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Research Article

Awareness of Safe Water, Proper Sanitation, Hygiene Practices and Prevalence of Water Borne Diseases among People of Different Slum Areas of Chattogram City, Bangladesh

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Abstract

Introduction: Mass people are the manpower of a nation. They always help the nation to upgrade continuously. Henceforth, it is a vital duty for the nation to aware of their basic facilities, health status including their knowledge of diseases, especially low-middle income families.

Objective: To find out the percentage of knowledge on safe water, proper sanitation, hygiene practices, and water-borne diseases in some selected slum areas in Chattogram city.

Methods: Data was randomly collected from different slum areas of Chattogram City Corporation. The majority of the respondents were female in this study. The data were collected, compiled, analyzed, and prepared. In this study, 720 adult people were enrolled.

Results: The majority of the respondents had completed primary school. Most of them knew about safe water and the proper use of water. About 90% of people knew that diarrhea is waterborne disease and 64.6% knew that typhoid is waterborne. Disinfection of water was also popular in this area. They knew different types of disinfection methods. They were also aware of hygienic latrines but most of them didn't have ownership of latrine. More than half of the respondents wash their hands with soap before and after taking a meal and also after defecation. Knowledge of ORS preparation also satisfactory among the people of these slum areas. Most of the people are not affected by water-borne diseases (WBD). It is also true that some people still are suffering from WBD. They have either enough knowledge or not. They are being affected because of lacking enough places of hygiene practices. We observed that most of the people have no own latrine. And they have some limitations.

Conclusion: Most of the people of slum areas were educated where they had completed their studies from different schools and colleges. They were, most of them, aware of hygiene, sanitation, water safety and had knowledge of water-borne diseases.

Keywords: *Hygiene; Sanitation; Safe Water; Waterborne Diseases; Slum Area; Education; Handwashing*

Introduction

Water is imperative for all living animals. Without water, we cannot think for a single day. Surely water is important for life but not all kinds of water. For example, pure water is safe for health while contaminated water is not safe. Contaminated water contains different kinds of pathogenic agents. Therefore, water quality maintenance is very important for protecting public health. There is a close association between human health and the quality of drinking water. Hence ensuring safe drinking water has become one of the most important public health priorities [1].

When water is free from pathogenic microorganisms, harmful chemical substances, pleasant to taste and usable for domestic purposes, it is called safe water [2]. Water is polluted by different types of physical, chemical and biological agents. There are four main routes by which water-related infections are spread. They are water-borne route, water-washed route, water-based route and insect vector route [3]. In slum areas, poor sanitary practices lead to contamination of water and as a result waterborne diseases [4]. The common problem in poor urban and rural communities in developing countries is fecal contamination of food and water. Children's finger and others transmit microorganisms to household objects, to water, to food, that may be stored or transported to another place, to the hands of other children and finally to the mouth of any susceptible persons [5].

There is no water source free from microbial contamination, including piped water. Globally 1.8 billion people drink water that lies unsafe due to fecal contamination. That type of contamination is most prevalent in Africa and South-East Asia [6].

Water and excreta related diseases still remain a major health concern for Bangladeshi people also. Human and animal excreta spread through the drinking water, sewage, indirect contact, foods and many others way and affect human health [7].

Different types of diseases are caused by water contamination. They are diarrhea, typhoid, dysentery, hepatitis, jaundice, skin diseases and many other diseases. Diarrhea is more prevalent than any other waterborne diseases. Key causes of morbidity and mortality in less developed countries are diarrheal disease, especially among the children who are under 5 years old [8,9]. Every year, almost 2.2 million people die due to diarrheal diseases and of these 1.8 million deaths occur in low-income countries [10].

Child mortality rate below 5 years age's child is due to diarrheal diseases in Bangladesh and the percentage is 2%, 3.3% in its urban areas and 1.6% in rural areas [11].

At first it was thought that direct fecal-oral transmission was the predominant mode of transmission of typhoid fever. But now one thing is also included. It is environmental transmission (water contamination and poor sanitation) that is occurs indirectly [12].

In Asia and Africa, typhoid fever is a very concerning issue for young children that is one of vital causes of morbidity and mortality. Risk of typhoid fever is highest among the densely populated areas because of lacking proper sanitation and safe drinking water [13-15].

People who are living in slums are usually unaware of the ill effects of unsafe water, unhygienic latrines and improper disposal of solid wastes and consequently suffer from diseases and burdens of health care costs [16].

Hygiene interventions act by reducing contamination of hands, food, water, and fomites and seem to be at least as effective as the other interventions. Hygiene interventions were those that included hygiene and health education and the encouragement of specific behaviors, such as hand washing. Hygiene interventions could include measures as diverse as keeping animals out of the kitchen to advice on the correct disposal of human feces [17].

It is very necessary to improve the quality of health services, improved sanitation and hygienic environment along with establish health care centers in the nearby areas and ensure available services from the government [18].

Slum-dwelling children are more malnourished, have lower immunization rates (measles vaccination and vitamin A supplementation) and higher rates of measles, are more susceptible to diarrheal illness due to *V. cholera* and suffer from severe dehydration more often than children from non-slum areas. Improved health and nutrition strategies should give priority to children living in urban alums [19].

Safe drinking water and hygiene are essential to reducing Kenya's diarrheal diseases burden. A school-based safe water and hygiene intervention in Kenya was evaluated to assess its impact on students' knowledge and parents' adoption of safe water and hygiene practices. This novel program shows promise for reducing school absenteeism and promoting water and hygiene interventions in the home [20].

Instructions for preventing diarrhea, based on a knowledge-deficit model, are a common health promotion approach aimed at the providers of child care attending nutritional rehabilitation centers. However, almost all measures of knowledge, based on open and closed questions, were not related to the corresponding practice. Several types of barriers to preventive practices were reported on questions, including, beliefs, children as barriers and time. This information may help in designing more effective health promotion programs [21].

There have so much possibility to get affected by soil transmitted helminths (STH) in slum areas. STH infections affect persons living in areas with poor water, sanitation and hygiene (WASH). These helminths associated with growth retardation, impaired cognitive development, anemia and vit - A deficiency [22]. It is a privileged for low-middle income countries that WHO give mass drug administration of albendazole to school-aged children to control soil transmitted helminths; however, they recommend improved sanitation and hygiene practices to make sure long-term sustainability of deworming efforts [32]. Researchers said that sanitation practices have to be improved to prevent waterborne diseases [33-38].

Piped water supply is not safe for human health because it is contaminated by bacteria and it can't be used for drinking purpose [23]. Many waterborne diseases may spread by piped water.

Swimming in contaminated water is not good for health. Globally, each year, 120 million cases are estimated that suffer from gastrointestinal diseases and 50 million cases are severe respiratory diseases associated with swimming and bathing in wastewater-polluted coastal waters [24].

Wastewater contains microbial pathogens that may enter into water through some point sources like sewage outfalls. That's why swimmers are not safe from diseases [25,26].

Knowledge, attitude and practices may help to increase handwashing and proper sanitation management. Safe drinking water and proper sanitation and also promoting good hygiene are the key components to prevent water borne diseases. Education and advertisement on hygiene are very much important to ensure the correct and proper use of pure water and maintenance of sanitation hygiene [27].

Objective of the Study

The objectives of this study to find out the percentage of knowledge on safe water, proper sanitation, hygiene practices and relation between water borne diseases among slum area's people in Chattogram city.

Method

Study design

A descriptive type of cross-sectional study was carried out.

Study population

All adult population from different slum areas in Chattogram city.

Study period

It was conducted from January 2019 to June 2019.

Sample size

Due to financial constrain and time limitation researchers took 720 samples according to guide's decision.

Inclusion criteria:

- The participants who live in the area of study.
- The respondents who are willing to participate.

Exclusion criteria:

- Those who were unwilling to participate in the study.
- Those who did not permanently live in the area.
- Mentally retarded or handicapped.

Sampling techniques

Purposive sampling technique was followed.

Data collection tools

A pre-tested, modified, interviewer administrated, semi-structured questionnaire was used.

Data collection techniques

By face to face interview.

Data management and analysis plan

All interview questionnaires were checked for its completeness, accuracy, and consistency to exclude missing or inconsistent data. Data was checked, cleaned, and edited properly before analysis. The study was based on primary data with descriptive cross-sectional design filled directly with the help of respondents. The data analyzed by using Microsoft excel 2016.Descriptive statistics was used for interpretation of the findings.

Ethical Approval

The ethical approval had been issued and the recommendations had been followed accordingly. Letter. Reference No: UCTC/off-order/Eth-com/VII (II)/2019/007.

Result

Among the participants, 22.1% respondents belonged to 18 - 24 years age group, 42.9% belonged to 25 - 32 years age group, 16.2% to 33 - 40 years, 11.2% to 41 - 48 years age and 7.5% belonged to 49 - 65 years age group.

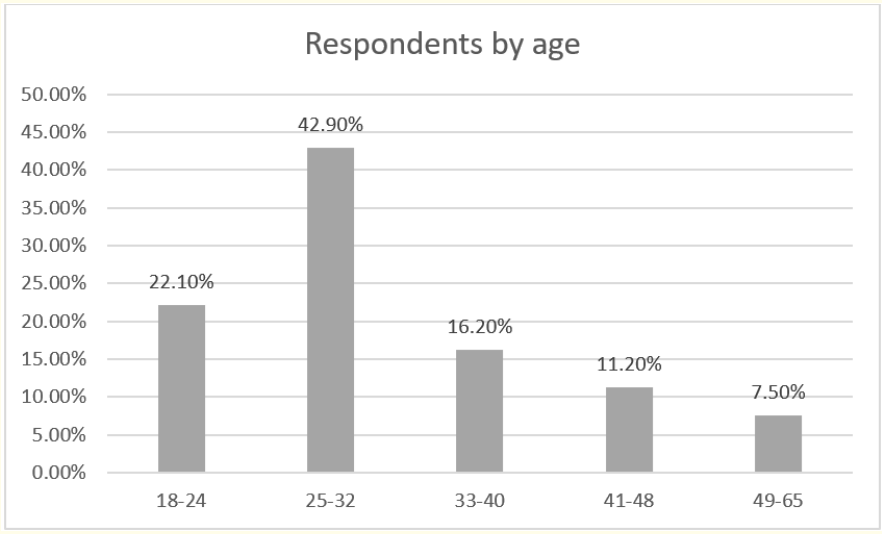

Figure 1: *Distribution of the respondents by age.*

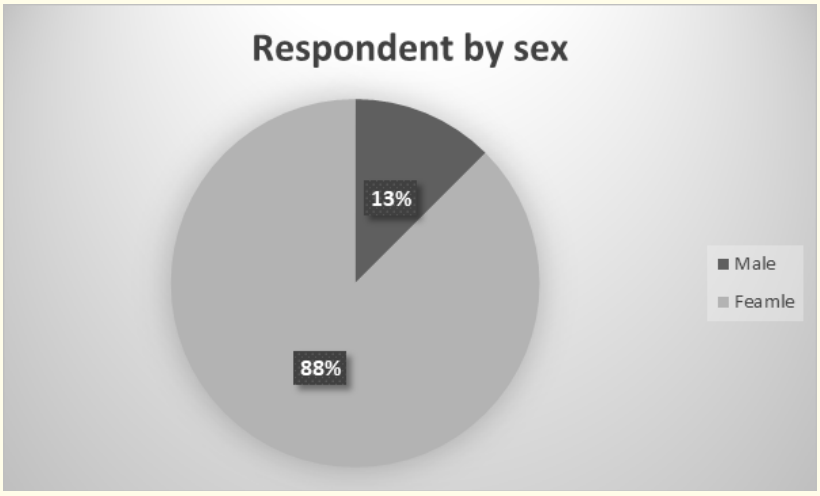

Figure 2: *Distribution of the respondent by sex.*

Majority of the respondent were female (87.5%) and 12.5% were male in this study.

Among the respondents 83.3% had completed primary education, 10.8% secondary education 4.2% higher secondary and only 1.7% had graduation and above level of education.

In this research, 24.2% of the respondents had knowledge about germ free water as safe water, 20% opined smell free water, 37.5% told both germ free water and smell free water as safe water and 18.3% had no idea about safe water.

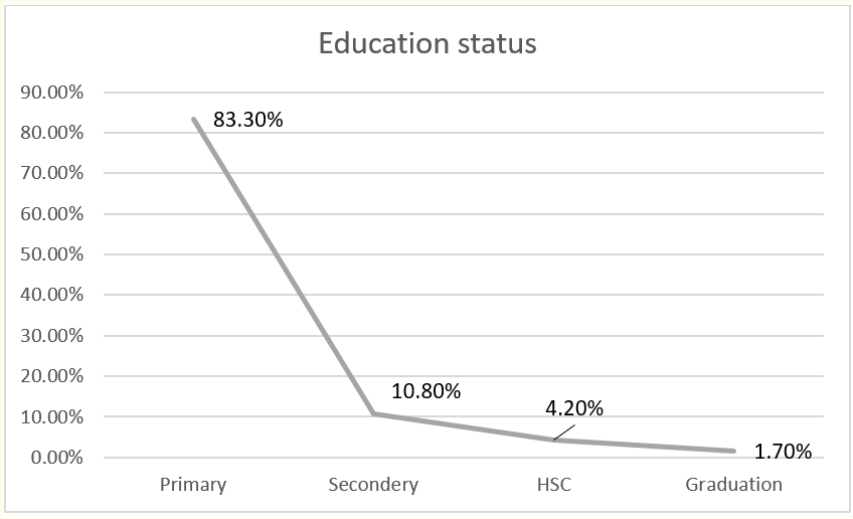

Figure 3: *Distribution of the respondents by their educational status.*

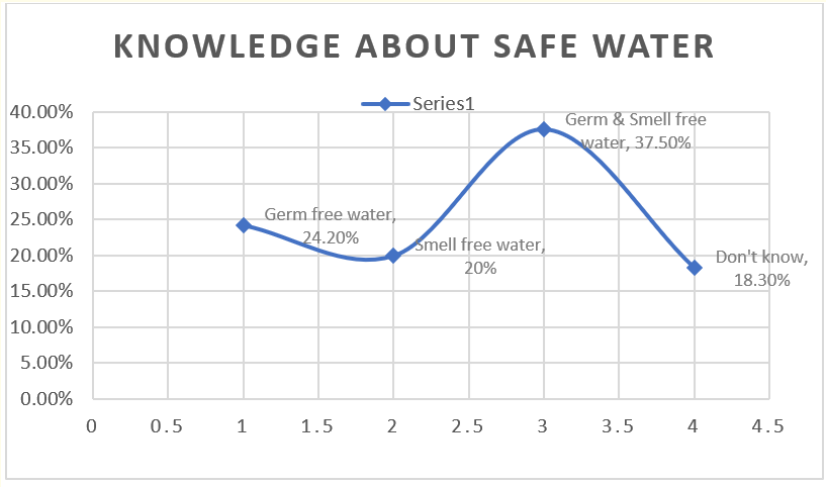

Figure 4: *Distribution of the respondents by knowledge about safe water.*

Name of the Diseases	Percent
Diarrhea	90
Dysentery	64.6
Arsenic Problem	1.2
Typhoid	29.2
Jaundice	22.5
Skin diseases	2.1
Other diseases	1.7

Table 1: *Distribution of the respondents by knowledge on different types of diseases due to use of unsafe water.*

The table shows that 90% of the respondents told that diarrhea may happened if they did not use safe water. Furthermore, 64.4% told about dysentery, 1.2% stated about arsenic problem, 29.2% about typhoid, 22.5% told jaundice (Hepatitis B), 2.1% mentioned skin diseases and 1.7% stated other diseases may happen if they did not use safe water.

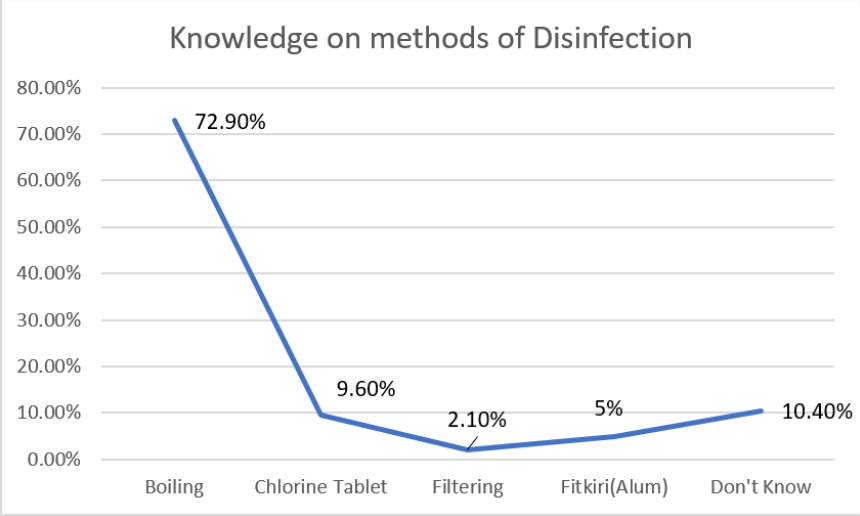

Figure 5: *Distribution of the respondents by knowledge on methods of disinfection of water.*

Among the participants, 72.9% of the respondents mentioned boiling as process of water disinfection, 9.6% mentioned use of chlorine tablet, 2.1% told about filtering, 5% said use of fitkiri/alum and rest of the respondents (10.4%) had no knowledge on process of water disinfection.

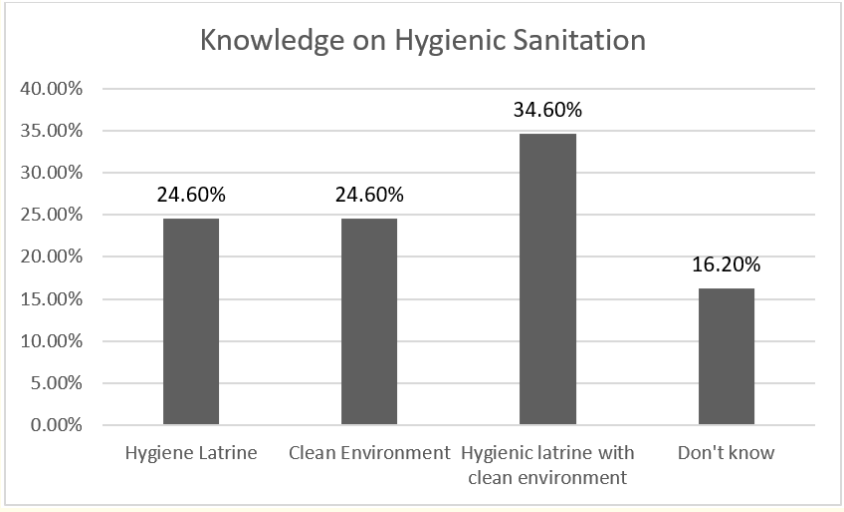

Figure 6: *Distribution of the respondents by knowledge on hygienic sanitation.*

This figure shows that 24.6% of the respondents had knowledge about hygienic sanitation that it was hygienic latrine, 24.6% said clean surrounding environment, 34.6% mentioned both hygienic latrine and clean environment and rest 16.2% did not have knowledge about hygienic sanitation.

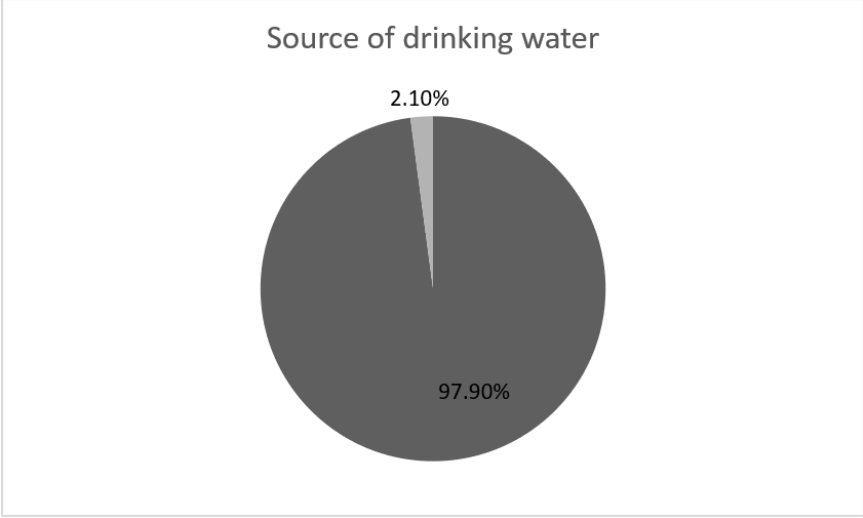

Figure 7: *Distribution of the respondents by source of water for drinking.*

The pie diagram explores that 2.1% of the respondents used shallow TW as their drinking water sources and the rest 97.9% used water from piped water supply for their drinking purposes.

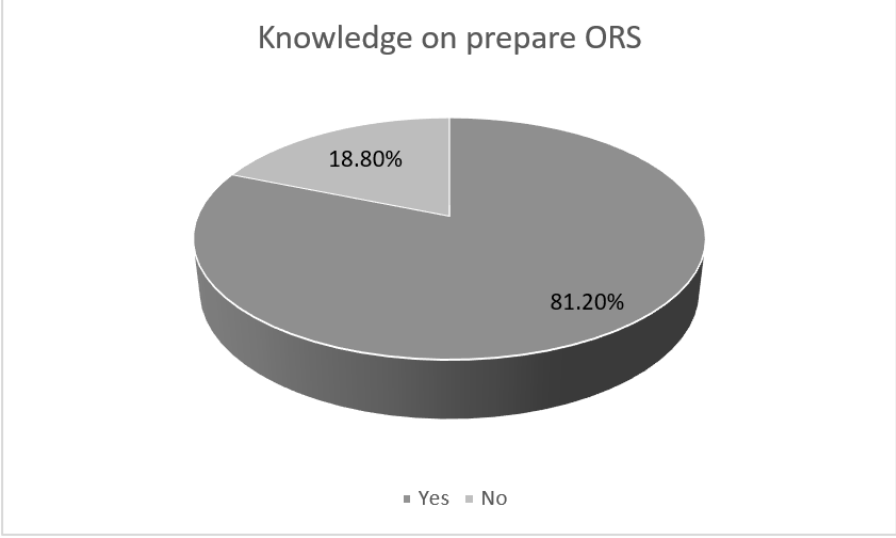

Figure 8: *Distribution of the respondents by family members about knowledge on prepare ORS.*

This diagram told that 81.2% of the respondent family members had knowledge on prepare ORS and 18.8% had no knowledge.

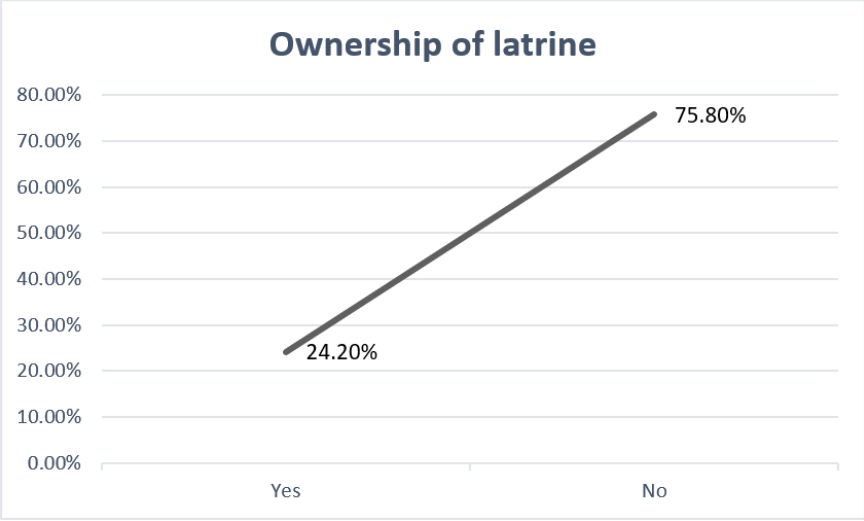

Figure 9: *Distribution of the respondents by the ownership of latrine.*

Our data explored that 24.2% of the family of respondents had own latrine and 75.8% did not have own latrine.

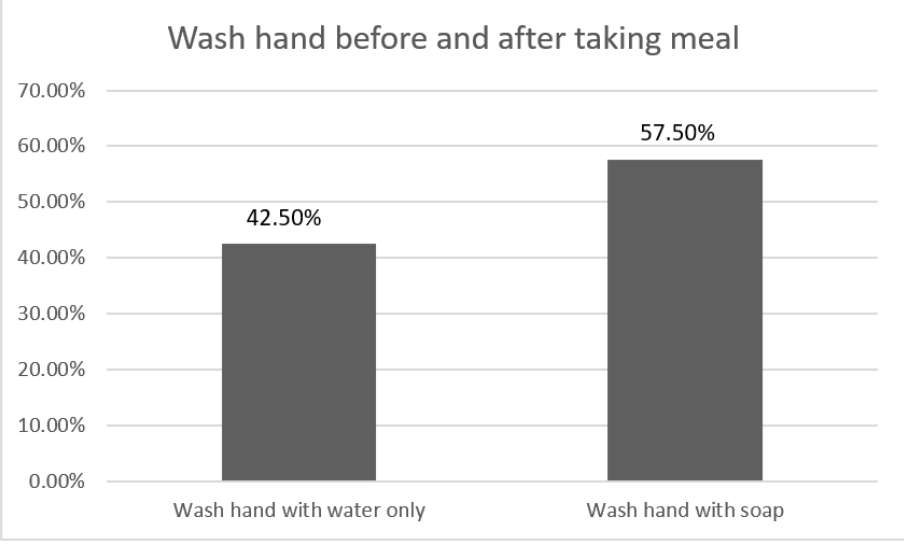

Figure 10: *Distribution of the respondents by hand wash before and after taking meal.*

Our conducted survey showed that 42.5% of them were wash their hand with water only before and after taking meal and 57.5% were with soap.

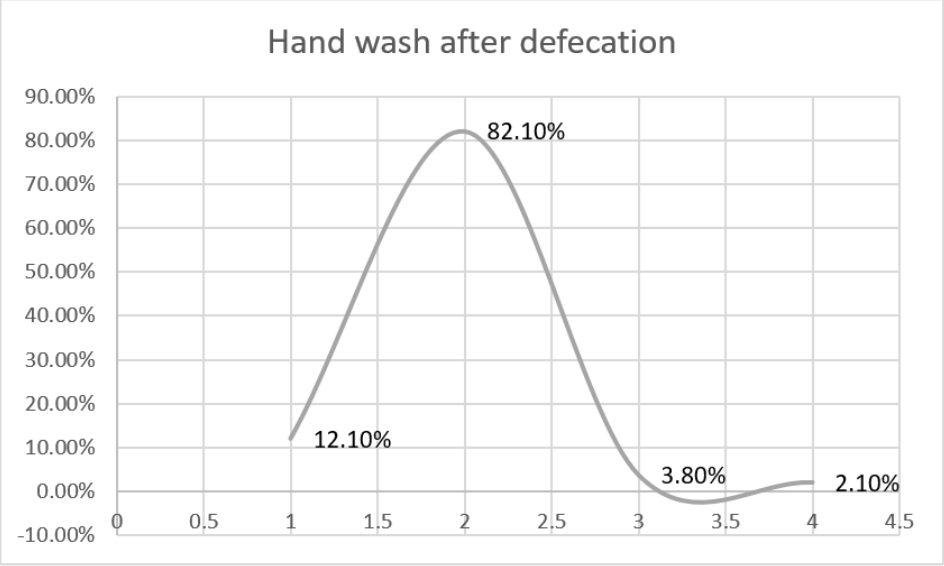

Figure 11: *Distribution of the respondents by hand wash after defecation.*

Among the respondents 12.1% were wash their hand with water only after defecation, 82.1% were wash hand with soap, 3.8% with ash and rest 2.1% wash hand with mud.

Hygienic condition of latrine	Percentage
Hygienic	65.4%
Unhygienic	34.6%
Total	100%

Table 2: *Distribution of the respondents by hygienic condition of latrine.*

The table said that 65.4% of the respondents used hygienic latrine and 34.6% used unhygienic latrine.

This table reveals that 5.8% of the respondent's family members who are children under 5 years of age suffered by diarrhea, 6.7% were 5 - 18 years age group, and 5.8% were adult since last two weeks.

This figure concluded that 10% of the respondent's family members suffered by intestinal worms, 2.9% were typhoid, 1.2% was jaundice, 10% were skin diseases, 0.4% suffered by cholera, 3.3% were dysentery, 2.9% were other water borne diseases and majority of the respondents (69.2%) had no WBD within the time.

Age of family members suffered by Diarrhea	Percentage
Children under 5 years old	5.8%
5 - 18 year	6.7%
Adult (18+ years of age)	5.8%
No person affected by Diarrhea	81.7%
Total	100%

Table 3: *Distribution of the respondents by age of family members suffered by diarrhea.*

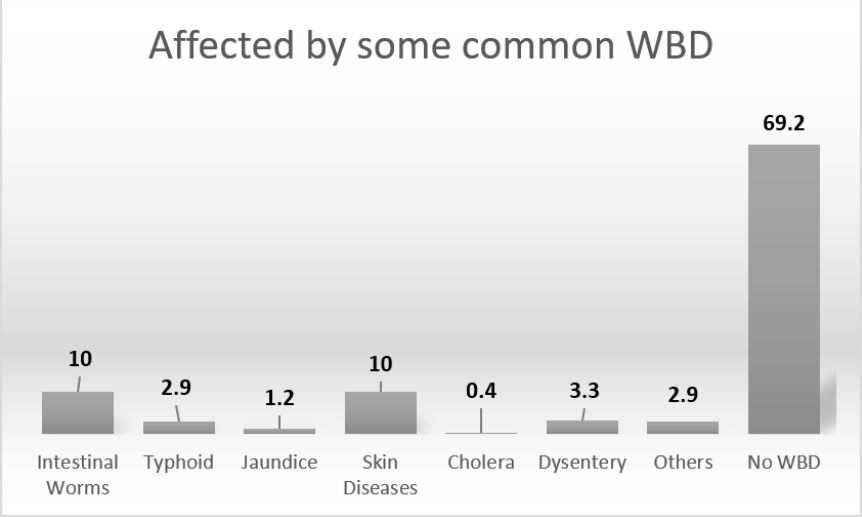

Figure 12: *Distribution of the respondent's family members suffered by common waterborne diseases (WBD) within last six months.*

Discussion

The descriptive type of cross-sectional study was conducted in order to find out the awareness, hygiene practices and knowledge about common water borne diseases and also prevalence of these diseases in different slum areas in Chattogram city with a sample size of 720.

The subjects of this research were randomly selected. In this study 22.1% of respondents belonged to the 18 - 24 years age group, 42.9% belonged to 25 - 32 years age group, 16.2% to 33 - 40 years, 11.2% to 41 - 48 years age and 7.5% belonged to 49 - 65 years age group. The majority of the respondents were female (87.5%) and 12.5% were male. All of the subjects were willingly answered all the questions. We found that among the respondents 83.3% had completed primary education, 10.8% secondary education, 4.2% higher secondary and only 1.7% had graduation and above level of education.

This study informed that 24.2% of the respondents knew germ-free water as safe water, 20% opined smell free water, 37.5% told germ-free water and smell free water as safe water and 18.3% had no idea about safe water. The percentage was quite good. Though they lived in the slum area, they knew about water microbiology. A cross-sectional study of Zambia explored that all respondents were aware of

waterborne diseases [28]. A cross-sectional study of Kabul, Afghanistan provided that 53% of the respondents answered that they would like to treat water before drinking which means they had an idea about safe water [29].

This research showed that 90% of the respondents told that diarrhea may happened if they did not use safe water. That means most of the people knew about diarrhea as a waterborne disease. Furthermore, 64.4% told about dysentery, 1.2% stated about arsenic problem, 29.2% about typhoid, 22.5% told jaundice (Hepatitis B), 2.1% mentioned skin diseases and 1.7% stated other diseases may happen if they did not use safe water. Other types of water borne diseases were less familiar among the respondents except dysentery. A study was conducted in Pakistan which revealed that 60% of the community had no idea of water borne diseases, however some of them (36%) knew that diarrhea and typhoid were water borne and 4% of these knew about hepatitis E diseases [30].

About 72.9% of the respondents mentioned that boiling is a process of water disinfection, 9.6% mentioned use of chlorine tablet, 2.1% told about filtering, 5% said they use of fitkiri/alum and the rest of the respondents (10.4%) did not know the process of water disinfection. Disinfection of water is necessary and they knew it, most of them followed the boiling method. Because this method is easier and cost-free. A study was conducted in Kitwe, Zambia providing that 97% of households used disinfectants for water purification, and of these 95% households treated water with chlorine, boiling, or both as methods [28]. Another study was conducted in Kabul, Afghanistan which explored that 79% of the respondents treated water by boiling, 13% by bleach, 7% cloth filter, and 2% solar disinfection. The researchers of this group also asked that is it necessary to boil water every time before drinking? 76% of the slums area's respondents replied 'yes' [29].

Our conducted research explores that 2.1% of the respondents used shallow TW as their drinking water sources and the rest 97.9% used water from piped water supply for their drinking purposes. Piped water is not free from pathogenic agents and hence disinfection process is must. A study result of Zambia provided us that 92.3% households used shallow well as a source of drinking water. Water of shallow well is not good for health, that water carry different types of water borne diseases. It is a matter of happy that most of the respondents knew about water safety [28].

Our study reveals that 81.2% of the respondent's family members had knowledge on preparing ORS and 18.8% had no knowledge. A study in the rural areas of Maharashtra, India told that one-third of mothers of the respondents could not make ORS properly [31]. ORS preparation knowledge should have in every person. Public awareness should be raised among societies.

Our study explored that 24.2% of the family of respondents had own latrine and 75.8% did not have own latrine. It is very sad thing for us. Without proper sanitation, WBD cannot be removed. Government have to look at this topic.

Our study also said that 42.5% of them were wash their hand with water only before and after taking meal and 57.5% were with soap. Many people knew about the importance of handwashing but till didn't make it as habit.

Among the respondents 12.1% were wash their hand with water only after defecation, 82.1% were wash hand with soap, 3.8% with ash and rest 2.1% wash hand with mud.

A cross sectional study of Kabul, Afghanistan,78% respondents of slum area told that they didn't share their latrine between households and rest 22% shared between households, 31% respondents washed their hand with soap before taking meal and 69% didn't. Among the slum area respondents of Kabul, 75% did not wash their hand with soap after defecation and 25% did [29].

About 65.4% of the respondents used hygienic latrine and 34.6% used unhygienic latrine. Almost all respondents have knowledge about hygiene of latrine but till practices have not reach in satisfactory range.

Our study also shows that 24.6% of the respondents had knowledge about hygienic sanitation that it was hygienic latrine, 24.6% said clean surrounding environment, 34.6% mentioned both hygienic latrine and clean environment and rest 16.2% did not have knowledge about hygienic sanitation. A cross sectional study of Kabul, Afghanistan provided that 84% respondent disinfected their latrine and rest 16% didn't disinfect [29].

Our cross-sectional study reveals that 5.8% of the respondent's family members who are children under 5 years of age suffered by diarrhea, 6.7% were 5 - 18 years age group, and 5.8% were adult since last two weeks. Therefore, 18.3% respondents suffered by diarrhea since last two weeks. A study was conducted among slum area of Delhi which provided that 7.73% children (0 - 5 years aged) are attacked by Acute Diarrheal Diseases [39]. Another study was conducted in northeastern Brazil and severe diarrhea illness were found. 65% of children had minimum one episode of persistent diarrhea (≥ 14 days duration) [40]. From an article, we found that Diarrhea is the third leading cause of childhood mortality in India and is liable for 13% of all deaths per year in children under 5 years old [41].

This study concluded that 10% of the respondent's family members suffered by intestinal worms, 2.9% were typhoid, 1.2% was jaundice, 10% were skin diseases, 0.4% suffered by cholera, 3.3% were dysentery, 2.9% were other water borne diseases and majority of the respondents (69.2%) had no WBD within sixth time.

A study was conducted in Kolkata, India and found that 4% of the respondent's stool culture were confirmed cholera [42]. Another study found that the lowest overall value put into located in Jakarta, in which the anticipated incidence became 0.5/one thousand population/year. The incidence became 3 times better in Kolkata (1.6/1000/year) and eight times higher in Beira (4.0/one thousand/year). In all take a look at sites, the finest burden was in kids beneath five years of age [43].

A conducted study in Africa (urban site) showed that 247 cases per 100,000 were suffered by typhoid where 5 - 9 years aged children were highest in rate [44]. Another study in Bangladesh showed that almost one-third (32%) of all and 40% of school-aged children had an STH infection [45]. A study in Uttarakhand showed that 8.61% had acute viral hepatitis [46]. Another study in children from slum areas in Karachi explored that 4.1% were suffered by dysentery [47]. Thirty years ago, a study was conducted in Dhaka city, told that 7. 9% people had skin diseases [48]. Now the percentage of skin disease is increased among mass people.

Conclusion

Water borne disease is one of the leading causes of morbidity and mortality in less developed countries, especially low-income communities in the urban slum areas. It is a symptom of infection caused by a host of bacterial, viral, and parasitic organisms most of which can be spread by contaminated water. Poor and inadequate safe water, improper sanitation and hygiene behaviors practices are lead water borne diseases in the urban slum settings. The present study was conducted at different slum of Chattogram city with 720 respondents were purposively selected and interviewed through face to face interview. Though they could determine the water borne diseases and they have knowledge about this, usually they do not practice proper hygiene and sanitation. Most of the people of slum areas were educated where they had completed their study from different school and colleges. They were, most of them, aware about hygiene, sanitation, water safety and had knowledge about water borne diseases. Many people washed their hand with soap regularly during taking meal and after defecation but not all. Many householders knew about hygiene practices but all of them didn't had own latrine. Knowledge about hygiene cannot be applied in their daily life. It was satisfactory that many people knew about water borne diseases. Specially most of them knew about diarrhea that is water borne. Many family members also knew how to prepare ORS for water borne diseases patients.

But the percentage need to be increased. Whereas, all of them were not secured from water borne diseases, we all have to work for their proper sanitation, safe drinking water and also for proper hygiene practices.

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