

INCIDENCE OF CARIES IN 6 – 12 YEARS CHILDREN VISITING PUNJAB DENTAL HOSPITAL, LAHORE & SARDAR BEGUM DENTAL COLLEGE AND HOSPITAL, PESHAWAR

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ABSTRACT

This study was conducted on 1146 patients having age of 6-12 years visiting two dental hospitals of NWFP and Punjab, Pakistan. The aim of this study was to determine the incidence of caries in 6-12 years children. G.V.Black's classification of dental caries was used. 516 cases were studied in Lahore while 630 in Peshawar during the period from January to December 2006. Class I & II carious lesions were included. Among 516 cases studied in Lahore, total of 938 carious lesions were detected on various surfaces. class I caries on buccal surface was found in 40 (4.3%) teeth, on palatal / lingual surfaces 4 (0.4%), occlusal surface caries, 503 (53.6%). Class II caries on mesial surface 77 (8.2%) were detected while on distal surface 91 (9.7%) were seen. Other details were; mesio-occlusal (M-O) caries 109 (11.6%), disto-occlusal (D-O) caries 85 (9.1%), mesio-occluso-distal (MOD) caries were 29 (3.1%).

630 patients were examined at Sardar Begum dental College & Hospital, Peshawar. A total of 1838 carious lesions were detected on various surfaces. Class I caries on buccal surface 01 (0.1%), palatal / lingual surfaces 19 (1.0%), occlusal surface caries 665 (36.2%). Class II caries on mesial surface 200 (10.9%), on distal surface 173 (9.4%), mesio-occlusal (M-O) caries 384 (20.9%), disto-occlusal (D-O) caries 328 (17.8%), mesio-occluso-distal (MOD) caries 68 (3.7%). A high significance level ($p < 0.05$) was detected. Ready availability of sweets and confectionaries to children of all classes in the country compounded by poor knowledge of preventive and restorative oral health care services was contributory to the current trend.

Key words: Dental caries, Dentition, Diagnosis.

INTRODUCTION

It is well known that dental caries is an infectious microbiologic disease of the teeth that results in localized dissolution and destruction of the calcified tissue. Dental caries is among the most common dental problems affecting humans. This is a major health problem with high prevalence, globally involving the people of all regions and society.¹

Dental caries result from the microbial deposits covering the tooth surface at any given site. Mineral

loss and subsequent cavity formation is a result of imbalance in the dynamic equilibrium between tooth mineral and plaque fluid. In an unfavorable environment, the remineralization rate does not sufficiently neutralize the rate of demineralization and caries occurs.²

Diagnosis of caries involves primarily visual-tactile methods but radiographs are also extensively used. Since the late 19th century, it has been recognized that detection and classification of dental caries are not easy. The problems of misdiagnosis of caries lesions

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and “hidden caries” are not new phenomena.³ Featherstone⁴ made it clear that both detection of demineralization and an appreciation of lesion activity are required for caries diagnosis.

In the early decades of the 20th century, the technical foundation of restorative dentistry was developed. In the USA, a pioneering and inquisitive dentist, dental teacher, and researcher, Dr. G.V. Black, developed a system for restoring decayed teeth. Dr. Black was surprisingly well aware of the limitation of the restorative approach to management of dental caries⁵⁻⁸. He organized Black's Classification of Caries lesions which is in use today. Since that time, only one more category has been added to his classification system.

Various studies have been conducted on the incidence of caries in children in different parts of the world and almost every study showed high incidence of caries.⁹⁻¹¹ The dilemma is that while several solutions have been proposed, we still do not have consistent and valid systems for clinical caries detection. Hence, this paper aims to evaluate the incidence of dental caries in 6-12 years old children through clinical examination based on visual and visuo-tactile caries detection using G.V Black caries classification system.

MATERIALS AND METHODS

Patients were selected from the outpatient departments of Sardar Begum Dental Hospital, Peshawar and de, Montmorency College of Dentistry/Punjab dental hospital, Lahore. An informed consent was taken from each patient. The study population consisted of children between age 6 – 12 years. Patients with missing teeth, congenital disorders and mental retardation and patients with attrition, abrasion were excluded from the study. Only Class I & II carious lesions were included in the study.

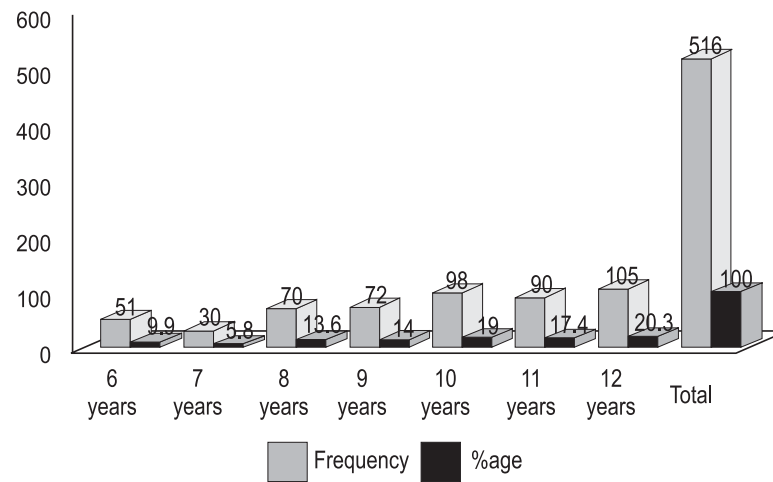
A mouth mirror and a probe were used for examination. For the detection of pit and fissure lesions, (G.V. Black's Class I) Ash's Sickle Probe No. 54 was used, and for approximal lesions, (G.V. Black's Class II) Ash's Probe No. 12 was used. Each tooth was dried thoroughly, and every surface examined. A pit or fissure was counted as carious when the point sticks without doubt and required a definite pull to be removed.

Approximal lesions were considered detectable if Ash's No. 12 probe catches a roughened surface or a definite cavity. Arrested caries were counted as carious, and exposed dentin in hypoplastic teeth was counted as carious, only if there were positive evidence of softening. If the pits and fissures were light or dark brown at base, then the area was diagnosed as carious.

RESULTS

516 patients were examined in Punjab Dental Hospital, Lahore during 2006 with mean age of $9.60 \pm SD 1.90$ ranging from 6-12 years. (Fig 1) A total of 938 carious lesions were detected, Class I caries on buccal surface were found in 40 (4.3%) teeth, while on palatal/lingual surfaces, they were 4 (0.4%). Class I occlusal surface caries, 503 (53.6%) were found. In class II caries on mesial surface 77 (8.2%) were found. In Class II caries on distal surface 91 (9.7%) cavities were found. In class II, mesio-occlusal (M-O) caries 109 (11.6%) Cavities were found. In class II disto-occlusal (D-O) caries 85 (9.1%) cavities were found. In class II mesio-occluso-distal (MOD) caries 29 (3.1%) cavities were found. (Table 1) Age distribution of caries showed 105 (20.3%) patients of age 12 years were most affected followed by 10 years (19.0%) and 11 years (17.4%) respectively with p value of 0.0001. (Fig 1) Tooth wise distribution showed permanent molars to be the most affected, 632 (67.4%) followed by premolars (18.2%) and primary molars (14.4%) respectively. (Table 2)

630 patients were examined at Sardar Begum Dental College & Hospital, Peshawar with mean age of $9.27 \pm SD 2.00$ ranging from 6-12 years. (Table 3) A total of 1838 carious lesions were detected, class I caries on buccal surface was found in 01 (0.1%) teeth, while on palatal/lingual surfaces, they were 19 (1.0%). On occlusal surfaces, 665 (36.2%) were found. Class II caries on mesial surfaces were 200 (10.9%). On distal surface, they were 173 (9.4%) and mesio-occlusal (M-O) caries, were 384 (20.9%) on disto-occlusal (D-O) surface, 328 (17.8%) were seen while on mesio-occluso-distal (MOD) caries were, 68 (3.7%) cavities were found. Results are shown in Fig 2. Age distribution of caries showed 111 (17.6%) patients of age 12 years were most affected, followed by 10 years (17.1%) and 11 years (15.4%) respectively with p value of 0.0001. (Table 4) Permanent molars were the most affected teeth 1004 (54.6%) followed by premolars (29.2%) and primary molars



Mean $9.60 \pm S.D 1.90$ $P = 0.0001$

Fig 1. Age-wise Distribution of Caries in Lahore

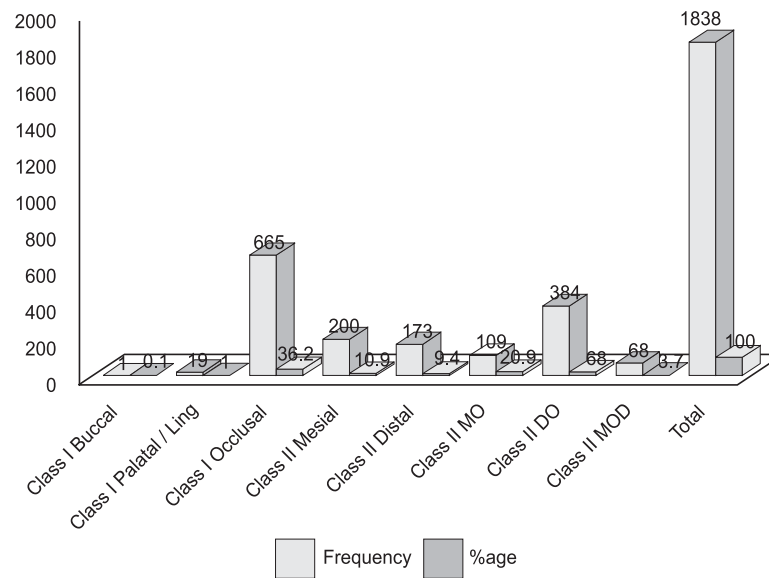


Fig 2: Frequency of caries in deciduous and permanent dentition in Peshawar

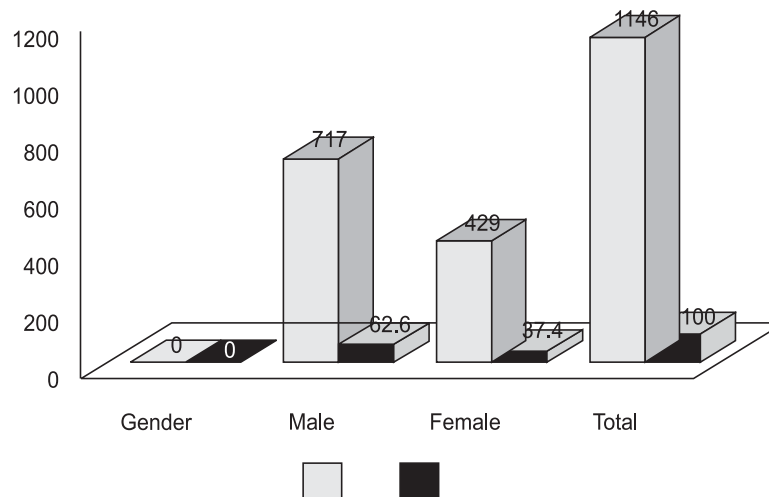


Fig 3: Sexwise distribution

G.V Black's Caries Type	Frequency (%age)
Class I Buccal Surface	40(4.3)
Class I Palatal/Lingual Surface	4(0.4)
Class I Occlusal	503(53.6)
Class II Mesial	77(8.2)
Class II Distal	91(9.7)
Class II Mesio Occlusal	109(11.6)
Class II disto occlusal	85(9.1)
Class II Mesio Occluso Distal	29(3.1)
Total	938(100)

TABLE 1: DISTRIBUTION OF CARIES IN DECIDUOUS AND PERMANENT DENTITION IN LAHORE AS PER BLACK'S CLASSIFICATION

Tooth Type	Frequency (%age)
Primary molars	135(14.4)
Premolars	171(18.2)
Permanent molars	632(67.4)
Total	938(100)

TABLE 2: FREQUENCY OF CARIES IN DECIDUOUS & PERMANENT DENTITION IN LAHORE

Age of patient	Frequency (%age)
6 years	75(11.90)
7 years	89(14.1)
8 years	60(9.5)
9 Years	90(14.3)
10 years	108(17.1)
11 years	97(15.4)
12 years	111(17.6)
Total	630(100)
Mean 9.27 ± S.D 2.00 P = 0.0001	

TABLE 3: AGEWISE DISTRIBUTION OF CARIES IN PESHAWAR

Tooth Type	Frequency (%age)
Primary molars	288(15.7)
Permanent incisors & canine	10.0 (0.5)
Premolars	536(29.2)
Permenant molars	1004(54.6)
Total	1838(100)

TABLE 4: INCIDENCE OF CARIES IN DECIDUOUS & PERMANENT DENTITION IN PESHAWAR

(15.7%) respectively. (Table 3) Sex wise distribution showed 37.4% females & 62.6% males. Results are shown in Fig 3.

DISCUSSION

During the last 100 years, the dental profession has made significant progress in reducing the burden of dental caries in economically developed countries. The scientific and technological advances during the 20th century have profoundly revolutionized how dentistry is practiced and how dental diseases are managed. However, while dental caries still represents the major chronic disease affecting humans, the application of understanding of the dynamic process of caries development has not yet been widely incorporated into dental practice and research. Criteria systems used for the clinical detection of caries lesions have not yet been scrutinized according to standard protocols that are in use in social and clinical sciences. Content validity of caries detection criteria has not yet been investigated. The importance of the “first step” (*i.e.*, detection and diagnosis) in caries management has not been widely recognized, and dentists are usually underpaid for this activity.

This study focused on the visual detection of caries and classification into different groups. As stated before, calls to study and detection of caries lesions were made in the 19th century and by G.V. Black in 1910. Over the last 20 years, there have been many attempts to expand the methods used to detect and diagnose the presence of caries lesions.

Incidence of dental caries has been extensively studied over the past 50 years in North America and Europe. Epidemiological studies have been useful in determining the extent of the need for and effectiveness of dental treatment. The most common measures of caries is an evaluation of the number of permanent teeth that are decayed, missing, or filled (DMF). Measures of primary teeth are reported as *dmf*. This measure is cumulative as it totals the number of restorations and extractions in addition to the number of teeth having active caries. DMF scores are not the true equivalent of caries prevalence as they over state the pervalence of active caries.

In this study G.V.Black's classification was used, which is more basic, practical and appealing. This

clinical detection criteria of caries was simple and straight forward. Cavitated and non-cavitated lesions are easily identified and classified. There is evidence from different studies published, that non-cavitated caries lesions are more prevalent than cavitated lesions in economically developed countries.^{12, 13} Non-cavitated lesions, especially on smooth tooth surfaces in young children, may serve as indicators of caries activity.¹⁴⁻¹⁷

The result of this study showed that incidence of caries in permanent molars was very high, 67.4% in Lahore & 54.6% in Peshawar, average being 61%. Age wise distribution showed 12 years to be the high risk age having 20.3% caries in Lahore & 17.6% in Peshawar, which were highly significant. ($p < 0.05$)

A study conducted by Juric H et al⁹ showed that Children in Croatia had very high values of the dmft-t/DMF-T (7.7/6.7), dmfs/DMF-S (16.5/11.8), (WHO target of caries is 1.5 DMFT), and significant index of caries. A study conducted by Maragakis GM¹² et al showed that occlusal surface caries accounted for 36.69% of all dmfs. proximal surfaces for 42.40% and buccal and lingual surfaces for 20.91%. In this study higher values of 44.9% occlusal surface caries was found while proximal caries (9.44%) and buccal/ lingual surfaces (1.45%) showed less values as compared to Maragakis et al.

Another study by Esclassan R¹⁸ et al showed the prevalence of caries 17.46% and also the most frequent caries were found to be occlusal and proximal. Molars were the most frequently affected maxillary and mandibular teeth. Goyal A¹¹ et al showed in their study the mean dmft of 4.0 +/- 3.6 in 6 year old and 4.61 +/- 3.14 in 9 year old, whereas the mean DMFT in 12 year old was found to be 3.03 +/- 2.52 respectively (WHO target of caries is 1.5 DMFT).

In this study the frequency of caries at 6 years was 10.9%, at 9 years 14.15% while at 12 years it was 18.95%. The high prevalence of dental caries in these children was attributed to the lack of use of fluoride toothpastes, lack of knowledge about etiology of dental caries and frequency of sugar intake.

Class I occlusal surface caries were most common in this study having 53.6% in Lahore and 36.2% in Peshawar which is the result of unsatisfactory oral

hygiene and lack of proper tooth brushing technique as well as posterior teeth complex morphology.

The status of caries in third world countries like Pakistan represents the greatest challenge to dental science. In developing countries income for basic health care need is minimal. Similarly lack of oral hygiene and awareness levels among the people is low, leading to high rates of caries activity in the community. Paradoxically the higher social classes who have greater exposure to cariogenic diet containing sucrose are frequently the most affected.

The result of this study showed that Class I occlusal surface caries were more prevalent in the society which can be restored and the teeth saved from further procedures like endodontics and extractions and so increase the life of dentition. Further more restoration of caries lesions in deciduous dentition is of utmost importance as premature extractions due to caries and infections can lead to mal-eruption of permanent teeth leading to further complications.

The reason behind such high incidence of caries is lack of proper awareness and counselling programmes for the patients on both governmental and domestic level. The cry of the day is to promote the awareness and learning programmes among the masses in addition to promotion of different techniques and materials in the field of dental sciences.

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REFERENCES

- 1 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.
- 2 Fejerskov O. Concepts of dental caries and their consequences for understanding the disease. *Comm Dent Oral Epidemiol* 1997; 25: 5-12.
- 3 A.I. Ismail. Visual and Visuo-tactile Detection of Dental Caries *Dent Res* 2004; 56-66.
- 4 Featherstone JDB. Clinical implications: new strategies for caries prevention. In: *Proceedings of the 1st Annual Indiana*

- Conference. Early Detection of Dental Caries. Ed Stookey GK. Indiana University: 1996; p287-95.
- 5 Black G. Some points in the natural history of caries of the teeth, and the value of fillings for its arrest. *Am J Dent Sci* 1880; 14: 289-308.
 - 6 Black G. A plea for greater earnestness in the study of caries of the enamel in its relation to the practice of dentistry. *Dent Brief* 1910; 15: 161-78.
 - 7 Black AD. Preventive dentistry. Illinois State Dental Society Fifty-Eighth Annual Meeting. Springfield: The American Dent J Publishers, 1922; p32-8.
 - 8 Black G. Operative dentistry. Chicago: Med-Dent Publ. Co, 1924; p 1-319.
 - 9 Juriæ Het al. Incidence of caries in children of rural and subrural areas in Croatia. *Coll Antropol* 2008; 32:131-6.
 - 10 Umesi-Koleoso DC, Ayanbadejo PO, Oremosu OA. Dental caries trend among adolescents in Lagos, South-West Nigeria. *West Afr J Med* 2007; 26: 201-5.
 - 11 Goyal A, Gauba K, Chawla HS, Kaur M, Kapur A. Epidemiology of dental caries in Chandigarh school children and trends over the last 25 years. *J Indian Soc Pedod Prev Dent* 2007; 25: 115-8.
 - 12 Esclassan R et al. Study of the prevalence and distribution of dental caries in a medieval population in Southwest France. *Rev Stomatol Chir Maxillofac* 2008 ; 109: 28-35.
 - 13 Ismail AI. Clinical diagnosis of precavitated carious lesions. *Community Dent Oral Epidemiol* 1997; 25: 13-23.
 - 14 Amarante E, Raadal M, Espelid I. Impact of diagnostic criteria on the prevalence of dental caries in Norwegian children aged 5, 12 and 18 years. *Community Dent Oral Epidemiol* 1998; 26: 87-94.
 - 15 Domoto P et al. White spot caries in Mexican-American toddlers and parental preferences for various strategies. *J Dent Child* 1994; 61: 342-6.
 - 16 Grindefjord M, Dahlöf G, Modéer T. Caries development in children from 2.5 to 3.5 years of age: a longitudinal study. *Caries Res* 1995; 29: 449-4.
 - 17 Imfeld TN, Steiner M, Menghini GD, Marthaler TM. Prediction of future caries increments for children in a school dental service, and in private practice. *J Dent Educ* 1995; 59: 941-4.
 - 18 Maragakis GM, Kapetanakou DN, Manios Y. Caries prevalence and location and dental treatment needs in preschoolers in Athens—GENESIS project. *Community Dent Health* 2007; 24: 264-7.