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2. Rashid M. Food and Nutrition. In Rashid KM, Rahman M, Haider S eds. Textbook of Community Medicine and Public Health. 4th edn. RHM Publishers 2004; 126-140
3. Sayeed MA, Hussain MZ, Banu A, Rumi MAK, Azad AK. Prevalence of diabetes in a suburban population of Bangladesh Diab Res Clin Prac 1997; 34: 149-155
4. Jarett RJ. Insulin and hypertension (Letter). Lancet 1987; 2: 748- 749
5. Banerji MA, Faridi N, Atulri R, Chiken RI, Lebovitz HE. Body composition, visceral fat, leptin and insulin resistance in Asian Indian men. J Clin Endocrinol Metab 1999; 84: 137-144 (Abstract)
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Editorial

A secret is not something with a limited audience. We share it with everyone - but only one person at a time. Similarly, we as dentists serve society by preventing oral diseases, promoting oral health and improving the quality of life through organised efforts. However, we do it by treating only one patient at a time.

The most beneficial way of improving oral health is not by drilling, filling and oral hygiene instruction but by building awareness and advocacy. In doing that, a dentist need to remain professional and neutral. Concomitantly, we have to ensure that we look after ourselves and our health and well-being if we are to look after our patients effectively.

The current issue (Volume 8, Issue 1, July 2019) of the Journal of Contemporary Dental Sciences focuses on awareness regarding common preventable diseases and knowledge of first aid among school children, virulence factors and their associated genes of multidrug-resistant Klebsiella pneumoniae, conventional management of discoloured incisors with large periapical lesions and surgical management of submandibular sialolithiasis. We sincerely hope dentists will read these articles and, where possible, advocate them or, if they prefer, keep them as secrets!

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Contents

Awareness regarding common preventable diseases among school children in Dhaka City- a cross sectional study

MRU Khan[1], MTH Chowdhury[2], SK Nath[3], TB Badsha[4]

Abstract

Background: *School children should be healthy to continue their study properly as ill health hampers the education. Awareness about the personal hygiene in their daily life will facilitate them to avoid the sufferings of many health problems.* ***Purpose:*** *The objective of the study is to assess, the level of awareness on selected common preventable diseases (scabies,dental caries, viral hepatitis-A,viral hepatitis-B,enteric fever and tetanus) among school children.* ***Method:*** *This cross-sectional study was conducted among 209 students of class nine (IX) and ten (X)in two selected schools of Dhaka cantonment. Purposive sampling was carried out. Data were collected through face-to-face interview using pre-tested semi-structured questionnaire.* ***Result:*** *The number of male and female childrenin this study was 47.80% and 52.20% respectively with a mean age of 14.89 years. It was revealed that students are more aware about the cause, mode of transmission and prevention of Dental Caries, Viral hepatitis-A and Tetanus.While students have more awareness regarding preventive measure of scabies and causation of Hepatitis-B but have less awareness about cause, mode of transmission of scabies and mode of transmission and prevention of Hepatitis-B. Thoughmost of the students could not correctly mention causative organism of enteric fever, most of them aware regarding mode of transmission and prevention of enteric fever. Most of the respondents have habit of washing hand before meal and after defecation and habit ofdaily tooth brushing. Most of the respondents used to get the information regarding personal hygiene from multiple sources (37.5%). The study shows that most of the respondents were either agreed or strongly agreed that prevention of disease is possible by washing hand before taking meal and after defecation (99.0%) and also there is requirement of awareness on personal hygiene for a healthy life (98.6%). All these findings suggest that awareness on common preventable diseases as well as personal hygiene was good among the school children but some poor hygiene habit was prevailing among respondents, which needs appropriate measure for improvement.*

Key Words: Awareness, Common preventable diseases, School children ***(J Cont Dent Sci 2019;7(2): 1-10***

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Introduction

Behavioral intervention is a major focus of health education practice[1]. After the family, schools are most important places of learning for children; they have a centralplace in the community. Schools are a stimulating learning environment for children which can stimulate change. If sanitary facilities in schools are available, they can act as a model, and teachers can function as role models. Schools can also influence communities through outreach activities, since through their students; schools are in touch with a large proportion of the households in a community[2].

The relationship between health, education and development is very important, as a healthy child is the major input for human resources development. Children in low-income countries, carry the greatest burden of morbidity and mortality. Much of this burden results from hazards within their homes or their immediate environment[3]. Although the mortality rate among school-age children is relatively low, the burden of disease is high which affect the children s ability to attend, learn, and remain in the school[4].

The health of school children is a common concern of the school, parents and the community. School is an important place, next to home, where a child learns to be healthy. The schools are particularly important because these institutions represent gathering places for a population of

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age 5-17 years. They are susceptible to many communicable diseases and vulnerable to physical, mental and moral hazards. Moreover, a considerable proportion of school children, particularly in the underdeveloped and developing countries, suffer from malnutrition and deficiency diseases and as special attention is required for their physical and intellectual development[5].

Modern civilization demands education on wider scale. It is therefore obligatory for the society to ensure that students are in fit condition of body and mind to receive the education and benefited by it. The children are a most responsible group and have attitude of learning, therefore, it is the best time to include in them the good habit of healthful living. Health knowledge and health practices acquired by a child in the course of study in a school become a part of his way of life [6].

Poor hygiene practices and inadequate sanitary conditions play major roles in the increased burden of communicable diseases within developing countries. A large fraction of the world s illness and death is attributable to communicable diseases. 62% and 31% of all deaths in Africa and Southeast Asia, respectively, are caused by infectious disease. This trend is especially notable in developing countries where acute respiratory and intestinal infections are the primary causes of morbidity and mortality among young children. Inadequate sanitary conditions and poor hygiene practices play major roles in the increased burden of communicable disease within developing countries[7].

It was recognized that the school going children could make a change about good hygiene practice into home. Health education in school in developing countries is very important. Since 1971 government of Bangladesh is giving limited health care services to the school students through 25 school health clinics. But this was not adequate. Now school health pilot project started to enhance preventive services. For those purpo teachers are given training on health problem as part of education curriculum. Students are gi education on physical exercise, personal hy and common diseases [8].

School children should be healthy and fit continue their study properly. Ill health w hamper the education. If they are aware abo their personal hygiene in their daily life, they ca avoid the sufferings of many health problems an can help others to keep away from the sufferings.

Scabies is a contagious disease of skin whic incidence is quite high in Bangladesh. Poo hygienic habits and unclean clothing are mostly responsible for development of scabies. Proper awareness about cause, mode of transmission and prevention of scabies can help to develop personal efforts to prevent it [9].

Jaundice due to viral hepatitis is a serious public health problem particularly in developing countries. Over crowding and poor sanitation facilitates the spread of the disease[9].The school students should be aware of safe drinking water and food. They should be given proper education about sanitation and safe water[10].

Hepatitis-B virus infection is one of the causes of morbidity and mortality related to liver disease all over the world. The virus has already infected 2000 million people globally. There are 350 million estimated carriers. Asymptomatic carriers are the commonest source of infection[11]. The disease is caused by blood transfusion from infected persons, sharing razors, needles and syringes of infected person. School students should get adequate information, so that hepatitis-B infection can be prevented and fatal complications can be avoided[12].

Dental caries in children is one of the health problems, which concern parents, children and the dental doctors alike. The school system is the

logical environment in which to teach preventive dental health practices[12]. The school can provide a supportive environment and an ideal setting for promoting oral health[13,14]. In Bangladesh the incidence of dental caries, especially in children seems to be increasing. With advanced civilization the incidence of dental caries increases due to change in dietary habit[13]. Students should be given education about dental caries and oro-dental hygiene. If they get correct information for awareness about dental caries they can avoid many dental complications[14].

Enteric fever is world-wide in distribution. A recent epidemiologic study showed that south-east and south-central Asia are the regions of highest endemic with rates greater than 100/100,000 cases per year; the rest of Asia, Africa, Latin America, the Caribbean and Oceania(except Australia and New Zealand) are the next highest with incidence rates of 10-100/100,000 and Europe, North America and the rest of the developed world have low rates of disease. In Bangladesh, the disease is said to be endemic particularly among the low socioeconomic group. Provision of safe drinking water, sanitary disposal of human excreta, sanitary food handling in all eating places, hand-washing facilities and control of flies are some of the important preventive measures for enteric fever. If the students from their early life aware about these preventive measures of enteric fever, it will be beneficial for Bangladesh because knowledge of prevention is the only weapon to fight this situation[15].

Tetanus is an acute disease caused by exotoxin produced by clostridium tetani, is another common health problem in our country. Case fatality rate is rather high, varying from 30 to 90%, so the disease still continues to pose a problem as a killer disease in the developing countries. It has been reported that tetanus claims at least one million human lives a year in the world, about half of this being that of newborn infants. In Bangladesh it is believed that 75,000 persons contract tetanus annually and 72,000 of them die as a result of the disease. So, Awareness buildup for tetanus prevention should start right at this age[16].

The simple acts of brushing teeth, showering, shampooing, using deodorant and brushing hair all add up to good hygiene practices. While these acts are simple and should be a part of everyone's daily routine, some overlook taking care of their hygiene needs, putting themselves at risk of illness, infection, poor dental health and social avoidance. Cultivating good personal hygiene, showering and washing hands frequently can help reduce the incidence of illness[17].

In reality, schools are often more than just places for learning and behavior change. If school sanitation and hygiene facilities are absent, or are badly maintained and used, schools become risky places where diseases are transmitted. Schools can also pollute the natural environment in such a way that it causes health hazards for the community at large. It is therefore important that schools have proper facilities. However, improved facilities in themselves are not sufficient. If we want to reduce the incidence of sanitation and hygiene-related diseases and to protect the natural environment, behavioral changes are also needed, leading to proper use of the facilities.

Maximum research works have been conducted on personal hygiene of various professionals. Very few have been done to assess awareness of school children. This study will provide information about how much the students are aware about their personal hygiene. This will identify their lacking and will provide guidelines for planning and preparation of curriculum to conduct intervention program for students.

This study was conducted to assess the level of awareness about selected preventable diseases as well as on personal hygiene among the students of selected schools.

This study will provide information about how much the students aware about the selected diseases. This will identify their lacking and will provide guidelines for planning and preparation of curriculum to conduct intervention programme for students. The findings of the study may help planner to rethink about preventive aspects of those diseases.

Materials and Methods

This descriptive type cross-sectional study was conducted among 209 male and female students of class Nine (IX) and Ten (X) in two selected schools of Dhaka cantonment named Shaheed Ramiz Uddin Cantonment School, Dhaka Cantonment, Dhaka-1206 and Muslim Modern Academy, Dhaka Cantonment, Dhaka-1206. Students of class IX and X of both sex and their willingness to participate in the study were the inclusion criteria whereas the students who are absent due to sickness or other reason during data collection period was the exclusion criteria of our study.

Purposive sampling was carried out, where data were collected through face-to-face interview using pre-tested semi-structured questionnaire from a total sample size of 209 students, who were selected purposively.

A semi-structured questionnaire was prepared keeping in view the research questions, objectives and variables of the study and used for data collection. The questionnaire was pretested before final use and modified accordingly. Before the interview, interviewees were briefed about the purpose of the study for their best cooperation. To assess the level of awareness, Likert Scale was used. The children who were strongly agreed and agreed to the questions had the awareness. On the other hand, who strongly disagreed, disagreed and neutral had no awareness because they do not know the correct answer.

After collection, answers of all interviewed questions were checked for its completeness and correctness and edited accordingly. The data was analyzed by using the latest version of software Statistical Package for Social Science (SPSS-16 version). The data was presented in the form of tables, charts and graphs.

According to the World Health Organization (WHO) and Bangladesh Medical Research Council (BMRC) guidelines of ethical consideration, the informed consent was taken before the interview. Written Permission was taken from the head of the school. Respondent's right to refuse and withdraw from the study any time was accepted.Confidentiality of the respondents was maintained.

Results

This was a descriptive type of cross sectional study. The study was conducted to assess awareness of school children about selected common preventable diseases among the students of class nine (IX) and ten (X) of Shaheed Ramiz Uddin Cantonment School and Muslim Modern Academy, Dhaka Cantonment. A total of 209 purposively selected students were interviewed.

Table 1: Distribution of respondents by Age (n=209)

Age(years)	Frequency	Percent
13	14	6.7
14	51	24.4
15	96	45.9
16	43	20.6
17	1	.5
18	4	1.9

Mean-SD(Range)=14.89-0.950(13-18)years.

The distribution of children by age shows that, the age of the students was ranging between 13 and 18 years. The mean age of the children was 14.89 years with standard deviation - 0.950 years. Among the children, Maximum 96(45.9%) respondents were of 15 years

age and minimum 01(0.5%) was from 17 years of age.

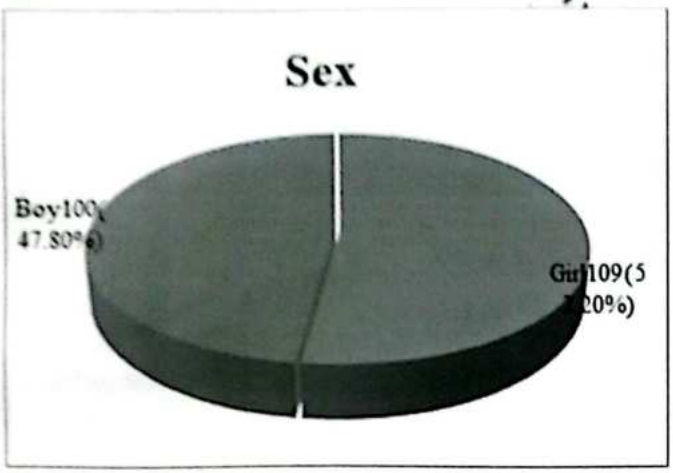

Figure 1: Distribution of the respondents by sex (n=209)

The pie chart shows that 109 (52.20%) of the respondents were girl and 100 (47.80%) were boys.

Table 2: Response of respondent s knowledge regarding Cause, Mode of Transmission and Prevention of selected common preventable diseases.(n=209)

Statements	Response regarding Cause (n=209)		Response regarding Mode of Transmission (n=209)		Response regarding Prevention (n=209)	
	Correct	Incorrect and not known	Correct	Incorrect and not known	Correct	Incorrect and not known
Scabies	50 (24.0%)	159 (76.0%)	36 (17.2%)	173 (82.8%)	203 (97.1%)	6 (2.9%)
Dental Caries	179 (85.6%)	30 (14.4%)	154 (73.7%)	55 (26.3%)	206 (98.6%)	3 (1.4%)
Viral Hepatitis-A	169 (80.9%)	40 (19.1%)	107 (51.2%)	102 (48.8%)	186 (89%)	23 (11%)
Viral Hepatitis-B	116 (55.5%)	93 (44.5%)	84 (40.2%)	125 (59.8%)	74 (35.4%)	135 (64.6%)
Enteric Fever	29 (13.9%)	180 (86.1%)	158 (75.6%)	51 (24.4%)	191 (91.4%)	18 (8.6%)
Tetanus	120 (57.4%)	89 (42.6%)	180 (86.1%)	29 (13.9%)	146 (69.9%)	63 (30.1%)

The table 2 shows response regarding cause of selected diseases. Maximum number of correct response 179(85.6%) & 169(80.9%) had given respectively in case of Dental caries and viral hepatitis-A. Whereas maximum incorrect and not known response 180(86.1%) and 159(76.0%) had given respectively in case of Enteric fever and Scabies.

Again, the table shows response regarding Mode of Transmission of Selected diseases. Maximum number of correct response 180(86.1%), 158(75.6%) 154(73.7%) & 107(51.2%) had given respectively in case of Tetanus, Enteric fever, Dental caries & viral hepatitis-A. Whereas maximum incorrect and not known response 180(86.1%) and 159(76.0%) had given respectively in case of scabies and viral hepatitis-B.

Again, the table shows response regarding Prevention of Selected diseases. Maximum number of correct response 206(98.6%), 203(97.1%) & 191(91.4%) had given respectively in case of Dental Caries, Scabies, Enteric fever. Whereas maximum incorrect and not known response 135(64.6%) had given in case of viral hepatitis-B.

Table 3: Distribution of the respondents by habit of washing hands before taking meal and after defecation (n=209)

Responses	Hand washing habit before taking meal	Hand washing habit after defecation
Yes	208 (99.5)	203 (97.1)
No	1 (0.5)	6 (2.9)

The table shows that 208 (99.5%) of the respondents had the habit of washing hand before taking meal and 1 (0.5%) did not have such habit. Again, the table shows that almost all the respondents 203 (97.1%) had the habit of washing hand after defecation and only 6 (2.9%) did not have.

Table 4: Distribution of respondents by material used for hand washing before taking meal and after defecation (n=209)

Material used	Hand washing before taking meal	Hand washing after defecation
Only Water	36 (17.2)	5 (2.4)
Water and soap	173 (82.8)	204 (97.6)

The table shows that 173 (82.8%) respondents washed hand with water and soap and 36 (17.2%) with water only.

Again, table shows that 204 (97.6%) wash hand with water and soap and 5 (2.4%) with water only.

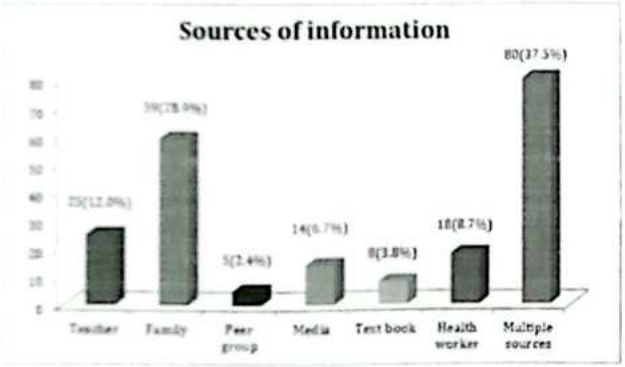

Figure 2: Distribution of respondents by source of information regarding personal hygiene (n=209)

The Bar diagram shows that 59 (28.9%) got infromation from only their family. 18(8.7%) got only from health worker and 25 (12%) from only their teacher. 80(37.5%) students got information from Multiple sources.

Table 5: Distribution of respondents by habit of teeth cleaning every day(n=209)

Habit of teeth cleaning	Frequency	Percent
Yes	202	96.7
No	7	3.3

The table shows that 202 (96.7%) respondents had the habit of teeth cleaning everyday.

Table 6: Distribution of respondents by time of cleaning teeth(n=209)

Time of cleaning	Frequency	Percent
After waking up early in the morning	38	18.2
After every meal	5	2.4
Morning and before going to bed	166	79.4

The table shows that 166 (79.4%) had the habit of teeth cleaning in the morning and before going to bed,[5] (2.4%) after every meal and 38 (18.2%) early in the morning.

Table 7: Distribution of respondents by material used for teeth cleaning (n=209)

Material used for tooth cleaning	Frequency	Percent
Tooth Paste	201	96.2
Tooth Powder	3	1.4
Ash/charcoal	1	0.5
Meswak	4	1.9

The table shows that 201 (96.2%) respondents use tooth paste for teeth cleaning. 3 (1.4%) use tooth powder, 1 (0.5%) use ash and 4 (1.9%) use meswak for teeth cleaning.

In our study, we introduced a Likert Scale to assess the level of awareness, related to health and hygiene of the respondents. The number one usually represents the strongest negative response, such as 'strongly disagree'. The number two represents a less negative response 'disagree'. The number three represents indifference, which is usually indicated by the term 'neutral'. The number four represents a positive response, like 'agree'. The number five represents the strongest positive response 'strongly agree'.

Among 209 respondents distribution of responses are shown in number and percentage as per Likert scale. These five responses were arranged in two groups Having awareness strongly agree & agree) and not having awareness (neutral, disagree & strongly disagree) will be discussed in the next table (Table-8).

Table 8: Distribution of respondents by level of awareness related to health and hygiene. (n=209)

Statements	Having Awareness	Not having Awareness
Disease are transmitted if no hand wash before meal	195 (93%)	14 (6.7%)
Diseases are transmitted if no hand wash after defecation	204 (97.6%)	5 (2.4%)
Disease may occur if teeth is not cleaned	205 (98.1%)	4 (1.9%)
Prevention of disease is possible by hand washing before meal and after defecation	207 (99.0%)	2 (1.0%)
Awareness on personal hygiene is required for healthy life	206 (98.6%)	3 (1.4%)

Figure in the parenthesis indicate percentage.

Table shows Distribution of respondents regarding awareness related to health and hygiene. Among 209 respondents 93.3% students having awareness that disease may occur if do not wash hand before meal. Similarly students having awareness representing 99.0%, 98.6%, 98.1% in relation to prevention of disease is possible by hand washing before meal & after defecation, awareness on personal hygiene is required for healthy life and disease may occur if teeth is not cleaned respectively. On the other side of coin, students not having awareness representing 1.4%, 1.0%, 1.4% in relation to regular teeth cleaning causes dental disease, prevention of disease is possible by hand washing before meal and after defecation and awareness on personal hygiene is required for healthy life respectively.

Discussion

This descriptive type of cross-sectional study was carried out to assess the awareness of school children about selected common preventable diseases including personal hygiene awareness status among the students of Shaheed Ramiz Uddin Cantonment School and Muslim Modern Academy, Dhaka Cantonment, Dhaka. Total 209 male and female students of class IX and X were selected purposively for the study.

Socio-demographic characteristics of the respondents:

The mean age of the respondents was 14.89 years. Among the respondents maximum 96 (45.9%) was in 15 years age group (Table-1). The study finding is dissimilar with the finding of the study conducted by Rahman, A[18] in 2002 where he found age group of the majority students (46.66%) were in the age of 12 years. Because in this study the students were of class IX and X. Here majority of the respondents were girls (52.2%) (Figure-1)which is similar with the findings of the study conducted by Rahman, A[18] in 2002 where 63.33 % were girls.

Awareness about cause, mode of transmission and prevention of selected diseases:

In the present study only 24.0% gave correct response, 76.0% gave incorrect and not known response regarding the cause of scabies (Table-2) and comparable with the study of Hossain[19]. In his study 10 (9.1%) respondents had correct knowledge and 54 (49.1%) respondents had partial knowledge on causes of scabies.

Out of all respondents of present study only 17.2% gave correct response, 82.8% gave incorrect and not known answer regarding the mode of transmission of scabies (Table-2). Again 97.1% gave correct response, 2.9% gave incorrectand not known response regarding the prevention of scabies (Table-2).

In Hossain[19] series showed nearly similar response, 62.7% respondents had partial and 11.8% had correct knowledge on prevention of scabies. So if the level of knowledge regarding mode of transmission can be increased and the students know more about scabies then better preventive measure can be taken.

Among all of the present study only 85.6% gave correct response, 14.4% gave incorrect and not known response regarding cause of dental caries (Table-2). About 73.7% gave correct response, 26.3% gave incorrect and not known answer regarding mode of transmission of dental caries (Table-2). Again 98.6% gave correct responseand 1.4% gaveincorrect and not known answer regarding the prevention of dental caries (Table-2). A study was conducted on 110 respondents to assess the level of knowledge on oro-dental hygiene. Their result revealed that 15.04% of total respondents had good knowledge, 69.09% had poor knowledge and no one found to have good knowledge. To prevent dental caries adequate knowledge on it is necessary.[20]

Regarding the causation of hepatitis- A, 80.9% respondents gave correct response, 19.1% could not give the correct andnot known response (Table-2). Regarding mode of transmission ofViral Hepatitis- A, about 51.2% gave the correct answer, while 48.8% of the respondents gave incorrect response and not known answer (Table-2).Regarding prevention of viral hepatitis-A, maximum 89.0% gave the correct answers, while 11.0% could not give correct answer and not known (Table-2).

Similarly 55.5% gave correct response about the cause of hepatitis B, 44.5% gave incorrect and not known answer (Table-2). About 51.2% gave correct answer about the mode of transmission of hepatitis-B, 48.8% gave correct and not known answer (Table-2). It is very important to note that only a very few respondents (12.7%, in multiple responses) knew that hepatitis B could be transmitted by sexual intercourse with infected person, which is one of the prime mode of transmission of the disease now a days. Regarding prevention of hepatitis B only 35.4% gave correct response, while 64.6% gave incorrect response and not known answer (Table-2).

A study was conducted on knowledge regarding hepatitis infection among the Madrasa students by Siddeque[21] and findings were respondents gave correct response regarding meaning of hepatitis as communicable disease, respondents knew that hepatitis B is the most dangerous than other hepatitis virus, also gave correct response that liver is affected in hepatitis, 3.58% gave correct response that hepatitis can cause cirrhosis or cancer. In their study no measure on prevention pattern was evaluated. Their findings of causation patterns were almost similar to my study.

In Hossain series 40.0% respondents could not give any answer about prevention of hepatitis-A and 60.0% respondents could not give any answer about causes and prevention of hepatitis-B[22].

A study was conducted on knowledge regarding hepatitis infection on secondary school by Ahmed; the result revealed that respondents gave correct response about meaning of hepatitis and respondents knew that hepatitis is a communicable disease[23]. Findings differed from the present study.

Regarding the response on Enteric fever, 13.9% respondents gave correct answer while 86.1% gave incorrect response and not known answer about the causation of enteric fever (Table-2). Maximum 75.6% gave correct response, while24.4% gave incorrect response and not known answer regarding mode of transmission

of enteric fever (Table-12). Again 91.4% respondents gave correct response about the prevention of Enteric fever while 8.6% gave incorrect and not known answer (Table-2).

In Hossain[22] series 60.5% respondents gave correct response and 39.5% respondents could not give correct response about enteric fever. A study conducted in China on enteric fever infected cases in 1998 and result revealed that in rural area 60% of teens did not possess basic knowledge about enteric fever.

Studies to level of response on Tetanus, regarding response on causation of Tetanus it was found that 57.4% gave correct response while 42.6% gave incorrect response and not known answer (Table-2). Regarding the mode of transmission of tetanus maximum 86.1% gave correct response, while 13.9% gave incorrect answer and not known answer (Table-2). Similarly 69.8% could identify the necessary preventive measures, while 30.1% gave incorrect response and not known answer (Table-2). It reflects almost similar observation found in Hossain series[22]. In his study only 70.5% gave correct response and 29.5% gave incorrect response regarding cause and mode of transmission about Tetanus while 62.7% gave correct response about prevention of Tetanus.

In our study, it was revealed that the students of class IX and X of Shaheed Ramiz Uddin Cantonment School and Muslim Modern Academy are much more aware about the cause, mode of transmission and prevention of Dental Caries, Viral hepatitis-A and Tetanus. Students have awareness regarding preventive measure of scabies but don t aware about cause and mode of transmission of scabies. Most of the students aware about causation of Hepatitis B but not aware about mode of transmission and prevention of Hepatitis B. Most of the students could not correctly mention causative organism of enteric fever but most of them aware regarding mode of transmission and prevention of enteric fever (Table-2). So health education in school should be given due importance. Educational intervention programme on different diseases in urban as well as rural area also necessary to increase the level of awareness.

Awareness related to health and hygiene

It was found from the study that almost all the respondents had habit of washing hand before meal and after defecation (Table-3) and daily teeth cleaning (Table-5) which correlates with study findings conducted by Chowdhury FA[24] in 2008 where all the food handlers of Dhaka University hostel messes had habit of hand washing before meal and brushing teeth daily. This result is also similar to the result found by Alyssa Vivas et al[25] where the finding was 99% and 76.6% respectively for hand washing before meal and after defecation.

It was found in our study that only 79.4% had the habit of brushing teeth twice a day (Table-6) which is more or less similar with the study conducted by Rahman, A18 and Harikiran AG et al[26] where the findings were 38.5% and 42% respectively.

On the basis of selected variables and giving weightage on each answer, personal hygiene practice status of the students was categorized as good, average and poor. It was evident from the study that, out of 209 respondents 171 (82.1%) students had good hygiene practice habit, 25 (12.4%) had average hygiene practice habit and 13 (5.5%) had poor hygiene practice habit. The study finding differs from the finding of the study conducted by Chowdhury FA[24] in 2008 who found 71.2% food handlers of Dhaka University hostel had poor hygiene practice habit and 28.8% had good hygiene practice habit. The hygiene practice of the students were better due to good educational level.

It was found from the study that 98.1% and98.6% respondents had good knowledge that washing hand before meal and after defecation prevent transmission of diseases and awareness on personal hygiene is required for a healthy life respectively. This finding differs from the study conducted by Alyssa Vivas et al[25] which shows that 25% having good knowledge about personal hygiene.

Conclusion

Taking all the findings into account it can be concluded that awareness regarding cause, mode of transmission and prevention on dental caries, hepatitis A and tetanus were good, whereas they were just aware about causation of hepatitis B but not aware about prevention of hepatitis B. Students were aware about prevention of scabies and enteric fever but not aware of its causation. Although the diseases which were included in the study, were taught to the students according to the curriculum of National Curriculum and Textbook Board, from class V to VIII, but most of the students pointed out media as their prime sources of awareness which was followed by family, school teachers, health workers, media, text books, peer group. So, measure should be taken to uplift the level of awareness of the school students on these health conditions by government agencies, NGOs, private entrepreneurs and concerned community itself.

Majority of the students had habit of washing hand before meal and after using toilet. Overall awareness of the school students was good. Almost all the students had agreed that washing hand before meal and after defecation prevents the spread of diseases. They also agreed that awareness on personal hygiene is required for living a healthy life.

This study did not depict the national scenario; it only reflected a community picture. There is need for further study on larger scale to find out the real picture.

Recommendation

Both the education and the health department should co-operate and act in a synchronous way to provide services and facilities for health care in school.

School environment should serve as an idle place for demonstration of healthy environment such as personal cleanliness, proper maintenance of sanitary latrines and safe water supply.

School teachers should receive adequate training in health education and in the use of suitable teaching materials.

Government should take up community based programmes to uphold and establish the value of maintaining and promoting health in urban as well as rural Bangladesh. Media can also play an important role in this regard.

Further in-depth studies may be conducted on representative sample to determine the personal hygiene practice status and knowledge among the rural school children.

Limitations of the Study

The findings of the study may not be representative of the whole population of Bangladesh. As the interview schedule was used to collect data from the respondent, response to the question depend solely on the sincerity and honesty of the respondent. There might be scope of bias during the study.

Conflict of Interest: The authors declare no conflict of interest.

Informed Consent Statement:According to the World Health Organization (WHO) and Bangladesh Medical Research Council (BMRC) guidelines of ethical consideration, the informed consent was taken before the interview. Written Permission was taken from the head of the school. Respondent s right to refuse and withdraw from the study any time was accepted. Confidentiality of the respondents was maintained.

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Detection of virulence factors and their associated genes in multidrug resistant Klebsiella pneumoniae

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Abstract

Background: *Multidrug resistant and virulent strains of Klebsiella pneumoniae are responsible for severe infections and increasing morbidity and mortality. Purpose: Aim of this study was to detect virulence factors and their associated genes among MDR and non-MDR K. pneumoniae that may provide important information on virulence factor expression in the clinical isolates as well as correlation between virulence and multidrug resistance.* ***Method:*** *This cross-sectional study was conducted at Department of Microbiology, BSMMU during September 2017 to August 2018. A total of 150 K. pneumoniae were tested for the detection of MDR & non-MDR strains and potential virulence factors and their associated genes.* ***Results:*** *Majority of K. pneumoniae were multidrug resistant (82%). Presence of fimbriae was observed phenotypically in 53.6% of MDR and 59.2% of non-MDR Klebsiella pneumoniae isolates. Whereas, the associated gene mrkD was present in 65.8% of MDR and 55.5% of non-MDR isolates. Hypermucoviscosity was detected in 13.8% MDR and 3.7% non-MDR K. pneumoniae isolates. Genes rmpA and magA were present in 11.38% and 8.13% MDR isolates respectively. Although magA gene was absent in non-MDR isolates but rmpA gene was detected in 7.4% of non-MDR isolates. About 83% of MDR and 74.07% of non-MDR K. pneumoniae isolates were biofilm producers. About 95.5% of MDR isolates and 77.7% of non-MDR isolates expressed BssS gene.* ***Conclusion:*** *The result of this study showed high prevalence of MDR and virulent K. pneumoniae. The potential risk factors, for example biofilm, hypermucoviscosity were significantly expressed in these isolates and more pronounced in MDR strains.*

Key Words: Klebsiella pneumoniae, MDR, Bangabandhu Sheikh Mujib Medical University. ***(J Cont Dent Sci 2019;7(2):12-17)***

Introduction

Klebsiella pneumoniae is a Gram-negative, encapsulated bacterium that lives on the mucosal surfaces of mammals and in the environment (soil, water, etc.) In humans, K. pneumoniae lives in the digestive tract and, less often, the nasopharynx, where it can get into the bloodstream and infect other tissues.[1] Klebsiella pneumoniae is recognized as an urgent threat to human health because of the emergence of multidrug (MDR) resistant strains associated with hospital outbreaks and hypervirulent strains associated with severe community-acquired infections.[2]

The worldwide development of MDR strains of K. pneumoniae is a growing public health issue and is a serious concern for the medical community. Treatment of MDR K. pneumoniae will become more complex in the coming years, because of further limitation of available drugs.[3]

MDR K. pneumoniae strains have virulence characteristics that contribute to their pathogenesis and can complicate the management and treatment of the infection. Resistance to antimicrobial agents are often associated with the spread of transmissible plasmids, which may also carry virulence determinants and acquisition of resistance and virulent traits may provide a survival benefit to this microorganism. Resistance and virulence are not independent properties, and their relationship may play an important role in the pathogenesis of K. pneumoniae infections.[4] In K. pneumoniae, several virulence factors have been demonstrated to mediate infectivity and includes biofilm formation, capsule production, hypermucoviscosity, fimbriae, siderophore activity, serum resistance and efflux pumps which have been shown to play important roles in its pathogenesis and outcome of infection.[5]

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For proper understanding of virulence of Klebsiella pneumoniae both phenotypic and genetic analysis of virulence factors are necessary. Because multiple genes are responsible for single virulence factor and phenotypic factors are not always expressed despite the presence of genes.

So simultaneous detection of virulence factors and their associated genes gives a comprehensive knowledge about magnitude of virulence of Klebsiella pneumoniae. This study was conducted to determine the phenotypes and molecular characterization related to virulence of Klebsiella pneumoniae. Aim of this study was to detect virulence factors and their associated genes among MDR and non-MDR K. pneumoniae that may provide important information regarding virulence factors expression in the clinical isolates.

Material & Methods

This cross-sectional study was conducted at the Department of Microbiology & Immunology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from September 2017 - August 2018. Klebsiella pneumoniae, isolated from different clinical specimens (urine, pus, wound swab, tracheal aspirates, sputum, blood, body fluids etc.) were collected from the Laboratory of Microbiology Department, BSMMU.

Klebsiella pneumoniae was identified based on their colony morphology (MacConkey Agar), Gram staining pattern, and biochemical tests (catalase, oxidase, urease, iodole test, gas production, motility, and citrate utilization test and lactose fermentation). Disk diffusion method was used for antimicrobial susceptibility testing of the isolated organism by Kirby-Bauer method using Mueller-Hinton agar and commercially available antibiotic discs (OxoidLtd, UK).[6]

Multidrug resistant Klebsiella pneumoniae was defined as acquired non-susceptibility to at least one agent in three or more antimicrobial groups (such as, aminoglycosides, antipseudomonal penicillins, 1st and 2nd generation cephalosporins, carbapenems, extended-spectrum cephalosporins; 3rd and 4th generation cephalosporins, fluoroquinolones, penicillins and β-lactamase inhibitors).[7]

Phenotypic detection of virulence factors:

1. The ability of Klebsiella pneumoniae to form a biofilm on an abiotic surface was detected by Tissue Culture Plate Method (TCP).[8]
2. Detection of Hypermucoviscosity (HMV) was detected by string test.[9]
3. Haemagglutination test was done for phenotypic detection of fimbriae of Klebsiella pneumoniae.[10]

Detection of Virulence genes by Polymerase Chain Reaction (PCR)

Using conventional PCR, virulence genes BssS for biofilm, rmpA and magA for hypermucoviscocity and mrkD for fimbriae were determined from culture isolates. PCR assay was performed in PCR laboratory of Department of Microbiology and Immunology, BSMMU.[9, 11, 12]

The data were analyzed using SPSS software Version-23 (SPSS Inc., Chicago, IL, USA).

Results

A total of 150 Klebsiella pneumoniae isolates were collected from Microbiology laboratory, BSMMU during the period of September 2017 to August 2018.

Table 1 showed among 150 K. pneumoniae, 123 (82%) were identified as MDR and 27 (18%) were non-MDR.

Table-1: MDR and non-MDR among 150 Klebsiella pneumoniae isolates

MDR/Non-MDR	No. of isolates	Percentage
MDR	123	82
Non-MDR	27	18

Detection of Several virulence factors of Klebsiella pneumoniae and their associated gene shown in table 2. Among 150 K. pneumoniae isolates, in 82 (54.67%) isolates had type 3 fimbriae, however the fimbriae gene (mrkD) was detected in 96 (64%) isolates.

One hundred twenty-two (81.34%) K. pneumoniae isolates were biofilm producer, whereas biofilm gene, BssS was detected in 139 (92.67%) isolates.

Another potential virulence factor, hypermucoviscosity was positive in 18 (12%) K. pneumoniae isolates and the genes associated with this virulence property, rmpA and magA gene were detected in 16 (10.67%) and 10 (6.67%) isolates respectively.

Table-2: Phenotypic detection of virulence factors and their associated gene among Klebsiella pneumoniae isolates (n=150)

Virulence factors	No of phenotype positive isolates n (%)	No of genotype positive isolates n (%)
Fimbriae	82 (54.67)	mrkD-96 (64)
Biofilm formation	122 (81.34)	BssS-139 (92.67)
Hypermucoviscosity	18 (12)	rmpA-16(10.67) magA-10(6.67)

Table 3 showed the phenotypic detection of virulence factors and their associated genes among MDR and non-MDR Klebsiella pneumoniae. Presence of type 3 fimbriae was observed phenotypically in 53.6% MDR and 59.2% non-MDR Klebsiella pneumoniae isolates. Gene for type 3 fimbriae, mrkD was present in 65.8% MDR and 55.5% non MDR isolates. 83% MDR and 74.07% non-MDR K. pneumoniae isolates were biofilm producers. Biofilm gene BssS was present in 95.5% MDR isolates and 77.7% non MDR isolates.

Hypermucoviscosity was detected in 13.8% MDR and 3.7% non MDR K. pneumoniae isolates. Genes rmpA and magA were present in 11.38% and 8.13% MDR isolates respectively. Although magA gene was absent in non-MDR isolates but rmpA gene was detected in 7.4% non-MDR isolates.

Table- 3: Phenotypic detection of virulence factors and their associated genes among MDR and non-MDR Klebsiella pneumoniae.

Virulence factors	No. of phenotype positive isolates n (%)		Genes	No. of genotype positive isolates n (%)	
	MDR strains	Non-MDR strains		MDR strains	Non-MDR strains
Fimbriae	66(53.6)	16(59.2)	mrkD	81 (65.8)	15 (55.5)
Biofilm formation	102 (83)	20 (74.07)	BssS	118 (95.5)	21 (77.7)
Hypermucoviscosity	17(13.8)	01 (3.7)	rmpA	14 (11.38)	02 (7.4)
			magA	10 (8.13)	0 (0)

Discussion

Among 150 K. pneumoniae, 123 (82%) were identified as MDR and 27 (18%) were identified as non-MDR. A similar finding was observed by Aljanaby et al., (2016)13, 84.37% MDR K. pneumoniae were isolated from different clinical sources in Iraq. In a study in Bangladesh about 87% MDR K. pneumoniae were recorded from urine samples (Rahman et al., 2007).[14]

Pathogenicity of K. pneumoniae is due to the presence of many virulence genes which encode virulence factors that allow it to attack the immune system of mammalians and cause many kinds of diseases. Some of these virulence factors are: fimbriae, siderophore production, serum resistance, biofilm formation, hypermucoviscosity and capsule synthesis (Aljanaby et al., 2016).[13]

In this study, Type 3 fimbriae were detected phenotypically by hemagglutination assay. Type 3 fimbriae encoding gene mrkD gene was also detected by PCR. Among 150 K. pneumoniae isolates, 82 (54.67%) had type 3 fimbriae were detected phenotypically, however the fimbriae gene (mrkD) was expressed in 96 (64%) isolates.

In a study in India reported that type 3 fimbriae were detected in 69.7% K. pneumoniae phenotypically (Chandan et al., 2015)[15], which was almost similar to present study. 84% mrkD gene was detected among K. pneumoniae in a

study done in Turkey (Candan et al., 2015)[15] which almost correlates with the result of present study. Another study found 34.3% mrkD gene found in K. pneumoniae (Davies et al., 2015)[16] which was dissimilar to present study probably the K. pneumoniae isolates in that study were mostly isolated from urinary samples, did not cause invasive infections.

Out of 96 mrkD gene positive K. pneumoniae, 72 (75%) were detected phenotypically by hemagglutination method and 24(25%) were not detected. Out of 54 PCR negative K. pneumoniae, 10 (18.5%) were phenotypically positive but 44 (81.4%) were not detected phenotypically.

K. pneumoniae strains can produce a thick layer of extracellular biofilm as a virulence factor that helps the organism attach to living or abiotic surfaces, preventing the effects of antimicrobial agents (Vuotto et al., 2014)[17]. In present study, about 122 (81.34%) K. pneumoniae isolates were biofilm producer, when tested by tissue culture plate method, which was almost similar (76%) in a study in Malaysia (Barati et al., 2016).[18]

In this study, the biofilm gene, BssS was detected in 139 (92.67%) isolates by PCR. The similar finding was recorded in a study done by Urology and Nephrology Center (UNC), Egypt, in which BssS gene found in 94% K. pneumoniae isolates from urine sample (Hasan et al., 2011).[19]

In present study, out of 139 BssS gene positive K. pneumoniae 122 (87.76%) were also detected by tissue culture plate method but 17(12.23%) were not detected by that method. Biofilm was not detected phenotypically or genotypically among the remaining 11 isolates.

In this study, another potential virulence factor, hypermucoviscosity was detected by string test and were positive in 18 (12%) K. pneumoniae isolates. Almost similar isolation rate of hypermucoviscous phenotype among K. pneumoniae was found in different studies, 6.7%, 8.5%, 9% respectively (Pereira et al., 2015, Devarari et al., 2017, Barati et al., 2016).[20,21,18] K. pneumoniae isolates were mostly from invasive infection and were hyper virulent phenotype in that study. This high level of hypermucoviscosity in these samples might be attributed to different sample type and severity of infection.

In present study, the genes associated with hypermucoviscosity, rmpA and magA gene were detected in 16(10.67%) and 10 (6.67%) isolates respectively. Isolation rate rmpA and magA genes were 15.38% and 3.07% respectively in a study conducted in Iran (Nahavandinejad et al., 2017)[22], which was correlated with present study.

In present study, correlation between phenotypic detection of virulence factors and their associated genes among MDR and non-MDR Klebsiella pneumoniae was also observed.

Presence of type 3 fimbriae was observed phenotypically in 53.6% MDR and 59.2% non-MDR Klebsiella pneumoniae isolates. Gene for type 3 fimbriae, mrkD was present in 65.8% MDR and 55.5% non MDR isolates.

About 83% MDR K. pneumoniae isolates and 74.07% non-MDR were biofilm producers when tested by TCP method. Similarly, biofilm gene BssS was present in 95.5% MDR isolates and 77.7% non MDR isolates.

Hypermucoviscosity was not expressed significantly in MDR (13.8%) and non-MDR (3.7%) K. pneumonia isolates. Genes rmpA and magA were present lower in MDR isolates (11.38% and 8.13% respectively). Although magA gene was not detected in non-MDR K. pneumoniae isolates.

Considering the identification of virulence factor with extended multidrug resistance with higher prevalence of mrkD and BssS genes. The study findings highlight the challenges posed by MDR K. pneumoniae.

Conclusion

Majority of the isolated K. pneumoniae (82%) in this study is multi drug resistant. Biofilm formation is the most prevalent virulence factor expressed among K. pneumoniae isolates. Most of the virulence factors: biofilm, hypermucoviscosity are expressed in higher percentage among MDR strains.

Recommendation

However, genome sequencing of K. pneumoniae can be done for proper understanding of transmission potential of virulence as well as drug resistance. Periodic surveillance should be taken to monitor virulence activity of MDR K. pneumoniae in hospitalized patients as well as from community acquired infections.

Ethical approval

Ethical clearance was taken from Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka (No. BSMMU/2018/3709).

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Knowledge on First Aid among the high school students in a selected rural community of Dhaka district

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Abstract

First Aid is responding to an emergency or unexpected situation like fainting, bleeding, drowning, poisoning, electrocution, cut injuries, scalds or burns and the likes. Having a basic knowledge on proper first aid procedures can save lives. The aim of this study was to assess the knowledge on first aid among the high school students in a rural community of Dhaka district. This is a descriptive type of cross sectional study. A structured self-administered questionnaire used to collect data. A total 200 samples selected purposively. Students of class VIII, IX and class X interviewed. Out of 200 students, both class VIII and IX had the same number of students, where the frequency and percentage were 79 and 39.5 % respectively. Class X had 42 students, which was 21% of the total. About 29.5% mothers were primary level passed whereas 23% were illiterate. On the other hand, maximum 22.5% fathers were primary level passed and only 6.5% passed degree course or above respectively. Regarding the meaning of first aid 36.5% (n=73) of the respondent s answer was to provide initial treatment to the wounded. About 22.5 % (n=45) of the respondents answered for cross sign to recognize the first aid box. Majority (56.0%) gave multiple answers regarding their knowledge on circumstances requiring first aid. Majority (62.5%) of the respondents gave multiple answers regarding their knowledge on contents of first aid box. First Aid administered under the premise of immediate care for an illness or injury. Therefore, it is necessary to equip the students with knowledge while dealing with an emergency before professional help arrived.

Key Words: First Aid, First Aid kit, Knowledge, Education, Rural Community, Medical Emergency ***J Cont Dent Sci 2019;7(2):18-21***

Introduction

First aid is the temporary and immediate care given to the person who is injured or suddenly become ill. First aid can save a victim s life especially if the victim is bleeding heavily and has stopped breathing. It also prevents additional medical emergencies that can arise from an injury or illness.[1]

According to carotto M Reinke, first aid is an important responsibility of all the persons, because it remote areas and there is very limited access to full fledged hospitals and dispensaries in nearby vicinity. Therefore, we should be able to provide care of those who are injured. The aims of first aid are too preserve life, promote recovery and prevent worsening of the victim s general condition and quick transport of the casualty to the nearest medical aid if required.[2]

First aider can be common people who may have learnt the standard method of application of first aid best suited to his skills. The person identifies the problem and provides emergency care and when necessary move the persons without causing further injury. First aid can save a victims life in emergency that can arise from an injury or illness. This is an age when technology has produced complicated machinery and swift means of transport so accidents are on the rise and produce divesting results with loss of life, injuries to the body and mind. Under these circumstances, first aid has gained much importance. First aid can be given to a sick or injured person until services of qualified sector are obtained.[3]

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An organized worldwide effort of giving first aid came only in 1877, though first aid were being practiced from ancient times. The famous German surgeon, general Esmatch was the first concerned the idea of the first aid with the formation of st. John Ambulance association of Wigand. In1922 Red Cross society of India established with more than 400 branches all over the india.[4]

According to the National safety council, the national center for injury prevention and control, Huston Texas 2002 reveals that each year about 2.6 million people are hospitalized for nonfatal injuries and about 60.5million people nearly 1in 4, seek medical attention or suffer at least one day of activity restriction from an injury. So it is important for us to know how to recognizes emergencies and how to nespond.[5]

In Bangladesh it has also been documented that first aid act as a functional component in school health services that are available in primary and secondary School. However, the starting year of School health programme in Bangladesh was 1948. One of the services rendered by school medical officer was ``participation in the organization of sports, games and first aid in conjunction with the physical education teacher. Modern civilization demands education on wider scale. It is therefore obligatory for the society to ensure that the students are in fit condition of body and mind to receive first aid acquired by a child in the course of study in the school become part of his way of life. It is a package of activities, which primarily aims at the maintenance, improvement and preventive services by bettering its environment and by educating in the matter of health.[6]

The purpose of the study was to assess the knowledge on first aid among the high school students in a selected rural community of Dhaka district.

Methods

This was a descriptive type of cross sectional study. The study carried out at Dhamrai Girls High School in Dhamrai upazilla of Dhaka district. Topic selection started in February 2012. Total allocated study period was 1 week commencing from 15 to 19 April 2012. A time schedule was prepared at the beginning of the study keeping in mind the different tasks that had to complete within the period. Development of research proposal, topic approval, questionnaire preparation and pre-testing of the questionnaire done before this time. The subsequent period used for data collection, analysis and interpretation of the results and report writing. The study population was the students of class-VIII, IX and Class X of Dhamrai Girls High School in Dhamrai upazilla of Dhaka district. The sample size was 200. The sample was collected by non-probability purposive sampling technique. No statistical method used. All the students of class-VIII, IX and Class X presented included in this study. A structured questionnaire developed to collect the data. The questionnaire was pre tested and necessary modifications done and finalized before collection of data. The questionnaire developed by using variables as per objectives. With the verbal consent of the respondents, data collected by the researchers themselves by face-to-face interview with a Bengali version of questionnaire. After completion of data collection, to maintain consistency the data checked and edited manually and verified before tabulation. Data coded, entered and analyzed in a computer. The findings of the study presented by frequency, percentage and table. Data analysis was done by using SPSS (statistical package for social science) -17 for windows version and Microsoft word and Excel according to the key variable and the objectives of the study.

Results

Table-1: Distribution of the students by name of class n=200)

Class name	Frequency	Percent (%)
Class VIII	79	39.5
Class IX	79	39.5
Class X	42	21

Table-1 shows the distribution of the students according to their classes of study. Out of 200 students, both class VIII & class IX had the same number of students, where the frequency and percentage were 79 and 39.5 % respectively. Class X had 42 students, which was 21% of the total.

Table-2: Distribution of the students by their father's education (n=200)

Father's education	Frequency	Percent (%)
Illiterate	28	14
Primary level passed	45	22.5
Class Eight passed	41	20.5
SSC passed	38	19
HSC passed	35	17.5
Passed Degree Course or above	13	6.5

Table-2 shows the level of education of respondents fathers where 14% (n=28), 22.5%(n=45), 20.5%(n=41),19%(n=38),17.5% (n=35) and 6.5% (n=13) were illiterate, primary level passed, class eight passed, SSC passed, HSC passed and passed degree course or above respectively.

Table-3: Distribution of the students by their mother's education (n=200)

Mother's education	Frequency	Percent (%)
Illiterate	46	23
Primary level passed	59	29.5
Class Eight passed	44	22
SSC passed	26	13
HSC passed	23	11.5
Passed Degree or above passed	2	1

Table-3 shows distribution of the respondents by their mother s education. 23% (n=46), 29.5% (n=59), 22% (n=44), 13% (n=26), 11.5% (n=23) and 1% (n=2) of the respondent s mother were found illiterate, primary level passed, class eight passed, SSC passed, HSC passed and passed degree course or above respectively.

Table-4: Distribution of students by Knowledge on meaning of first aid (n=200)

Meaning of first aid	Frequency	Percent (%)
To help ill persons	19	9.5
To call a doctor	7	3.5
To carry the patient to hospital	7	3.5
To provide initial treatment to the wounded	73	36.5
To put pressure on bleeding area	6	3
Multiple answer	88	44

Table-4 shows the distribution of the respondents by their knowledge on meaning of first aid. Maximum 36.5% of the respondents told about providing initial treatment to the wounded whereas only 3% put pressure on bleeding area.

Table-5: Distribution of students by their knowledge on recognizing first aid box by sign (n=200)

Recognizing first aid box by sign	Frequency	Percent (%)
Minus sign	25	12.5
Sign of division	9	4.5
Sign of multiplication (Cross Sign)	45	22.5
Plus sign	26	13
Lunar sign	67	33.5
Multiple answer	28	14

Table-5 shows about 22.5% of the respondents answered for cross sign and 4.5% gave sign of division. Only 26 respondents (13%) answered the plus sign for recognizing first aid box.

Table-6: Distribution of students by their knowledge on Circumstances requiring first aid (n=200)

Circumstances requiring fir st aid	Frequency	Percent (%)
Sudden injury	27	13.5
Cut injury	28	14
Drowning	14	7
Restlessness	15	7.5
Mosquito bite	4	2
Multiple answer	112	56

Table-6 shows that majority 56% gave multiple correct answers whereas only 2% answered due to mosquito bite.

Table-7: Distribution of the respondents by their knowledge on contents of a first aid box (n=200)

Contents of a first aid box	Frequency	Percent (%)
Pain killer	12	6
Thermometer	6	3
Dettol or Savlon	15	7.5
Antibiotic	16	8
Gauge and bandage	26	13
Multiple answer	125	62.5

Table-7 shows that majority 62.5% of the respondents gave multiple answers and only 3% answered due to Thermometer.

Table-8: Distribution of students by their knowledge on initial management of profuse bleeding due to cut injury (n=200)

Initial management of profuse bleeding due to cut injury	Frequency	Percent (%)
To apply egg white on cut	13	6.5
To press and tie the cut by rope or gaamsa	38	19
If the wound occurs on hand or leg that should be kept a bit lifted	11	5.5
Have to move at once to nearby treatment centre	34	17
Have to call the Ozha	3	1.5
Multiple answer	101	50.5

Table-8 shows that among the respondents 19% (n=38) gave response 'pressing and tying the cut by rope or gaamsa' for the initial management of profuse bleeding. On the other hand only 6.5 % (n=13) of the respondents gave for applying egg white on cut respectively.

Discussion

The descriptive type of cross sectional study titled 'Knowledge on first aid among the high school students in a rural community of Dhaka district'. The purpose of the study was to assess the knowledge on first aid among the high school students in a selected rural Community of Dhaka district.

In this study according to the class distribution of the students, Out of 200 students both class VIII & class IX had the same number of students, where the frequency and percentage were 79 and 39.5 % respectively. Class X had 42 students, which was 21% of the total. In terms of education level of respondent's fathers maximum 22.5% were primary level passed whereas only 6.5% were passed degree course or above. In addition, maximum 29.5% mother were primary level passed and only 1% were passed degree or above. Moreover, dissimilar finding was found in the another study revealed that about maximum 52.9% parents were secondary level passed whereas only 11.8% were primary level and university level passed.[7]

According to the distribution of the respondents by their knowledge on meaning of first aid about 36.5% of the respondents providing initial treatment to the wounded where as another study shows dissimilar finding. Indicating the knowledge of trained students found to be better than those of untrained students were yet the mean of trained students had less than 50%, which is not satisfactory.[8]

However according to the Australia Wide First Aid-A white cross(Plus Sign) on a green background is the internationally accepted symbol for first aid 9.The maximum respondent in our study did not aware about the sign. About 22.5% recognize the sign of multiplication (cross sign) which is not correct and only 13% answered the plus sign, which is correct and acceptable.

In addition, the distribution of students by their knowledge on circumstances requiring first aid revealed that majority 56 % gave multiple answers and only 14% gave answered only due to cut injury. On the other hand, another study conducted by 'Chirongoma F, Chengetanai S, Tadyanemhandu C' revealed the dissimilar finding that was common use of first aid practices after burn injury in 40 (80.0%) of the participants.[10]

The distribution of the respondents by their knowledge on contents of a first aid box shows that majority 62.5% of the respondents gave multiple answers, 13% answered gauge and bandage and only 6% answered painkiller whereas another study revealed dissimilar finding. Among the management of burning of a worker most of the respondents think content should be dettol and cotton (85.4%), painkiller (75.6%) or gaz/bandage (57.3%).[11]

Moreover, the distribution of students by their knowledge on initial management of profuse bleeding due to cut injury 19 % gave answer for pressing and tying the cut by rope or gaamsa, 5.5% answer if the wound occurs on hand or leg that should be kept a bit lifted and 17% answer have to move at once to nearby treatment center. In addition, dissimilar finding was found in the another study whereas 65.3% respondents pressed firmly with clean bandage to stop bleeding, 16.7% respondents elevated bleeding body part gently and 45.8% respondents contacted responsible school authority and parent to stop bleeding.[12]

Conclusion

In the present study Knowledge on First Aid among the High School Students in a rural Community of Dhaka district was measured where maximum (22.5%) respondent's father's education status were in primary level and majority of the respondent's mother's education status were also primary education (29.5%) but there was none in post graduate level. Most of the students did not have adequate knowledge about first aid. It is important to know first aid so that someone helped by him/her and can be helpful to others in case of many accidents or injuries. The chances for someone to recover more easily or even surviving an accident or injury greatly improved if someone immediately uses first aid knowledge to help them. Many programs to learn basic first aid taught by schools, Fire departments, hospitals, and community organizations are great tools for everyone. First Aid usually administered under the premise of immediate care for an illness or injury. Therefore, it is necessary to equip the students with knowledge while dealing with an emergency before professional help arrived.

Completing Interests Disclaimer

Authors have declared that no competing interests exist. The items used for this research are commonly and predominantly use item in our area of research and country. There is absolutely no conflict of interest between the authors and authorities of the school because we do not intend to use these items as an avenue for any litigation but for the advancement of knowledge. In addition, the research not funded by the concern organization.

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Submandibular sialolithiasis in teenagers: A series of two case reports

SL Biswas,[1] Z Hossain,[2] S Tafhim,[3] KG Mohiuddin,[4] N Amin[5]

Abstract

Sialolithiasis is one of the most common pathologies of the submandibular gland and accounts for about 80 percent of all salivary duct calculi. The sublingual gland and minor salivary glands are rarely affected. A patient usually complains of pain or/and swelling in the salivary glands, especially during meal. In this article, we presented two cases of sialolithiasis in the submandibular gland in teenagers which were removed via intraoral approaches.

Keywords: Sialolithiasis, Submandibular gland, Sublingual gland, Salivary glands, teenagers.

(J Cont Dent Sci 2019;7(2):24-27)

Introduction

Sialolithiasis is the most common disease of salivary glands characterized by development of salivary stones, known as calculi or sialoliths, in the salivary ducts or in the affected salivary gland.[1-3] It accounts for about 1.2% of unilateral major salivary gland swellings. Submandibular gland has the highest predilection for sialolithiasis with 80% occurrence rate, followed by the parotid (19%) and the sublingual (1%) glands. It is usually seen between the age of 30 and 60 years. It is uncommon in children as only 3% of all sialolithiasis cases have been reported in the pediatric population. Males are affected twice as much as females.[4]

The stones themselves are typically composed of calcium phosphate or calcium carbonate in association with other salts and organic material such as glycoproteins, desquamated cellular residue, and mucopolysaccharides. Some factors inherent to the submandibular gland tend to favor stone formation there like longer and larger caliber duct, flow against gravity, slower flow rates, and higher alkalinity along with higher mucin and calcium content of the saliva. Most submandibular stones are found in the salivary duct (75-85% of cases). Ductal stones are elongated in shape whereas hilar stones tend to be oval.[5]

The clinical symptoms include swelling and pain in the affected gland. If the blockage of the duct is complete, the symptoms will be severe. Pain and swelling, may be recurrent and most pronounced during meals. In this paper we present two cases of large (>10 mm) sialoliths of the wharton s duct, treated with intraoral sialolithotomy.

Case Reports

Case- 1

A 16 years old male reported on 5th May, 2019 at Sapporo Dental College & Hospital with a complaint of recurrent episodes of pain, difficulty in mastication and swallowing for the last two months (Fig. 1A). On bimanual palpation left submandibular gland was firm and tender. Intraorally, left submandibular duct opening was inflamed and erythematous along with a diffuse swelling (Fig. 1B). The mandibular occlusal radiograph revealed a single ovoid radiopacity extending from the lower left canine to left second premolar area (Fig. 1C). On the basis of clinical and radiological findings, we diagnosed the case as a left submandibular

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sialolithiasis. All preoperative investigations were under normal limits. Following an informed consent, under local anesthesia, sialolithotomy with sialodochoplasty was performed via an intraoral approach (Fig. 1D).

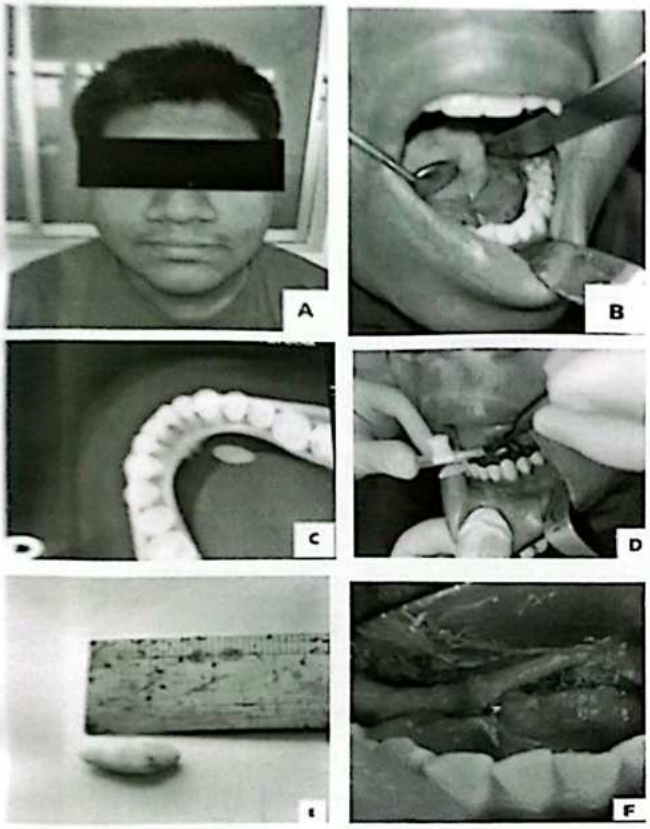

Fig.1 (A) Patient's profile; (B) swelling in the floor of the mouth; (C) mandibular occlusal radiograph showing sialolith; (D) sialolithotomy with sialodochoplasty (E) excised sialolith (F) suturing of the defect.

An incision was placed on the wharton's duct directly over the sialolith to expose it. A 15 mm long stone was removed (Fig. 1E). A 18 gauge drainage catheter was inserted into the duct and salivary flow was confirmed (Fig. 1F).

Case-2

A 13 years boy reported on 14th November, 2019 at Sapporo Dental College & Hospital with a swelling on right side of the floor of the mouth, which was associated with pain during meal for 3 months (Fig. 2A).

Clinical examination revealed a superficial, hard swelling situated near the lingual frenum, which was tender on palpation (Fig. 2B). There was no associated discharge or bleeding reported from the area. The mandibular occlusal radiograph revealed a radiopacity extending from the lower right canine to the right second premolar area (Fig. 2C).

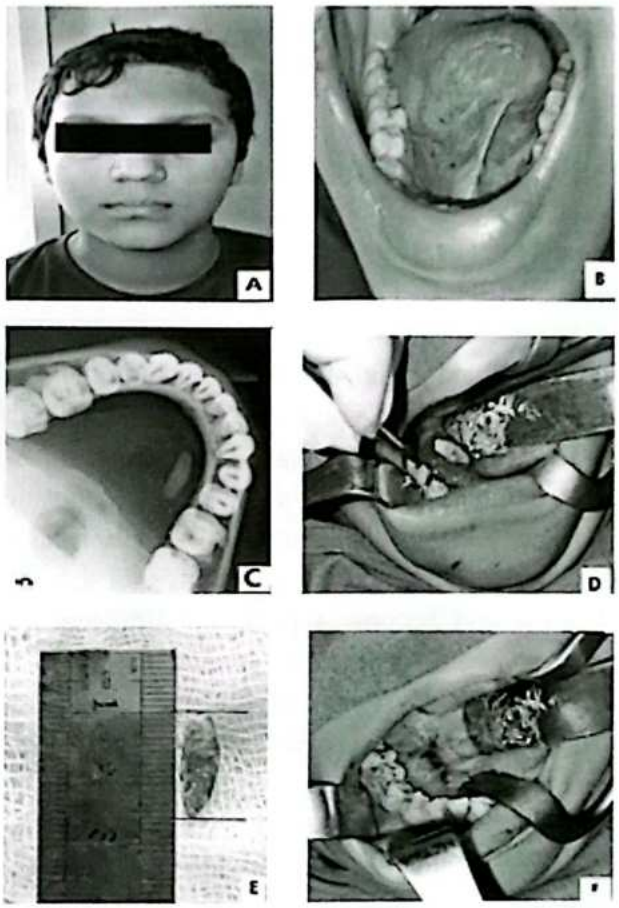

Fig. 2. (A) Patient's profile; (B) swelling in the floor of the mouth; (C) mandibular occlusal radiograph showing sialolith (D) sialolithotomy (E) excised sialolith (F) suturing of the defect.

Under local anesthesia, intraoral incision was made in the floor of the mouth. The duct was opened up and the sialolith was removed in a single piece which was about 18mm in length (Fig. 2D, 2E). The wound was closed in layers and salivary secretion through the ductal opening was confirmed peroperatively (Fig. 2F).

Discussion

The exact etiology and pathogenesis of salivary calculi is a largely unknown phenomenon. It may arise from the deposition of calcium salts around a nidus of debris within the duct system.[6-8] Salivary stagnation due to inadequate drainage, bacterial infection, and epithelial injury along the duct may also play a role in the formation of stones.[9]

The submandibular sialolith typically causes obstruction of salivary secretion, which leads to swelling, pain and infection of the gland, and finally requires surgical intervention.[10] The swelling is usually worsened by meals. This is explained by an elevated intraglandular pressure resulting from an increased salivary secretion in the obstructed gland by the sight and smell of food. However, if the duct adjacent to the sialolith is able to dilate, allowing normal secretion of saliva around the stone, it might be asymptomatic and thus allowing the growth of a giant calculus eventually. In other words, the ability of a sialolith to grow and become a giant sialolith depends mainly on the ability of the duct to dilate to accommodate the stone.[11] Most of the sialolith are usually of 5 mm in maximum diameter and all the stones over 10 mm should be reported as a sialolith of unusual size. Furthermore, they are classified as giant in case any dimension exceeds 15 mm.[4]

The treatment objective of salivary calculi, is the restoration of normal salivary secretion. Different treatment options may be selected according to the size and location of the sialolith. The sialolith should be removed with a minimally invasive procedure, usually through a intraoral sialolithotomy, to avoid morbidity associated with sialadenectomy.[11] However, submandibular gland excision is recommended in cases of intra glandular sialoliths. In our cases, prophylactic removal of the sialoliths were performed intraorally to prevent further scarring and gland dysfunction, as well as to prevent possible retrograde infection. Newer treatment modalities such as extracorporeal short-wave lithotripsy and sialoendoscopy are effective alternatives to conventional surgical excision for smaller sialoliths. However, for giant sialoliths, intraoral sialolithotomy with sialodochoplasty or sialadenectomy remains the mainstay of management.[12]

Conclusion

Management of sialoliths remain a challenge for the clinicians in aspect of both diagnosis and treatment purpose. The choice of surgical treatment and the preservation of the submandibular gland require careful consideration when dealing with sialoliths of larger size. Submandibular and facial pain particularly when it is related with intake of food should be considered as salivary calculi. Proper history taking and correct imaging techniques are required for the confirmation of clinical diagnosis. Though different advanced imaging techniques are available, occlusal radiographs still remains as the gold standard for diagnosis of sialoliths. In our cases, sialolithotomy was the treatment of choice due to the location of the stone within Wharton's duct.

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Management of a Discoloured Incisor Tooth with Large Periapical Lesion- A Case Report

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Abstract

Periapical lesions commonly occur in incisors resulting from inflammatory responses to microorganisms around the teet and root canals, followed by trauma. In such cases, microbial elimination or minimization from the pulp system usin efficient chemomechanical preparation nonsurgically can lead to a successful outcome. In addition, discolouration of thes teeth can often be corrected successfully with intracoronal bleaching. In the reported case, nonsurgical endodontic therap successfully resolved a large periapical lesion of tooth # 32, which suffered from trauma. Intracoronal bleaching followed b endodontic treatment also corrected the discolouration. After 1 year, the incisor tooth showed clinical and radiographi signs of success.

Key Words: Discolouration, Periapical lesion, Bleaching, Root canal treatment. ***(J Cont Dent Sci 2019;7(2):28-32)***

Introduction

Periapical lesions result from inflammatory responses to microorganisms around the teeth and root canals. Trauma, caries, or tooth wear commonly initiate periapical radiolucencies[1].

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Treatment approaches for periapical lesions range from nonsurgical endodontic therapy with or without endodontic surgery to tooth extraction. Microbial elimination or minimization from the pulp system using efficient chemomechanical preparation can lead to a successful outcome[2].

Tooth discolouration varies in aetiology, appearance, location, and severity and could be classified as intrinsic, extrinsic, or both[3,4]. Extrinsic discolouration is caused by chromogens derived from habitual intake of dietary sources such as wine, coffee, tea, carrots, oranges, chocolate, tobacco, mouth rinses, or plaque on the tooth surface[5]. In contrast, intrinsic discolouration typically results from systemic or local causes. Systemic causes include drug-related (tetracycline), metabolic, fluorosis, and genetic (hyperbilirubinemia, amelogenesis imperfecta, and dentinogenesis imperfecta). Local causes include pulp necrosis, intrapulpal haemorrhage, pulp tissue remnants after endodontic therapy, coronal filling materials, root resorption, and ageing[6].

Different options are available for managing discoloured teeth. These include full veneers, laminates, crowns, and non-invasive techniques like bleaching. Even though the outcomes of laminate veneers or full porcelain crowns are more acceptable and predictable, the procedures require tooth preparation, resulting in substantial natural tooth structure loss that cannot be reversed.

In addition, both approaches may mask the discolouration and fail due to fracture, debonding, and marginal leakage[7].

Local causes of discolouration of teeth can often be corrected successfully with intracoronal bleaching. Over the years, many bleaching agents such as oxalic acid, calcium hypochlorite, hydrogen peroxide, carbamide peroxide, and sodium perborate have been used with varying results[8]. However, the most commonly used agents for bleaching endodontically treated teeth (intra-coronal bleaching) are 30% 35% hydrogen peroxide and sodium perborate in combination or separately[9]. Intra-coronal bleaching procedure is well documented within the literature[10]. It s an efficient and safe procedure, although it s been related to cervical root resorption (CRR). Previous studies indicate that previous traumatic injury, the patient s increasing age, and a high concentration of hydrogen peroxide and heating are risk factors that promote cervical root resorption[11,12]. The present article reports the management of a discoloured incisor tooth with a large periapical lesion that resulted from trauma.

Case report

A 35-year-old male patient complained of pain, and aesthetically unacceptable lower left lateral incisor (tooth # 32). The patient had a history of trauma 10 years back. No relevant medical history and history of allergy was noted. Clinical and radiographic examinations were carried out. The intraoral examination revealed that tooth # 32 was tender on percussion. Radiographic examination revealed a large periapical radiolucency (6.5 x 7 mm) associated with the tooth (Fig. 2-A). The tooth had become nonvital and infected following the injury. The case was diagnosed as an acute exacerbation of chronic periapical periodontitis on tooth # 32.

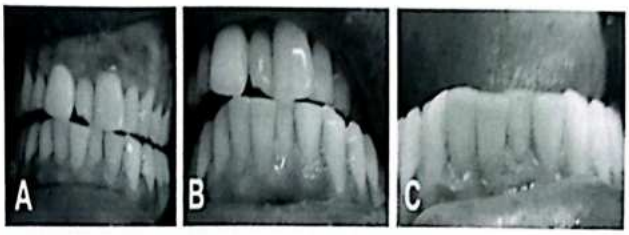

Fig. 1 A - C. Treatment of discoloured tooth # 32 by bleaching. A, Before bleaching; B, After bleaching; C, 1-year-follow-up

The complete treatment plan and procedures were discussed with the patient, and informed consent was obtained before initiating the treatment procedures. At this initial appointment, access to the root canal was established, and a purulent discharge from the canal was noticed. Cotton rolls and high-volume evacuation were used for isolation. The canal was gently irrigated with normal saline (Normal/The ACME Laboratories Ltd, Dhaka, Bangladesh). A cotton pellet was placed within the pulp chamber, and the cavity was kept open. The patient was discharged with the advice of warm saline gurgling over the next 48 hours. A 3rd generation of Cephalosporin (Cefixime 400 mg, 12 hourly for 7 days) was also prescribed to aid in periradicular microbial control. The materials used for root canal treatment are shown in Table 1.

Table 1. Materials used for Root canal treatment

Material	Name/Manufacturer
Normal Saline	Normal/The ACME Laboratories Ltd, Dhaka, Bangladesh
2% Sodium Hypochlorite Solution	Irrisol/HAI Laboratories, Dhaka, Bangladesh
Paper Point	Absorbent Paper Points/DiaDent, Korea
Pure Calcium Hydroxide Powder	Calcium Hydroxide/Deepti Dental Products, Ratnagiri, India
Zinc Oxide Cement	e-Temp/DiaDent, Korea
Calcium Hydroxide Sealer	Sealapex/SybronEndo, Glendora, USA
Gutta Percha Points	Gutta -percha Points/DiaDent, Korea

After 48 hours on the next appointment, the working length was determined. First, necrosed material from the canal was removed. Then, mechanical preparation of the canal was done to an apical size of 30 and irrigated with 2% sodium hypochlorite solution (Irrisol/HAI Laboratories, Dhaka, Bangladesh) and normal saline alternately. After drying with the sterile paper points (Absorbent Paper Points, DiaDent, Korea), the canal was medicated with pure calcium hydroxide (Calcium Hydroxide, Deepti Dental Products, Ratnagiri, India) mixed into a paste form with normal saline. Finally, the access cavity was filled with zinc oxide cement (e-Temp/DiaDent, Korea).

The patient was recalled after 7 days, and the treated tooth was found to be asymptomatic. The access cavity was reopened, copious irrigation was done with 2% NaOCl solution using a side vented needle and finally irrigated with normal saline. The root canal was dried with sterile paper points. Then, the root canal was obturated with gutta-percha (Gutta-percha Points, DiaDent, Korea) as filler and calcium hydroxide as a sealer (Sealapex, SybronEndo, Glendora, USA) by lateral condensation technique.

On the next appointment, after 7 days, the tooth was found asymptomatic. Therefore, bleaching treatment was initiated according to the patient's aesthetic requirement. First, a preoperative photograph was taken (Fig. 1-A) for reference. Then, the Vita classic porcelain shade guide (Vita Zahafabrik) was used under normal daylight to record the shade of teeth # 42 and # 32 before bleaching. The shade of tooth # 42 was A2. Next, approximately 2 mm of gutta-percha (GP) was removed from the pulp chamber (Fig. 2-B).

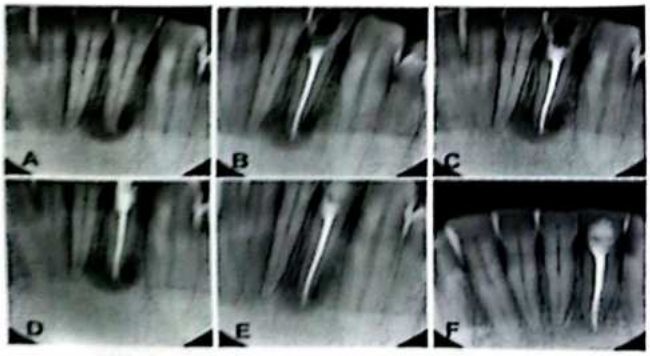

Fig. 2 A - F. Root canal treatment followed by intra-coronal bleaching and follow-up of tooth # 32. A, Preoperative intraoral periapical view showing large circular radiolucency around the apex of tooth # 32; B, Removal of approximately 2 mm Gutta Percha obturating material from the pulp chamber after root canal treatment; C, Placement of approximately 2 mm thick Glass Ionomer cement barrier; D, Placement of bleaching agent and restoration by zinc oxide cement; E, 3-months-follow-up showing bone regeneration and gradual disappearance of the periapical radiolucency; F, 1-year-follow-up revealing complete periapical healing by bone regeneration.

Then, to maintain a mechanical seal between the obturated canal and bleaching gel, 2 mm thick glass ionomer cement (GlasIonomer FX ULTRA/Shofu Dental Corporation, Japan) was placed over the GP (Fig. 2-C). Next, water-soluble cream (Vaseline) was applied to protect soft tissues. Next, the bleaching process was undertaken using 35% hydrogen peroxide gel (Opalescence Endo/Ultradent Products Inc., USA). Next, bleaching gel was placed into the pulp chamber with the help of a spatula and properly condensed with a wet cotton pellet. Finally, the access cavity was sealed with zinc oxide cement (Fig. 2-D). The materials used for bleaching are shown in Table 2.

The bleaching gel was changed and replaced after every week until desired shade was obtained. 3 rounds of bleaching treatment produced satisfactory results (Fig. 1-B). Then the pulp chamber was washed, dried, and neutralized with pure calcium hydroxide mixed into a paste form with normal saline. After 1 week, the tooth was restored with a bonded (CLEARFIL S3 BOND Universal/Kuraray Noritake Dental Inc., Japan.) composite resin (CLEARFIL AP-X/Kuraray Noritake Dental Inc., Japan) restoration.

In the follow-up visit after 3 months, the tooth was found asymptomatic and aesthetically acceptable.

Clinical evaluations showed no palpation or percussion sensitivity, and the radiograph showed a reduction of periapical radiolucency by bone regeneration (Fig. 2-E).

Table 2. Materials used for Intra-coronal bleaching

Material	Name/Manufacturer
Glass Ionomer Cement	Glasionomer FX ULTRA/Shofu Dental Corporation, Japan
35% Hydrogen Peroxide	Opalescence Endo/Ultradent Products Inc., USA
Adhesive	CLEARFIL S[1] BOND Universal/Kuraray Noritake Dental Inc., Japan
Light Cure Composite Resin	CLEARFIL AP-X/Kuraray Noritake Dental Inc., Japan

Follow-up after 12 months revealed similar clinical findings (Fig. 1-C). In addition, the radiograph showed complete periapical healing by bone regeneration (Fig. 2-F). During follow-up visits, the patient was counselled about the importance of oral hygiene maintenance.

Discussion

Up to 94.4% of periapical lesions show partial or complete healing when managed with a conservative approach using nonsurgical endodontic therapy[13,14]. The nonsurgical endodontic treatment proved effective for the reported case as well.

The presented case exhibited a large periapical lesion (Fig. 2-A). Inflammatory periapical lesions are considered large when their diameter is more than 5 mm[15]. Shaping and cleaning the root canals aided with calcium hydroxide as the intracanal medication is recommended to resolve such lesions. An antibacterial calcium hydroxide-based paste dressing was placed in the canal and kept for 7 days in the reported case. Studies have shown calcium hydroxide dressing promotes periapical healing, notably in young adults[16,17]. Similarly, in the presented case, complete periapical healing occurred within 1 year of nonsurgical endodontic therapy. Radiographic examination demonstrated bone regeneration with increasing density, trabecular reconstruction, and lamina dura formation (Fig. 2-F).

Approximately a 2 mm glass ionomer cement barrier was placed over the root filling material (Fig. 2-C) to ensure a mechanical barrier between the sealed root canal and the bleaching gel, which according to previous studies, prevents leakage, chemical injury, periodontitis and CRR[18-20].

Residual H2O2 from bleaching treatment may adversely affect the bonding strength of composites. Therefore, waiting at least 7 days after bleaching before restoring the tooth with resin composites has been recommended. In addition, catalase treatment at the final visit may enhance the removal of residual peroxides from the access cavity. Packing calcium hydroxide paste in the pulp chamber for a few weeks before the placement of a final restoration to counteract acidity caused by bleaching agents and to prevent root resorption has also been suggested. In the reported case, after reaching the desired shade, the pulp chamber was filled with calcium hydroxide for seven days before placing the final material. This step eliminated residual oxygen, which interferes with the polymerization of the filling material. In addition, it neutralized the medium, reducing the risk of cervical resorption[20,21].

It is well documented in some previous studies that the success rate of endodontically treated anterior teeth with or without crowns shows no significant difference[22]. Thus, supporting our view that endodontically treated discoloured anterior teeth can be treated without crowns[23].

Conclusion

In the presented case, nonsurgical endodontic treatment with calcium hydroxide medication has proven its ability in apical healing. Intracoronal bleaching with 35% hydrogen peroxide also successfully corrected discoloration. Clinical and radiographic follow-up after 1-year showed impressive outcomes.

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