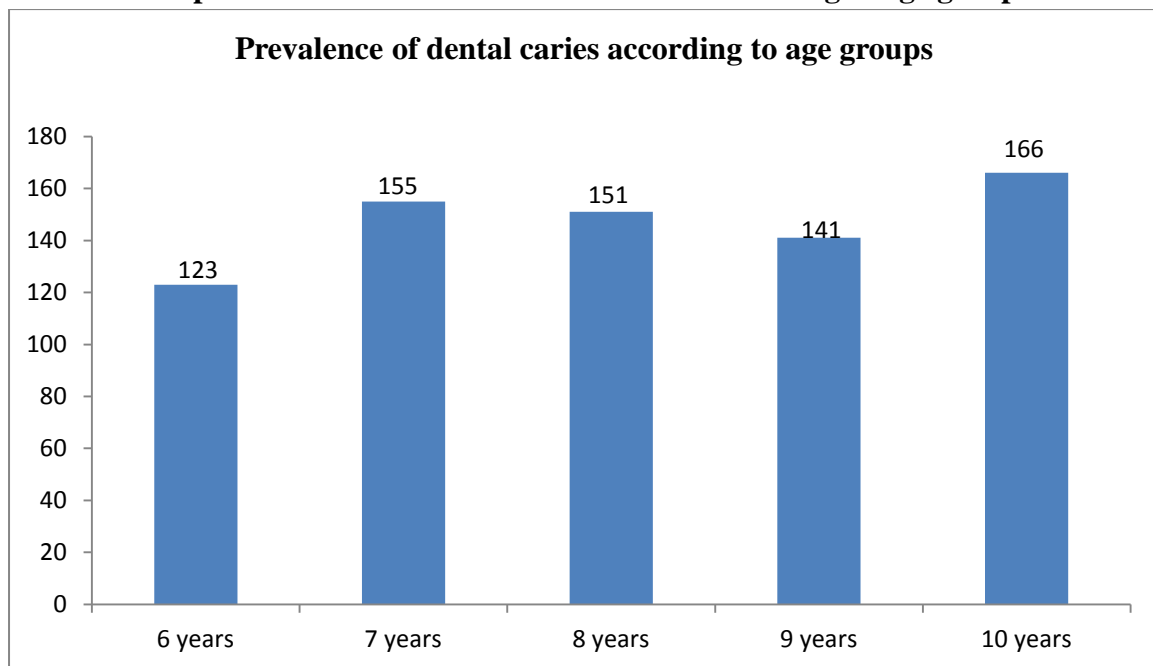
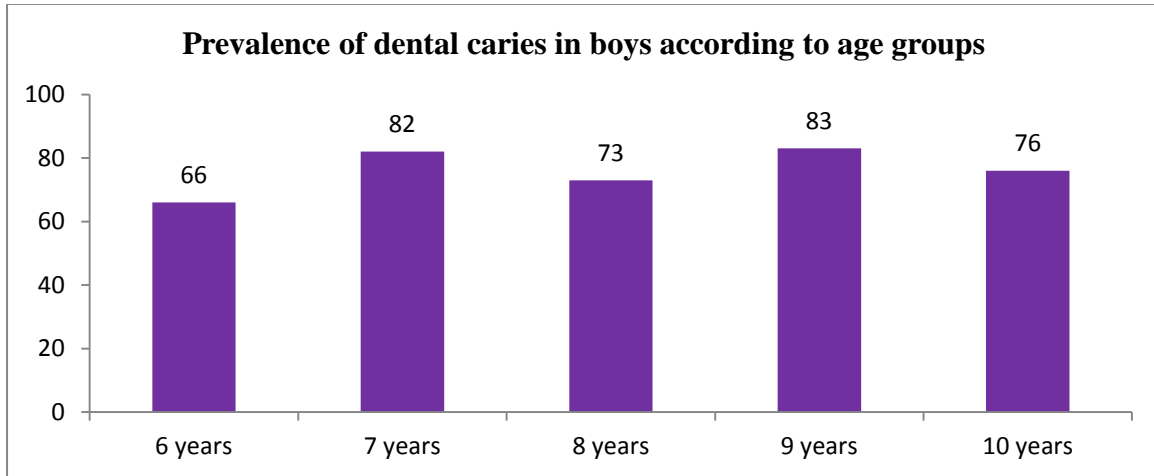


Table no. 3:- Prevalence of dental caries in boys according to age groups

Age groups	Boys		
	No.	With Caries	Prevalence
6 years	175	66	37.71%
7 years	195	82	42.05%
8 years	166	73	43.97%
9 years	144	83	57.63%
10 years	138	76	55.07%

Total	814	380	46.68%
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Graph no. 3:- Prevalence of dental caries in boys according to age groups**Table no. 4:- Prevalence of dental caries in girls according to age groups**

Age groups	Girls		
	No.	With Caries	Prevalence
6 years	145	57	39.31%
7 years	155	73	47.09%
8 years	162	78	48.14%
9 years	120	58	48.33%
10 years	150	90	60%
Total	732	356	48.63%

χ^2 -value=6.18,p-value=0.158,NS,p>0.05

Graph no. 4:- Prevalence of dental caries in girls according to age groups

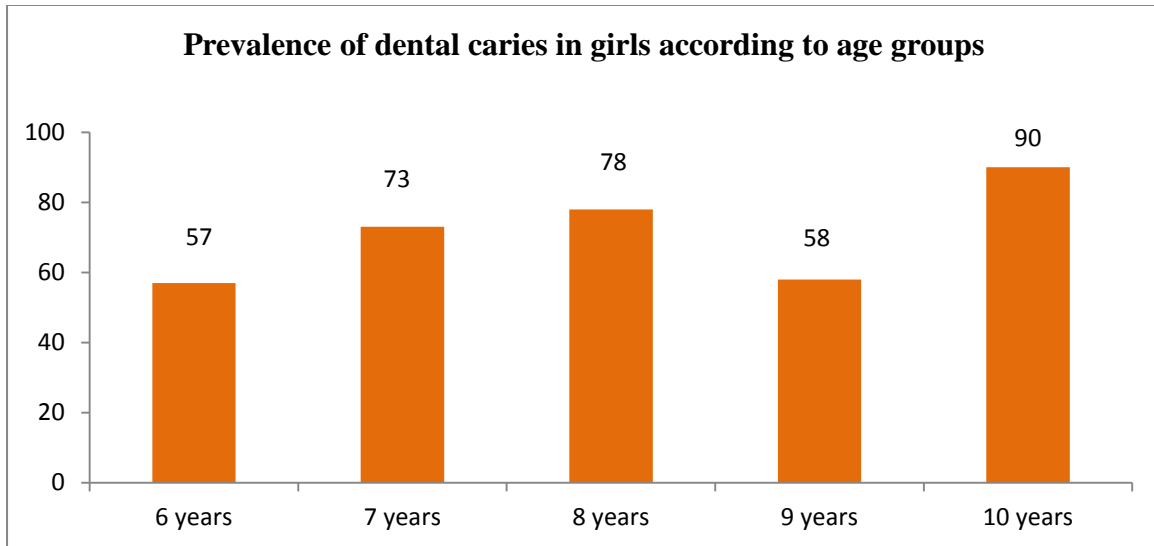


Table no. 5:- Mean DMFT in first permanent molars according to age groups

Age groups	No.	Number of teeth examined	Decayed	Missing	Filled	Total DMFT	Mean DMFT
6 years	320	750	123	9	2	134	0.17
7 years	350	921	155	8	9	172	0.18
8 years	328	978	151	12	34	197	0.20
9 years	264	1056	141	3	71	215	0.20
10 years	288	1152	166	5	87	258	0.22

χ^2 -value=86.24,p-value=0.0001,S,p<0.05

Graph no. 5:- Mean DMFT in first permanent molars according to age groups

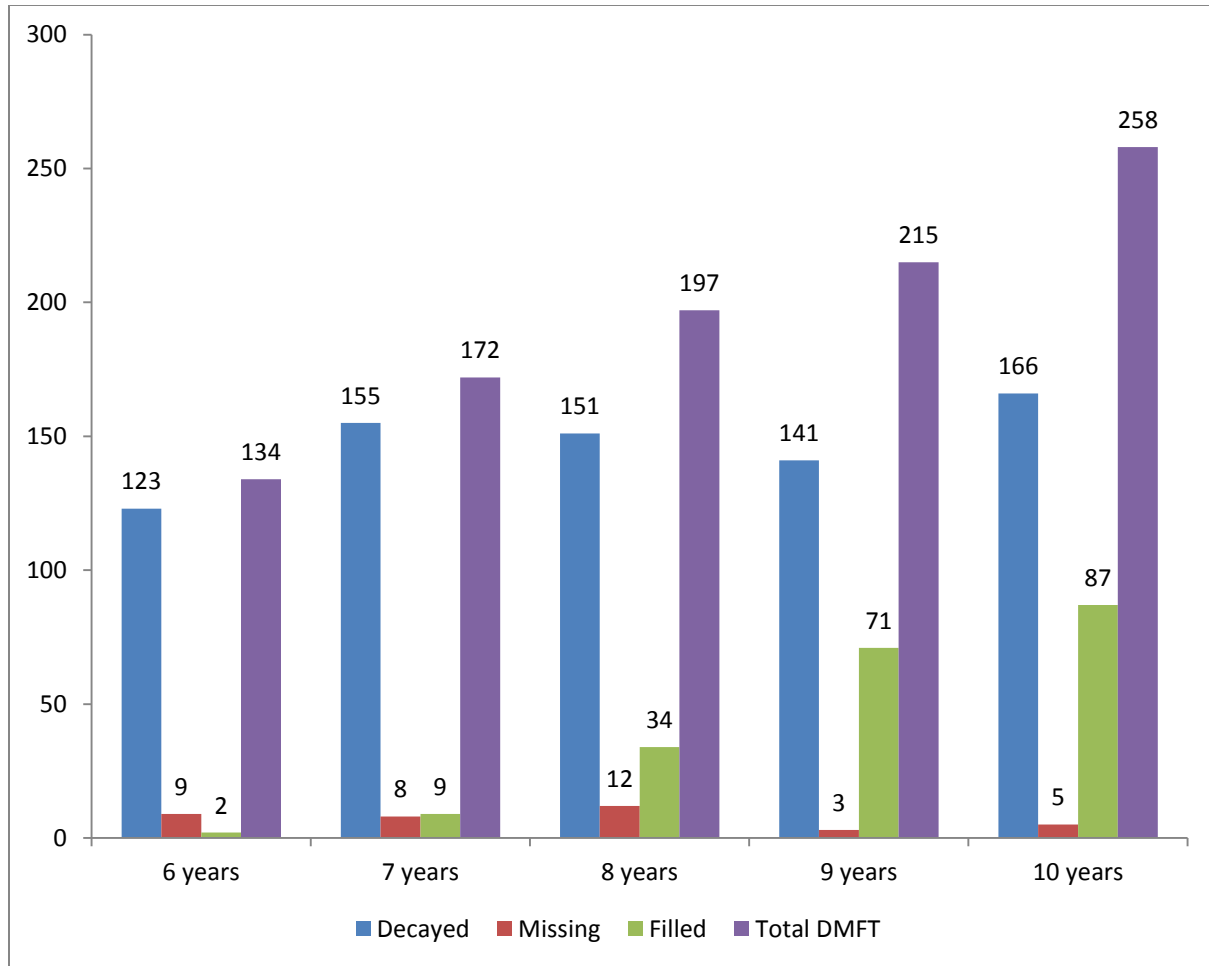
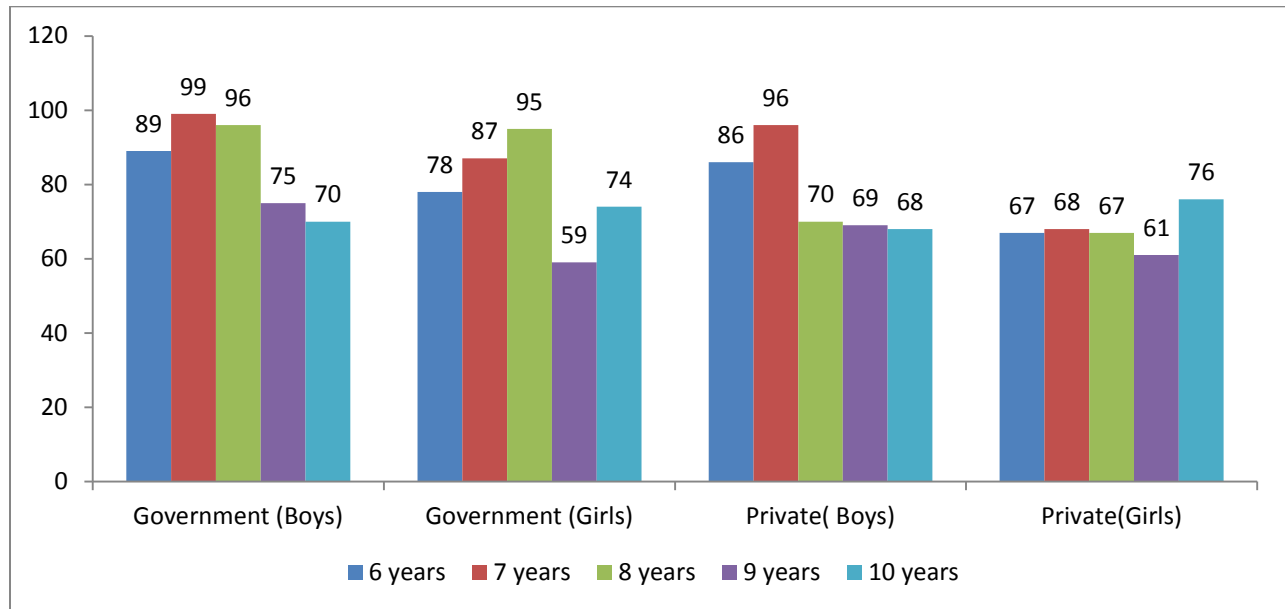


Table no. 6:- Distribution of Boys and Girls according to Government and Private School

School		Boys		Girls		χ ² -value
		No.	With Caries	No	With Caries	
Government	6 years	89	45	78	35	4.79 P=0.30,NS
	7 years	99	55	87	56	
	8 years	96	44	95	45	
	9 years	75	56	59	35	
	10 years	70	51	74	54	
Total		429	251	393	225	
Private	6 years	86	21	67	22	2.57 P=0.63,NS
	7 years	96	27	68	17	
	8 years	70	29	67	33	
	9 years	69	27	61	23	
	10 years	68	25	76	36	
Total		389	129	339	131	

Graph no. 6:- Distribution of Boys and Girls according to Government and Private Schools**Table no. 7:-Frequency of simultaneous presence of first permanent mandibular molar caries and its antimere in Boys and Girls.**

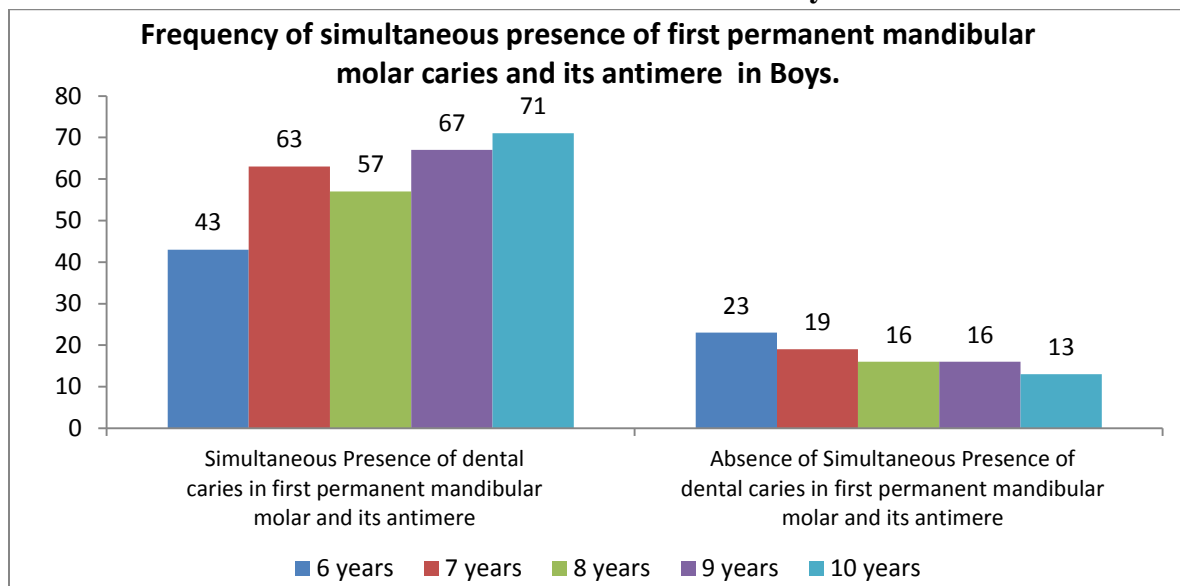
Gender	Age	With Caries	Simultaneous Presence of dental caries in first permanent mandibular molar and its antimere		Absence of Simultaneous Presence of dental caries in first permanent mandibular molar and its antimere	
			No.	%	No.	%
Boys	6 years	66	43	65.15%	23	34.84%
	7 years	82	63	76.82%	19	23.17%
	8 years	73	57	78.08%	16	21.91%
	9 years	83	67	80.72%	16	19.27%

	10 years	84	71	84.52%	13	15.47%
Total		388	301	77.57%	87	22.42%
Girls	6 years	57	43	75.43%	14	24.56%
	7 years	73	65	89.04%	8	10.95%
	8 years	78	67	85.89%	11	14.10%
	9 years	58	38	65.51%	20	34.48%
	10 years	82	63	76.82%	19	23.17%
Total		348	276	79.31%	72	20.68%

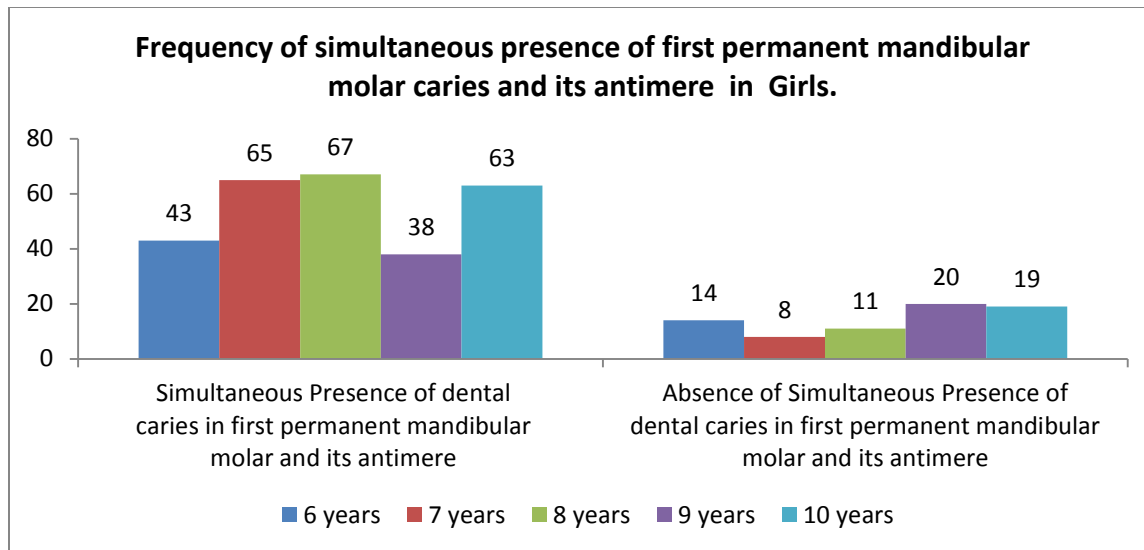
χ^2 -value(Boys)=8.69,p-value=0.06,NS,p>0.05

χ^2 -value(Girls)=13.83,p-value=0.007,S,p<0.05

Graph no. 7:- Frequency of simultaneous presence of first permanent mandibular molar caries and its antimere in Boys.



Graph no. 8:- Frequency of simultaneous presence of first permanent mandibular molar caries and its antimere in Girls.



RESULTS:-

A total of 1550 students were examined which includes 818 Boys and 732 girls.(Table 1). Prevalence of dental caries according to age groups (6, 7, 8, 9 and 10 years) was 38.43%, 44.28%, 46.03%, 53.40% and 57.63% respectively. (Table no 2). Prevalence of dental caries in boys according to age groups (6, 7, 8, 9 and 10 years) was 37.71%, 42.05%, 43.97%, 57.63%, 55.07% respectively.(Table no. 3). Prevalence of dental caries in girls according to age groups (6, 7, 8, 9 and 10 years) was 39.31%, 47.09%, 48.14%, 48.33% and 60% respectively. (Table no.4)

The mean DMFT in first permanent molars was 0.17, 0.18, 0.20, 0.20 and 0.22 for 6, 7, 8, 9 and 10 years age group respectively indicating that as age increased the DMFT also increased correspondingly. (Table no.5)Among Government school students 251out of 429 boys showed caries (58.50%) and 225 out of 393 girls showed caries.(57.25%). Among Private school students **129**out of 389 boys showed caries (33.16%) and **131** out of 339 girls showed caries.(38.64%) (Table no. 6)

The percentage of children exhibiting simultaneous presence of dental caries in both first permanent mandibular molar and its antimere was 77.57% for boys and 79.31% for girls while this relationship was absent in 22.42% for boys and 20.68% in girls as shown in Table no 7.

STATISTICAL ANALYSIS:-

Statistical analysis was done by using descriptive inferential statistics using chi-square test and software used in analysis were SPSS 22.0 version and GraphPad Prism 6.0 version and $p < 0.05$ is considered as level of significance.

DISCUSSION:-

Dental caries is a dynamic process for which several studies have been done to determine the risk factors. Presence of plaque along with cariogenic diet and the essential cariogenic

microorganisms (*Streptococcus Mutans*) have been found to lead to carious lesions.¹⁵ The factor of pit and fissure morphology is often not observed that plays an important role in this ubiquitous process acting as safe shelter for the microorganisms to grow in.¹⁶

The current study was exclusively done on first permanent molar. They play a key role in maintaining the Dental and overall health of an individual. The first permanent tooth to erupt is first permanent molar. Maximum occlusal load is also beared by them.¹⁷ Apart from this, since they have the maximum root surface area they are considered to be best source of anchorage for moving the tooth. Above all the health of this tooth in particular can form a good basis to assess the oral health status of these children, since this tooth is more vulnerable to caries than others because of its functional and morphological characteristics.¹⁸

In the present study 736 out of 1550 children were with caries with a prevalence of 47.48% and DMFT for first permanent molar was 0.17, 0.18, 0.20, 0.20, 0.22 for 6,7, 8, 9 and 10 years age group respectively. As age increased the Mean DMFT also increased. These results are in agreement with study done by **Rafi Ahmad Togoo et al.**¹⁹, **Dash et al**²⁰, **Dharet al**²¹, **Saravanan et al**²² and **Goyalet al**²³. The reason for caries being more as age increased can be accredited to the fact that as caries being a continuous and cumulative. Prevalence of dental caries in girls was higher 48.63% as compared to boys with prevalence of 46.68% which is in accordance to studies by **Fazeli SA et al**²⁴, **Antunes JL et al**²⁵ and **Ferraro M et al**²⁶. The apparent reason could be the age of eruption of first permanent molars which appears earlier in females than in males.²⁷ Also salivary composition and flow rate varies in males and females and salivary flow rate is less in females than in males.²⁸ **Pakpour**³⁰ found a high incidence of caries in males as compared to females while **Sadeghi M.** found no difference in caries incidence among both sexes.³¹

In the current study, 476 out of 822 government school students exhibited caries with a prevalence of 57.90% while 260 out of 728 private school students exhibited caries with a prevalence of 35.71%. So ultimately government school students showed higher caries prevalence as compared to private school students. This finding is similar with the findings of study done in **Saudi Arabia, Jordan**³² as well as in **Syria**.³³ The apparent reason for this could be lack of access to health education, preventive Dental programs and school Dental services for the government school students.

Prevalence of simultaneous presence of dental caries in first permanent mandibular molar and its anti-mere in boys was 77.57% and in girls it was 79.31% whereas it was absent in 28.90% boys and 20.68% girls. This finding was similar with study done by **Iffat Batool Syed et al** where they found that 80(80%) males and 85(85%) females exhibited evidence of simultaneous presence of dental caries in mandibular first permanent molar and its anti-mere while 20(20%) males and 15(15%) females did not show any evidence.

Dental caries can ultimately lead to the extraction of the first permanent molars if not treated early. This particular tooth is very important with regards to bearing all the masticatory loads and also helping in functionally desirable occlusion.³⁵ This enhances the importance of keeping 1st permanent molars safe. If this tooth is lost in early age then it can result in mal-

positioning of the other teeth,^{24,34} midline shifts and even skeletal asymmetry³⁶ correction of which needs expensive and prolonged orthodontic treatment.

CONCLUSION:-

1. The prevalence of dental caries in first permanent molars among 6-10 year old school going children was 47.48%
2. Prevalence of caries in first permanent molars and DMFT increased with age.
3. Caries Prevalence in girls (48.63%) was significantly higher than boys (46.68%)
4. Prevalence of caries in Government School children (57.90%) was higher than Private School Children (35.71%)
5. Simultaneous presence of dental caries in first permanent mandibular molar and its antimere was more than its absence.

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