



Daffodil
International
University

**A cross sectional overview of relationship between
diarrheal disease prevalence among children & their
socio-demographic status**

Submitted by

Md. Minhazul Abedin. Sujon

Student ID: 181-34-726

Email: minhazul34-726@diu.edu.bd

Department of Nutrition & Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

Submitted to

Ms. Fouzia Akter

Head

Department of Nutrition & Food Engineering

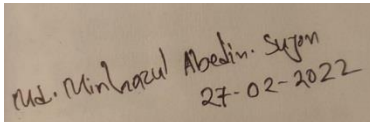
Faculty of Allied Health Sciences

Daffodil International University

DECLARATION

By submitting this thesis entitled “A cross sectional overview of relationship between diarrheal disease prevalence among children & their socio-demographic status”, I declare that the entirety of the work contained therein is my own, original work, and I am the sole author of it. It also declares that it has not been submitted elsewhere for any conferment.

Signature



.....

(Md. Minhazul Abedin. Sujon)

Student ID: 181-34-726

Email: minhazul34-726@diu.edu.bd

Department of Nutrition & Food Engineering

Faculty of Allied Health Sciences

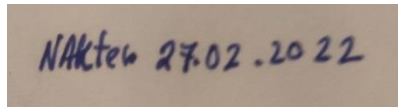
Daffodil International University

Dhaka, Bangladesh

Certification

This is to certify that Md, Minhazul Abedin. Sujon has completed his dissertation entitled “A cross sectional overview of relationship between diarrheal disease prevalence among children & their socio-demographic status”, for the partial fulfillment of the requirements for the conferment of the Bachelor’s in Nutrition & Food Engineering degree under my direct supervision. To my knowledge, the results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

Signature of the Supervisor



(Nasima Akter Mukta)

Senior Lecturer

Email: nasima.nfe@daffodilvarsity.edu.bd

Department of Nutrition & Food Engineering

Faculty of Allied Health Sciences

Daffodil International University

Dhaka, Bangladesh

Approval of Dissertation

This Project titled “A cross sectional overview of relationship between diarrheal disease prevalence among children & their socio-demographic status”, submitted by Md. Minhazul Abedin. Sujon to the Department of Nutrition & Food Engineering, Faculty of Allied Health Sciences, Daffodil International University, Dhaka, Bangladesh has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Masters in Public Health and approved as to its style and contents. The presentation has been held on 02 December 2021.

(Name)

Chairman

Designation

Name of the Institution

(Name)

Internal Examiner

Designation

Name of the Institution

(Name)

External Examiner

Designation

Name of the Institution

Date of Approval _____

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Md. Minhazul Abedin. Sujon

Principle Investigator

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ACRONYMS

- DIU- Daffodil International University
- WHO- World Health Organization
- UNESCO- United Nations Educational, Scientific and Cultural Organization
- BMHC- Banghabandhu Memorial Hospital Chittagong
- HFI- Household Food Insecurity
- BDHS- Bangladesh Demographic & Health Survey
- GDP- Gross Domestic Product
- WASH- Water, Sanitation & Hygiene
- BBS- Bangladesh Bureau of Statistics
- ORT- Oral Rehydration Therapy
- SPSS- Statistical Package for Social Sciences

Abstract

The passage of three or more loose or watery stools per day is considered diarrhea. Diarrhea is the second leading cause of illness and mortality (about 23 percent of total among children below 5 year old in the south-east region of Asia are occurred due to diarrhea). Every year, it causes 1.7 million morbidity and 0.76 million deaths in children. The influence of pediatric diarrhea on socioeconomic position has been observed to be inversely connected, with children in poverty being more susceptible to acute diarrheal episodes. According to a Bangladesh demographic and health study, 65 children died every 1000 live births in 2007 and 45 children died every 1000 children in 2017, indicating a decrease in the death rate from 6.5 percent to 4.5 percent. The prevalence of diarrheal disorders varied significantly among geographical regions, ranging from 2.7 percent in Rangpur division to 6.5 percent in Barisal, 6.7% in Chittagong 6.1% in Sylhet & 6.5 percent in Dhaka.

This study's research uses a mixed-methods strategy to collect both qualitative & quantitative data. The study population will be children (both boy and girl) aged 1 to 6 years old who live in non-slums & slums of Chattagram city. Our goal is to use random sampling to identify the link between one thing (an independent variable) and another (a dependent variable) within the target population. The data will be collected using a semi-structured questionnaire, and then double-checked, error-checked, and entered into the database using IBM SPSS 22.

According to UNESCO, Bangladesh's female literacy rate was 71.9 percent in 2019. In this study location, the female literacy rate was 90 % of the total 182 participants. 45.7 % of Bangladeshi children experienced at least 1 episode of sickness in the two weeks preceding up to the survey, with 69.2 percent of the children affected with diarrhea in less than the past 5 months of the investigation. This study discovered a weakly significant connection (P-value 0.041) between the method used to purify drinking water and the most recent diarrheal infection. Diarrheal morbidity affects children under the age of 5 3.2 times per year worldwide, however this study indicated that diarrhea affects children 2.25 times per year on average in Chattagram city. Along with the mother's educational background and occupation, evidence of family income, participant's home, toilet usage, and water purification methods were found to be factors in the occurrence of diarrhea among children in this study location.

Chapter-1: Introduction

1.1 Background:

Diarrhea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual) [WHO, 2017]. Diarrhea is the indication of intestinal contamination with a variation of different Bacteria, Parasites or Viruses and it's familiar in low-income countries where water and sanitation facilities are insufficient [Keusch GT, 2006]. Diarrheal diseases are occurs mainly from waterborne pathogens which could be viral (Rotavirus) or bacterial (Vibrio-Cholera) developing gastroenteritis [Thapar N, 2004]. Diarrhea is the dominant symptom of IGE (infectious gastro-enteritis) which represents above 30% of hospitalizations morbidity [Noaman, A.A., 2013], generally begins as acute watery diarrhea or as dysentery bloody diarrhea [Indian Academy of Pediatrics, 2011], after that leads to weight reduce and may create dehydration [Al-Badri, 2007]. It's ordinary in every age's individual but mainly in infants and young children, because of children's digestive and immune systems are still developing and more vulnerable to infection than adults [Abu-Ragheef, 2007]. Although several viruses may be responsible for acute gastro-enteritis in infant & child's but Rotavirus is the major etiological agent for causing acute diarrhea in children [Blacklow N.R, 1981]. Rotavirus infections mainly exist in children aged 6 months to 24 month [Carlson J.A.K., 1978]. They are identified by a hazardous onset of vomiting, watery diarrhea and dehydration expansion [Muchnik G.R, 1981].

Diarrhea is the second largest cause of morbidity & mortality (about 23% of all deaths among children under 5 year of age in the south-east Asian region are caused by diarrhea) [Boschi C, 2008]. Among all child deaths each year, seven in ten of these deaths are due to diarrhea, acute respiratory infections, malnutrition or combination of these conditions [Agarwal V, 2005]. It is responsible for 1.7 million morbidity and 760, 000 mortality of children every year (WHO; 2013). Globally, 178 million children are stunted and 52 million children are wasted (which is one of the key indicator of diarrheal disease) respectively [Black RE, 2013].

Several pandemic of bacterial outbreaks from 1817, some major outbreaks are: The 1st pandemic of cholera outbreaks are known as Asiatic cholera (1817-1824), began near the city of Calcutta (Kolkata) and spread throughout South and Southeast Asia to the Middle East, Eastern Africa and the Mediterranean coast, Thousands of Indians & ten thousands of British soldiers are died in this outbreaks, The second cholera (1829-1837) outbreaks known as King Cholera [Barua D, 1972]. In recent times (21st century) many African (Nigeria, Zambia, Zimbabwe, Ghana, Somalia, Haiti), South American (Venezuela, Brazil) & Asian (India, Bangladesh, Myanmar, Indonesia) are witnessed of this outbreaks [Barua D, 1972].

Pediatric diarrheal effect has been visible to be inversely related to Socio-economic status, with children in poverty is more suspicious to acute diarrheal episodes [Hatt LE, 2006]. 99 % of this burden is found in Sub-Saharan Africa and South Asian countries [De Onis M, 2012]. By 2030, it is estimated that 4.4 million children under the age of five will die from infectious diseases annually and that 60% of those deaths will occur in sub-Saharan Africa [Liu L, 2015].

It should be pointed that although 98 % of total cholera cases and 99 % of all mortality in 2009 were appeared from 30 affected African countries, the infection is still endemic in many South-East Asian countries and epidemic are periodically reported although countries with excessive rates have not started reporting [Waldor et al. 2010]. An estimated 200000 or more people are infected with *Vibrio cholera* yearly in Bangladesh but does not report any cholera activity to the WHO [Anon. Cholera, 2000].

1.2 Scope of the study:

Geographically Asia is the largest continent of the world with covering 44.614 million of earths land surface which is the 29.2% of total land [Gourou, P., 2020], Bangladesh has the land area of 130,170 square kilometer which 0.292% of Asia's geographical area [worldpopulationreview, 2021], Bangladesh is the country of 0.1646 billion of population which is the 8.74% of total population of Southern Asia with a density of 1265 people in per square kilometer. [Worldometers, 2021]. Socio-economic status indicates a countries progress per capita income is one the most important indicator to indicates any countries progress, According to world bank

global GDP per capita is 10925.728 dollar, where GDP per capita of Bangladesh is 1968.792 [worldbank, 2020], which is approximately 5 times lower than the global GDP per capita.

Bangladesh demographic & health survey reported that 65 children death per 1000 live births in 2007 & 45 children deaths per 1000 live births in 2017, where the death rate decreases from 6.5% to 4.5% [BDHS, 1996-1997]. One of the targets of Millennium Development Goal (MDG) is to reduce the child mortality by two-third. About 20 million coastal inhabitants have been affected directly or indirectly by flood [Rony ZI, 2016]. Poor housing configuration provides reproduction environment of vermin such as cockroaches and rats that causes infection [Evans GW, 2001]. Shelter that does not enable householder to keep store safe and prepare food places children at greater risk of diarrheal diseases [Lepore SJ, 1991]. Most of the developing countries socio-demographic characteristics like maternal and child age and accessibility sanitary facilities, cleanliness practices, flies infection, and daily consumption of street food are also some causal factors for the existence of diarrheal disease [K. Oadi, 2005]. Although Bangladesh has the upper life cycle and the lowest rate infant and children mortality in the Southern Asia region, the prevalence of childhood morbidity is still distressing [Giashuddin MS, 2005].

Chittagong city covers an area of 160.99 square kilometer which the 0.123% of total area of Bangladesh [Bangladesh Population Census, 2001] Chittagong is the second largest city in Bangladesh with a population of 3.92 million [worldometers, 2021]. Chittagong is one of the most cyclone & flood prone area in Bangladesh where children are more susceptible to diarrheal disease due to Poor sanitation, Unhygienic health practices, Unhygienic water uses practices, Living in the place of below standard to live, gender inequalities, lower income, mother's illiteracy the results they affected by infectious diarrheal disease.

1.3 Rationale of the study:

Globally, around 2-4 billion episodes of diarrheal cases occur every year [Farthing MJ, 2000] and this overwhelming level of morbidity has seen little decrease during the last four decades [Kosek M, 2003]. Globally, 20% children deaths or around 1.5 million every year are due to diarrheal diseases which are more than AIDS, Malaria and Measles combined [UNICEF, 2010]. Currently, less than half of all young children with diarrhea receive appropriate treatment [Forsberg BC, 2007]. In Africa & South Asia more than 80 percent death occurs due to diarrheal infection where 82% of them are under five year of old [UNICEF, 2012]. Every-day diarrheal infection accounts for an approximately 12,600 deaths of children in Asia, Africa, and Latin America [Guerrant, R, 1990]. Prevalence of diarrhea among children less than 5 years old was 25.2% in Kashmir, India and 22% in Ethiopia [Ahmed SF 2008 & Alebel A 2018].

From the overall diarrheal diseases only 188 people died in Australia due to diarrheal infection where only 5.32% are ranges in 0-14 year of age of total death, 556 people died in Bolivia in 2017 & 47.48% of them are in the age ranges 0-14, 1508 people died due to diarrheal diseases in Canada in 2017 and only 1.19% of them are in the range of 0-14 years, 5.66%, 10.16% & 6.97% of under 5 year ages of children were died due to diarrheal diseases in Bhutan, Bangladesh & Nepal respectively and 3.12%, 4.32% & 2.45% of died individuals are from 5-14 year ages range, All three countries are located in Southern Asia region but here the percentage of death are higher in both ages group in Bangladesh compare to Bhutan & Nepal [ourworldindata, 2017]. Several factors are involved in difference of rate of infection and also rate of mortality like geographical location, socio-economic status, Total number of population & density of the population, government policy to prevent morbidity & mortality. Parental education is also a key factor that prevent gender inequality which is one of the key obstacle for female child health-care, Global overall literacy rate of individuals ages 15 year or above is 86.3%, where male literacy rate is 90%, which is higher than female literacy rate 82.7% [worldpopulationreview, 2021]. Developed countries has literacy rate of 99%, Most of the illiterate adults are living in southern Asia, west Asia & Sub-Saharan Africa [worldpopulationreview, 2021].

Bangladesh is a country with literacy of 74.7% where adult male literacy rate 77.4% & adult female literacy rate 71.9% total literacy in Bangladesh which is lower than the global literacy rate [unesco, 2019], but a mother has higher involvement in child care in a family than a father, lower maternal literacy is a key obstacle in developing & under developed countries to prevent the prevalence of childhood diarrheal infection.

The coastal zone of Bangladesh covers an area of 47,201 km², 32% of the country [Abu M, (2003)]. Major problem in coastline zone are cyclone, flood & saline water. Prevalence of diarrheal diseases varied considerably across different geographical regions from as low as 2.7% in Rangpur division to as high as 6.5% in Barisal, 6.7% in Chittagong, 6.5% in Dhaka and 6.1% in Sylhet [Mitra and Associates; 1997]. In 2017, 1.57 million people died due to diarrheal diseases, where 0.587 million were the ages ranges between 0-14 years, which is the 37.39% of total death of diarrheal diseases [ourworldindata, 2017].

My study is to find out the present situation of association between diarrheal diseases among children & their socio-demographic status in Chittagong city and to find the ways to prevent morbidity & mortality rate of Child Diarrheal diseases.

1.4 Literature Review:

An association between substandard hand-washing practice at crucial times and the manifestation of acute diarrhea among children below five year of age is in line with the outcome of other studies in Zambia [Musonda C, 2017], and Nigeria [Oloruntoba EO, 2014]. Some researchers found out the problems of the some basic reasons of diarrheal diseases are people's low financial status, worst sanitary practices, bad nutritional status and weaning practices significantly influence the prevalence of recurrent diarrhea. A study in Chobe District, Botswana identifies diarrhea in under-5 children as a determined problem with distinct seasonality in diarrheal case prevalence, Lack of disparity in outbreak variables suggests the possibility of environmental operators influencing outbreak fluctuations and the potential importance of human linkages in Chobe District, Botswana [Alexander, K, 2013].

Recurrent diarrhea was more known for the age group of 13-24 months (29.6%) and 25-36 months (23.4%) and children belonging to lower socioeconomic class (64%), Malnutrition was notably associated with recurrent diarrhea and 21% of malnourished children had the same [Avachat SS, 2011]. A collective countries analysis found that 25% of total childhood stunting could be attributed to suffered 5 or more diarrheal episodes before 2 year of age [Checkley, W., 2008], and other studies have revealed associations between childhood diarrheal occurrence and changes in gut microbial counts that result in nutritional mal-absorption [Prendergast, A., 2014]. The high frequencies of diarrhea identified in children within the first 30 days after birth (rainy season) and a twofold risk in older children (dry season) may be suggesting different gastrointestinal syndromes with possible seasonal influences [VanDerslice J, 1995]. The frequency of parasites was comparatively higher during the monsoon, from June to August, with a frequency rate of 28%. In disparity, no rotavirus and fewer bacterial infections were observed during this season [Leon W, 2011]. Improvement of water supply, Quality of water, water reservoir, sanitation facilities, and washing hand behaviors can interrupt the transmission both bacterial [Almedom AS, 1997] & viral cycle that causes diarrhea and decrease the risk of diarrhea by an estimated 17.48% [Fewtrell L, 2005].

Low income families suffer from diarrhea because of inability to afford soap, aqua-guard and toilets [Rahman A, 2006]. An internal comparisons point-out that the likelihood of a prevalence of diarrheal illness was lowest among urban, non-slum (model family) households and the occurrence of prolonged diarrhea (>7 days) was greatest within urban slum households (non-model family), affecting one-quarter of the children identified (24.7%) [Larson, 2006]. Where others found out the majority of children are receiving ORT; however, use continues to be significantly lower in rural populations, Gender inequalities in the utilization of licensed providers. Zinc tablet, Oral Rehydration Solution (ORS) & mandatory breast feeding till 6 month of age to reduce the child mortality & morbidity. Compared between model and non-model households, A noticeable difference in childhood diarrhea prevalence was observed, The occurrence of diarrheal disease among children's whose houses were non-model for health extension program was 25.5%, which is around four times greater than children's whose houses were model for this program was 6.4 [Gebru et al, 2014].

In the two weeks leading up to the poll, 45.7 percent of children in Bangladesh had at least one symptom of diarrheal episodes [Kamal MM, 2015], which is much lower than the 5 year preceding (49.7%), indicating that the country's children's health is improving [Mitra, 2015]. Because of a lack of cleanliness, the disease occurs more frequently among children under the age of five in impoverished countries. Inadequate sanitation is responsible for over 90% of diarrheal illness [Bitew BD, 2017]. Diarrhea is more likely in people with a lower socioeconomic standing. The economy is a key impediment to the development of infrastructure that facilitates individual and family sanitary habits. Furthermore, inadequate environments hasten disease pathogen transmission as a result of intake of feces-contaminated water or food [Mandal S, 2011].

A study reported that the target people' poor economic position and the area's difficult geology were the two most common causes of impoverished WASH practices [Mahmud. S., 2020]. Almost every participant reported in this research engaging in multiple unsanitary behaviors at the same occasion, such as drinking unsafe water, consuming or cooking food without hygiene practices. The non-whites were discovered to be frequent victims of a variety of waterborne ailments, including as diarrhea, dysentery, and trachoma, as a result of their improper water consumption [Bartram, J., 2010].

Low maternal education and low socioeconomic level were also linked to HFI (household food insecurity) in children under the age of five who had diarrhea, regardless of children dietary habits [Chowdhury et al., 2016]. Educated women are more aware of the seriousness of disease and the significance of seeking immediate medical attention, which encourages them to seek medical attention for their children [Alene, M., 2019]. Mothers with a greater degree of literacy are more likely than mothers with lower educational levels to bring their children to a medical facility during an incident of diarrhea [Thind, 2003]. Children from families in the upper wealth quintile and those whose moms have at least a secondary school education are substantially more likely to receive care for diarrhea from a healthcare professional or institution [John. E., 2009].

1.5 Objectives:

There are two purposes of this study:

- **Primary Objectives:** To assess the association between diarrheal diseases among children & their socio-demographic status.
- **Specific Objectives:**
 - (i) To find out socio-demographic status of the respondents
 - (ii) To assess the water sanitation and hygiene (WASH) practice among respondents
 - (iii) To identify diarrheal disease frequency and treatment management among children of the respondents.
 - (iv) To assess is there any association between socio-demographic status and WASH practice among respondents.
 - (v) To identify is there any relationship between socio demographic status and diarrheal disease frequency and treatment management among children of the respondents.
 - (vi) To assess is there any association between WASH practice and diarrheal disease frequency and treatment management among children of the respondents.

Chapter-2: Methodology

2.1 Study Design & Type:

The research will use a mixed technique approach to acquire both quantitative and qualitative data. To obtain quantitative data for various study aims, we will conduct a cross-sectional survey among the 182 children.

2.2 Study Population:

Children (both male and female) aged 1 to 6 years living in slums and non-slums of Chattagram city will constitute the study population.

2.3 Selection Criteria:

- Inclusion Criteria:
 - i. Children aged 6 or under & more than 1 year old group, who lives in the cities slum and non-slum areas will be included.
 - ii. Both male and female participants will be included.
 - iii. The willingness of the children's parents to engage in the study.
- Exclusion Criteria:
 - i. Population who are not living in the coverage area (Outside of the Chattagram city)
 - ii. Population who are living in the city for a short period (Who are not the resident of the city).
 - iii. People whose ages are less than 1 year or more than 6 year.

2.4 Sampling Strategy:

To access the study population's intended participants, a multi-stage sampling technique will be used. The study will start with Chattagram city and its only subdivision, Chattagram City Corporation, and then select a few wards from the City Corporation using the Simple Random Sampling (SRS) technique. Using the Simple Random Sampling (SRS) technique, a focused sample will be selected from the list wards in the second stage. However, we will execute a brief enumeration survey in the selected location to compile a list of children's diarrheal reports, which will operate as our sampling frame. Finally, to reach the target sample participants, we will implement probability proportional sampling (PPS). Our goal is to determine the relationship between one thing (an independent variable) and another (a dependent variable) within the targeted population, as this study will be the mixed technique of quantitative & qualitative investigation.

1. Study Instruments:

- Quantitative data will be collected using a semi-structured questionnaire. As it was a cross-sectional investigation evaluating the association between children's diarrheal disorders and their socio-demographic status, only quantitative approaches were used. The questionnaire will be developed by a multidisciplinary team that includes social scientists, epidemiologists, public health professionals, and statisticians. The study's Principal Investigator and Co-Investigator, on the other hand, played a key part in creating the questionnaire, which was double-checked by the other members.
- To get feedback on the acceptability, appropriateness, and sequencing of the queries, the Bengali version of the questionnaire will be pre-tested in non-sampled participants in the targeted demographics. The field staff will be recruited and

trained on the study's background, aims and objectives, methodology, individual instrument sections, interviewing techniques, and so on.

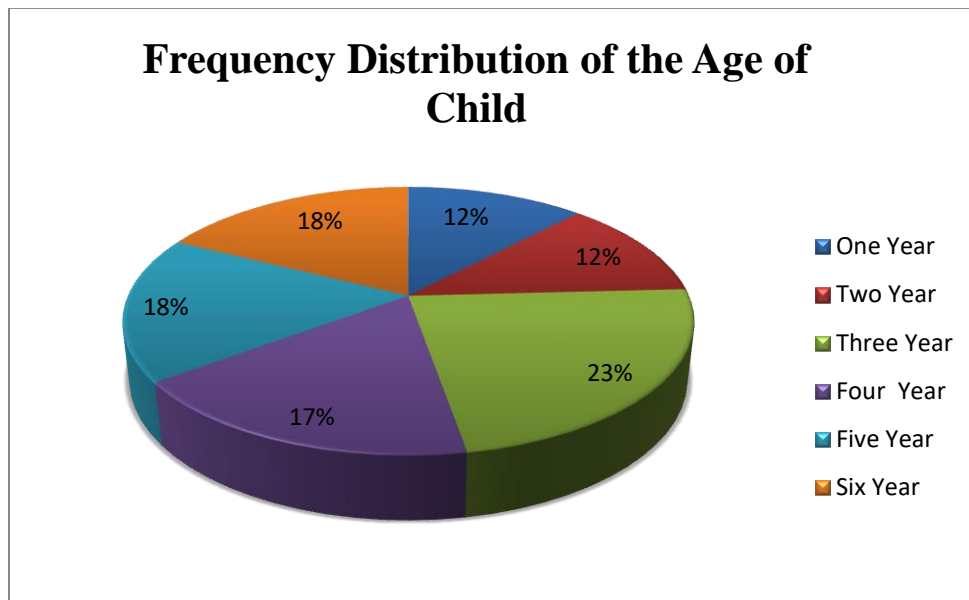
2. Data Processing & Analysis:

- All of the participant's responses will be double-checked, checked for errors, and input into the database using SPSS software.
- The analysis will be focused on the study objectives as well as the indicators. To investigate the relationship between Diarrheal diseases in children and their socio-demographic status, we will utilize statistical tests such as Fisher's exact χ^2 test, as well as bivariate and multivariate (adjusted) logistic regression. Diarrheal cases will be considered as a dependent variable and as a reference category, while socio-demographic variables, including such age, living conditions, and family income, will be used as independent variables, with a 95% confidence interval (CI) for each category.

Chapter-3: Result & Analysis

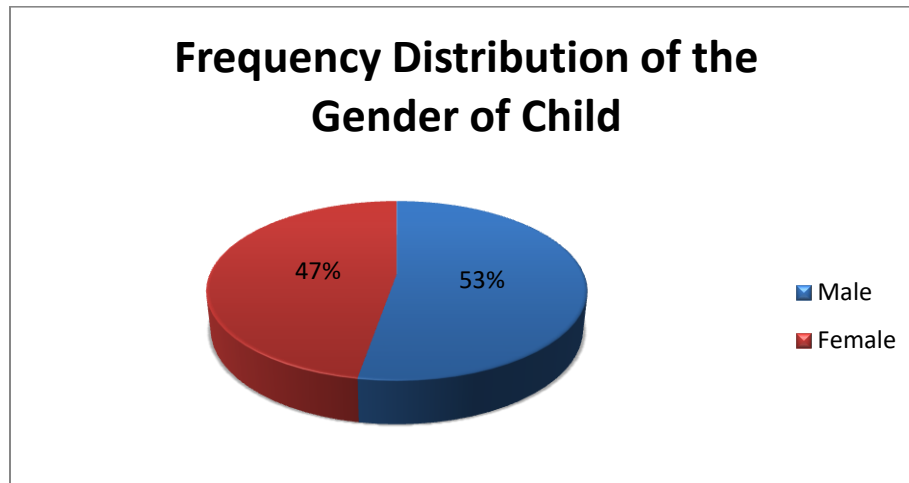
3.1 Socio Demographic Information

Frequency Distribution of the Age of Child (N= 182)

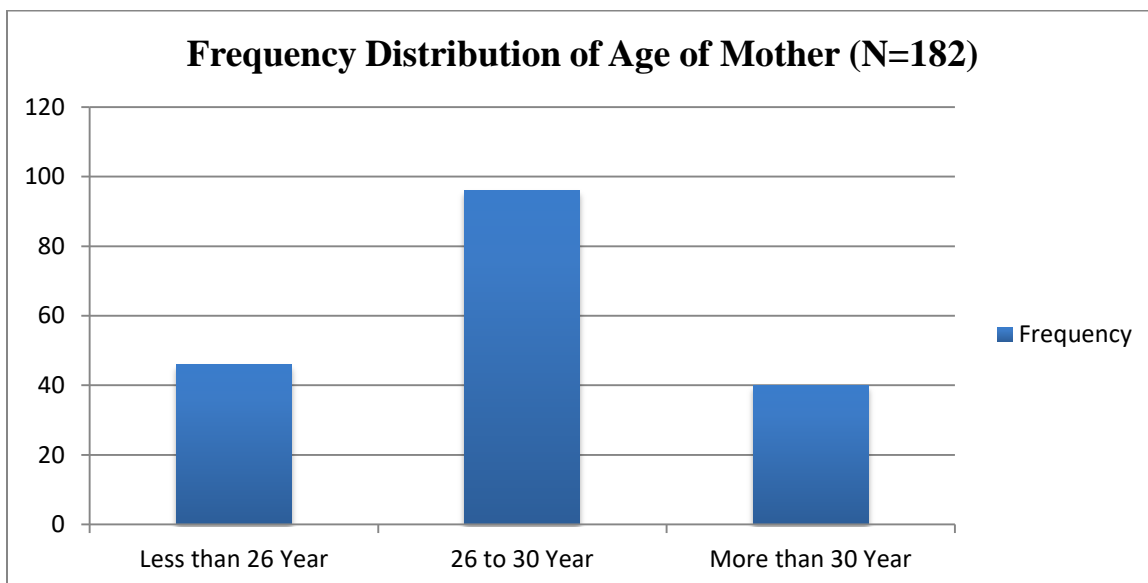


(Figure-1)

In this graph, the children's ages of the participants are distributed, with the highest number of children in the 3 year old group (23%) and the lowest percentage of children in the 1 and 2 year old groups (12.5% each-group). (Figure-1)

Frequency Distribution of the Gender of Child (N=182)**(Figure-2)**

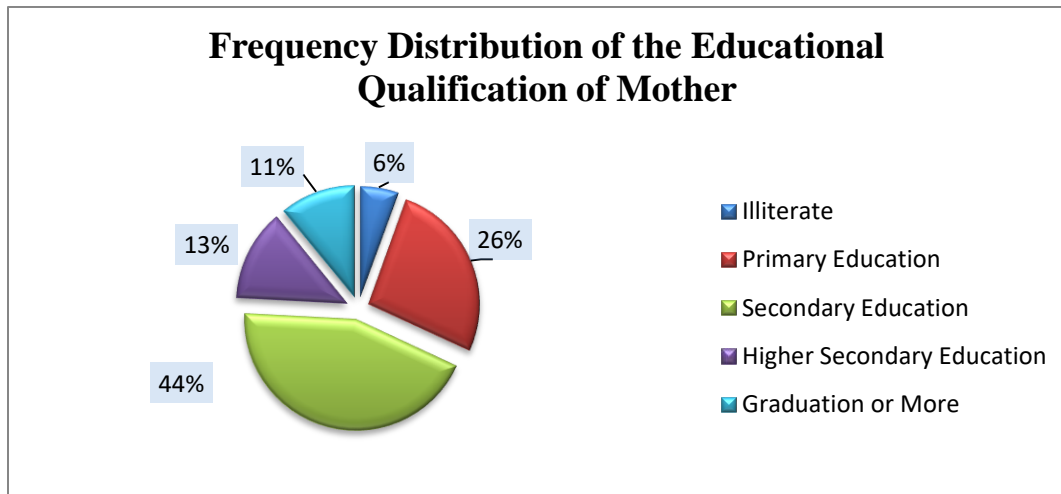
This figure depicts the gender of the child; the bulk of the children (53 %) are male, while the remaining are female (47 %). (Figure-2)

Frequency Distribution of the Age of Mother (N=182)**(Figure-3)**

This figure represents the age of the mother of children's & In this figure is categorized the age of the child's mother into three group, where 25.3% of the total mothers are from the group

whose age is 25 year old or lower, Majority mothers (52.7%) are listed in 26-30 year old group & 22% of the total mothers are from the group whose age are 30 year or more. (Figure-3)

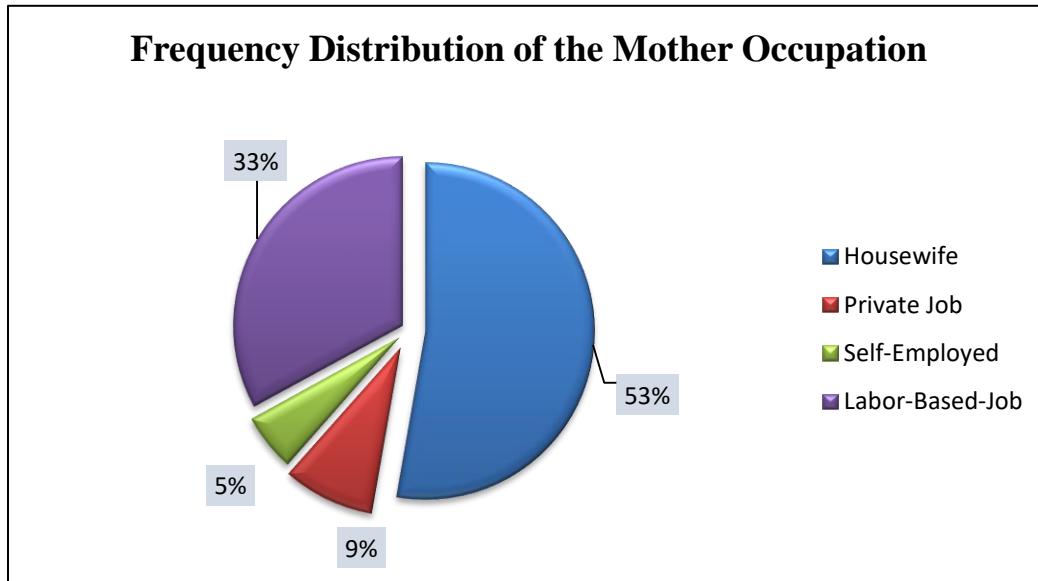
Frequency Distribution of Mother Educational Qualification (N=182)



(Figure-4)

This figure describe the educational qualification of the respondents where the highest percentage of respondents educational qualification is Secondary education (44%) & the lowest percentage of respondents are illiterate (6%), Apart from these two group whose educational qualification is Primary Education, Higher Secondary Education & Graduation or more are 26%, 13% & 11% respectively. (Figure-4)

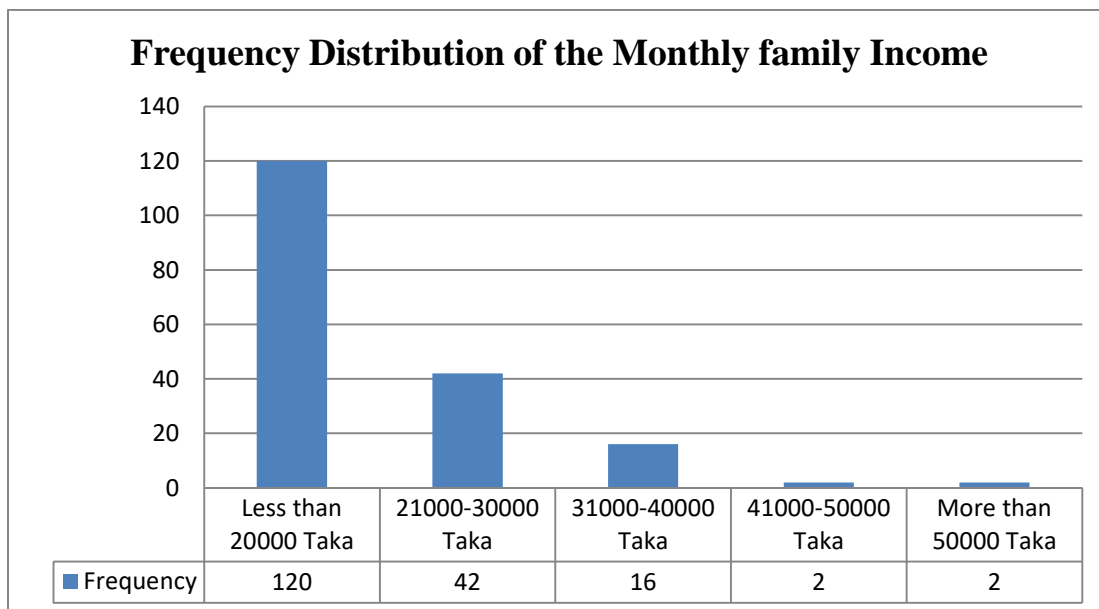
Frequency Distribution of the Mother Occupation (N=182)



(Figure-5)

This figure explains the occupation of the mother, a highest percentage of mother occupation is housewife (53%), 33% of the total respondents occupation is labor-based-job, 9% of the total respondents are self-employed & only 5% mothers are doing private job. (Figure-5)

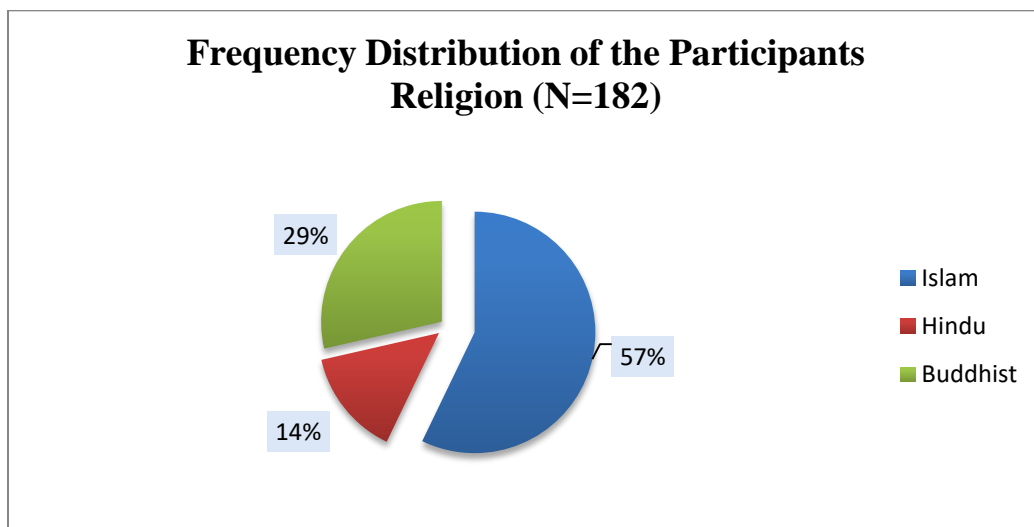
Frequency Distribution of the Monthly Family Income (N=182)



(Figure-6)

This figure illustrates the respondents' family's monthly family income; 65.9% of respondents' families had monthly family income of 20000 taka or less, which is the greatest proportion of respondents' frequency. 23.1% of respondents' families have a family income of 21000-30000 taka, 8.8% have a family income of 31000-40000 taka, and only 2.2% of respondents' families have a family income of 41000 taka or more. (Figure-6)

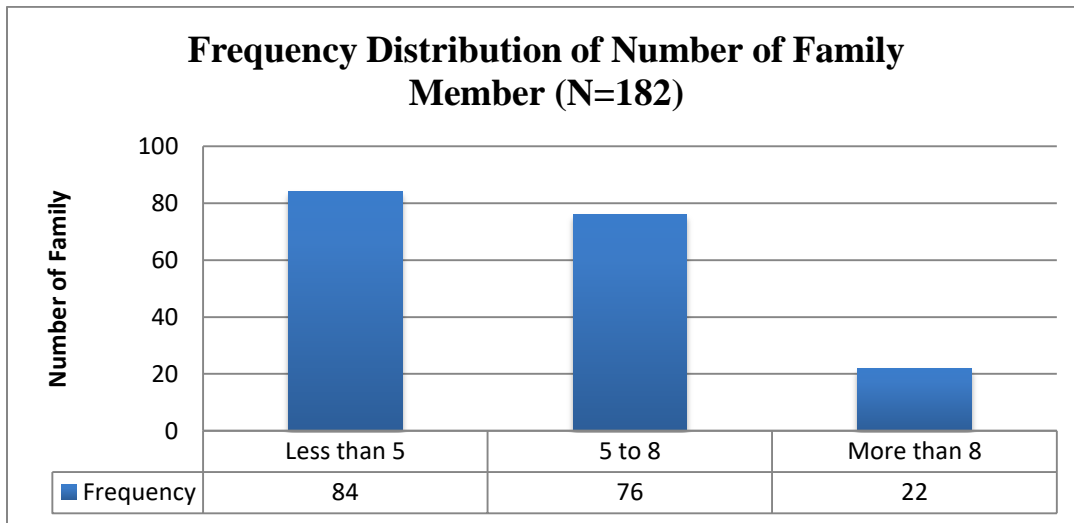
Frequency Distribution Table of the Participants Religion (N=182)



(Figure-7)

This graph illustrates the religious affiliations of the participants, with Islam accounting for the majority (57%) of the total respondents, Buddhist accounting for 29% and Hindu accounting for 14% of the total respondents. (Figure-7)

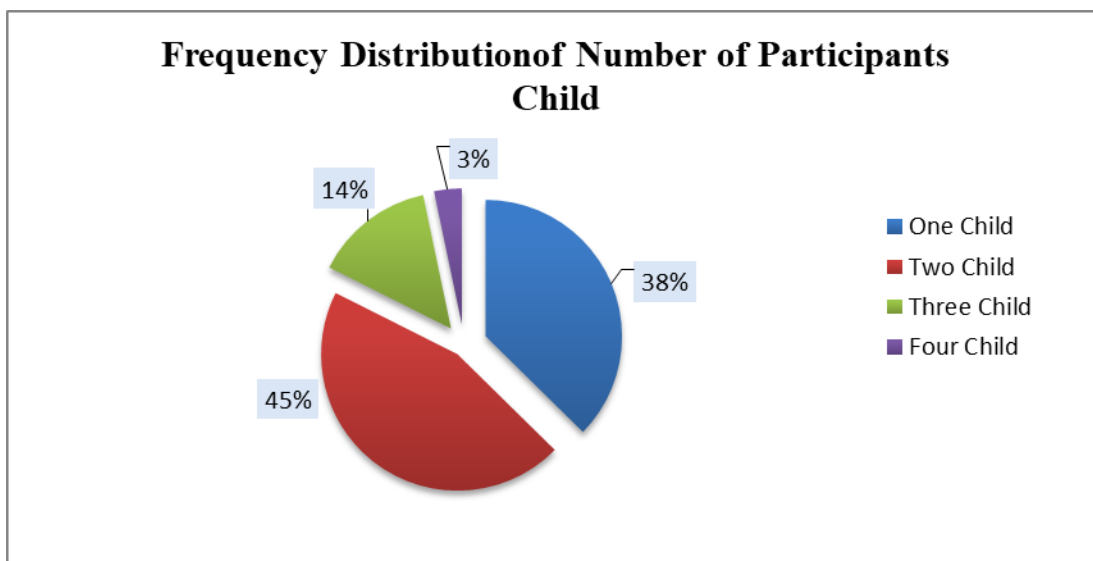
Frequency Distribution of the Number of family Member (N=182)



(Figure-8)

This figure illustrates the number of family member, 65.9% of the total respondent's family number is less than 5, 5-8 individuals lives in the 30.8% of the total respondent's family & More than 8 person lives in the 3.3% respondent's family. (Figure-8)

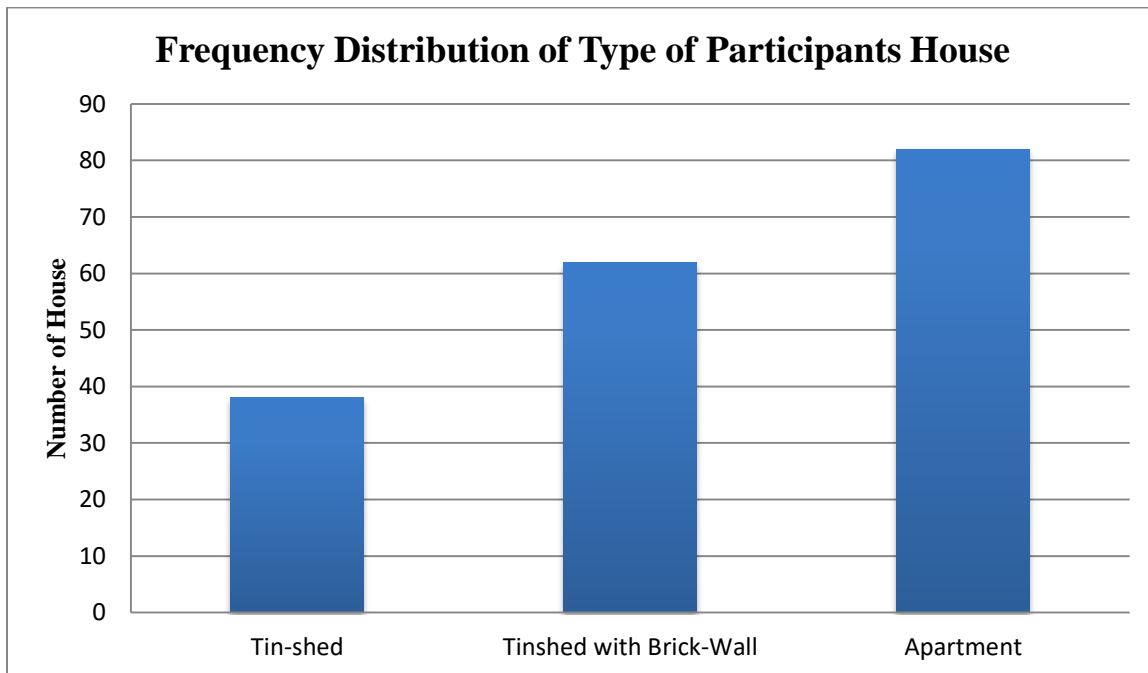
Frequency Distribution of Number of Participants Child (N=182)



(Figure-9)

This chart describes the number of participant's child, 45% of the total participants have 2 children which is the highest percentage among the total participants, participants whose has one child, three children & four children are 38%, 14% & 3% respectively. (Figure-9)

Frequency Distribution of Participants House Type (N=182)



(Figure-10)

This figure illustrates the frequency distribution of type of participant's house where most the participants are lives in Apartments (45.1%), Participants lives in Tin-shed with Brick-Wall & Tin-Shed House are 34.1% & 20.8% respectively. (Figure-10)

3.2 Toilet Related Information

Frequency distribution table of Toilet related information

Type of Toilet	Frequency	Percent
Ring Slab Pit Latrine Without Sewage Channel	18	9.9%
Ring Slab Pit Latrine With Sewage Channel	92	50.5%
Toilet with Ideal Sanitary Facilities	68	37.4%
Other's	4	2.2%
Number of Single Toilet User		
Less than 5	98	53.8%
5 to 8	62	34.1%
More than 8	22	12.1%
Toilet Cleaning Count (Per Week)		
Never	4	2.2%
One Time	62	34.1%
Two Times	82	45.1%
Three Times	20	11%
More Than Three Times	14	7.7%
Grading Environment		
Bad	8	4.4%
Moderate	86	47.3%
Good	88	48.4%
Sewage Channel Availability		
Yes	132	72.5%
No	50	27.5%
Place of Talking Bath		
Yes	170	93.4%
No	12	6.6%
Waterlogged Record During Rainy Season		
Yes	102	56
No	80	44

Table: 3.1

The respondents' and their children's toilet information is represented in this figure. Type of toilet, number of single toilet users, toilet cleaning frequency (per week), grading cleanliness and

environment of the toilet, and sewage channel availability with the washroom are all included in a single-frequency table. (Table: 3.1)

50.5% of the 182 respondents' families use Ring Slab Pit Latrine with Sewage Channel, which is the most common type of toilet used by respondents' families, followed by 37.4% who use Toilet with Ideal Sanitary Facilities, 9.9% who use Ring Slab Pit Latrine without Sewage Channel, and 2.2% who use other types of toilet. (Table: 3.1)

53.8% of households use a single toilet for less than five people, 34.1% use a single toilet for five to eight people, and 12.1% of households use a single toilet for more than eight people. (Table: 3.1)

Only 2.2% respondents never clean their toilet, whereas 45.1% clean their toilet twice a week, 34.1%, 11%, and 7.7% clean their toilet once a week, three times a week, and more than three times a week, respectively. (Table: 3.1)

In terms of toilet cleanliness, 48.4% evaluated their toilet cleanliness as good, 47.3% evaluated their toilet cleanliness as moderate, and only 4.4% evaluated their toilet cleanliness as bad. (Table: 3.1)

Sewage channel is available with 72.5% of the respondent's washroom, where there is no sewage channel availability in 27.5% respondent's washroom. (Table: 3.1)

Among 182 participants 93.4% participants & their family taking bath in the washroom where only 6.6% & their family member taking bath in open space with water supply. (Table: 3.1)

56% of the total participants & their family affected by flood & waterlogged around their house during the rainy season, where 44% participants & their family doesn't affected by flood & waterlogged during the rainy season around their house. (Table: 3.1)

3.3 Water Related Information

Frequency distribution table of Water Related Information

Drinking Water Source	Frequency	Percent
WASA	46	25.3%
Tube-Well	40	22%
Deep Tube-Well	6	3.3%
Personal Electrical Water Pump	90	49.5%
Kitchen Water Source		
WASA	46	25.3%
Tube-Well	42	23.1%
Deep Tube-Well	6	3.3%
Personal Electrical Water Pump	88	48.4%
Glass of Water		
Less than 4 Glass	98	53.8%
4 to 6 Glass	70	38.5%
More than 6 Glass	14	7.7%
Satisfaction Level		
Not Satisfied	22	12.1%
Satisfied	148	81.3%
Very Satisfied	12	6.6%
Tank Type		
Under Ground Tank	2	1.1%
Roof Top Plastic Tank	94	51.6%
Roof Top Brick-Wall Tank	34	18.7%
None	52	28.6%
Method Apply to Purify Drinking Water		
Commercial or Pure-It Filter	10	5.5%
Stone Based Layered Filter	14	7.7%
Boiled Water for 30 Minutes	82	45.1%
No Filtration	76	41.8%

Table: 3.2

This table illustrates water-related information about the participant's family. All water-related factors (drinking water source, kitchen water source, counting drinking water glass per day, satisfaction level by water source, reserve tank and method used to purify drinking water) are assembled in single table. (Table: 3.2)

Personal Electrical Water Pump is the drinking water source of 49.5% respondent families, WASA is used by 25.3% of respondent families; Tube-Well is used by 22% of respondent's family and only 3.3% of total respondent's families use Deep Tube-Well as their drinking water source. (Table: 3.2)

In terms of kitchen water sources, 48.4% families use personal electrical water pump as the supply source of kitchen water, 25.3% & 23.1% participant's family are uses WASA & Tube-Well respectively as their supply sources of kitchen water & only 3.3% families has the Deep Tube-Well as supply sources of kitchen water. (Table: 3.2)

Only 7.7% of the 182 children drink more than 6 glasses of water per day, 38.5 % children drinking 4 to 6 glasses of water per day, and 53.8% of the total children drinking less than 4 glasses of water per day. (Table: 3.2)

The majorities of the respondents (81.3%) are satisfied with their supply source of water, whereas 12.1% are not satisfied with their supply source of water and only 6.6% are extremely satisfied with their supply source of water. (Table: 3.2)

71.4% of all participants' families have a reserve tank (Roof Tank Plastic Tank 51.5%, Roof Top Brick-Wall Tank 18.7%, Under Ground Water Tank 1.1%) for water storage, while 28.6% of participants' families have no reserve tank at all. (Table: 3.2)

There are several types of water purification method available that are applied by the respondents to purify drinking water, 45.1% of the total participant's apply boiled water for 30 minutes to drink it, 41.8% of the total participants applies no filtration method to purify water, 7.7% & 5.5%

of the total participants uses commercial or pure-it filter & stone based layered filter respectively to purify their drinking water. (Table: 3.2)

3.4 Hand Washing Behavior Related Information

Frequency Distribution Table of Hand Washing Behavior Related Information

Wash Hand before & after Consume Food	Frequency	Percent
Sometimes	20	11%
Every-Time	162	89%
Wash Hand after using Washroom		
Sometimes	58	31.9%
Every-Time	124	68.1%
Wash Fruit & Vegetable before Eating or Cooking		
Never	14	7.7%
Sometimes	78	42.9%
Every-Time	90	49.5%
Hand Washer Type		
None	6	3.3
Bar Soap	98	53.8
Liquid Soap	72	39.6
Ashes or Other's	6	3.3

Table: 3.3

The hand washing behavior of participants and their children is illustrated in this table. Hand washing frequency before and after eating, hand washing after using the washroom, washing of fruits and vegetables before eating or cooking, and hand washing soap types are all included in this table. (Table: 3.3)

89% of 182 participants & their children washes their hand every time before & after consume food whereas 11% are washes their hand sometimes before & after consume food. (Table: 3.3)

68.1% of total participants & their children wash their hand every time after using washroom whereas 31.9% participants & their children wash their hand sometimes after using washroom. (Table: 3.3)

Among 182 participants 49.5% wash their fruit & vegetable every-time before eating or cooking, 42.9% of the total participants wash fruit & vegetable sometimes before eating or cooking & remaining 7.7% of the total participants never wash fruit & vegetable before eating or cooking. (Table: 3.3)

53.8% of the total participants & their family members use Bar-Soap to wash their hand, 39.6% of the total participants & their family members use Liquid Soap to wash their hand & remaining 6.6% participants & their family members use ash's or other's (3.3%) & use None (3.3%) to wash their hand. (Table: 3.3)

3.5 Diarrheal Disease Related Information

Frequency Distribution Table of Diarrheal Disease Related Information

Last Diarrheal Infection	Frequency	Percent
Less than 5 Month	126	69.2%
5 to 11 Month	20	11%
12 Month or More	36	19.8%
Diarrheal Count in 12 Month		
Never	26	14.3%
1-2 times	88	48.4%
3-4 times	64	35.2%
More than 4 times	4	2.2%
Duration of Infection		
Less than 4 Day	94	51.6%
4 to 6 Day	68	37.4%
More than 6 Day	20	11%

Treatment Center		
None	18	9.9%
Local Medicine Shop	60	33%
Doctor or Health Worker	62	34.1%
Hospital Admission	42	23.1%
Type of Medicine		
Only Oral Saline	10	5.5%
Both Oral & Rice Saline	22	12.1%
Antibiotic & Oral Saline	130	71.4%
Natural Fruit Juice/ Coconut Water	18	9.9%
None	2	1.1%
Type of Food		
Soup or Liquid Food	108%	59.3
Cooked Rice & Curry	50%	27.5
Other's	24%	13.2

Table: 3.4

This table illustrates the diarrheal record & previous diarrheal information of participant's children's. All the information (last diarrheal infection, diarrheal count in last 12 month, duration of last diarrheal infection, treatment center during the diarrheal infection, types of medicine, types of food) are given in a single table with frequency. (Table: 3.4)

69.2 % of the total children infected by diarrhea in less than last 5 month, 11% of the total children infected by diarrhea in between 5 to 11 month & 19.8% of the total children infected by diarrhea in more than last 11 month. (Table: 3.4)

48.4% of the total children infected by diarrheal disease once or twice in last 12 month, 35.2% children infected by diarrheal diseases 3-4 time in last 12 month, only 2.2% children infected by diarrheal diseases more than 4 times in last 12 month whereas 14.3% children never infected by diarrheal diseases in last 12 month. (Table: 3.4)

51.6% of the total children's last diarrheal infection lasted less than 4 days, 37.4% of the total children's last diarrheal infection lasted 4 to 6 days whereas only 11% children's last diarrheal infection lasted more than 6 days. (Table: 3.4)

34.1% of the participants took their children's to outdoor patient care unit for consultation of the treatment, 33% of all participants took medicine from local medicine shop to treat their children's whereas 23.1% of participants admit their children's in indoor patient care unit & only 9.9% participants followed none of the procedure of treatment. (Table: 3.4)

71.4% of the total participants provided Anti-biotic & Oral saline as the medicine of diarrheal infection to their children, 12.1% participants provided both Oral saline & Rice saline to their children as the infection of diarrhea, whereas 5.5% & 9.9% participants provided only Oral saline & Natural Fruit Juice/Coconut water respectively as the treatment of diarrheal infection to their children, only 1.1% of the participants provided none of the above to their children during their diarrheal infection. (Table: 3.4)

59.3% of the total participants provided Soup or Liquid food to their children during their diarrheal infection whereas 27.5% participants provided cooked rice & curry during the diarrheal infection of their children & remaining 13.2% participants provided other's type of food during the diarrheal infection of their children. (Table: 3.4)

3.6 Association between socio-demographic status and WASH practice among respondents.

Association table between Mother Occupation & other variables

		Mother Occupation				Total	Percent	Pearson Chi-Square
		Housewife	Private Job	Self Employed	Labor based Job			
Toilet Type	Ring Slab Pit Latrine Without Sewage Channel	10	0	0	8	18	9.89	0.005
	Ring Slab Pit Latrine With Sewage Channel	42	0	8	42	92	50.55	
	Toilet with Ideal Sanitary Facilities	42	16	2	8	68	37.36	
	Other's	2	0	0	2	4	2.2	
Grading Toilet Cleanliness	Bad	6	0	0	2	8	4.39	0.097
	Moderate	52	0	4	30	86	47.25	
	Good	38	16	6	28	88	48.35	
Water Purification method Apply	Commercial or Pure-it	6	4	0	0	10	5.49	0.033
	Stone based layered Filter	10	2	2	0	14	7.69	
	Boil Water for 30 Minutes	44	10	4	24	82	45.1	
	No Filtration	36	0	4	36	76	41.75	
	Every time	84	16	8	54	162	89.01	
Wash Hand after Using Washroom	Sometimes	20	0	8	30	58	31.86	0.001
	Every time	76	16	2	30	124	68.13	
Wash Fruit or Vegetable before Eating or Cooking	Never	8	0	0	6	14	7.69	0.040
	Sometimes	38	0	8	32	78	42.86	
	Every time	50	16	2	22	90	49.45	
Types of Soap use to Wash Hand	None	2	0	0	4	6	3.3	0.041
	Bar Soap	54	0	6	38	98	53.85	
	Liquid Soap	34	16	4	18	72	39.56	
	Other's	6	0	0	0	6	3.3	

Type of Food Provide During Diarrheal Infection	Soup or Liquid Food	60	12	4	32	108	59.34	0.048
	Cooked Rice or Curry	26	2	0	22	50	27.47	
	Other's	10	2	6	6	24	13.2	

(Table: 3.5)

This association table demonstrates the relationship between Mother Occupation & other's dependent variables. In this table there's been strongly significant relationship between Mother Occupation with Toilet type (P-value<0.005) & Wash hand after using Washroom (P-value<0.001). (Table: 3.5)

In this table, There also been mildly significant relationship between Mother's Occupation with Grading toilet cleanliness (P-value<0.097), Method Apply to Purify Drinking Water (P-value<0.033), Wash fruits/vegetables before eating or cooking (P-value<0.040), Kind of soap use to wash hand (P-value<0.041) & Types of food provide during diarrheal infection (P-value<0.048). (Table: 3.5)

There's been no significant relationship between Mother Occupation with Number of toilet user (P-value<0.284), Supply source of drinking water (P-value<0.163), Wash hand before & after food consumption (P-value<0.672), Last diarrheal infection (P-value<0.731), Treatment center during diarrheal infection<0.612), Duration of last diarrheal infection (P-value<0.416), Diarrheal count in last 1 year (P-value<0.491) & Types of medicine provided during diarrheal infection (P-value<0.467). (Table: 3.5)

Association table between Mother Educational Qualification & other's Variable

		Mother Educational Qualification					Total	Percent	Pearson Chi-Square
		Illiterate	PSC	SSC	HSC	Graduation or More			
Toilet Type	Ring Slab Pit Latrine Without Sewage Channel	0	6	10	0	2	18	9.89	0.025
	Ring Slab Pit Latrine With Sewage Channel	4	34	40	14	0	92	50.55	
	Toilet with Ideal Sanitary Facilities	6	8	28	8	18	68	37.36	
	Other's	0	0	2	2	0	4	2.2	
Grading Toilet Cleanliness	Bad	0	6	2	0	0	8	4.4	0.037
	Moderate	4	28	44	8	2	86	47.25	
	Good	6	14	34	16	18	88	48.35	
Water Purification method Apply	Commercial or Pure-it	2	0	4	0	4	10	5.5	0.003
	Stone based layered Filter	0	0	8	2	4	14	7.7	
	Boil Water for 30 Minutes	0	14	40	16	12	82	45.1	
	No Filtration	8	34	28	6	0	76	41.6	
Wash Hand before & after Food Consumption	Sometimes	4	8	8	0	0	20	11	0.097
	Every time	6	40	72	24	20	162	89.01	
Wash Hand after Using Washroom	Sometimes	8	32	18	0	0	58	31.87	0.000
	Every time	2	16	62	24	20	62	34.1	
Wash Fruit or Vegetable before Eating or Cooking	Never	2	6	6	0	0	14	7.69	0.000
	Sometimes	6	38	30	2	2	78	42.86	
	Every time	2	4	44	22	18	90	49.45	

Information center for Treatment	None	0	4	14	0	0	18	9.89	0.027
	Local Medicine Shop	2	22	22	6	8	60	32.97	
	Doctor or Health Worker	0	16	22	16	8	62	34.1	
	Hospital Admission	8	6	22	2	4	42	23.1	
Types of Food Provide During Diarrheal Infection	Soup or Liquid Food	6	28	54	4	16	108	59.34	0.071
	Cooked Rice & Curry	4	16	16	12	2	50	27.47	
	Other's	0	4	10	8	2	24	13.2	

(Table: 3.6)

This association table explicates the relationship between Mother Educational Qualification & other's dependent variables. In this table there's been strongly significant relationship between Mother Educational Qualification with Method to apply purify drinking water (P-value<0.003), Wash hand after using Washroom (P-value<0.000) & Wash fruits & vegetables before eating or cooking (P-value<0.000). (Table: 3.6)

This table also illustrates mildly significant relationship between Mother's educational qualifications with Type of toilet (P-value<0.025), Grading toilet cleanliness (P-value<0.037), Wash hand before & after food consumption (P-value<0.097), Treatment center during diarrheal infection<0.027) & Types of food provide during diarrheal infection (P-value<0.071). (Table: 3.6)

There's been no significant relationship between Mother Educational Qualification with Number of toilet user (P-value<0.737), Supply source of drinking water (P-value<0.361), Kind of soap use to wash hand (P-value<0.173), Last diarrheal infection (P-value<0.289), Duration of last diarrheal infection (P-value<0.658), Diarrheal count in last 1 year (P-value<0.198) & Types of medicine provided during diarrheal infection (P-value<0.870). (Table: 3.6)

Association table between Participants House Type & other's Variable

		Participants House Type			Total	Percent	Pearson Chi-Square
		Tin-Shed	Tin-Shed With Brick-Wall	Apartments			
Toilet Type	Ring Slab Pit Latrine Without Sewage Channel	18	0	0	18	9.89	0.000
	Ring Slab Pit Latrine With Sewage Channel	16	54	22	92	50.55	
	Toilet with Ideal Sanitary Facilities	0	8	60	68	37.36	
	Other's	4	0	0	4	2.2	
Number of single toilet user	Less than 5	12	38	48	98	53.85	0.032
	5 to 8	14	22	26	62	34.1	
	More than 8	12	2	8	22	12.1	
Grading Toilet Cleanliness	Bad	8	0	0	8	4.4	0.000
	Moderate	28	32	26	86	47.25	
	Good	2	30	56	88	48.89	
Drinking Water Source	WASA	0	10	36	46	25.56	0.000
	Tube-Well	22	18	0	40	21.98	
	Deep Tube-Well	6	0	0	6	3.3	
	Personal Electrical Water Pump	10	34	46	90	49.45	
Water Purification method Apply	Commercial or Pure-it	0	0	10	10	5.5	0.058
	Stone based layered Filter	0	4	10	14	7.78	
	Boil Water for 30 Minutes	20	24	38	82	45.1	
	No Filtration	18	34	24	76	41.76	
Wash Hand after Using Washroom	Sometimes	14	30	14	58	31.87	0.016
	Every time	24	32	68	124	68.13	
Wash Fruit or Vegetable before Eating or Cooking	Never	8	4	2	14	7.78	0.002
	Sometimes	20	36	22	78	43.33	
	Every time	10	22	58	90	49.45	

Types of Soap use to Wash Hand	None	2	2	2	6	3.3	0.000
	Bar Soap	28	38	32	98	53.85	
	Liquid Soap	2	22	48	72	39.56	
	Other's	6	0	0	6	3.3	

(Table: 3.7)

This association table explicates the relationship between Type of participant's house & other's dependent variables. In this table there's been significant relationship between Type of participant's house with Type of toilet (P-value<0.000), Grading toilet cleanliness (P-value<0.000), Supply source of drinking water (P-value<0.000), Kind of Soap use to wash hand (P-value<0.000) & Wash fruits & vegetables before eating or cooking (P-value<0.002). (Table: 3.7)

In this table there's also been mildly significant relationship between participant's house types with Number of toilet user (P-value<0.032), Method apply to purify drinking water (P-value<0.058) & Wash hand after using washroom (P-value<0.016). (Table: 3.7)

This table illustrates that there's been no significant relationship between Type of participant's house with Wash hand before & after food consumption (P-value<0.569), Last diarrheal infection (P-value<0.176), Treatment center during diarrheal infection<0.477), Duration of last diarrheal infection (P-value<0.213), Diarrheal count in last 1 year (P-value<0.146), Types of medicine provided during diarrheal infection (P-value<0.680) & Types of food provide during diarrheal infection (P-value<0.106). (Table: 3.7)

Association table between Monthly Family Income & other's Variable

		Monthly Family Income					Total	Percent	Pearson Chi-Square
		Less than 20000 Taka	21000 to 30000 Taka	31000 to 40000 Taka	41000 to 50000 Taka	More than 50000 Taka			
Toilet Type	Ring Slab Pit Latrine Without Sewage Channel	14	4	0	0	0	18	9.89	0.000
	Ring Slab Pit Latrine With Sewage Channel	72	16	4	0	0	92	50.55	
	Toilet with Ideal Sanitary Facilities	32	22	12	0	2	68	37.36	
	Other's	2	0	0	2	0	4	2.2	
Drinking Water Source	WASA	34	8	4	0	0	46	25.27	0.000
	Tube-Well	36	4	0	0	0	40	21.98	
	Deep Tube-Well	2	2	0	2	0	6	3.3	
	Personal Electrical Water Pump	48	28	12	0	2	90	49.45	
Water Purification method Apply	Commercial or Pure-it	6	2	2	0	0	10	5.5	0.038
	Stone based layered Filter	4	4	4	0	2	14	7.78	
	Boil Water for 30 Minutes	50	24	6	2	0	82	45.1	
	No Filtration	60	12	4	0	0	76	41.76	
Last Diarrheal Infection	Less than 5 Month	94	26	6	0	0	126	69.23	0.001
	5 to 11 Month	4	6	6	2	2	20	10.99	
	12 Month or More	22	10	4	0	0	36	19.78	

(Table: 3.8)

This association table explicates the relationship between Monthly family income & other's dependent variables. In this table there's been significant relationship between Monthly family

income with Type of toilet (P-value<0.000), Supply source of drinking water (P-value<0.000) & Last diarrheal infection (P-value<0.001). (Table: 3.8)

In this table there's also been mildly significant relationship between Monthly family income & Method apply to purify drinking water (P-value<0.038). (Table: 3.8)

But there's been no significant relationship between Monthly family income with Number of toilet user (P-value<0.577), Grading toilet cleanliness (P-value<0.505), Wash hand before & after food consumption (P-value<0.268), Wash hand after using washroom (P-value<0.129), Wash fruits & vegetables before eating or cooking (P-value<0.391), Kind of Soap use to wash hand (P-value<0.658), Treatment center during diarrheal infection<0.157), Duration of last diarrheal infection (P-value<0.194), Diarrheal count in last 1 year (P-value<0.669), Types of medicine provided during diarrheal infection (P-value<0.933) & Types of food provide during diarrheal infection (P-value<0.431). (Table: 3.8)

3.7 Association between WASH practice and diarrheal disease frequency and treatment management among children

Association table between Types of toilet & other's Variable

		Types of Toilet				Total	Percent	Pearson Chi-Square
		Ring-Slab Pit Latrine Without Sewage Channel	Ring-Slab Pit Latrine Without Sewage Channel	Toilet with Ideal Sanitary Facilities	Other's			
Number of single toilet user	Less Than 5	4	50	42	2	98	53.85	0.076
	5 to 8	6	32	22	2	62	34.1	
	More than 8	8	10	4	0	22	12.1	
Grading Cleanliness of Washroom	Bad	6	2	0	0	8	4.4	0.000
	Moderate	12	52	18	4	86	47.25	
	Good	0	38	50	0	88	48.35	
Drinking Water Source	WASA	0	22	24	0	46	25.27	0.000
	Tube-Well	16	22	0	2	40	22	
	Deep Tube-Well	0	4	0	2	6	3.3	
	Personal Electrical Water Pump	2	44	44	0	90	49.45	
Supply Source of Kitchen Water	WASA	0	22	24	0	46	25.27	0.000
	Tube-Well	16	22	2	2	42	23.1	
	Deep Tube-Well	0	4	0	2	6	3.3	
	Personal Electrical Water Pump	2	44	42	0	88	48.9	
Sewage Channel Attachment with Washroom	Yes	0	76	54	2	132	72.53	0.000
	No	18	16	14	2	50	27.47	
Water Blockage Record During Rainy Season	Yes	14	64	24	0	102	56.04	0.003
	No	4	28	44	4	80	43.96	
Wash Fruit/Vegetable before Eat/Cook	Never	6	4	4	0	14	7.69	0.011
	Sometimes	8	50	18	2	78	42.86	
	Every time	4	38	46	2	90	49.45	

Diarrheal Count in Last 12 Month	Never	0	14	12	0	26	14.29	0.024
	1-2 times	8	32	46	2	88	48.35	
	3-4 times	8	46	8	2	64	35.16	
	More than 4 times	2	0	2	0	4	2.2	
Types of Food Provide During Diarrheal Infection	Soup or Liquid Food	8	50	50	0	108	59.34	0.006
	Cooked Rice & Curry	8	30	12	0	50	27.47	
	Other's	2	12	6	4	24	13.19	
Duration of last Diarrheal Infection (Day)	3 or Less	6	56	32	0	94	51.65	0.060
	4 to 6	12	30	22	4	68	37.36	
	7 or More	0	6	14	0	20	11	

(Table: 3.9)

This association table explicates the relationship between Types of toilet & other's dependent variables. In this table there's been significant relationship between Types of toilet with Grading cleanliness environment of toilet (P-value<0.000), Supply source of drinking water (P-value<0.000), Supply source of kitchen water (P-value<0.000), Sewage channel availability with washroom (P-value<0.000), Water blockage during the rainy season (P-value<0.003) & Types of food provide during the diarrheal infection (P-value<0.006). (Table: 3.9)

In this table there's been mildly significant relationship between types of toilet with Number of toilet user (P-value<0.076), Wash fruits & vegetables before eating or cooking (P-value<0.011), Diarrheal count in last 1 year (P-value<0.024) & Duration of last diarrheal infection (P-value<0.060). (Table: 3.9)

There's been no significant relationship between Types of toilet with Wash hand after using washroom (P-value<0.147), Toilet cleaning frequency per week (P-value<0.177), Wash hand before & after food consumption (P-value<0.125), Types of medicine provided during diarrheal infection (P-value<0.809), Last diarrheal infection (P-value<0.292) & Treatment center during diarrheal infection<0.159). (Table: 3.9)

Association table between Types of Soap uses by Participant & other's Variable

		Types of Soap uses by Participant as Hand-Washer				Total	Percent	Pearson Chi-Square
		None	Bar Soap	Liquid Soap	Other's			
Number of single toilet user	Less Than 5	4	50	44	0	98	53.85	0.000
	5 to 8	2	44	16	0	62	34.1	
	More than 8	0	4	12	6	22	12.1	
Grading Cleanliness of Washroom	Bad	0	4	0	4	8	4.4	0.000
	Moderate	6	66	12	2	86	47.25	
	Good	0	28	60	0	88	48.35	
Wash Hand after using Washroom	Sometimes	4	36	12	6	58	31.87	0.006
	Every time	2	62	60	0	124	68.13	
Drinking Water Source	WASA	0	12	34	0	46	25.27	0.005
	Tube-Well	2	30	4	4	40	21.98	
	Deep Tube-Well	0	6	0	0	6	3.3	
	Personal Electrical Water Pump	4	50	34	2	90	49.45	
Supply Source of Kitchen Water	WASA	0	12	34	0	46	25.27	0.009
	Tube-Well	2	30	6	4	42	23.1	
	Deep Tube-Well	0	6	0	0	6	3.3	
	Personal Electrical Water Pump	4	50	32	2	88	48.35	
Sewage Channel Attachment with Washroom	Yes	4	68	60	0	132	72.53	0.016
	No	2	30	12	6	50	27.47	
Water Blockage Record During Rainy Season	Yes	4	66	26	6	102	56.04	0.013
	No	2	32	46	0	80	43.96	
Wash Hand before & after consume food	Sometimes	0	10	4	6	20	10.99	0.000
	Every time	6	88	68	0	162	89.01	

Wash Fruit/Vegetable before Eat/Cook	Never	4	2	2	6	14	7.7	0.000
	Sometimes	2	58	18	0	78	42.86	
	Every time	0	38	52	0	90	49.45	
Diarrheal Count in Last 12 Month	Never	0	12	14	0	26	14.29	0.017
	1-2 times	2	50	36	0	88	48.35	
	3-4 times	4	36	20	4	64	35.16	
	More than 4 times	0	0	2	2	4	2.2	

(Table: 3.10)

This association table explicates the relationship between Types of Soap uses by participants & other's dependent variables. In this table there's been strongly significant relationship between Types of Soap uses by participants with Number of toilet user (P-value<0.000), Grading cleanliness environment of toilet (P-value<0.000), Wash hand after using washroom (P-value<0.006), Supply source of drinking water (P-value<0.005), Supply source of kitchen water (P-value<0.009), Wash hand before & after food consumption (P-value<0.000) & Wash fruits & vegetables before eating or cooking (P-value<0.000). (Table: 3.10)

This table also shows mildly significant relationship between Types of soap uses by participants with Sewage channel availability with washroom (P-value<0.016), Water blockage during the rainy season (P-value<0.013) & Diarrheal count in last 1 year (P-value<0.017). (Table: 3.10)

There's been no significant relationship between Types of Soap uses by participants with Toilet cleaning frequency per week (P-value<0.244), Types of medicine provided during diarrheal infection (P-value<0.763), Types of food provided during the diarrheal infection (P-value<0.792), Duration of last diarrheal infection (P-value<0.182), Last diarrheal infection (P-value<0.782) & Treatment center during diarrheal infection<0.604). (Table: 3.10)

Association table between Method apply of purify Drinking Water & other's Variable

		Water Purification Method				Total	Percent	Pearson Chi-Square
		Commercial or Pure-it Filter	Stone Based Layered Filter	Boil Water For 30 Minutes	No Filtration			
Grading Cleanliness of Washroom	Bad	0	0	0	8	8	4.4	0.058
	Moderate	0	6	40	40	86	47.25	
	Good	10	8	42	28	88	48.35	
Wash Hand after using Washroom	Sometimes	0	4	8	46	58	31.87	0.000
	Every time	10	10	74	30	124	68.13	
Toilet Cleaning Frequency Per week	Never	0	0	4	0	4	2.2	0.021
	Once	2	0	24	36	62	34.1	
	2 times	4	12	32	34	82	45.1	
	3 times	0	0	16	4	20	10.99	
	More than 3 times	4	2	6	2	14	7.7	
Water Blockage Record During Rainy Season	Yes	0	10	40	52	102	56.04	0.016
	No	10	4	42	24	80	43.96	
Wash Fruit/Vegetable before Eat/Cook	Never	0	0	2	12	14	7.7	0.055
	Sometimes	2	4	32	40	78	42.86	
	Every time	8	10	48	24	90	49.45	
Last Diarrheal Infection (Month)	Less than 5	6	6	56	58	126	69.23	0.041
	5 to 11	2	6	12	0	20	10.99	
	12 or More	2	2	14	18	36	19.78	

(Table: 3.11)

This association table explicates the relationship between Method apply to purify drinking water & other's dependent variables. In this table there's been significant relationship between Method apply to purify drinking water with Wash hand after using washroom (P-value<0.000). (Table: 3.11)

This table also explains mildly significant relationship between Method apply to purify drinking water with Grading cleanliness environment of toilet (P-value<0.058), Toilet cleaning frequency per week (P-value<0.021), Water blockage during the rainy season (P-value<0.016), Wash fruits & vegetables before eating or cooking (P-value<0.055) & Last diarrheal infection (P-value<0.041). (Table: 3.11)

There's been no significant relationship between Method apply to purify drinking water with Number of toilet user (P-value<0.101), Supply source of drinking water (P-value<0.236), Supply source of kitchen water (P-value<0.261), Sewage channel availability with washroom (P-value<0.585), Wash hand before & after food consumption (P-value<0.541) & Diarrheal count in last 1 year (P-value<0.664), Types of medicine provided during diarrheal infection (P-value<0.700), Types of food provide during the diarrheal infection (P-value<0.254), Duration of last diarrheal infection (P-value<0.743) & Treatment center during diarrheal infection<0.189). (Table: 3.11)

3.8 Association between socio demographic status and diarrheal disease frequency and treatment management among children

Association table between Grading Cleanliness Environment of Washroom & other's Variable

		Grading Cleanliness Environment of Washroom			Total	Percent	Pearson Chi-Square
		Bad	Moderate	Good			
Last Diarrheal Infection (Month)	Less than 5	8	58	60	126	69.23	0.761
	5 to 11	0	10	10	20	10.99	
	12 or More	0	18	18	36	19.78	
Duration of Last Diarrheal Infection (Day)	3 or Less	2	48	44	94	51.65	0.533
	4 to 6	6	30	32	68	37.36	
	7 or More	0	8	12	20	10.99	
Diarrheal Count in Last 12 Month	Never	0	10	16	26	14.29	0.007
	1-2 times	0	40	48	88	48.35	
	3-4 time	6	36	22	64	35.16	
	More than 4 times	2	0	2	4	2.2	
Treatment Information Centre	None	2	12	4	18	9.9	0.362
	Local Medicine Shop	4	30	26	60	32.97	
	Doctor or Health Worker	0	30	32	62	34.1	
	Hospital Admission	2	14	26	42	23.1	
Types of Medicine Provide During Diarrheal Infection	Oral Saline	2	6	2	10	5.5	0.109
	Oral & Rice Saline	2	10	10	22	12.1	
	Antibiotic & Oral Saline	4	54	72	130	71.4	
	Fruit Juice/Coconut Water	0	16	2	18	9.9	
	None	0	0	2	2	1.1	
Types of Food Provide During Diarrheal Infection	Soup or Liquid Food	4	54	50	108	59.34	0.934
	Cooked Rice & Curry	2	22	26	50	27.47	
	Other's	2	10	12	24	13.19	

(Table: 3.12)

This association table explicates the relationship between grading cleanliness environment of washroom & diarrheal diseases related information of participant's children. In this table there's been strongly significant relationship between grading cleanliness environment of washroom with Diarrheal count in last 1 year (P-value<0.007). (Table: 3.12)

There's been no significant relationship between grading cleanliness environment of washroom with Last diarrheal infection (P-value<0.761), Duration of last diarrheal infection (P-value<0.533), Treatment center during diarrheal infection<0.362), types of medicine provided during diarrheal infection (P-value<0.109), Types of food provide during the diarrheal infection (P-value<0.934). (Table: 3.12)

Association table between supply source of drinking water & other's Variable

		Drinking Water Source				Total	Percent	Pearson Chi-Square
		WASA	Tube-Well	Deep Tube-Well	Personal Electrical Water Pump			
Last Diarrheal Infection (Month)	Less than 5	36	36	2	52	126	69.23	0.111
	5 to 11	2	2	2	14	20	10.99	
	12 or More	8	2	2	24	36	19.78	
Duration of Last Diarrheal Infection (Day)	3 or Less	24	18	2	50	94	51.65	0.065
	4 to 6	10	22	4	32	68	37.36	
	7 or More	12	0	0	8	20	10.99	
Diarrheal Count in Last 12 Month	Never	6	2	2	16	26	14.29	0.149
	1-2 times	28	12	2	46	88	48.35	
	3-4 time	12	26	2	24	64	35.16	
	More than 4 times	0	0	0	4	4	2.2	
Treatment Information Centre	None	2	6	0	10	18	9.9	0.306
	Local Medicine Shop	16	20	0	24	60	32.97	
	Doctor or Health Worker	12	8	4	38	62	34.1	
	Hospital	16	6	2	18	42	23.1	

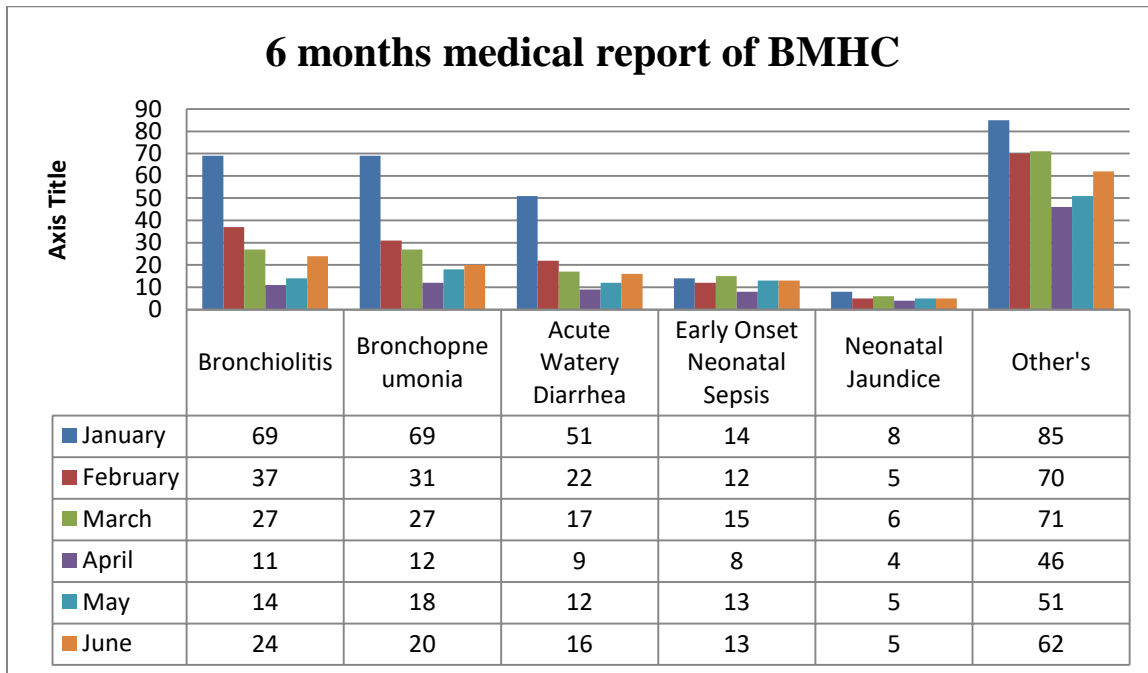
	Admission							
Types of Medicine Provide During Diarrheal Infection	Oral Saline	2	4	0	4	10	5.5	0.584
	Oral & Rice Saline	8	2	0	12	22	12.1	
	Antibiotic & Oral Saline	34	30	6	60	130	71.43	
	Fruit Juice/Coconut Water	0	4	0	14	18	9.9	
	None	2	0	0	0	2	1.1	
Types of Food Provide During Diarrheal Infection	Soup or Liquid Food	34	18	2	54	108	59.34	0.503
	Cooked Rice & Curry	8	14	2	26	50	27.47	
	Other's	4	8	2	10	24	13.19	

(Table: 3.13)

This association table explicates the relationship between supply source of drinking water & diarrheal diseases related information of participant's children. There been mildly significant relationship between supply source of drinking water & Duration of last diarrheal infection (P-value<0.065). (Table: 3.13)

There's been no significant relationship between supply source of drinking water with Last diarrheal infection (P-value<0.111), Diarrheal count in last 1 year (P-value<0.149), Treatment center during diarrheal infection<0.306), types of medicine provided during diarrheal infection (P-value<0.584) & Types of food provide during the diarrheal infection (P-value<0.503). (Table: 3.13)

3.9 Qualitative Outcomes



(Figure-11)

This figure illustrates 6 months patient's data of pediatric department of Banghabandhu Memorial Hospital (2021), Chattagram, Bangladesh. Patients come with 5 most pediatric diseases & admitted in the indoor patients care unit are: Bronchiolitis (18.6%), Bronchopneumonia (18.1%), Acute Watery Diarrhea (13%), Early Onset Neonatal Sepsis (7.7%), Neonatal Jaundice (3.4%) & Other's (39.3%).

A highest percentage of 30.23% of total patients are admitted in January whereas patients (child) with Acute Watery Diarrhea also highest in the month of January (40.16%), Patients admitted with diarrheal disease in other's month are: February (17.32%), March (13.4%), April (7.1%), May (10.24%) & June (10.24%).

An expert who is a medical officer of Banghabandhu Memorial Hospital was opined that patients with diarrheal diseases are admitted in the indoor patients care unit with a higher percentage compare to most of the pediatric diseases among children & the entire medical data which are uses in this figure (Figure-11) are collected from him.

Another expert, Dr. Mosarrof Hossain, Registrar, Department of pediatrics, Shohid Monsur Ali Medical College Hospital, Uttara, Dhaka, Bangladesh, was opined most of the important things about diarrhea among children's. He (Dr. Mosarrof Hossain) opined that an average of 7-8 patients admitted in indoor patients care unit in the hospital, whereas he attend an average of 10-12 patients who are comes with stomach pain & other's diarrheal symptoms.

He also gave opined about the reason of diarrheal diseases among children where he (Dr. Mosarrof Hossain) said that diarrhea are categorizes in 3 types: 1. Infective diarrhea which occurs due to bacterial & viral infection, 2. Invasive diarrhea, 3. Watery stool diarrhea (its occurs less among children), Bloody diarrhea (it also occurs less among children), diarrheal infection are categorized in this type when blood released with stool. But mostly infective diarrhea occurs among children & causes of those infections are Rotavirus & Vibrio-Cholera, Salmonella, Shigellosis (another organism that causes bloody diarrhea), Some diarrhea are defined as persistent diarrhea & specific diarrhea has specific causes to infect human.

In terms of explained the relationship between socio-economic status & diarrheal disease he (Dr. Mosarrof Hossain) added that People who have low economic condition are infected more by diarrhea than the people who are economically stable; because of people those lives in low economic condition have lower facilities of sanitation, unable maintain personal hygiene & aware less about causes of diarrhea. Mainly traveller diarrhea infect the people with high economic condition most & rest of type of diarrhea mostly infect the people who have lower economic condition.

In terms of opined about relationship between water source, drinking habit & hygiene with diarrheal diseases he (Dr. Mosarrof Hossain) answered that the source of our daily required water comes in parallel way, where the pipe has the highest chance of licking & it could easily infect the water through bacteria like Shigella, Salmonella and Escherichia Coli. Etc. We will be the victim of diarrhea if we are not purify the water before use or drink, Several purification method like filtration & boiling could reduce the chances of diarrheal infection.

Lastly he describe about the process how can we reduce the infection of diarrheal diseases among children where he explained that we have to maintain hygiene, we have to wash our hand before & after using washroom, we have to wash our hand before & after eat something. We have to avoid outside food (mostly liquid drink we purchases from the street like fruit juice), Bacteria can multiply if we store food in metal packaging for a long time, so we have to also avoid consumption of these type of food).fresh home cooked food (which are cooked at a higher temperature) & water that are purified are preferable to prevent diarrheal infection.

Chapter-4

4.1 Discussion

Increased drinking water and sanitation facilities have a wide range of effects on diarrhea morbidity in undeveloped countries, according to studies [Feachem, R. G., 1983]. Every year, 4 billion episodes of diarrhea occur, with more than 90% of them occurring in undeveloped countries [Murray CJL, 1996]. Diarrheal infections were responsible for 11% of the expected 7.6 million deaths of children under the age of five worldwide in 2010 [Liu L, 2012]. Diarrhea killed 11% of all children under the age of five in Bangladesh (n = 182,936) [Black RE., 2010].

This investigative study will acquainted the relationship between socio-demographic status with other's factor & Frequency of child diarrhea in the Chattagram City Corporation area. A total of 182 participants were interviewed in this study, Where Interview conducted in the area of ward 4, 5 & 6 in Chattagram City Corporation. Mother of the children's was the respondent's in this study where children were the sample of the study.

As in earlier studies, Islam et al. found the incidence of diarrhea was higher in households with a higher occupation group and a bigger household size [Islam M S, 1984], where in my study I found out that there's been closely significant relationship between Mother Occupation with Toilet type (P-value<0.005) & Strongly significant relationship between Mother Occupation with Wash hand after using Washroom (P-value<0.001).

There's been observed the association of the level of education of mother & hygiene practices by their family in my study where found out that there's been strongly significant relationship between Mother Educational Qualification with Method to apply purify drinking water (P-value<0.003), Wash hand after using Washroom (P-value<0.000) & Wash fruits & vegetables before eating or cooking (P-value<0.000), in other research ALAM et al. found that the level of education was poor, and there was no effect on the occurrence of diarrhea. However, in this demographic, minimal education may not be a useful determinant of socioeconomic level.

UNESCO reported the female literacy rate of Bangladesh in 2019 where literacy rate of female were 71.9%, in my study area among 182 participants female literacy rate is 94%.

The usage of a better water source and improved sanitation had a considerable impact on the incidence of childhood diarrhea in the slum sections of Bangladesh's national capital, Dhaka, according to a Ferdous et al. [Ferdous F, 2014]. In my study, investigation found out that there's been strongly significant relationship between Type of participant's house with Type of toilet (P-value<0.000), Grading toilet cleanliness (P-value<0.000), Supply source of drinking water (P-value<0.000), Kind of Soap use to wash hand (P-value<0.000) & Wash fruits & vegetables before eating or cooking (P-value<0.002). Qualitative analysis of this study found that Bacteria such as Shigella, Salmonella, and Escherichia Coli, among others, cause diarrheal disease through water sources. If we do not purify the water before using or drinking it, we will become victims of diarrhea. Several purification methods, such as filtration and boiling, can reduce the risk of diarrheal infection.

In the two weeks leading up to the survey, 45.7 percent of Bangladeshi children had at least one episode of illness [Kamal MM, 2011], where 69.2% of the children infected by diarrhea in less than of last 5 months of time in this investigation.

Maternal education, household income, and child hand washing before feeding are all risk factors for diarrhea. In the research area, about half of the households earned less than 10,000 BD TK. A family's economic situation can readily enhance housing conditions, turn unsanitary into hygienic, and safeguard the kitchen from pest attack [Khan. M. S. I. et al., 2018], where this studies illustrates 65.9% of respondents' families had monthly family income of 20000 taka or less & several factors has connected with monthly family income, Types of toilet (P-value<0.000), Drinking water source (P-value<0.000) & Last diarrheal infection (P-value<0.001) are strongly significant, where method apply to purify drinking water (P-value<0.038) is mildly significant. In this qualitative study, I found that Persons in low-income households are more likely to contract diarrhea than those in higher-income households; this is because people in low-

income households have fewer sanitation facilities, is unable to maintain personal hygiene, and is less knowledgeable about the causes of diarrhea.

Diarrheal morbidity affects 3.2 times in children under the age of five worldwide per year [Kosek M, 2003], whereas this study found that an average of per child affected by diarrhea 2.25 times per year in Chattagram city. Grading cleanliness environment of the toilet is a factor that connected with Diarrheal count in last 1 year ($P\text{-value}<0.007$), where this relationship are strongly significant.

Because of a lack of cleanliness, diarrheal infection occurs more frequently among children under the age of five in developing countries. Inadequate sanitation is responsible for over 90% of diarrheal disease [Bitew BD, 2017]. This study evidences strongly significant relationship of several hygiene & cleanliness practitioner with type of toilet include Grading cleanliness environment of toilet ($P\text{-value}<0.000$), Supply source of drinking water ($P\text{-value}<0.000$), Supply source of kitchen water ($P\text{-value}<0.000$), Sewage channel availability with washroom ($P\text{-value}<0.000$), Water blockage during the rainy season ($P\text{-value}<0.003$) & mildly significant with several cleanliness or hygiene practitioner include Number of toilet user ($P\text{-value}<0.076$), Wash fruits & vegetables before eating or cooking ($P\text{-value}<0.011$) with types of toilet. This study also evidences mildly significant relation between type of toilet with diarrheal count in last 1 year ($P\text{-value}<0.024$) & duration of last diarrheal infection ($P\text{-value}<0.060$).

All mothers, according to Khan et al., cleansed their hands before preparing food and feeding their children. If a child fed herself, 56.3 percent cleansed their hands with soap before eating, and babies who did not use soap before eating were 3.92 times more likely to have diarrhea than those who did [Khan. M. S. I. et al., 2018]. This study evidences 89% of mother & their children wash their hand every-time before consume food & 11% of mother & their children wash their hand sometimes before consume food where 53.8% of them uses bar soap during washes their hand, 39.6% uses liquid soap during washes their hand & remaining 6.6% of the participants & their children uses ashes or others & None (3.3% each). There's been mildly significant relationship between types of soap uses by participants & Diarrheal count in last 1 year ($P\text{-value}<0.017$). In qualitative analysis I found that we must maintain personal hygiene by washing

our hands before and after using the restroom, as well as before and after eating. We must avoid outside food (mainly liquid drinks purchased on the street, such as fruit juice). Bacteria can spread if food is stored in metal packaging for an extended period of time, so we must also avoid eating this type of food.

In a study in Chattagram city among 200 participants 16.66% of total participant's boiled water for 30 minutes before drinking, 38% of total participant's filtered water before drinking & Increased CWASA authority conscientiousness to ensuring safe supply water from point of production to consuming households, according to 38% of respondents, could improve system efficiency, the study's main conclusion is that many characteristics of CMC's supply water quality, such as its diversified use patterns and observed health implications, are significant factors to consider for better water supply control in the city [Molla. M. H., 2014]. This study evidences 45.1% of the total participant's apply boiled water for 30 minutes to drink it, 41.8% of the total participants applies no filtration method to purify water, 7.7% & 5.5% of the total participants uses commercial or pure-it filter & stone based layered filter respectively to purify their drinking water. This investigation also found out mildly significant relationship between method apply to purify drinking water & Last diarrheal infection (P-value<0.041).

Molla et al. reported that piped water is the primary supply of water for city dwellers (85%), followed by tube-wells as the secondary source of drinking water. In both research locations, only a tiny percentage of residents (ranging from 2 to 9%) collect rainwater for domestic consumption [Molla. M. H., 2014]. Where this study revealed that 49.5% of the respondent's families supply source of drinking water is Personal Electrical Water Pump, 25.3%, 22% & 3.3% of respondents families drinking water source is WASA, Tube-Well & Deep Tube-Well respectively, There's also been mildly significant relationship of Duration of last diarrheal infection (P-value<0.065) with supply source of drinking water.

4.2 Conclusion

According to our findings, mothers are directly involved with child health. Along with mother's educational qualification & mother's occupation, there's been also an evidence of family income, participant's house, type of toilet uses & water purification methods are responsible for the prevalence of diarrhea among children in this study area. Another finding of this study is that acute watery diarrhea is one of the most visible diseases in the pediatrics department of hospitals. Proper practices of hand-washing before & after consume food, after using washroom & wash fruit/vegetable before eating/cooking has a great impact on reduces the prevalence of diarrhea among children. Though the findings of this study have a number of critical implications for public health, they can help shape strategic efforts to combat the expanding morbidity & mortality due to diarrhea in children.

4.3 Recommendation

- First and foremost, the Bangladeshi government must appropriately address the education and female literacy rate, as well as strategies to enhance the ratio as soon as possible, as it is the major indicator for improving children's health.
- Several NGO's & International organization that are work from the front in this country, can arrange several program to aware the mother about children diarrhea & share knowledge how to prevent it.
- Apart from the mother, other family members who look after the children or live in the same house must also maintain hygiene.
- Because of its effective means of transmitting knowledge, the mass media frequently plays a key influence in shaping behavior. Regular education on how to manage diarrhea in children and how to live a healthy lifestyle will go a long way toward reducing the prevalence of diarrhea.
- Lastly every individual have to avoid drinks water that comes through direct pipeline & should treat the water by following standardized purification method before drink it.

4.4 Limitations

Because it was a cross-sectional study, both the result and the exposure are evaluated at the same time, the temporal connection between the result as well as the exposures can't be detected in this research. The study conducted among Chattagram city children, with the mothers of the children participating as the respondents. Some grandmother or father of the children replies in this study due to the mother's work. Another limitations of this study is number of respondents, due to COVID-19 restriction it's unable to conduct this study in huge number of people. We can't draw any inferences about the nature of the observed relationships because the study is cross-sectional. This study also unable to reports the mortality rate among children below 6 year of age due to diarrheal infection as this survey conducted through randomized sampling.

References

- Abu M, Kamal U, Rob K. Delineation of the coastal zone Dhaka, PDO-ICZMP, Bangladesh (2003).
- Abu-Ragheef, L.F. and Hussein A.K.A. (2007) Incidence of Seasonal Diarrhea among Children at Child's Central Hospital. *Science Journal Nursing*, 20, 20-26.
- Agarwal V. Integrated management of neonatal and childhood illness: A holistic approach for child survival: continuing medical education module. Public Health Department 2005.
- Ahmed SF, Farheen A, Muzaffar A and G Mattoo, 2008. Prevalence of diarrhoeal disease, its seasonal and age variation in under- fives in Kashmir, India. *Int. J. Health Sci.*, 2: 126-133.
- ALAM, NURUL; WOJTYNIAK, BOGDAN; HENRY, FITZROY J; RAHAMAN, M MUJIBUR (1989). Mothers' Personal and Domestic Hygiene and Diarrhoea Incidence in Young Children in Rural Bangladesh. *International Journal of Epidemiology*, 18(1), 242–247.
- Al-Badri, A.A., Al Ammary, M.A.F, Al-Badawi, G.G. and Al-Azawi, S.A. (2007) Relation between Behavioral Factors, Malnutrition and Persistent Diarrhea in Children under Two Years of Age: A Hospital Study. *Journal of the Faculty of Medicine Baghdad*, 2249, 22-23.
- Alene, M., Yismaw, L., Berelie, Y., & Kassie, B. (2019). Health care utilization for common childhood illnesses in rural parts of Ethiopia: evidence from the 2016 Ethiopian demographic and health survey. *BMC Public Health*, 19(1), 57.
- Alexander, K., Blackburn, J. Overcoming barriers in evaluating outbreaks of diarrheal disease in resource poor settings: assessment of recurrent outbreaks in Chobe District, Botswana. *BMC Public Health* 13, 775 (2013).
- Almedom AS, Blumenthal U, Manderson L. Hygiene evaluation procedures: approaches and methods for assessing water and sanitation-related hygiene practices. London: International Nutrition Foundation for Developing Countries; 1997.
- Anon. Cholera, 2000. *Wkly Epidemiol Rec* 2001; 76: 233–40.
- Avachat SS, Phalke VD, Phalke DB, Syed MMA, Kalakoti P. A cross-sectional study of sociodemographic determinants of recurrent diarrhoea among children under five of rural area of Western Maharashtra. *AMJ* 2011, 4, 2, 72-75.
- Bangladesh Population Census 2001, Bangladesh Bureau of Statistics; Cultural survey report of 2007; Field reports of Chittagong City Corporation.
- Bartram, J. & Cairncross, S. (2010). Hygiene, Sanitation, and Water: Forgotten Foundations of Health. *PLoS Medicine*, 7 (11) e1000365, 1-9.

Barua D. Cholera. *Pro Roy Soc Med* 1972; 65:11-6.

Bitew BD, W Woldu and Z Gizaw, 2017. Childhood diarrheal morbidity and sanitation predictors in a nomadic community. *Ital. J. Pediatr.*, 43: 91.

Bitew BD, W Woldu, Z Gizaw, 2017. Childhood diarrheal morbidity and sanitation predictors in a nomadic community. *Ital. J. Pediatr.*, 43: 91.

Blacklow N.R. and Cuckor G. (1981): Viral gastro- enteritis. - *New Engl. J. Med.*, 304: 397-406.

Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, De Onis M, Ezzati M, Grantham-McGregor S, Katz J, Martorell R. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet*. 2013; 382(9890):427–51.

Black RE, Cousens S, Johnson HL, Lawn JE, Rudan I, et al. (2010) Global, regional, and national causes of child mortality in 2008: a systematic analysis. *Lancet* 375: 1969–1987.

Boschi C, Velebit L. Estimating child mortality due to diarrhea in developing countries. *WHO Bulletin* 2008; 86:710-717.

Carlson J.A.K., Middleton P.J., Szymanski M.T., Huber J. and Petric M. (1978): Fatal rotavirus gastroenteritis. - *Am. J. Dis. Child.*, 132: 477-479.

Checkley, W., Buckley, G., Gilman, R., Assis, A., Guerrant, R., Morris, S., Black, R. (2008). Multi-country analysis of the effects of diarrhoea on childhood stunting. *International Journal of Epidemiology*, 37(4), 816-830.

Chowdhury et al., Low maternal education and socio-economic status were associated with household food insecurity in children under five with diarrhoea in Bangladesh; *Foundation Acta Pædiatrica*. Published by John Wiley & Sons Ltd 2016 105, pp. 555–561.

De Onis M, Brown D, Blossner M, Borghi E: Levels and trends in child malnutrition. UNICEF-WHO-the World Bank joint child malnutrition estimates. 2012.

Evans GW, Saegert S, Harris R: Residential Density and Psychological Health among Children in Low-Income Families. *Environ Behav* 2001, 33:165-180.

Farthing MJ. Diarrhoea- a significant worldwide problem. *Int J Antimicrob Agents* 2000; 14(1): 65-9.

Feachem, R. G., Hogan, R. C. & Merson, M. H. (1983). Diarrhoeal disease control: reviews of potential interventions. *Bulletin of the World Health Organization*, 61, 617-640.

Ferdous F, Das SK, Ahmed S, et al. Diarrhea in slum children: observation a large diarrheal disease hospital in Dhaka, Bangladesh. *Trop Med Int Health* 2014;19:1170–6.

Fewtrell L, Kaufmann RB, Kay D, Enanoria W, Haller L, Colford JM Jr. Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries: a systematic review and meta-analysis. *Lancet Infect Dis* 2005; 5: 4252.

Forsberg BC, Petzold MG, Tomson G, Allebeck P. Diarrhoea case management in low- and middle-income countries-an unfinished agenda. *Bull World Health Organ* 2007; 85(1): 42-8.

Geburu et al. *BMC Public Health* 2014, 14:395.

Giashuddin MS, Kabir M, Hasan M. Economic disparity and child nutrition in Bangladesh. *Indian J Pediatr* 2005;72:481-7.

Gourou, P., Chapman, G., Graham P., Ryabchikov, Aleksandr Maximovich, Leinbach, Thomas R., Alexeeva, Nina Nikolaevna, Owen, Lewis, Şengör, A.M. Celâl, Spencer, Joseph E., Yefremov, Yury Konstantinovich, Chandrasekhar, Sripathi, Narasimhan, Chakravarthi V., Pannell, Clifton W. and Beaufort, Lieven Ferdinand de (2020, November 16). *Asia*. Encyclopedia Britannica.

Guerrant, R.L., Hughes, J.M., Lima, N.L., and Crane, J. 1990. Diarrhea in developed and developing countries: magnitude special settings and etiologies. *Rev. Infect. Dis.* 12: S41-S50.

Hatt LE, Waters HR: Determinants of child morbidity in Latin America: a pooled analysis of interactions between parental education and economic status. *Soc Sci Med* 2006, 62(2):375-386.

<http://uis.unesco.org/en/country/bd>, 2019.

<https://www.who.int/westernpacific/health-topics/diarrhoea#>, May 2, 2017.

<https://worldpopulationreview.com/countries/bangladesh-population>, (2021).

<https://www.worldometers.info/world-population/bangladesh-population/>,(2021).

<https://www.worldometers.info/world-population/bangladesh-population/>,(2021).

<https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BD>, (2020).

<https://www.worldometers.info/world-population/asia-population/>,2021.

https://ourworldindata.org/grapher/deaths-from-diarrheal-diseases-by-age?country=~OWID_WRL, (2017).

<https://worldpopulationreview.com/country-rankings/literacy-rate-by-country>,(2021).

<https://worldpopulationreview.com/country-rankings/literacy-rate-by-country>,(2021).

https://ourworldindata.org/grapher/deaths-from-diarrheal-diseases-by-age?country=~OWID_WRL.

Islam M S, Bhuiya A, Yunus Md, Socioeconomic differentials of diarrhoeal morbidity and mortality in selected villages of Bangladesh. *J Dir Dis Res* 1984; 2 : 232-7.

John. E., (2009). *Maternal and Child Health || The Global Burden of Childhood Diarrhea.* , 10.1007/b106524(Chapter 13), 225–243.

Kamal MM, Hasan MM, Davey R. Determinants of childhood morbidity in Bangladesh: evidence from the Demographic and Health Survey 2011. *BMJ Open* 2015;5:e007538.

Kamal MM, Hasan MM, Davey R. Determinants of childhood morbidity in Bangladesh: evidence from the Demographic and Health Survey 2011. *BMJ Open* 2015;5:e007538.

Keusch GT, Fontaine O, Bhargava A, et al. Diarrheal diseases. In: *Disease Control Priorities in Developing Countries*. 2nd ed. New York, NY: Oxford University Press; 2006:371–388.

Khan. M. S. I. et al., Diarrheal prevalence and risk factors among under five years children in remote coastal area of Bangladesh; *Asian Australas. J. FoodSaf. Secur.* 2018, 2(2), 93-99.

Khan. M. S. I. et al., Diarrheal prevalence and risk factors among under five years children in remote coastal area of Bangladesh; *Asian Australas. J. FoodSaf. Secur.* 2018, 2(2), 93-99.

K. Oadi and M. Kuitunen, “Childhood diarrheal morbidity in the Accra Metropolitan Area, Ghana: socio-economic, environmental and behavioral risk determinants,” *Journal of Health and Population in Developing Countries*, Article ID 17646, pp. 33–46, 2005.

Kosek M, Bern C, Guerrant RL. The global burden of diarrhoeal disease, as estimated from studies published between 1992 and 2000. *Bull World Health Organ* 2003; 81(3): 197-204.

Kosek M, C Bern and RL Guerrant, 2003. The global burden of diarrhoeal disease, as estimated from studies published between 1992 and 2000. *Bull. World Health Organ.*, 81: 197–204.

Larson, Saha UR., Islam R., Roy N., Oxford University Press on behalf of the International Epidemiological Association; *International Journal of Epidemiology* 2006;35:1430–1439.

Leon W., Nitiema, Nordgren J., Ouermi D., Dianou D., Traore A.S., Svensson L., Simpore J., Burden of rotavirus and other enteropathogens among children with diarrhea in Burkina Faso, *International Journal of Infectious Diseases*; Volume 15, Issue 9, (2011), Pages e646-e652; ISSN 1201-9712.

Lepore SJ, Evans GW, Palsane MN: Social hassles and psychological health in the context of chronic crowding. *J Health Soc Behav* 1991, 32:357-367.

Liu L, Oza S, Hogan D, Perin J, Rudan I, Lawn JE, et al. Global, regional, and national causes of child mortality in 2000–13, with projections to inform post2015 priorities: an updated systematic analysis. *Lancet*. 2015;385(9966):430–40.

Liu L, Johnson HL, Cousens S, Perin J, Scott S, et al. (2012) Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *Lancet*.

Mahmud. S. et al., Water, sanitation and hygiene practices among ethnic communities in Chittagong hill tracts, Bangladesh; *International Journal of Current Research* Vol. 12, Issue, 08, pp.13269-13275, August, 2020.

Mandal S, MD Mandal and NK Pal, 2011. Cholera: a great global concern. *Asian Pac. J. Trop. Med.*, 4: 573– 580.

Molla. M. H., Chowdhury. M. A. T., Ali K. M. B., Muhibbullah. M., SUPPLY WATER USING PATTERNS AND HEALTH IMPACTS ON URBAN DWELLERS: A CASE STUDY OF RESIDENTS PERCEPTIONS IN CHITTAGONG METROPOLITAN CITY, BANGLADESH; *Asian Journal of Water Environment* Vol.1 No. 2 (2014) 19-30

Molla. M. H., Chowdhury. M. A. T., Ali K. M. B., Muhibbullah. M., SUPPLY WATER USING PATTERNS AND HEALTH IMPACTS ON URBAN DWELLERS: A CASE STUDY OF RESIDENTS PERCEPTIONS IN CHITTAGONG METROPOLITAN CITY, BANGLADESH; *Asian Journal of Water Environment* Vol.1 No. 2 (2014) 19-30.

Muchnik G.R. and Grinstein S. (1981): Rotavirus infection in children hospitalized for diarrhoea in Argentina. - *Annals of Tropical Paediatrics*, 1: 167-173.

Murray CJL, Lopez AD. Global health statistics: a compendium of incidence, prevalence and mortality estimates for over 200 conditions. *Global Burden of Disease and Injury Series*. Vol. 2. Cambridge, MA: Harvard University Press, 1996.

Musonda C, Siziya S, Kwangu M, Mulenga D. Factors associated with diarrheal diseases in underfive children: A case control study at arthur davisson children's hospital in Ndola, Zambia. *Asian Pac J Health Sci*. 2017; 4(3):228–34.

National Institute of Population Research and Training, Mitra and Associates, ICF International. Bangladesh Demographic and Health Survey 1996–1997. Dhaka, Bangladesh and Rockville, Maryland. 1997.

National Institute of Population Research and Training, Mitra and Associates, ICF International. Bangladesh Demographic and Health Survey 1996–1997. Dhaka, Bangladesh and Rockville, Maryland. 1997.

National Institute of Population Research and Training (NIPORT), Bangladesh Demographic and Health Survey. Mitra and Associates, Dhaka, Bangladesh and Calverton, Maryland, USA and ICF International. 2011.

Noaman, A.A. (2013) Acute and Chronic Diarrhea among Hospitalized Infants Aged (1-12) Months. *Diyala Journal of Pure Science*, 10, 1-10.

Oloruntoba EO, Folarin TB, Ayede AI. Hygiene and sanitation risk factors of diarrhoeal disease among under-five children in Ibadan, Nigeria. *Afr Health Sci.* 2014;14(4):1001–11.

Prendergast, A., & Humphrey, J. (2014). The stunting syndrome in developing countries. *Paediatrics and International Child Health*, 34(4), 250-265.

Rahman A, 2006. Assessing income-wise household environmental conditions and disease profile in urban areas: Study of an Indian city. *Geo Journal*, 65: 211–227.

Rony ZI, MSI Khan, MA Asgar, MR Begum and AG Kibria, 2016. Effects of saline water on health status of pregnant in coastal regions of Bangladesh. *Asian J. Med. Biol. Res.*, 2: 55-61.

Thapar N, Sanderson IR: Diarrhoea in children: an interface between developing and developed countries. *Lancet* 2004; 363: 641–53.

Thind. A., (2003) Diarrhea in the Dominican Republic: determinants of the utilization of children's health services; *Journal of Tropical Pediatrics*, 49: 93–98.

UNICEF. Diarrhoea: why children are still dying and what can be done. 2010.

UNICEF. Pneumonia and diarrhea tackling the deadliest diseases for the world's poorest children. 2012.

VanDerslice J, Briscoe J. Environmental interventions in developing countries. Interactions and their implications. *Am J Epidemiol* 141 (2): 135-144 (1995).

Waldor MK, Hotez PJ, Clemens JD (2010) A national cholera vaccine stockpile—a new humanitarian and diplomatic resource. *N Engl J Med* 363:2279–2282.

WHO: Diarrheal disease. WHO; 2013. <http://www.who.int/mediacentre/factsheets/fs330/en/>.

Annexure

ID Number:

A Cross Sectional Overview of association Between Diarrheal Diseases among Children & Their Socio-Demographic Status

Questionnaire

Principal Investigator: Md. Minhazul Abedin. Sujon
Student ID: 181-34-726

**Department of Nutrition & Food Engineering
Daffodil International University
Dhaka, Bangladesh**

Informed Consent

Title of Study: A Cross Sectional Overview of association Between Diarrheal Diseases among Children & their Socio-Demographic Status

Principal Investigator: Md. Minhazul Abedin. Sujon

Organization: Department of Nutrition & Food Engineering, Faculty of Allied Health Sciences, Daffodil International University, Dhaka, Bangladesh.

Mobile: 01862861618

Email: minhazul34-726@diu.edu.bd

Student Number: 181-34-726

Daffodil International University, Bangladesh

Dear Participant

Assalamualaikum/Adab

This letter is an invitation to consider participating in a study we are conducting on behalf of the Department of Nutrition & Food Engineering, under, Daffodil International University, Bangladesh.

Aim: To explore the association between diarrheal disease among children & their socio-demographic status.

Risk: As a participant in this study, you face no known or anticipated dangers. The benefit of participating in this study is that you will be supporting us in better understanding the relationship between diarrheal disease in children and their socio-demographic status in Chittagong City.

Anonymity & Confidentiality: All of the information you enter will be kept absolutely private. Your name will not appear in any thesis or report coming from this research; however, anonymous quotations may be used with your permission. Only researchers working on the project will have access to the information gathered.

Time: This study will take approximately 10 minutes of your time.

Your rights as research participants: It is entirely up to you whether or not you choose to take part in this study. You have the choice of not participating at all or quitting from the study at any time. If you like, you can refuse to answer any of the interview questions.

Compensation & Payment: There are no costs to you for your participation in this study. There is no monetary compensation to you for your participation in this study.

Query regarding study: If you have any query regarding the questionnaire of this study or would like additional data to assist you in reaching a decision about participation, please feel free to ask me.

Future use of Information: We are assuring that data of this study will be used only for research.

Participants consent: All of my concerns and questions concerning this study have been answered. I choose to take part in this study of my own desire. My willing signature here provides an assurance of my acceptance of all of the terms and conditions set forth above.

Signature of the participant
Date:

Signature of the Interviewer
Date:

Section A: Socio-demographic Characteristics

Sl. No.	Questions	Coding Categories	Code
1	How old is your children?	<input type="text"/> Years	<input type="text"/>
2	What is the child's gender identity?	Male=1 Female=2 Others (please specify) = 99	<input type="text"/>
3	How old are you?	<input type="text"/> Years	<input type="text"/>
4	What is your educational qualification?	Illiterate=1 Primary Education=2 Secondary Education Higher Secondary Education=3 Graduation or More=4	<input type="text"/>
5	What is your Occupation?	Unemployed=1 Student=2 Private job=3 Public/Govt. Job=4 Self-employed=5 Labor based job=6 Others (please specify) = 99	<input type="text"/>
6	What is your monthly family income (BDT)?	Less than 20000=1 21000-30000=2 31000-40000=3 41000-50000=4 More than 50000 = 5	<input type="text"/>
7	Which Religion the participant belongs to?	Islam=1 Hindu=2 Buddhist=3 Christian=4 Others (please specify)=99	<input type="text"/>
8	How many people live together in your house?	<input type="text"/>	
9	How many children do you have?	<input type="text"/>	
10	What type of house do you live in?	Hut=1 Tin-shed=2 Tin-shed with brick wall=3 Apartment building=4 Other's=99	<input type="text"/>

Section B: Information on House & Toilet

Sl. No.	Questions	Coding Categories	Code
1	What type of toilet your family use?	Ring slab pit latrine without sewerage channel=1 Ring slab pit latrine with sewerage channel=2 Toilet with ideal sanitary facilities=3 Other's=99	<input type="checkbox"/>
2	How many people use the toilet/washroom?	<input type="text"/>	<input type="checkbox"/>
3	How many times the toilet cleaned in every week?	Never=1 Once a week=2 2 times a week=3 3 time a week=4 More than 3 times a week=5	<input type="checkbox"/>
4	In your opinion, how do you grade the cleanliness & environment of the toilet?	Bad=1 Moderate=2 Good=3	<input type="checkbox"/>
5	What is the supply source of drinking water for your family?	WASA=1 Tube well=2 Deep Tube well=3 Traditional water pond=4 Personal electrical water pump=5	<input type="checkbox"/>
6	How many glass of water your children drinks per day (250 ml glass)	<input type="text"/> glass	<input type="checkbox"/>
7	What is the supply source of your kitchen water?	WASA=1 Tube well=2 Deep Tube well=3 Traditional water pond=4 Personal electrical water pump=5	<input type="checkbox"/>
8	Are you satisfied with the sources of drinking water that you use in daily life?	Not Satisfied=1 Satisfied=2 Very Satisfied=3	<input type="checkbox"/>
9	Which type of water reservoir used for the Drinking water source?	None=1 Under Ground Tank=2 Roof Top Plastic Tank=3 Roof Top Brick Wall Tank=4 Others (please specify) = 99	<input type="checkbox"/>
10	Where do your family members taking bath?	Pond=1 Washroom=2 Open space with water supply=3 Others (please specify) =99	<input type="checkbox"/>
11	What kind of method you apply to purify drinking water?	Commercial/Pure it Filter=1 Stone based Layered Filter=2 Water boiled for 30 Minutes=3 No Purification=4	<input type="checkbox"/>
12	Is there any sewerage channel attached with the toilet/washroom of your house?	Yes=1 No=2	<input type="checkbox"/>

13	Is your house affected by flood during rainy season?	Yes=1 No=2	<input type="checkbox"/>
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Section C: Hand Washing Behavior & Prevalence

Sl. No.	Questions	Coding Categories	Code
1	Do you wash your hand before & after consume food?	Never=1 Sometimes=2 Every time=3	<input type="checkbox"/>
2	Do you wash your hand after using washroom?	Never=1 Sometimes=2 Every time=3	<input type="checkbox"/>
3	Do you wash fruits & vegetables before eating/cooking?	Never=1 Sometimes=2 Every time=3	<input type="checkbox"/>
4	What do you use for washing hand?	None=1 Bar Soap=2 Liquid Soap=3 Ashes or Others=4	<input type="checkbox"/>

Section D: Diarrheal Record

SL No.	Questions	Coding Categories	Code
1	When does your child affected by Diarrhea last time?	<input type="text"/> months before	
2	How many times your child affected by diarrhea in last 12 months?	<input type="text"/> times	
3	How many days he/she was sick on that occasion of Diarrhea?	<input type="text"/> days	
4	Where did you get the information about treatment on that time?	None=1 Internet=2 Local Medicine Shop=3 Doctor or Health Worker=4 Hospital Admission=5	<input type="checkbox"/>
5	What types of medicine you provide during diarrheal infection to your child?	Only Oral Saline=1 Only Rice Saline=2 Both Oral & Rice Saline=3 Antibiotic & Oral Saline=4 Only natural fruit Juice/Coconut water =5 None=6	<input type="checkbox"/>

6	What types of medicine you provide during diarrheal infection to your child?	<ol style="list-style-type: none">1. None2. Liquid/Soup3. Rice & Curry4. Resturents Food5. Other's	<input type="checkbox"/>
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আইডি নম্বরঃ

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শিশুদের মধ্যে ডায়রিয়াজনিত রোগ এবং তাদের সামাজিক ও জনতাত্ত্বিক অবস্থার
মধ্যে সংযোগের একটি ক্রস-বিভাগীয় গবেষণা

প্রশ্নমালা

প্রধান তদন্তকারী: মোঃ মিনহাজুল আবেদীন সুজন

শিক্ষার্থী আইডিঃ ১৮১-৩৪-৭২৬

পুষ্টি ও খাদ্য প্রকৌশল বিভাগ

ড্যাফোডিল ইন্টারন্যাশনাল ইউনিভার্সিটি

ঢাকা, বাংলাদেশ

অবহিত সম্মতি

অধ্যয়নের শিরোনাম: শিশুদের মধ্যে ডায়রিয়াজনিত রোগ এবং তাদের সামাজিক-জনসংখ্যাগত অবস্থার মধ্যে সংযোগের একটি ক্রস বিভাগীয় পরিদর্শন।

প্রধান তদন্তকারী: মোঃ মিনহাজুল আবেদীন সুজন।

প্রতিষ্ঠান: পুষ্টি ও খাদ্য প্রকৌশল বিভাগ, অ্যালাইড হেলথ সায়েন্সেস অনুষদ, ড্যাফোডিল ইন্টারন্যাশনাল ইউনিভার্সিটি, ঢাকা, বাংলাদেশ।

মোবাইল ০১৮৬২৮৬১৬১৮

ই-মেইল: minhazul34-726@diu.edu.bd

শিক্ষার্থী আইডি: ১৮১-৩৪-৭২৬

ড্যাফোডিল ইন্টারন্যাশনাল ইউনিভার্সিটি, বাংলাদেশ

প্রিয় অংশগ্রহণকারী,

আসসালামু আলাইকুম/আদাব, উক্ত চিঠি, ড্যাফোডিল ইন্টারন্যাশনাল ইউনিভার্সিটি, বাংলাদেশের অধীনে পুষ্টি ও খাদ্য প্রকৌশল বিভাগের পক্ষ থেকে আমাদের পরিচালিত একটি গবেষণায় অংশগ্রহণের বিষয়ে বিবেচনা করার জন্য একটি আমন্ত্রণ পত্র।

উদ্দেশ্য: শিশুদের মধ্যে ডায়রিয়াজনিত রোগ এবং তাদের সামাজিক ও জনতাত্ত্বিক অবস্থার মধ্যে সম্পর্ক অন্বেষণ করা।

ঝুঁকি: এই গবেষণায় একজন অংশগ্রহণকারী হিসাবে, আপনি কোন অপরিচিত বা অপ্রত্যাশিত বিপদের সম্মুখীন হবেন না। এই গবেষণায় অংশগ্রহণের মাধ্যমে আপনি শিশুদের মধ্যে ডায়রিয়াজনিত রোগ এবং চট্টগ্রাম শহরে তাদের সামাজিক ও জনতাত্ত্বিক অবস্থার মধ্যে সম্পর্ক আরও ভালভাবে বোঝার জন্য আমাদের সহায়তা করবেন।

বেনামী এবং গোপনীয়তা: আপনার প্রকাশ করা সমস্ত তথ্য সম্পূর্ণভাবে গোপন রাখা হবে। আপনার নাম এই গবেষণা থেকে আসা কোনো থিসিস বা রিপোর্টে প্রদর্শিত হবে না। যাইহোক, আপনার অনুমতি নিয়ে বেনামী উদ্ধৃতি ব্যবহার করা যেতে পারে, শুধুমাত্র এই প্রকল্পে কাজ করা গবেষকরা সংগৃহীত তথ্য উপলব্ধি করতে পারবেন।

সময়: এই অধ্যয়নটি আপনার সময়ের প্রায় 10 মিনিট সময় নেবে।

গবেষণায় অংশগ্রহণকারী হিসেবে আপনার অধিকার: আপনি এই গবেষণায় অংশ নিতে ইচ্ছুক কিনা তা সম্পূর্ণ আপনার উপর নির্ভর করে। অংশগ্রহণ না করার কিংবা যেকোনো মূহুর্তে অধ্যয়ন থেকে বেরিয়ে যাওয়ার সম্পূর্ণ অধিকার আপনার আছে। আপনি সাক্ষাৎকারের যেকোনো প্রশ্নের উত্তর দিতে অস্বীকার করতে পারেন, যদি আপনি উক্ত প্রশ্নের উত্তর দিতে অনিচ্ছুক থাকেন।

ক্ষতিপূরণ এবং অর্থপ্রদান: এই গবেষণায় আপনার অংশগ্রহণের জন্য আপনার কোন খরচ নেই। এই গবেষণায় অংশগ্রহণের জন্য আপনাকে কোনো আর্থিক ক্ষতিপূরণ দিতে হবে না।

অধ্যয়ন সংক্রান্ত প্রশ্ন: এই অধ্যয়নের প্রশ্নাবলী সম্পর্কে যদি আপনার কোন প্রশ্ন থাকে বা অংশগ্রহণের বিষয়ে সিদ্ধান্তে পৌঁছাতে আপনাকে সহায়তা করার জন্য অতিরিক্ত তথ্যের প্রয়োজন হয়, তাহলে অনুগ্রহ করে নির্দিধায় আমাকে জিজ্ঞাসা করুন।

তথ্যের ভবিষ্যৎ ব্যবহার: আমরা নিশ্চিত করছি যে এই গবেষণার তথ্য শুধুমাত্র গবেষণার জন্য ব্যবহার করা হবে।

অংশগ্রহণকারীদের সম্মতি: এই গবেষণা সম্পর্কিত আমার সমস্ত উদ্বেগ এবং প্রশ্নের উত্তর দেওয়া হয়েছে। আমি আমার নিজের ইচ্ছায় এই অধ্যয়নে অংশ নেওয়ার সিদ্ধান্ত নিয়েছি। এখানে আমার ইচ্ছুক স্বাক্ষর, উপরে উল্লিখিত সমস্ত শর্ত ও শর্তাবলীতে আমার গ্রহণযোগ্যতার নিশ্চয়তা প্রদান করে।

অংশগ্রহণকারীর স্বাক্ষর
তারিখঃ

সাক্ষাৎকার গ্রহণকারীর স্বাক্ষর
তারিখঃ

বিভাগ ক: সামাজিক-জনসংখ্যাগত বৈশিষ্ট্য

সিরিয়াল নম্বর.	প্রশ্ন	কোডিং বিভাগ	কোড
১	আপনার সন্তানের বয়স কত?	<input type="text"/> বছর	<input type="text"/>
২	আপনার সন্তানের লিঙ্গ পরিচয় কি?	ছেলে=১ মেয়ে=২ অন্যান্য=৯৯	<input type="text"/>
৩	আপনার বয়স কত?	<input type="text"/> বছর	<input type="text"/>
৪	আপনার শিক্ষাগত যোগ্যতা কি?	নিরক্ষর=১ প্রাথমিক শিক্ষা=২ মাধ্যমিক শিক্ষা=৩ উচ্চ মাধ্যমিক শিক্ষা=৪ স্নাতক বা আরও=৫	<input type="text"/>
৫	আপনার পেশা কি?	বেকার=১ শিক্ষার্থী=২ প্রাইভেট চাকুরী=৩ পাবলিক/সরকারি চাকুরি=৪ স্ব-নিযুক্ত=৫ শ্রম ভিত্তিক চাকুরী=৬	<input type="text"/>

		অন্যান্য (অনুগ্রহ করে উল্লেখ করুন)=৯৯	
৬	আপনার পরিবারের মাসিক আয় কত??(টাকা)	২০০০০এর কম=১ ২১০০০-৩০০০০=২ ৩১০০০-৪০০০০=৩ ৪১০০০-৫০০০০=৪ ৫০০০০ এর বেশি=৫	<input type="checkbox"/>
৭	অংশগ্রহণকারী কোন ধর্মের অনুসারী?	ইসলাম=১ হিন্দু=২ বৌদ্ধ=৩ খ্রিস্টান=৪ অন্যান্য=৯৯	<input type="checkbox"/>
৮	আপনার পরিবারে কতজন সদস্য বসবাস করেন?	<input type="text"/>	
৯	আপনার কতজন ছেলে-মেয়ে আছে?	<input type="text"/>	
১০	আপনি কোন ধরনের ঘরে বসবাস করেন?	কুঁড়েঘর = ১ টিনের চালা=২ ইটের দেয়াল সহ টিনের চালা=৩ অ্যাপার্টমেন্ট বিল্ডিং = ৪ অন্যান্য = ৯৯	<input type="checkbox"/>

বিভাগ-খঃ বাড়ি এবং টয়লেট সম্পর্কিত তথ্য

সিরিয়াল নম্বর	প্রশ্ন	কোডিং বিভাগ	কোড
১	আপনার পরিবার কি ধরনের টয়লেট ব্যবহার করে?	বর্জ্য নিষ্কাশন সুবিধা ছাড়া রিং স্ল্যাব পিট টয়লেট=১ বর্জ্য নিষ্কাশন সুবিধাসহ রিং স্ল্যাব পিট টয়লেট=২ আদর্শ স্যানিটারি সুবিধা সহ টয়লেট=৩ অন্যান্য = ৯৯	<input type="checkbox"/>
২	কত জন সদস্য একটি টয়লেট ব্যবহার করে?	<input type="text"/>	<input type="checkbox"/>
৩	সপ্তাহে কতবার টয়লেট পরিষ্কার করা হয়?	কখনো না=১ একবার=২ দুইবার=৩ তিনবার=৪ তিনবারের বেশি=৫	<input type="checkbox"/>
৪	আপনার মতে, আপনি টয়লেটের পরিচ্ছন্নতা ও পরিবেশকে কিভাবে বিচার করবেন?	খারাপ=১ মোটামুটি =২ ভালো=৩	<input type="checkbox"/>
৫	আপনার পরিবারের জন্য পানীয় জলের সরবরাহের উৎস কি?	ওয়াসা=১ নলকূপ=২ গভীর নলকূপ=৩ পরম্পরাগত পুকুর=৪ ব্যক্তিগত বৈদ্যুতিক পানির পাম্প=৫	<input type="checkbox"/>
৬	আপনার পরিবারের রান্নার জন্য জলের সরবরাহের উৎস কি?	ওয়াসা=১ নলকূপ=২ গভীর নলকূপ=৩ পরম্পরাগত পুকুর=৪ ব্যক্তিগত বৈদ্যুতিক পানির পাম্প=৫	<input type="checkbox"/>
৭	আপনি কি পানীয় জলের উৎসগুলো নিয়ে সন্তুষ্ট যা আপনি দৈনন্দিন জীবনে ব্যবহার করেন?	সন্তুষ্ট না=১ সন্তুষ্ট=২ অনেক সন্তুষ্ট=৩	<input type="checkbox"/>
৮	আপনার সন্তান দৈনিক কি পরিমাণ পানি পান করে?	<input type="text"/>	<input type="checkbox"/>
৯	আপনার পরিবারের পানীয় জলের উৎসের জন্য কোন ধরনের জলাধার ব্যবহার করেন?	কোনটিই না= ১ মাটির নিচের ট্যাঙ্ক=২ ছাদের উপরের প্লাস্টিকের ট্যাঙ্ক=৩ ছাদের উপরের ইট ওয়াল ট্যাঙ্ক=৪	<input type="checkbox"/>

		অন্যান্য (অনুগ্রহ করে উল্লেখ করুন)= ৯৯	
১০	আপনার পরিবারের সদস্যরা কোথায় গোসল করে?	পুকুর=১ শৌচালয়=২ উন্মুক্ত পানি সরবরাহের জায়গায়=৩ অন্যান্য=৯৯	<input type="checkbox"/>
১১	পানীয় জল বিশুদ্ধ করার জন্য আপনি কি ধরনের পদ্ধতি প্রয়োগ করেন?	বাণিজ্যিক/পিউর ইট ফিল্টার=১ পাথর ভিত্তিক স্তরযুক্ত ফিল্টার = ২ ৩০ মিনিট ফুটানো পানি=৩ শুদ্ধিকরণ নেই=৪	<input type="checkbox"/>
১২	আপনার বাড়ির টয়লেট/শৌচাগারের সাথে কোন পয়ঃনিষ্কাশন চ্যানেল আছে কি?	হ্যাঁ=১ না=২	<input type="checkbox"/>
১৩	আপনার বাড়ির চারপাশে কি বর্ষাকালে প্লাবিত হয়?	হ্যাঁ=১ না=২	

বিভাগ-গঃ হাত-ধৌতকরণ অভ্যাস সংক্রান্ত তথ্য

সিরিয়াল নম্বর	প্রশ্ন	কোডিং বিভাগ	কোড
১	আপনি ও আপনার সন্তান কি খাবার খাওয়ার আগে এবং পরে হাত ধৌত করেন?	কখনো না=১ মঝেমঝে=২ প্রতিবার=৩	<input type="checkbox"/>
২	আপনি ও আপনার সন্তান কি টয়লেট ব্যবহারের পর হাত ধৌত করেন?	কখনো না=১ মঝেমঝে=২ প্রতিবার=৩	<input type="checkbox"/>
৩	আপনি ও আপনার সন্তান কি কাঁচা ফল-মূল খাওয়ার পূর্বে ধৌত করেন?	কখনো না=১ মঝেমঝে=২ প্রতিবার=৩	<input type="checkbox"/>
৪	হাত ধৌত করার জন্য আপনি ও আপনার সন্তান কি ব্যবহার করেন?	কিছুনা=১ সাবান=২ তরল সাবান=৩ ছাই ও অন্যান্য =৪	<input type="checkbox"/>

বিভাগ-গঃ ডায়রিয়ায় সংক্রমন সংক্রান্ত পূর্ববর্তী তথ্য

সিরিয়াল নম্বর.	প্রশ্ন	কোডিং বিভাগ	কোড
১	আপনার সন্তান সর্বশেষ কবে ডায়রিয়াতে আক্রান্ত হয়েছিল?	<input type="text"/> মাস আগে	
২	গত ১২ মাসে আপনার শিশু কতবার ডায়রিয়ায় আক্রান্ত হয়েছে?	<input type="text"/> বার	
৩	ডায়রিয়ায় আপনার সন্তান কত দিন অসুস্থ ছিল?	<input type="text"/> দিন	
৪	ডায়রিয়াকালীন সময়ে চিকিৎসা সংক্রান্ত তথ্য কোথায় পেয়েছিলেন?	কোথাওনা=১ ইন্টারনেট =২ স্থানীয় ঔষদের দোকান=৩ ডাক্তার অথবা স্বাস্থ্যকর্মী =৪ হাসপাতালে ভর্তি হয়ে=৫	<input type="checkbox"/>
৫	আপনার শিশুকে ডায়রিয়া সংক্রমণের সময় আপনি কী ধরনের ওষুধ দিয়েছিলেন?	শুধুমাত্র ওরস্যালাইন=১ শুধুমাত্র চালের স্যালাইন=২ ওরস্যালাইন এবং চালের স্যালাইন উভয়ই = ৩ অ্যান্টিবায়োটিক ও ওরস্যালাইন=৪ শুধুমাত্র প্রাকৃতিক ফলের রস/নারকেলের জল =৫ কোনটিই নয় = ৬	<input type="checkbox"/>
৬	আপনার শিশুকে ডায়রিয়াজনিত সংক্রমণের সময় কি ধরনের খাবার দিয়েছিলেন?	১. কোনটিই না ২. সুপ/তরল জাতীয় খাবার ৩. ভাত ও তরকারী ৪. রেস্তুরেন্ট এর খাবার ৫. অন্যান্য	