

PREVALENCE OF DENTAL CARIES AMONG 3-12-YEARS-OLD CHILDREN OF SWAT – PAKISTAN

¹MANZAR ANWAR KHAN

ABSTRACT

The aim of the study was to determine the prevalence of dental caries among 3-12 years old children in Swat, Pakistan. A total of 646 children were examined. The sample consisted of 231, 358, and 57 children in the 3-5, 6-8 and 9-12 years of age group, respectively. Dental caries and gingival index were examined and recorded accordingly. Dental caries was diagnosed according to criteria recommended by World Health Organization. The relationship of the DMFT index to the following factors was investigated: age, sex, and personal hygiene. The sample consisted of 513 males and 133 females who ranged in age from three to twelve years. Their mean age was 6.25 years. For the entire sample, the mean DMFT index was 4.02. The prevalence of dental caries was highest in 6-8 year of age group compared to 3-5 years and 9-12 years age groups. The increase in prevalence of dental caries needs dental health programs to be arranged in the specified population.

Key words: Dental caries, DMFT index, prevalence, gingival index

INTRODUCTION

The prevalence of dental caries is declining in developed countries, but increasing in developing countries with low socioeconomic status.¹ Income, Education and Social class has very important effect on dietary and oral hygiene status even in western countries. People having low socioeconomic status show more caries than high socioeconomic class². Many studies shows status of dental caries in the Pakistani population. In Pakistan, access to dental health services has increased in the urban areas during the past decade, with a resulting decrease in the prevalence of dental caries³.

In Pakistan, the government is a major employer of dentists as well as a major provider of low cost oral health services for the general population. This activity is accomplished through an extensive network of clinics in both urban and rural areas. Private dental care, on the other hand, is mostly urban-based. Prevention programs for dental diseases do not exist³. Caries is a multifactorial disease, most of these surveys associate dental decay with a number of factors, including age, sex, race, ethnic affiliation, lack of oral hygiene and socioeconomic status^{4,5,6,7,8}.

By the year 2000 World Health Organization (WHO) hopes that 50 percent of five year old children will be totally free of dental caries. To achieve this goal, oral health care should begin when oral health habits are being developed early in childhood⁹.

Community interest in dental health is important. In the past, emphasis was directed toward improving the skill and knowledge of the dentist. There has been

a failure to improve the distribution of dental services in developing countries. Dental health has been neglected for a long time in Pakistan, and still is not a primary issue in most of the developing nations for so many different reasons¹⁰. Thus, the present study was designed to assess the prevalence of dental caries in school children of Swat Pakistan.

METHODOLOGY

A study of prevalence of dental caries of school going children of Swat was undertaken, to evaluate prevalence of dental caries in relation to various risk factors.

This survey was carried out in different schools on 646 children living in Swat – Pakistan. These different schools were randomly selected. The sample consisted of 231, 358, and 57 children in the 3-5, 6-8 and 9-12 years of age group, respectively. In each of these age groups an attempt was made to include equal number of male and female subjects but it was not possible because of the fact that girls are usually neglected regarding sending to schools in such areas of Pakistan that's why male to female ratio was approximately 4:1 respectively.

Consent for examining of the children was obtained from the respective District Health Officer and District Education Officer along with the Principal of the schools in sample. All the children present on the day of examination were included in the study and only uncooperative children were excluded from it.

A separate proforma for each child was used and after entering basic demographic information and oral hygiene habits, child was examined in ordinary chair

¹Assistant Director, DGHS NWFP, Peshawar

under natural light. Radiograph was not taken and only frank cavity was considered as caries. All examination was done by single researcher according to basic method developed by WHO and DATA were entered by another person in proforma.

The data were analysed using the statistical package SPSS, They were summarized using arithmetic means and standard deviations. The statistical test used was one-way analysis of variance (ANOVA). An observed probability of 0.05 was considered statistically significant. An explanation of the various sub groupings and ordering schemes is shown below;

1 Age groups

- ages 3-5 years
- ages 6-8 years
- ages 9-12 years

2 Personal hygiene (Toothbrushing frequency)

- 0 never
- 1 occasionally
- 2 once-daily
- 3 twice-daily

3 Gingival status

- 0 healthy
- 1 moderate gingivitis
- 2 severe gingivitis

4 Geographic setting

- 1 rural
- 2 suburban
- 3 urban

RESULTS

Of the 646 school children in the sample, 513 were males (79.4 percent) and 133 were females (20.6 percent) (Table & Fig 1).

The sample was divided into three age groups: group 1 (3-5 years) consisted of 231 children (35.8 percent), group 2 (6-8 years) consisted of 358 children (55.4 percent) and group 3 (9-12 years) consisted of 57 children (8.8 percent)

The mean age in this study was 6.3(+_{SD}=1.7). The mean age for the male was 6.3(+_{SD}= 1.7 and for females was 6.2(+_{SD}=1.7).

The major oral health assessment variables examined in this study were Decayed Missing and Filled Teeth (DMFT), personal oral hygiene and gingival index (GI). The mean DMFT and standard deviation for

TABLE 1: GENDER-WISE DISTRIBUTION

	N	% <>
MALE	513	79.4
FEMALE	133	20.6

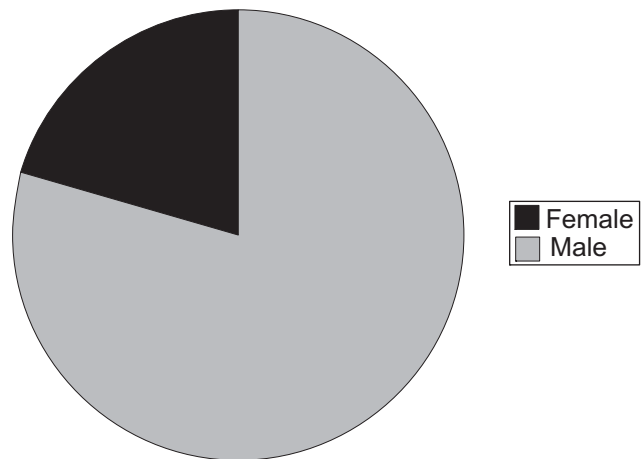
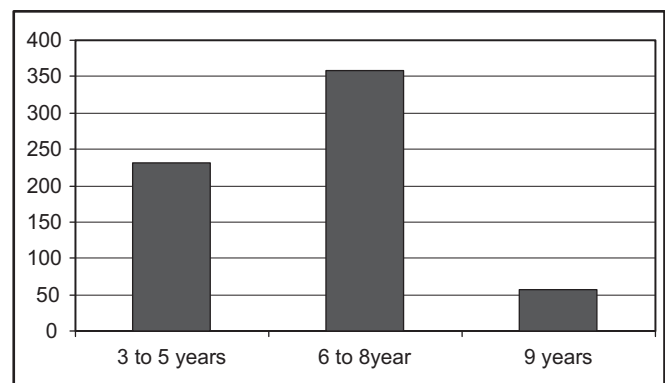


Fig 1

TABLE 2: ORAL HEALTH MEASURES BY AGE GROUPS

	3-5 yrs	6-8 yrs (n=231)	9-12yrs (n=358)	P*
DMFT	3.8±4.4	4.6±3.9	3.7±3.3	0.06
GI	0.7±1.5	1.3±1.9	1.3±2.0	.0005



+ MEAN ± STANDARD DEVIATION

* ONE-WAY ANALYSIS OF VARIANCE

Fig 2

the entire sample was 4.02 and 4.05, respectively. The mean and standard deviation for GI for the entire sample was 1.1 and 1.9.

There was a significant difference between age groups for GI (one-way ANOVA, $p=0.0005$); the youngest age group had a lower GI than did the other two groups (0.7, vs 1.3 and 1.3) (Table & Fig 3).

Only six fillings were observed in the entire sample of 646 children. Therefore, the variable "number of

TABLE 3: DMFT BY AGE

	3-5 yrs (n=231)	6-8 yrs (n=358)	9-12 yrs (n=57)	P*
DMFT	3.8±4.4	4.6±3.9	3.7±3.3	0.06

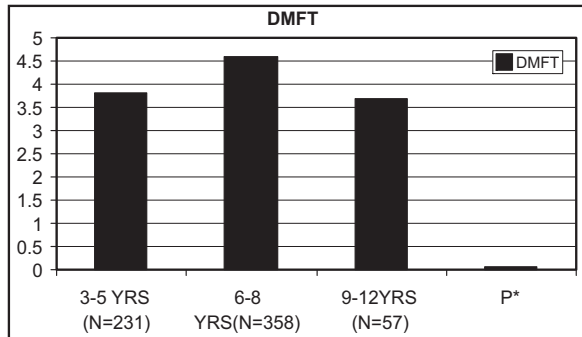


Fig 3

TABLE 4: AGE

	MEAN	SD	N	P
3-5 YEARS	3.6	4.1	231	0.15
6-8 YEARS	3.9	3.4	357	
9-12 YEARS	2.9	2.8	58	

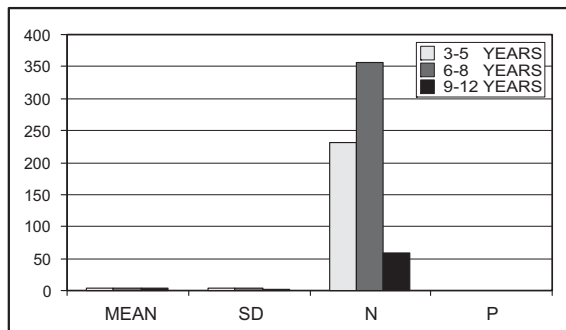


Fig 4

TABLE 5: RELATIONSHIP BETWEEN AGE AND MISSING TEETH

	MEAN	SD	N	P*
1-3 YEARS	0.3	0.8	231	<0.0001
6-8 YEARS	0.6	1.3	357	
9-12 YEARS	0.6	1.1	58	

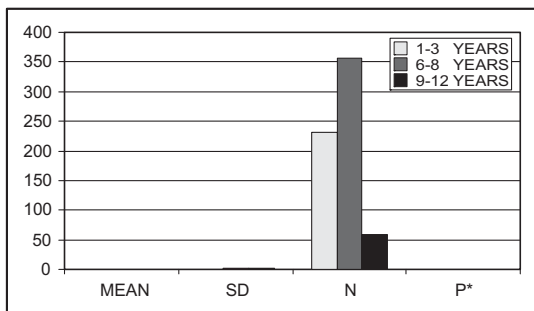


Fig 5

TABLE 6: RELATIONSHIP BETWEEN GENDER AND DECAYED TEETH

	MEAN	SD	N	P*
MALE	0.5	1.2	513	0.26
FEMALE	0.4	0.9	133	

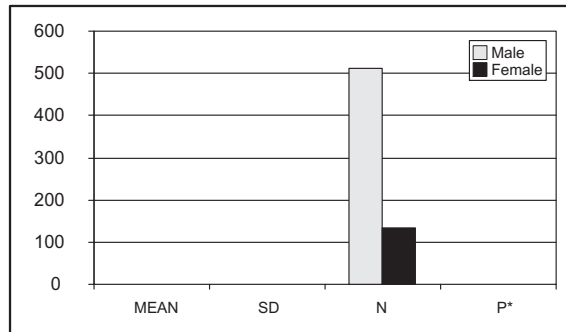


Fig 6

TABLE 7: FREQUENCY OF TOOTH BRUSHING

Frequency of T.B	Mean	SD	N	P*
0 None	0.6	1.3	329	0.001
1 Occasional	0.3	0.8	50	
2 Once-daily	0.4	0.9	207	
3 Twice-daily	0.2	0.7	60	

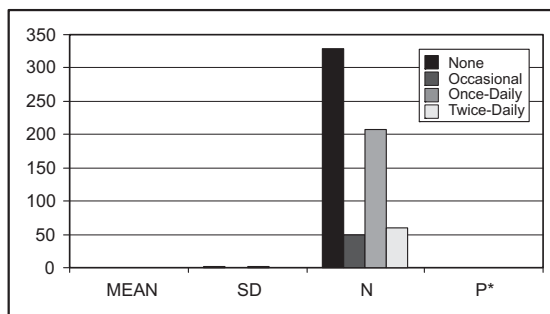


Fig 7

filled teeth” is omitted from both descriptive and inferential statistics. Tables 5 and 6 represent summary statistics and comparative analysis for the variables “number of decayed teeth” and “number of missing teeth” studied in this survey, segmented by the age, sex, personal hygiene, gingival status and geographic setting.

There were no significant differences seen between age groups for the number of decayed teeth by Age (one-way ANOVA, p= 0.15).

However, there were significant differences seen between age groups for the number of missing teeth. (one-way ANOVA, p<0.0001) The youngest age group had the least missing teeth (0.3 vs 0.6 and 0.6).

There was no significant difference between males and females for the number of decayed teeth and the number of missing teeth (one-way ANOVA, P= 0.47 and 0.26, respectively). Table 6

TABLE 8: GINGIVAL STATUS

	MEAN	SD	N	P*
0 HEALTHY	0.5	1.1	479	0.20
3 MODERATE	0.5	1.1	130	
4 SEVERE	0.9	1.3	37	

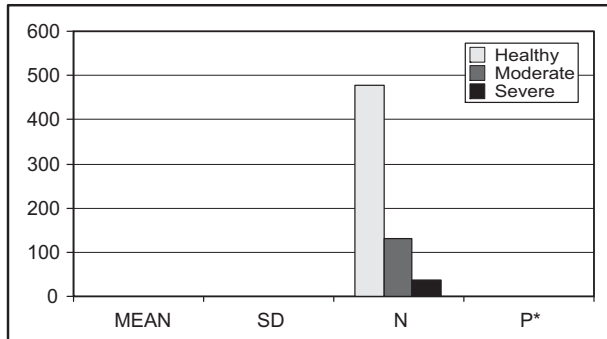


Fig 8

TABLE 9: GEOGRAPHIC SETTING

	MEAN	SD	N	P*
1 RURAL	0.5	1.3	259	0.06
2 SUBURBAN	0.4	1.0	240	
3 URBAN	0.4	0.9	143	

* ONE-WAY ANALYSIS OF VARIANCES

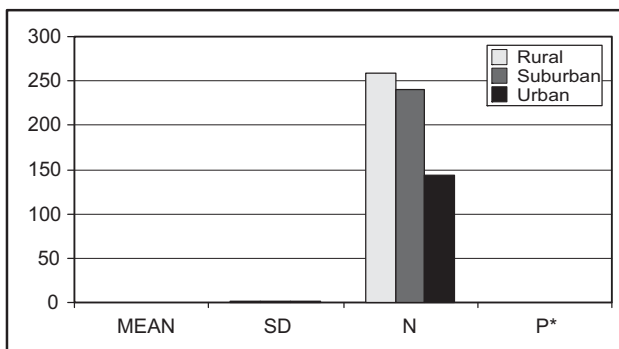


Fig 9

There were significant differences among personal hygiene subgroups for both the number of decayed teeth and the number of missing teeth. (one-way ANOVA, $p < 0.0001$ and 0.001 , respectively). The number of decayed teeth, and the number of missing teeth decreased considerably as the frequency of tooth brushing increased. (Table & Fig 7).

There were significant differences between the gingival subgroups for the number of decayed teeth (one-way ANOVA, $p < 0.0001$), but there were no significant differences between these groups for the number of missing teeth (one-way ANOVA, $p = 0.20$). Table 8

There were no significant differences among geographic subgroups for the number of decayed teeth (one-way ANOVA, $p = 0.52$). There was a borderline significant difference among these geographic groups for the number of missing teeth (One-Way Anova $P = 0.06$).

DISCUSSION

Contemporary data on the oral health status of Pakistani children is limited, particularly for the North Western province. It has been noted that a 50 percent reduction in the caries experience has occurred in the urban areas over a ten-year period starting in the early 1980s. During this time no known changes in the preventive measures have been noted³². It is an interesting phenomenon probably due to the use of fluoride containing dentifrices and better oral hygiene.^{20,55}

Seventy to eighty percent of the population in most of the developing countries resides in rural areas. There is a trend toward high caries prevalence and high levels of periodontal and mucosal diseases^{22,28}. Developing countries, in general, have shortages of trained personal; a high level of unmet dental needs and limited resources. Coupled with an alarming growth in population⁵¹, these problems will go unresolved for many years.

In Pakistan, the government manages health care services through the ministry of health, which provides the country with physicians, dentists and auxiliary health care workers. Government health services began in 1986-87. Dental surgeons were recruited under this scheme, but unavailability of the dental equipment rendered the program useless³².

In the present study there was no significant difference between boys and girls for DMFT, periodontal index (P1) and gingival index (GI). These findings are similar to a study previously completed in the eastern part of Pakistan (32), which suggests a need to generalize dentistry.

There was a borderline significant difference among age groups for DMFT (Table & Fig 4). The high caries prevalence of 6 to 9 years old can be attributed to various reasons, including poor oral hygiene, limited resources and lack of dental prevention programs. The apparent decrease in DMFT in the 9 to 12 years olds may be due to the natural shedding of primary teeth or it may be as a result of the relatively small sample size in the group. The overall high level of untreated dental caries in the children examined underscores the fact that some children are unlikely to have access to the dental care. Emphasis should be placed on the primary health care approach and on community dental health in general.

There were no significant differences in the Periodontal Index (PI) for the age and gender groups. With an overall mean PI for the study sample of 0.5, the sample examined appears to have a healthy periodontium. Children who require periodontal care could receive treatment from auxiliaries, such as dental hygienists, but currently the Pakistan dental health system trains only dentists and dental assistants. There is no program for training dental hygienists, who could help to maintain good oral health as well as treat dental disease.

Age was found to be associated with GI. As age increased, the GI increased. This emphasizes a need

for oral hygiene education and toothbrushing habits to be established at an early age. Most children in developed countries have established toothbrushing habits by the age of three¹¹, while in Pakistan and in most developing countries, toothbrushing is adopted, if at all, at school age.

Even though the DMFT observed in this study may seem relatively high, the results of the study support the hypothesis that the caries experience of Swat is comparable to WHO global oral health data for areas such as Bangladesh, Bhutan, Sri Lanka, Nepal and India⁴⁹.

The children who presented with higher scores on gingival status, periodontal status and malocclusion exhibited little or no oral hygiene behavior, and they had a significantly greater number of decayed teeth. Demographic factors had little impact on carious teeth, suggesting that unmet dental needs are uniformly distributed according to sex, age, geographic setting and parents occupation. The problem of relatively extensive unmet needs is also seen in the study finding that fewer than six children had any filled teeth.

The relatively high prevalence of caries and other indicators of oral disease found in the study can be related to several factors. The wide use of fluoridated water in the communities of developed countries is playing a major role in the decline of caries. In Pakistan, however, fluoride is not widely used. Although the community water is fluoridated in Swat and water fluoridation has its greatest and proven effect on decreasing caries prevalence^{12,22,24,58}.

In Pakistan, most of the school children are taught to brush their teeth using miswak with water, not with a toothbrush and toothpaste. Miswak, which is made from a branch of a rare plant called the Arak tree, is used in place of a toothbrush. This way of brushing is commonly, practiced by most of the people in rural areas in Pakistan. Children traditionally begin to use miswak at about age six. In this survey, some children reported using miswak, so it might be one of the causes in higher caries prevalence in six to nine year olds.

The proportion of dental visits for asymptomatic checkups is almost negligible. Many people think that their dental problems do not require urgent attention. By the time they self-diagnose the problems, it is too late to treat. However, this is a problem that exists everywhere, especially in the developing world. The extreme delay in seeking care accounts for the high prevalence of patients with toothaches who are seeking extractions. Also, there is a common misconception by the people that dental extraction is the cure for all dental problems. Public education emphasizing prevention and conservation is required to correct this perception.

Means for achieving optimal oral health care in Pakistan should begin with the use of innovative, conservative and restorative techniques and the adoption of models found to be successful in the same hemisphere²¹.

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