Original Article

Prevalence of Dental Caries Among Children Aged 6-12 Years in A Govt. Primary School in Siddhirganj

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Abstract

Among chronic oral diseases, dental caries is the most common, especially in children.

It is a progressive infectious process with a multifactorial etiology. The study is conduct to assess the prevalence of dental caries and associated factor among children aged 6-12 years in a govt. primary school. It was a descriptive type of cross-sectional study.The study was conducted in Siddhirganj government primary school, Narayanganj, Bangladesh. Duration of the study was 6 months from 1st January 2022 to 30th June 2022. Population of this study was all the children of class I to class V (8-12 years of age group). In this study we found those who had very good and good health condition were less suffered by caries incidence and those who had poor and very poor the health condition incidence of caries was high.Primary schools have a great potential for influencing health behavior of the children. Systematic training programs for teachers, give priority to community-oriented oral health care and strengthening of preventing programs through the joint efforts of dental auxiliary and the general public can help reduce the need for treatment.

Conclusion: This study provides preliminary reference values for salivary LDH in healthy adults, which may support future diagnostic applications. Further research on larger, demographically diverse populations is warranted.

Keywords: Salivary biomarkers, lactate dehydrogenase, diagnostic saliva, healthy adults, oral diagnostics

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Introduction

Among chronic oral diseases, dental caries is the most common, especially in children.Dental plaque deposits on the surface of teeth are the cause of dental caries. When fermentable carbohydrates are consumed, Streptococcus mutans ferments them and produces a large amount of acid, which lowers the pH in the area to a point where the minerals in enamel and dentine disintegrate. The likelihood of cavities is increased by dry mouth, frequent consumption of sweets, and inadequate oral hygiene. Dental caries results with delayed language development, tooth loss, eating difficulties, and dental pain and discomfort. Additionally, dental cavities impair kids' ability to focus in class and place a financial strain on families.

According to several studies, dental caries affects 60–90% of schoolchildren in both developed and developing nations. Numerous studies revealed that among Middle Eastern schoolchildren, dental caries prevalence could reach 83.3%. Additionally, studies showed that children living in cities had a greater prevalence of dental caries. Ethiopian urban schoolchildren had a 36.5% frequency of dental caries, according to a research. Additionally, research has shown that the age and sex of children as well as the parents' level of education, employment, and residence have an impact on the dental caries experiences of the children[1].But in developing nations, the prevalence of dental cavities has been rising [2]. The Kingdom of Saudi Arabia (KSA) has an extremely high caries prevalence among preschool-aged children, according to Wyne et al. The available data shows that between 10 and 28 percent of children aged 5 to 6 in the Middle East are caries-free. In children with nursing caries, maxillary central incisor was the most frequently reported tooth with caries[3]. It is commonly known that brushing your teeth can help prevent dental problems, and that plaque is a contributing cause to caries and increases the risk of periodontal diseases in particular. Brushing your teeth frequently is a beneficial habit that can help you maintain good oral and dental health[2]. Caries have been reported bilateral in primary dentition[2].

Dental caries is the outcome of long-term interactions between acid-producing bacteria, a substrate that the bacteria may metabolise, and numerous host components, such as saliva and teeth [4]. Dental caries is caused by a combination of biological, behavioural, and physical factors. Other risk factors include poverty, deprivation and social status [4].

Factors that may be implicated in giving rise to caries in school children have been described in a number of review papers [4]. Socioeconomic status has been recognized as a contributor to oral health worldwide [5].

It has been established that there is a social gradient in the prevalence of dental caries, as indicated by the correlation between dental caries indicators and socioeconomic status, even in nations with a long history of oral health promotion, preventive oral care, outreach dental health services, and high utilisation rates [6].In a recent study conducted in Khartoum, Sudan, including 12-year-olds, participants from middle-class groups were more likely to have dental caries than those from lower-class groups[7]. When dental plaque and microbes interact with food over an extended length of time, the

proper material of the teeth is irreversibly destroyed[8]. Dental caries is the most frequent oral illness in children worldwide and a significant dental public health concern[9]. Caries is the most prevalent chronic illness in children, occurring five times more frequently than asthma and seven times more frequently than hay fever. Dental caries is still a highly frequent paediatric illness, even in populations with minimal caries risk[10]. Dental caries has been prevalent in some developing nations, impacting 60–90% of schoolchildren[11]. Numerous epidemiological studies conducted both domestically and internationally have focused heavily on the occurrence of dental caries, which has long been of great interest[12]. In addition to harming teeth, this illness is the cause of a number of pathological disorders affecting the oral cavity and other bodily systems[13]. Due to ignorance, a lot of parents start their kids' dental hygiene at age two, and it's likely that by then, their first teeth cavities have already formed[14]. Dental caries in the permanent and mixed dentition are often the consequence of dental caries that develop in the primary dentition. Eight to twelve-year-olds are in the mixed dentition stage[15]. In order to create the required intervention and education in this area, it is therefore essential to research this age group. Based on the existing data, enamel's physical and chemical characteristics may change during tooth development, increasing the risk of dental caries. Too much sweet food consumption may be the cause of a higher prevalence of dental caries. There are few studies on dental caries prevalence and risk factors in this part of the nation. Hence the present study was undertaken to assess the prevalence and risk factors of dental caries among primary school children of Bangladesh.

Methods

It was a descriptive type of cross-sectional study.The study was conducted in Siddhirgaj government primary school Narayanganj, Bangladesh.Duration of the study was 6 months from 1st January 2022 to 30th June 2022 and population of this study was all the children of class I to class V (8-12 years of age group). Non probability purposive sampling technique was applied for selection of study subjects. About the sample size there was no rigidity. As study population were selected purposively, sample size was120. A structured questionnaire and checklist were used to collect information from the patients. The instruments will be prepared keeping in view the objectives and variables of the study. The purpose of the study was explained in details to the respondents. After that verbal consent as per selection criteria of the study, data from the respondents were collected through face-to-face interview. Questions were asked in Bengali. One questionnaire was used for each respondent was filling for data collection It was made clear to the respondents that they were at liberty to answer or not to answer any question. The respondents were given full assurance on some ethical point of view that under no circumstances any part of the interview will be disclosed to any unauthorized person. At the end of the day of data collection, individual questionnaire was edited through checking and rechecking to see whether it was filled completely and consistently. Then the data were entered into the computer, with the help of software SPSS program version 21 by the researcher. An analysis plan was developed keeping in view with the objective of the study. Frequency distributions of all continuous variables were checked. For analysis of the study results mean, percentage and standard deviation was used. Cross tabulation was prepared. following are the limitations during the study and should be considered while reviewing the study: The study was confined to only one hospital due to shortage of time and administrative inconveniences. The study population was selected purposively from one institution with small sample size, so it does not necessarily represent situations prevailing in other part of the country. Due to time constrained, the study involved limited sample size. So, the results may not coincide with large scale survey. The study was done in the out-patient department of where the patients generally found to be in panic and tense condition. In this condition, patients prefer seeking treatment rather than interview.

Ethical consideration

Ethical issue will be considered in this research. The study received approval from the Bangladesh Open

University's Faculty of Science and Technology's Ethical Committee for the MPH program. National interest will be given first priority during publication, and researchers will consider the risks and rewards of the respondents when gathering data. Respondents will be briefed on the nature and goal of the study prior to data collection. A formal request will be made to the relevant authority to get authorization to gather data. We will obtain informed consent from each respondent. The study's confidentiality and privacy will be rigorously upheld.

Clinical Procedure

The clinical examinations were carried out following class III type examination (A.D.A) using a dental explorer and a plane mouth mirror as well as adequate illumination. The patient will be seated on a chair facing away from the examiner and was examined from behind. The presence of plaque, dental caries, missing or filled teeth was noted.

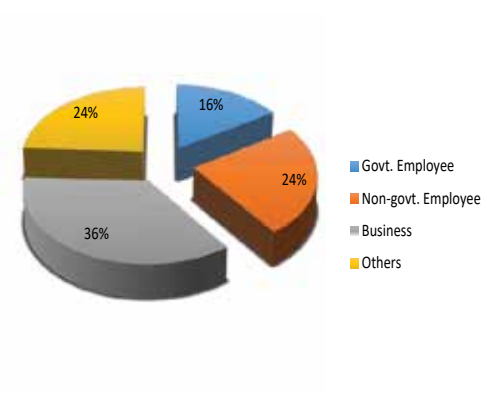
Results

Table 1: Distribution of the respondents according to age, gender and religion

Variables	Frequency (%)	Mean ± SD
Age(years)		6.6±1.56
5 years	8(6.7)	
6 to 9 years	99(82.5)	
10 -12 years	13(10.8)	
Gender		
Male		66(55.0)
Female		54(45.0)
Religion		
Muslim		115(95.8)
Hindu		5(4.2)

Table 4.1 shows that the respondents were grouped into three different age groups where the range of the age group was 3-11. Among them 5-8 years were 82.5%, more than 8 years (8-11) were 10.8% and less than 5 years were 6.7%. Regarding gender male were 55.0% and female respondents were 45.7%. The mean age± SD was 6.6±1.56. It also appears that out of 120 respondents, 95.8% were Muslim and 4.2% were Hindu.

Figure 1: Distribution of the respondents according to Fathers occupation [n=120]



From the figure 1, it also shows that among 120 respondents, 36% fathers were business man, 24% were non-govt. employee, 24% were involved in other profession which were not specified and rest 16% were Govt. employee.

Table 2: Distribution of the respondents according to Mothers occupation and parents' income [n=120]

Occupation	Frequency (%)
House wife	102(85.0)
Govt. Employee	3(2.5)
Non-govt. Employee	13(10.8)
Business	2(1.7)
Monthly income	
<5,000	2(1.7)
5,000-10,000	13(10.8)
10,000-20,000	56(46.7)
>20,000	49(40.8)

From the table 2, it appears that out of 120 respondents, 85.0% mothers were house wife, 10.8% were non-govt. employee, 2.5% were Govt. employee and rest 1.7% was involved in business. It also appears that out of 120 respondents, 46.7% were earned between the ranges of 10,000-20,000 BDT/month, 40.8% respondents earned more than 20,000 BDT/month, 10.8% were earned in between the range of 5,000-10,000 BDT/month and the rest 1.7% were earned less than 5,000 BDT/month.

Figure 2: Distribution of the respondents according to education [n=120]

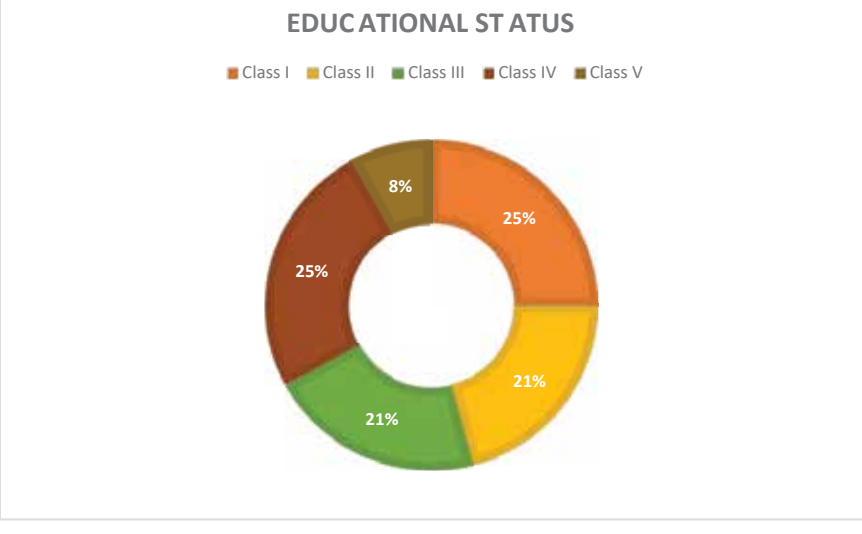


Figure 2 shows that, among 120 respondents, 25% children were read in class I and class IV respectively, 21% were read in II and class III respectively and rests 8% were read in class V.

Table 3: Distribution of the respondents according to their teeth oral hygiene maintenance

	[n=120]
Teeth brushing practice	**Frequency (%)**
Yes	120(100)
No	-
Materials used for brushing	
Brush & Paste	115(95.8)
Brush & Powder	3(2.5)
Coal powder	-
Only finger & Toothpowder	2(1.7)
Meswak	-
Brushing Method	
Up and down stroke	18(15.0)
Forward and backward stroke	75(62.5)
Both	27(22.5)
Mouth rinsing	
Yes	37(30.8)
No	83(69.2)

Table 3 shows that, out of the 120 respondents, all children brushed their teeth. reveals that just 1.7% of the 120 respondents used finger and toothpowder, 2.7% used brush and powder, and 95.8% used brush and paste as a combination for brushing teeth. None were found to use meswak or coal powder. Table 4.10 indicates that, of the 120 respondents, 62.5% used both forward and backward strokes to brush their teeth, 22.5% used both up and down and forward-backward strokes, and 15% used both up and down strokes. After consuming sweetened food, 30.8% of the 120 respondents brushed, rinsed, and cleaned their mouths, compared to 69.2% who did not

Figure 3: Distribution of the respondents according to Frequency of teeth brushing/day [n=120]

From the figure 3, it appears that among 120 respondents 56.7% were brush their teeth twice in a day and 43.3% did that once in a day.

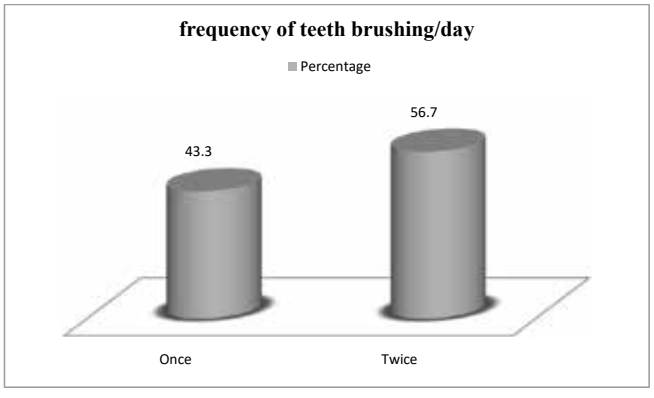


Figure 4: Distribution of the respondents according to their brushing time/day [n=120]

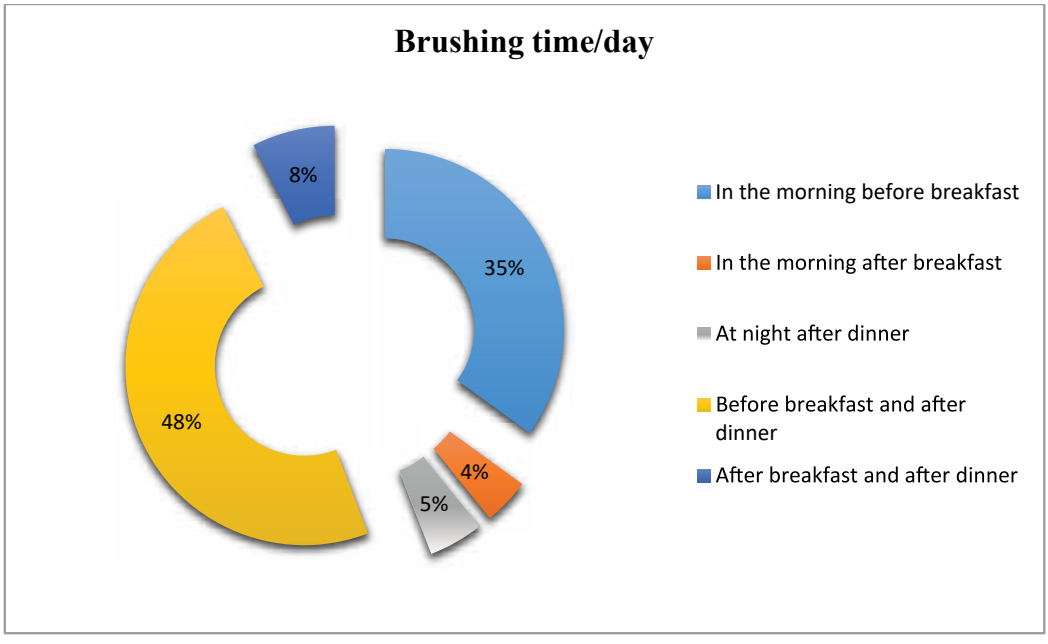
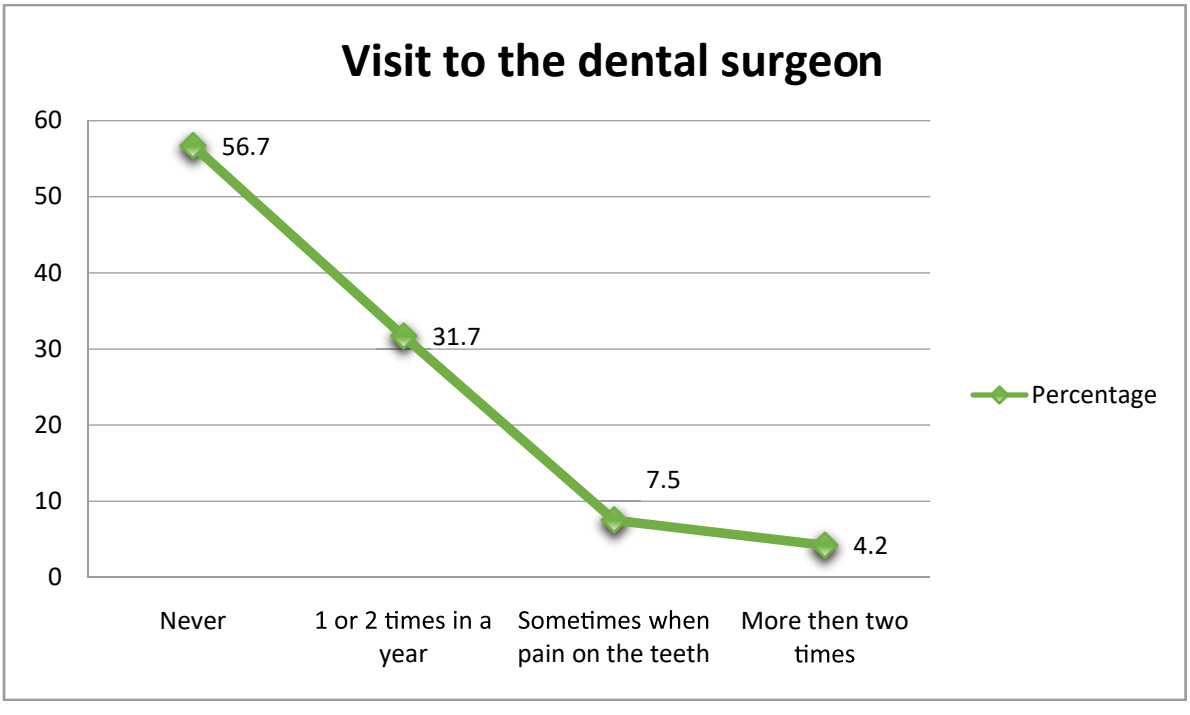


Figure 4 shows that, out of 120 respondents, 48% children were brush their teeth both in the morning before breakfast and at night after dinner, 35% were brush teeth only in the morning before breakfast, 8% were brush teeth both in the morning after breakfast and at night after dinner, 5% were brush teeth only at night after dinner and rest 4% were brush teeth only in the morning after breakfast

Figure 5: Distribution of the respondents according to visit any time to the dental surgeon [n=120]



From the figure 5, it appears that among 120 respondents, 56.7% were never visited to the dental surgeon, 31.7% were visited 1 to 2 times in a year to the dental surgeon and 7.5% were visited to the dental surgeon sometimes when pain on their teeth and only 4.25 were visited more than two times in a year to the dental surgeon.

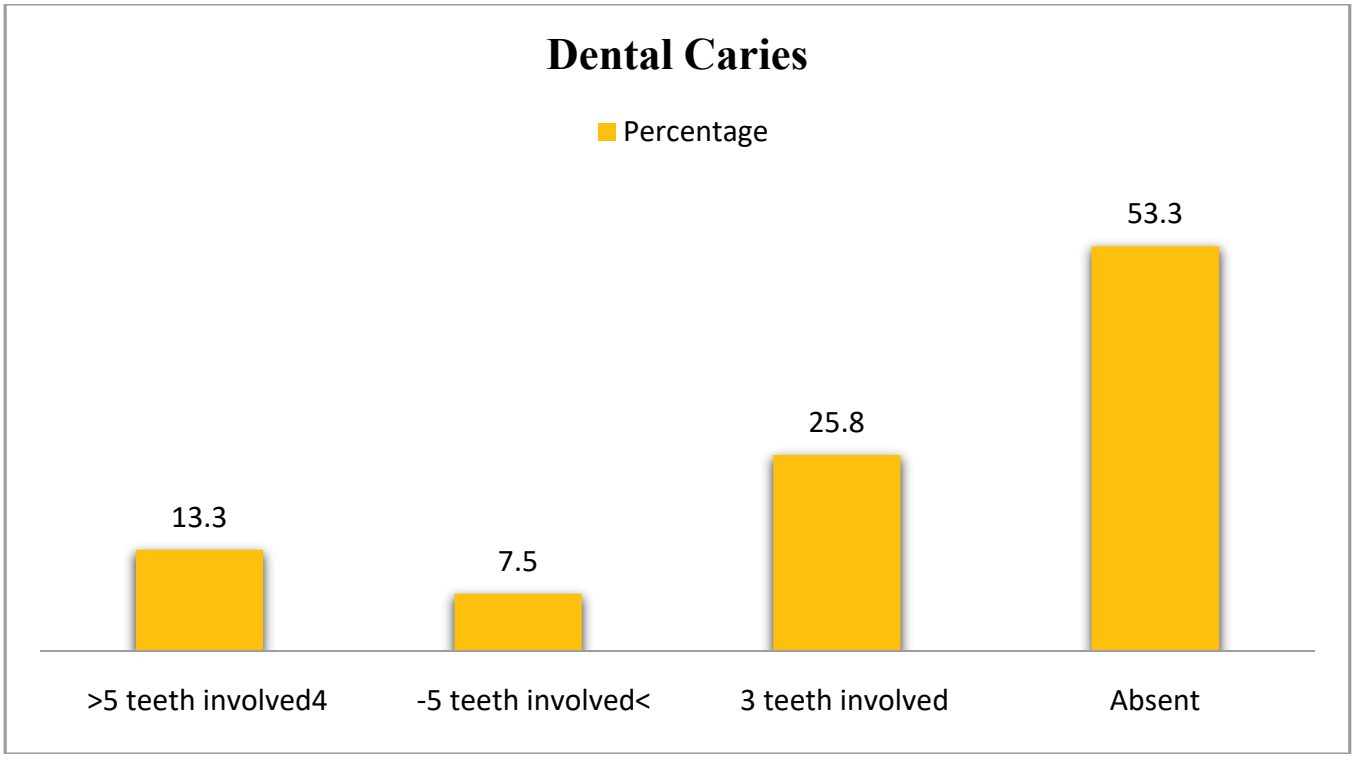
Table 4: Distribution of the respondents according to examination of dental plaque and dental caries

[n=120]

Dental Plaque	**Frequency (%)**
Absent	27(22.5)
Mild	55(45.8)
Moderate	54(28.3)
Severe	4(3.3)
Dental caries	
Absent	64(53.3)
Present	56(46.7)
Types of Dental caries	
Smooth surface caries	7(12.5)
Pit and fissure caries	30(53.6)
Gross caries	19(33.9)

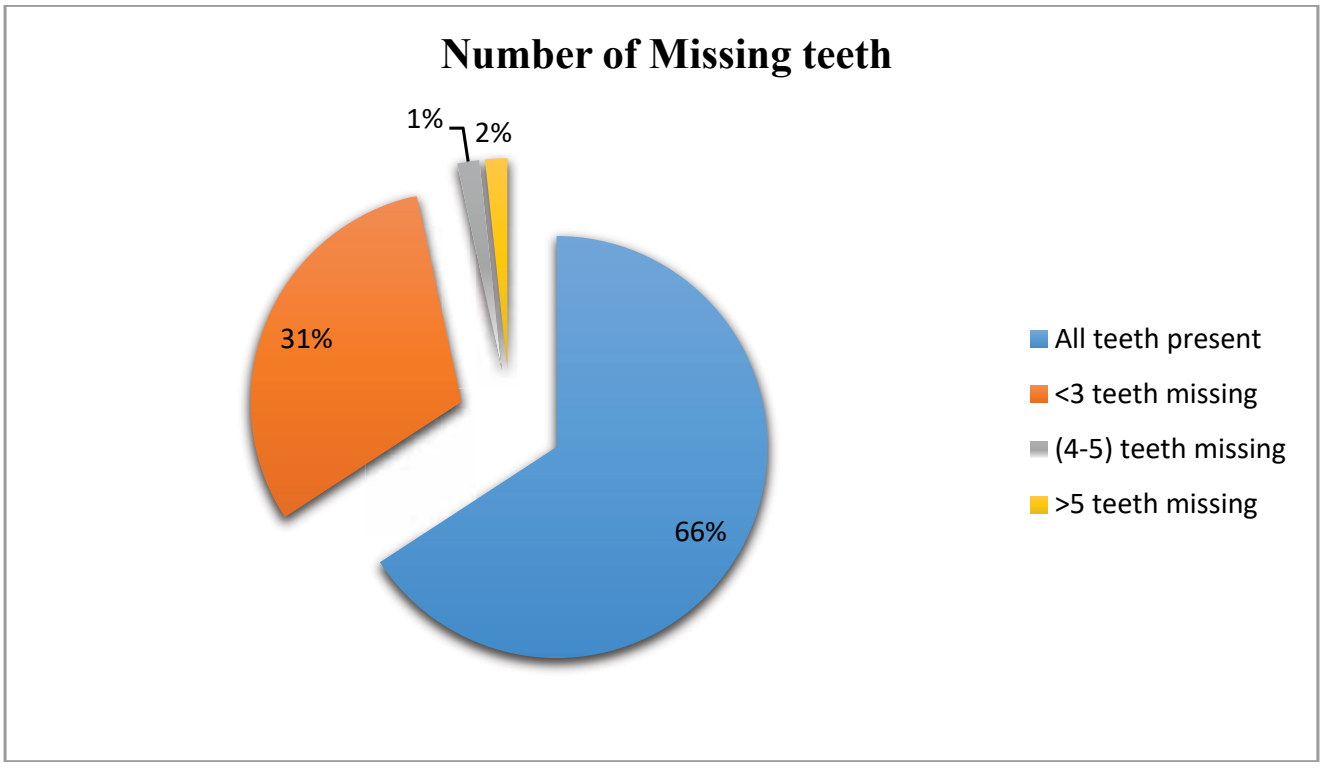
From the table 4, it appears that among 120 respondents, after intraoral examination 45.8% had mild plaque on their tooth surface, 28.3% had moderate plaque, 22.5% had no plaque on their tooth surface and only 3.3% had severe plaque on their tooth surface. About 53.3% had no caries in their oral cavity and 46.7% had caries in their oral cavity. Those who caries present in their oral cavity among 56 respondents, 53.6% were had pit and fissure caries, 33.6% had gross caries and 12.5% smooth surface caries

Figure 6: Distribution of the respondents according to examination of dental caries [n=120]



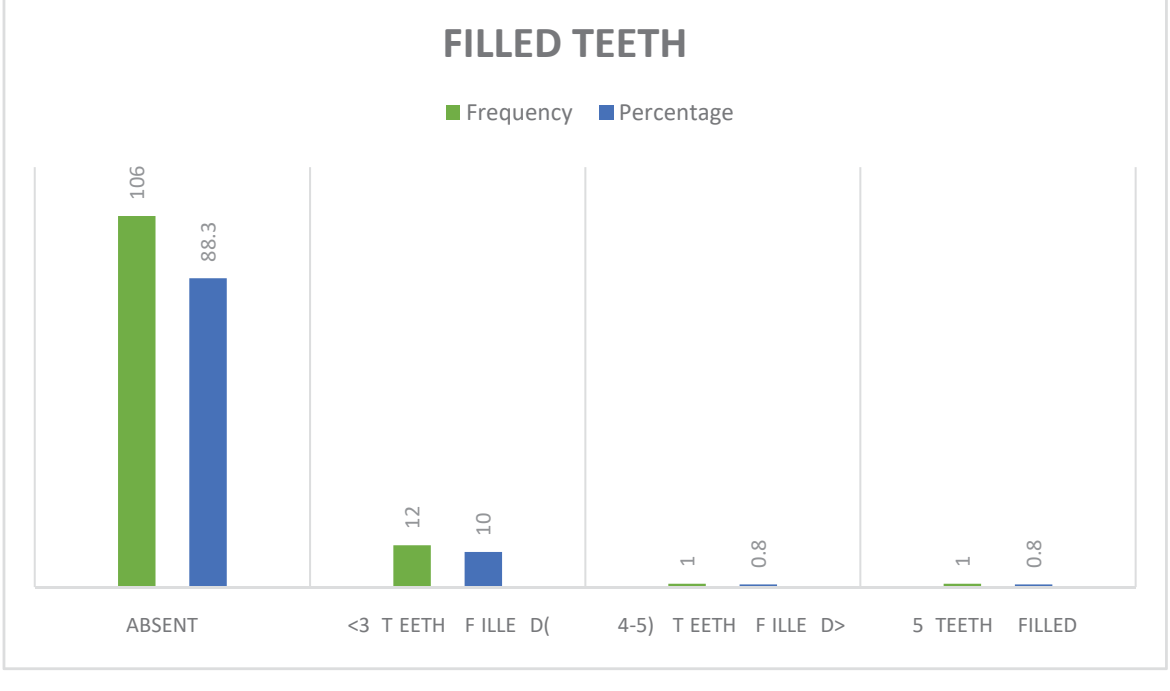
Form the figure 6, it appears that among 120 respondents, after intraoral examination 53.3% had no caries present in their oral cavity, 25.8% had caries involved <3 teeth, 13.3% had caries involved >5 teeth and only 7.5% had caries involved 4-5 teeth.

Figure 7: Distribution of the respondents according to number of missing teeth[n=120]



From the figure 7, at appears that among 120 respondents 66% had all teeth present in their oral cavity, 31% had less than 3 teeth were missing, 1% had (4-5) teeth present and again 2% had more than 5 teeth missing.

Figure 8: Distribution of the respondents according to number of filling teeth [n=120]



From the table 4.14, it shows that among 120 respondents 88.3% had no filling present in their oral cavity, 10% had less than 3 three teeth filled, 0.8% had 4-5 teeth filled again rest 0.8% had more than 5 teeth filled.

Figure 9: Distribution of the respondents according to their general health condition [n=120]

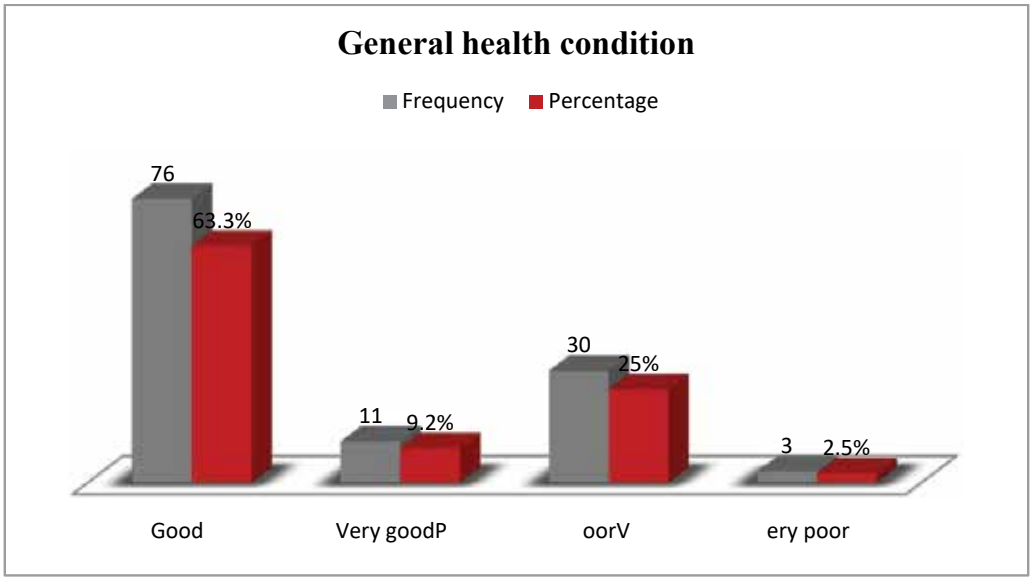


Figure shows that, among 120 respondents 63.3% had good health condition, 25% had their general health condition poor, 9.2% had very good health condition and only 2.5% had very poor health condition.

Discussion

Dental caries is a prevalent and significant health issue that affects children. Childhood dental caries is the most prevalent chronic disease, occurring five times as frequently as asthma. Dental cavities are still a common childhood illness, even in populations with low caries risk. Three key components are necessary for the development of caries: susceptible teeth, fermentable carbohydrates from the diet, and dental plaque, which may contain dangerous bacteria. Changing the bacterial makeup of dental plaque, lowering its levels, and altering the frequency and patterns of food consumption are all methods for preventing dental caries. To assess the prevalence and risk factors of dental caries among primary school children in Dhaka the present research a sample size consisting of 120 patients was studied.

By concentrating on the prevalence of dental cavities in elementary school-aged children, the study offers data on a range of age groups, from 3 to 11 years. Most of the kids (82.5%) were between the ages of five and eight. Men made up 55% of the respondents, while women and girls made up the remaining 45.7%. The majority of them (95.8%) were Muslims. Conversely, the aforementioned results were consistent with a 2007 study carried out by Gombe NT in Bulawayo, Zimbabwe[2].

According to their parents' occupations, this study also reveals that the majority of the children's mothers (85%) were housewives and the majority of their fathers were businessmen, followed by private employees and other professions. According to their socioeconomic status, the majority of the parents of the children (46.7%) made between 10,000 and 20,000 BDT per month. These results were less than those of the study that Paul TR carried out in Saudi Arabia[16].

In class I, 25% of the children were read to, in class IV, 21% were read to, in class III, and the remaining 8% were read to in class V. As education levels increased, there was a slight decrease in caries that affected four to five teeth and more than five teeth. These results were consistent with the comparison study carried out in Bulawayo, Zimbabwe, by Gombe NT[2].

All (100%) the children were found to brush their teeth. This finding reveals that all the students and their parents were aware about the maintenance of oral hygiene and which were much higher that the study findings of Gombe NT [2]. Among them majority (56.7%) were brush their teeth twice in a day followed by about 43.3% did that once in a day. Increased frequency of brushing

confirmed a lower level of presence of caries. Regarding time of teeth brushing practice about 48% children were brush their teeth both in the morning before breakfast and at night after dinner, 35% were brush teeth only in the morning before breakfast. The study shows that, those who brush teeth in the morning before breakfast 50% had no caries in their oral cavity whether who brush teeth in the morning after breakfast 60% had no caries in their oral cavity and who brush only at night after dinner more suffered from caries in comparison to other findings. On the other hand those who brush twice (in the morning before breakfast and at night after dinner/ after breakfast and after dinner) in a day those were less suffered by caries than those who brush once in a day. The findings regarding the frequency and time of teeth brushing were much higher than the findings of the study conducted by Gombe NT in Bulawayo city, Zimbabwe [2].

This study shows that, as the use of brushing materials almost all (95.8%) the children were used brush and paste as combined materials for teeth brushing. None was found to use coal powder and meswak. When it came to brushing their teeth, the majority of the kids—62.5%—used forward and backward strokes, while 22.5% used both up and down and forward-backward strokes and 15% were brush their teeth by up and down stroke method. The up and down stroke method was proved to be more helpful in reducing the degree of severity of dental caries. Caries is less common in students who use up-and-down strokes and more common in those who use both, followed by those who use forward- and backward-strokes.These results differed from those of the study carried out by Mashoto KO in Tanzania's Kilwa district[17].

The study shows that, after intraoral examination of the children about 45.8% had mild plaque on their tooth surface followed by 28.3% had moderate plaque, 22.5% had no plaque on their tooth surface and only 3.3% had severe plaque on their tooth surface. Regarding dental plaque level and caries incidence, the higher the degree of dental plaque severity, the higher the caries incidence. These results exceeded those of the study carried out by Gombe NT[2].

In case the prevalence of caries, about 46.7% had caries in their oral cavity. The prevalence rate was much lower than the prevalence rate of the caries in the study conducted in India by David J [18]. About 53.3% had no caries in their oral cavity, 25.8% had caries involved <3 teeth, 13.3% had caries involved >5 teeth and only 7.5% had caries involved 4-5 teeth. In regarding the types of caries, those who caries present in their oral cavity among 56 respondents, 53.6% were had pit and fissure caries, 33.6% had gross caries and 12.5% smooth surface caries. These findings of current study were lower than the findings of the study conducted by Paul TR in Saudi Arabia [16].

The majority of the children (66%) in the current study had every tooth in their oral cavity. Majority (56.7%) of the children were never visited to the dental surgeon. Most (88.3%) of the respondents had no filling present in their oral cavity. Majority (69.2%) were not brush/ rinse/ clean mouth after eating sweetened food and only 30.8% were brush/ rinse/clean mouth after eating sweetened food which increased the incidence of caries. These results differed from those of the study carried out in Bangladesh by Ullah MS[19].

Majority (63.3%) of the children had good health followed by about 25% had their general health condition poor. Caries incidence was related with the general health condition of the children. Those who had very good and good health condition were less suffered by caries incidence and those who had poor and very poor the incidence of caries was high such as all students with very poor health condition had suffered more than 5 teeth involved by caries. These results exceeded those of the study carried out by Gombe NT[2].

Conclusion

There is very little data and very little research on the prevalence of caries and oral health status in Bangladeshi children. The current study used a single cross-sectional study design. The study done focuses on the caries prevalence among primary school-going children (aged years) thereby providing information about age group ranging from 3 to 11years. In this study only play group and class III students' caries incidence is lower than

class I and class II students. The prevalence of caries was 46.7% among them majority (53.7%) had pit and fissure caries. majority (66%) of the children had all teeth present in their oral cavity. Majority (56.7%) of the children were never visited to the dental surgeon. Most (88.3%) of the respondents had no filling present in their oral cavity. Majorities (69.2%) were not brush/ rinse/clean mouth after eating sweetened food. The up and down stroke method was proved to be more helpful in reducing the degree of severity of dental caries. Regarding dental plaque level and caries incidence, the higher the degree of dental plaque severity, the higher the caries incidence. Those who had very good and good health condition were less suffered by caries incidence and those who had poor and very poor the health condition incidence of caries was high such as all students with very poor health condition had suffered more than 5 teeth involved by caries. In terms of children and families, the school could be a useful venue for promoting dental health. Since primary school students spend a significant amount of time there and can be contacted at a developmental stage when their health habits are being formed, primary schools have a great deal of potential to influence their health behaviour.As a result, the Health Services Department should provide teachers with systematic training programs and practical assistance, such as educational materials. Additionally, the same department should prioritise community-oriented oral health care to target children's needs and lifestyles in order to prevent oral disease and promote oral health. Essential care should be provided in accordance with the primary health care concept. Reducing the need for treatment can be achieved by enhancing preventative programs with the cooperation of the general public and dental auxiliary.

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