

Implications of sanitation environment on women's health: a case on railway slum of Khulna city in Bangladesh

Farhana Hoque, Md. Ayatullah Khan and Israt Jahan Preya

Development Studies Discipline, Khulna University-9208, Bangladesh

☑ Article received: 05.06.2022; Revised: 21.08.2022; First published online: 01 September, 2022.

Article Information

Key Words:

Sanitation environment,
Urban slum, Women's
Health, Physical and
psychological issue

Access by Smart Phone



For any information:
farhanahoque@ku.ac.bd

ABSTRACT

Sanitation is a multidimensional concept, mainly including providing service for clean water and safe disposal of human excreta, drainage and waste management. The researcher of the study aims to find out the existing condition of the sanitation environment and women's health issues for the implication of the sanitation environment. For this purpose, the researcher used the Khulna railway slum informal settlement of Khulna city as the study area and identified the sample size through convenience sampling as the study is explanatory. Under convenience sampling, 134 respondents were surveyed through a face-to-face interview. Through the study, the researcher learns about the existing sanitation environment through the present condition of sanitary facilities, drainage facilities, water facilities and waste management facilities. Furthermore, the sanitation environment is a significant concern in the slums. Because of the poor sanitation environment, the slum women are getting sick. They face physical health issues like cold and cough, diarrhoea, skin disease and urinary tract infection. Moreover, they also experience psychological health issues like depression, loss of sleep and losing confidence. In addition, women experience health issues during pregnancy (eating disorders, weakness, nausea, shortness of breath, back pain, sleep disorder, depression and anxiety disorder) and menstruation period (stomach pain, mood swing, excessive bleeding, rash at external genitalia).

Citation: Hoque, F., Khan, M. A. and Preya, I. J. (2022). Implications of sanitation environment on women's health: a case on railway slum of Khulna city in Bangladesh. *Journal of Science, Technology and Environment Informatics*, 12(01), 775-785. Crossref: <https://doi.org/10.18801/jstei.120122.78>

© 2022, Hoque et al. This is an open access article distributed under terms of the Creative Common Attribution 4.0 International License.

I. Introduction

Bangladesh, located in Asia and the Pacific, has a large population. An estimated 55.1% of the world's almost 163 million people reside in urban slums. Khulna is Bangladesh's third-largest city and second-busiest entrance port. Some people call it "the industrial city," and that's a name it goes by. According to the Structure Plan, Master Plan and Detailed Area plan (2001-2020) for Khulna City, 2002, the population of Khulna City Corporation (KCC) rose from 6,63,000 in 1991 to 1,400,689 by the end of 2007. Khulna's informal settlements are still a popular place for migrants to call home, despite the city's rapid urbanisation during the '50s and '60s due to industrial expansion and rural-urban migration. Presently, over 19.5% of cities' total populations reside in unofficial neighbourhoods (Nobi, 2021). The city of

Khulna is largely unorganised and illegal, which raises several issues such as improper access, a lack of basic services facilities, improper alignment and zoning issues. Khulna is home to a sizable population that is almost likely unable to afford a comfortable standard of living. Many of these people are employed in various informal or micro, small and medium-sized businesses. As a result, they have little choice but to make their homes in slums and squatter communities, far from any basic urban amenities or infrastructure (Tanni et al., 2014).

Sanitation is essential to human well-being, contributing to longer lives, stronger economies and fewer diseases (Telmo, 2002). At this point in the 21st century, providing urban sanitation services to all people residing in urban areas is the world's top priority. Despite the efforts of many governments and non-government groups worldwide, 2.4 billion people still lack access to adequate sanitation, which is a major barrier to achieving sustainable urban growth (Telmo, 2002). The situation is particularly dire in underdeveloped nations like Bangladesh, where only about 57% of urban residents have access to toilets (Group, 2016). Diseases like diarrhoea, cholera, dysentery, dengue, anopheles bites, asthma, coughs and more are common in slum dwellers. Men and women living in slums are vulnerable to environmental dangers that can transmit to anyone who comes into contact with them (Alam et al., 2013). Because people in the city rely on the services provided by those living in slums, particularly women for domestic work and men for rickshaw pulling, day labour and other jobs, slum dwellers are more likely to contract diseases including typhoid and cholera, as well as cancer and HIV/AIDS (Nobi, 2021).

With a population of over 1.5 million, Khulna is the third largest city in Bangladesh. The municipality was founded in 1884, when the city was still under British colonial rule and the city was officially recognised as a town. Khulna City Corporation (KCC) is home to around 1134 slums or 8.14 percent of the city's total area and they have a very poor sanitation system (BBS, 2015). People living in slums have a low standard of living because they lack a formal identity, secure housing, official recognition from the government and other essential amenities found in regular urban neighbourhoods (Wankhade, 2015). Sanitation services are being provided in many urban slums by the Khulna City Corporation (KCC) and other non-governmental organisations (NGOs) as part of separate sanitation programmes. However, sanitation efforts don't always succeed and fall short of slum residents' hopes and expectations. For example, the houses of the Railway slum, one of Khulna city's largest slums, rely on the community sanitary latrines given by NGOs like Water Aid, Notebook, etc., because individual sanitary latrines are extremely rare to find. The sanitation environment fails to meet the needs of slum dwellers for a variety of reasons, including a lack of resources, skilled human resources and new technology, corruption, nepotism, a lack of coordination, etc. As a result, slums' sanitation status deteriorates, posing a threat to the health and quality of life in the surrounding urban area (Alam and Mondal, 2019). In light of the foregoing, the study's goal is to assess how women implement current sanitation practices and how they affect women's physical and physiological health.

II. Materials and Methods

Study area

One of the important divisional city corporations of Bangladesh is Khulna City Corporation (KCC), a part of Khulna Municipality since its founding in 1884. KCC has a total area of 40.79 sq km and is situated between latitudes 24°45' and 24°54' north and 89°28' and 89°35' east (Figure 01). In KCC, administrative ward number 21, the Bhairav River banks are home to the densely populated slum known as Railway Slum. Upper Jessore Road is on the east side of the slum, the Bhairav River is on the west, Khalishpur is on the north and the railway station and BIWTA ghat are on the south. 476 homes, or among the 1980 inhabitants of Khulna city, reside in slums. Of these, 980 are women (BBS, 2015). But the slum's sewage is in terrible shape. Khulna City Corporation, along with several NGOs, offers community-based sanitation services in the city's Railway slum to enhance the sanitation system.

Unit of analysis and population

The only female (>15 years) who is living in the Khulna railway slum was selected as the unit of analysis of the study. So, the total number of females was accounted for as the population of this study.

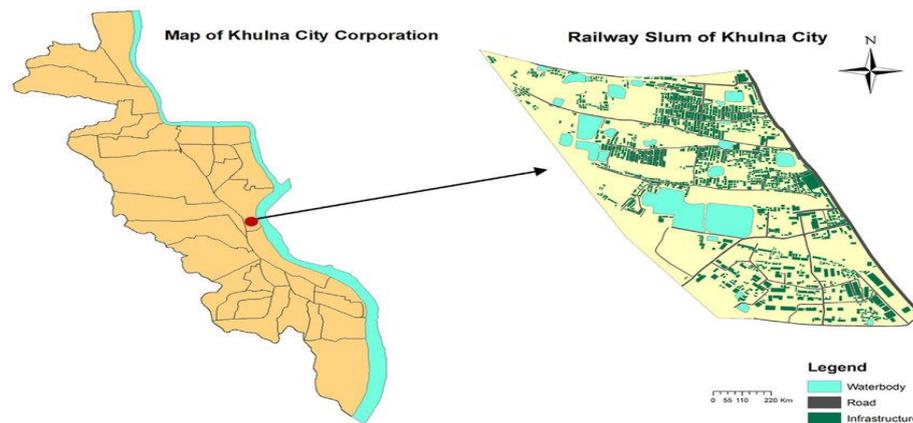


Figure 01. Study area of Khulna railway

Sampling procedure and sampling size

The sample for this study was collected from the railway slum area. The area was selected purposively. The convenience sampling method was used to collect data from the field as the study population is known. A convenience sample is a non-probability sampling method where the sample is taken from a group of people easy to contact or reach. This study followed a simplified formula known as Yamane's rule of sample size determination for sample size determination (1967). The formula was used in the following way.

$$\begin{aligned}
 n &= \frac{N}{1+N(e)^2} \\
 &= \frac{980}{1+980(0.08)^2} \\
 &= \frac{980}{1+6.272} \\
 &= \frac{980}{7.272} \\
 &= 134.7634 \\
 &= 134
 \end{aligned}$$

Here,

n = sample size; N = total population (980); e = margin of error (0.08)

Data collection

Data were collected through an interview schedule. An interview schedule was designed for this study. Interview schedule, a method of collecting social data at the individual level which ensures a higher response, is very useful in extensive inquiries and can lead to fairly reliable results (Kothari, 2004). Therefore, this study used an interview schedule to collect quantitative data for statistical analysis.

Processing and analysis of data

After collecting all the data, it was processed and analyzed using SPSS and Microsoft Excel. Then the data was presented in tables, figures, graphs, and charts as well as a written script.

III. Results

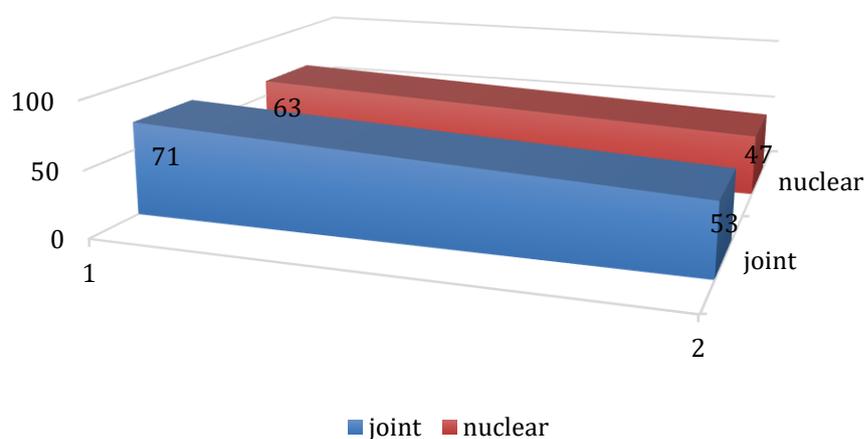
Demographic information of the respondents

Age of the respondents: Different age groups are selected for this study. These age groups are mainly categorized into three groups. Table 01 shows that the dominants of below 30 age groups participate in the study, representing 61.2% of the total respondents. The rest of the respondents belong to 29.1% of 31-50 and above 50 age group are 9.7%. The mean of the respondent group is 30.15 and the standard deviation is 10.94.

Family type of respondents: In this study, nuclear family means the family with below or equal to 5 members and extended family means the family with above 5 members. Figure 02 represents that most families tend to live in an extended family, around 53%, including 71 families, are a joint family and the rest, 47 percent, including 63 families are nuclear. Most of the families are joint.

Table 01. Age of the respondents

Age	Frequency	Percent
Young (≥ 30)	82	61.2
Middle (31-50)	39	29.1
Older (> 50)	13	9.7
Total	134	100.0
Mean = 30.15	Standard Deviation = 10.94	

**Figure 02. Family type of respondents**

Educational status: Table 02 shows that only 9.7 percent of the respondents have a tertiary level of education and 35.8 percent have a secondary level of education. 29.1 percent of the respondents have a primary level of education and 25.4 percent have no formal education.

Table 02. Educational status

Educational situation	Frequency	Percent
No schooling	34	25.4
Primary (1-5)	39	29.1
Secondary (6-10)	48	35.8
Tertiary (11-21)	13	9.7
Total	134	100.0
Mean = 1.30	Standard Deviation = 0.958	

Total income status: Data in Table 03 represents the distribution of the total household income of respondents. The highest 51.5 percent of households have low income (BDT below-10000) and the lowest 7.5 percent of households belong to the high-income group (BDT 10001-15000) and 41.0 percent of households have medium income (BDT 10001-15000).

Table 03. Total income status

Total income	Frequency	Percent
Lower (0-10000)	69	51.5
Middle (10001-15000)	55	41.0
Higher (15001-20000)	10	7.5
Total	134	100.0
Mean = 0.56	Standard Deviation = 0.631	

Sanitation environment

Type of defecation place: Figure 03 shows the types of defecation places used by respondents in the Khulna Railway slum. 41.0 percent of household members used septic tanks and 39.6 percent used water-sealed/slabs 16.4 percent of households used open pit latrines. Even today, in the time of modernization, 3.0 percent of households used hanging latrines. Most of the septic tank latrines are mainly community-based latrines.

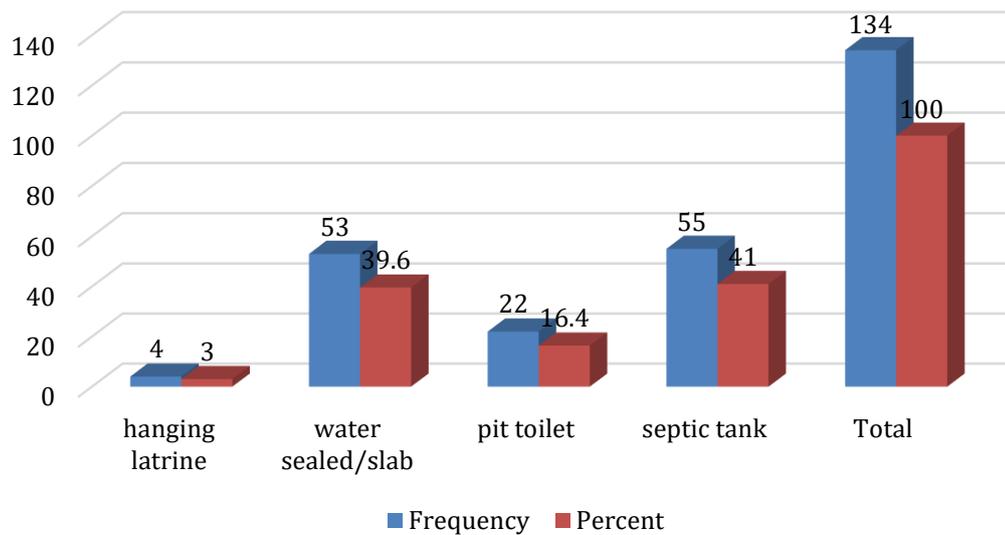


Figure 03. Type of defecation

Water sources: Table 04 shows the source of water for respondents. 75.4 percent of respondents use tube well water. This table also reveals that 21.6 percent of respondents use to supply water and 53.7 percent use ponds for water.

Table 04. Water sources

Indicator	Status	Frequency	Percent
Water source tube-well	No	33	24.6
	Yes	101	75.4
Water source supply	No	105	78.4
	Yes	29	21.6
Water source pond	No	62	46.3
	Yes	72	53.7

Drainage System: Figure 04 reveals the drainage system in the Greenland slum. Here poor drainage system is 97.0 percent and a well-planned drainage system is only 3.0 percent. Most of the drainage system is poor in this area.

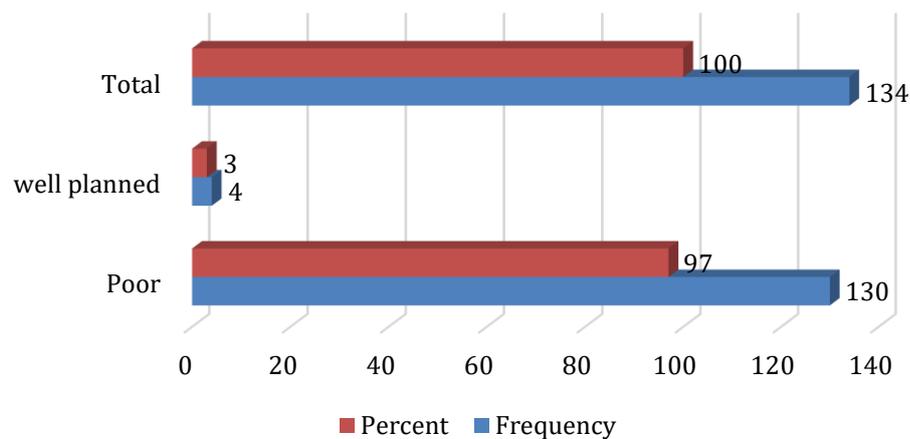


Figure 04. Drainage system of study area

Waterlogging: Figure 05 represents that 65.7 percent of respondents face water logging problems and the rest of only 34.3 percent of respondents don't have water logging problems. Waterlogging is a big issue in this area. Of this problem people of this area suffer the most.

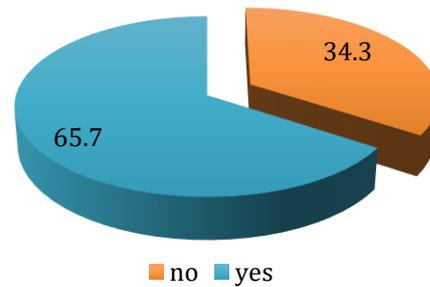


Figure 05. Waterlogging problem

Solid waste disposal: Figure 06 presents that 42.5 percent of respondents used community dustbins for solid waste disposal and 49.6 percent used the open fields for solid waste disposal. Of the rest of the respondents, 14.9 percent burnt solid waste in open and 3 percent used open-drain facilities. The solid waste disposal system is poor in this area.

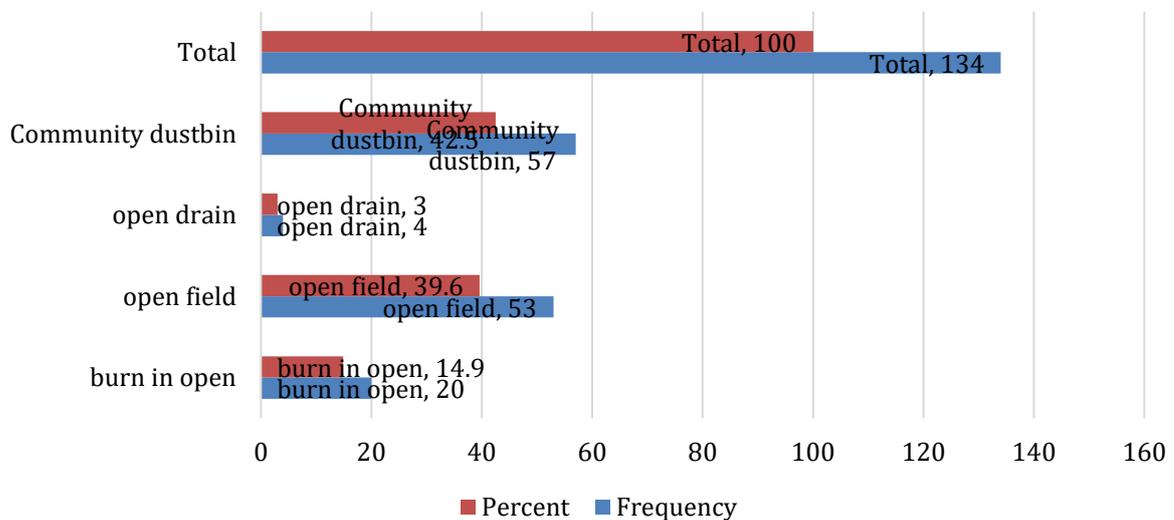


Figure 06. Solid waste disposal condition in study area

Separate latrine for women: Figure 07 reveals the present situation of separate latrines for women. The majority part 66.4 percent of women don't have a separate latrine and the rest 33.6 percent of women have separate latrines but most of them are community latrines.

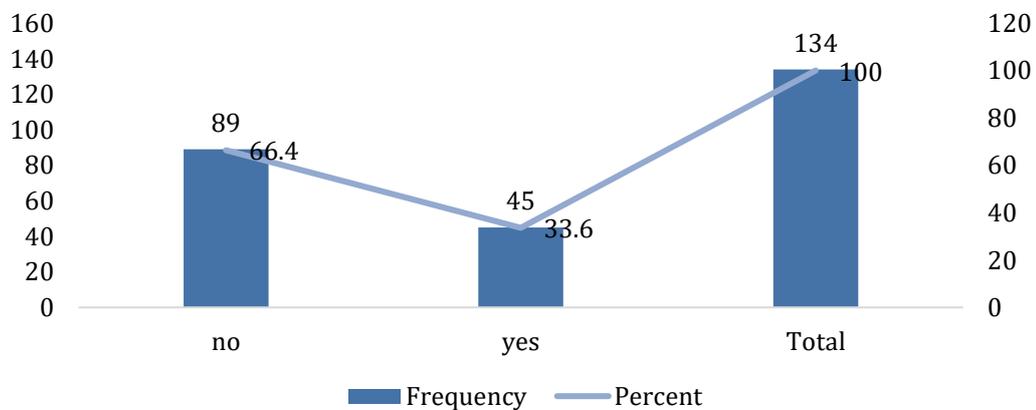


Figure 07. Separate latrine for women

Sanitation facility status: Figure 08 reveals that 63.4 percent of respondents have unimproved sanitation facility status and the rest 36.6 percent have improved sanitation facilities. It represents that the sanitation facility is poor in this slum. Only 36.6 percent agreed about improved sanitation. But they

thought that sanitation conditions improved because the present condition of sanitation is better than the past condition. In reality who agrees that the sanitation environment improved mainly used septic tank defection (community-based).

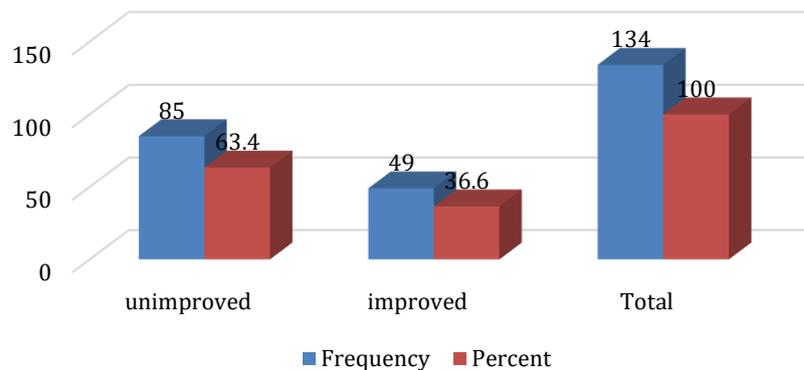


Figure 08. Sanitation facility status

Water shortage: Figure 09 reveals the water shortage problem experienced by respondents. The majority part 90.1 percent faced water shortage and the rest of 9.1 percent don't face shortage of water

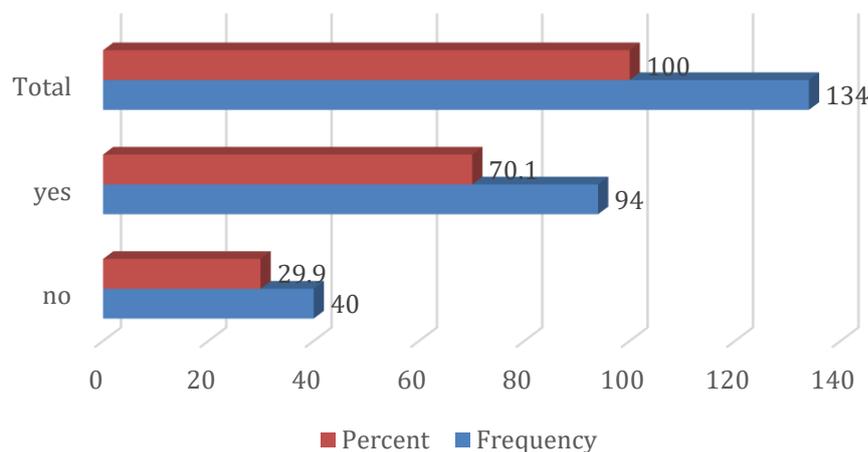


Figure 09. Water shortage

Association between sanitation facilities and experience of diseases: Table 05 examines the relationship between the present condition of sanitation facilities and the experience of diseases of respondents. It can be found that 10.4 percent of the respondents who are not infected with cold and cough belong to unimproved sanitation facilities. Results showed that 1.5 percent of the respondents who are not infected with cold and cough belong to the improved condition of sanitation facilities. On the other hand, the table also shows that 53 percent of respondents living in an unimproved sanitation facility are infected with colds and coughs, and 35.1 percent of respondents have been infected with colds and coughs that belong to the improved condition of sanitation facilities. The finding represents that cold and cough are highly associated with sanitation facilities and the difference is statistically significant ($\chi^2 = 4.537, P < 0.033^*$).

Moreover, Table 05 represents the relationship between present sanitation facilities and diarrhoea. From the table, it can be found that 30.6 percent of the respondents who are not infected with diarrhoea belong to the unimproved condition of sanitation facilities. The table also shows that 24.6 percent of the respondents who are not infected with diarrhoea belong to the improved sanitation facilities. On the other hand, 32.8 percent of respondents living in unimproved sanitation facilities are infected with diarrhoea and 11.9 percent of respondents have been infected with diarrhoea that belongs to the improved sanitation facilities. The finding represents that diarrhoea is highly associated with sanitation facilities and the difference is statistically significant ($\chi^2 = 4.591, P < 0.032^*$).

Table 05. Association between sanitation facilities and experience of diseases

Variables	Unit	Sanitation facility status		χ^2 (df)	P-value
		Unimproved n (%)	Improved n (%)		
Cold and cough	No	14 (10.4%)	2 (1.5%)	4.537 (1)	0.033*
	Yes	71 (53.0%)	47 (35.1%)		
Diarrhea	No	41(30.6%)	33(24.6%)	4.591 (1),	0.032
	Yes	44(32.8%)	16(11.9%)		
Skin disease	No	74(55.2%)	46(34.3%)	1.545 (1)	0.214
	Yes	11(8.2%)	3(2.2%)		
Urinary tract infection	No	73(54.5%)	49(36.6%)	7.598 (1)	0.006
	Yes	12(9.0%)	0(0.0%)		

In addition, [Table 05](#) represents the relationship between present sanitation facilities and skin disease. 55.2 percent of the respondents who are not infected with skin disease belong to the unimproved condition of sanitation facilities. While, 34.3 percent of the respondents who are not infected with skin disease belong to the improved condition of sanitation facilities. On the other hand, the table also shows that 8.2 percent of respondents who are living in an unimproved condition of sanitation facilities are infected with skin disease and 2.2 percent of respondents have been infected with skin disease that belongs to the improved condition of sanitation facilities. The finding represents that skin disease is not associated with sanitation facilities and the difference is statistically insignificant ($\chi^2 = 1.545$, $P < 0.214$). Furthermore, [Table 05](#) represents the relationship between present sanitation facilities and urinary tract infection. 54.5 percent of the respondents who are not infected with urinary tract infection belong to the unimproved condition of sanitation facilities. The table also shows that 36.6 percent of the respondents who are not infected with urinary tract infection belong to the improved condition of sanitation facilities. On the other hand, 9.0 percent of respondents who are living in an unimproved condition of sanitation facilities are infected in urinary tract infection and 0.0 percent of respondents have been infected in urinary tract infection that belongs to the improved condition of sanitation facilities. The finding represents that urinary tract infection is highly associated with sanitation facilities and the difference is statistically significant ($\chi^2 = 7.598$, $P < 0.006^{**}$).

Association between sanitation facilities and experience of mental health problems: [Table 06](#) examines the relationship between the present condition of sanitation facilities and the experienced mental health problems of respondents. From the table, it can be found that 25.4 percent of the respondents who are not experienced depression belong to the unimproved condition of sanitation facilities. The table also shows that 21.6 percent of the respondents who are not experienced depression belong to the improved condition of sanitation facilities. On the other hand, the table also shows that 38.1 percent of respondents who are living in an unimproved condition of sanitation facilities experienced depression, and 14.9 percent of respondents have experienced depression that belongs to the improved condition of sanitation facilities. The finding represents that depression is highly associated with sanitation facilities and the difference is statistically significant ($\chi^2 = 4.592$, $P < 0.032^*$). [Table 06](#) also examines the relationship between the present condition of sanitation facilities and the loss of sleep problems of respondents. From the table, it can be found that 27.6 percent of the respondents who have not experienced the loss of sleep belong to the unimproved condition of sanitation facilities. The table also shows that 18.7 percent of the respondents who have not experienced the loss of sleep belong to the improved condition of sanitation facilities. On the other hand, the table also shows that 35.8 percent of respondents who are living in an unimproved condition of sanitation facilities experienced a loss of sleep, and 14.9 percent of respondents have experienced the loss of sleep that belongs to the improved condition of sanitation facilities. The finding represents that loss of sleep is not associated with sanitation facilities and the difference is statistically insignificant ($\chi^2 = 0.702$, $P < 0.402$).

Additionally, relationship between the present condition of sanitation facilities and the losing confidence of respondents ([Table 6](#)), it indicate that 48.5 percent of the respondents who are not experienced losing confidence in belong to the unimproved condition of sanitation facilities. While 35.1 percent of the respondents who are not experienced losing confidence belong to the improved condition of sanitation facilities. On the other hand, 14.9 percent of respondents who are living in an unimproved condition of sanitation facilities experienced losing confidence and 1.5 percent of respondents have experienced

losing confidence that belongs to the improved condition of sanitation facilities. The finding represents that losing confidence is highly associated with sanitation facilities and the difference is statistically significant ($\chi^2 = 8.567, P < 0.003^{**}$). In case of the relationship between the present condition of sanitation facilities and the feeling unhappy of respondents, 44.0 percent of the respondents who are not experienced feeling unhappy belong to the unimproved condition of sanitation facilities. The table also shows that 32.1 percent of the respondents who are not experienced feeling unhappy belong to the improved condition of sanitation facilities. On the other hand, the table also shows that 19.4 percent of respondents who live in an unimproved condition of sanitation facilities experienced feeling unhappy and 4.5 percent of respondents have experienced feeling unhappy that belongs to the improved condition of sanitation facilities. The finding represents that feeling unhappy is highly associated with sanitation facilities and the difference is statistically significant ($\chi^2 = 5.753, P < 0.016^*$).

Table 06. Association between sanitation facilities and experience of mental health problems

Variables	Unit	Sanitation facility status		χ^2 (df)	P-value
		Unimproved n (%)	Improved n (%)		
Depression	No	34(25.4%)	29(21.6%)	4.592 (1)	0.032*
	Yes	51(38.1%)	20(14.9%)		
Loss of sleep	No	37(27.6%)	25(18.7%)	0.702 (1)	0.402
	Yes	48(35.8%)	24(17.9%)		
Losing confidence	No	65(48.5%)	47(35.1%)	8.567 (1)	0.003**
	Yes	20(14.9%)	2(1.5%)		
Feeling unhappy	No	59(44.0%)	43(32.1%)	5.753 (1),	0.016*
	Yes	26(19.4%)	6(4.5%)		

Correlation between sanitation environment and physical health and mental health

Sanitation environment and its impact on physical health: Table 07 demonstrates the correlation analysis between the sanitation environment and its impact on physical health including (cold and cough, diarrhea, skin disease, and urinary tract infection). The results indicate that cold and cough are positively related to the present condition of the sanitation environment ($R = 0.184, P < 0.033^*$). Moreover, diarrhea is statistically significant ($R = -0.185, P < 0.032^*$) and negatively related to the present condition of the sanitation environment. Skin disease ($R = -0.107, P < 0.217$) also negatively correlated with present condition of sanitation facilities. In addition, the result suggested a negative association between urinary tract infection and the present condition of the sanitation environment which is statistically significant ($R = -0.238, P < 0.006^{**}$).

Table 07. Sanitation environment and its impact on physical health

Disease experienced	Sanitation facility	
	R	p-value
Cold and cough	0.184	0.033*
Diarrhea	-.185	.032*
Skin disease	-.107	.217
Urinary tract infection	-.238	.006**

Sanitation environment and its impact on mental health: Table 08 depicts the correlation analysis between the sanitation environment and its impact on mental health, including (depression, loss of sleep, losing confidence, and feeling unhappy). The correlation analysis shows that depression is negatively related to the present condition of the sanitation environment, which is statistically significant ($R = -0.185, P < 0.032^*$). Moreover, feeling unhappy which is statistically significant ($R = -0.207, P < 0.016^*$) is negatively related to the present condition of the sanitation environment. Loss of sleep ($R = -0.072, P < 0.406$) also negatively correlated with the present condition of sanitation facilities. In addition, the result suggested a negative association between losing confidence and the present condition of the sanitation environment, which is statistically significant ($R = -0.207, P < 0.003^{**}$).

Table 08. Sanitation environment and its impact on mental health

Mental health problem	Sanitation facility	
	R	P-value
Depression	-.185	.032*
Loss of sleep	-.072	.406
Losing confidence	-.253	.003**
Feeling unhappy	-.207	.016*

IV. Discussion

Due to the poor sanitation environment, including safe drinking water facility, sanitation facility, drainage and waste management facility, the women in the study area face physical health issues and psychological health issues. Contamination in urban slums contributes to high rates of cholera, typhoid fever, dysentery and intestinal parasites along with this, evidence suggested that women most use traditional unhygienic latrines nevertheless 30% of women employ proper hygienic latrines (Nobi, 2021). So, they suffer from Diarrhea, Gastric ulcers, Anaemia, Cough, etc., in railway slums. The above findings also examine the relationship between the present condition of sanitation facilities and the experience of diseases of women. The researchers found that 53 percent of respondents living in an unimproved condition of sanitation facilities are infected with cold and cough represents that cold and cough are highly associated with sanitation facilities and the difference is statistically significant ($P < 0.033^*$). The study findings also represent the relationship between present sanitation facilities and diarrhoea. Most of the women who are living in unimproved conditions of sanitation facilities are infected with diarrhoea which is highly associated with sanitation facilities and the difference is statistically significant ($P < 0.032^*$). Most of the respondents were infected with these diseases. Despite having limited access to basic amenities like clean water to drink and sanitary facilities, those living in slums frequently work in vital service industries crucial for city dwellers (Alam et al., 2013).

There is also a growing awareness of the primary health risks to women and girls posed by poor sanitation, such as increased maternal mortality due to unsanitary birthing practises and inadequate infection control (Mudey et al., 2010). Other studies have also found that women are more likely to suffer from urinary tract infections (Mudey et al., 2010), urinary incontinence, and chronic constipation (Fisher, 2006). The Khulna railway sum study also represents the relationship between present sanitation facilities and urinary tract infection. Also found that 9.0 percent of respondents living in an unimproved condition of sanitation facilities are infected in urinary tract infection, and respondents who have the improved condition of sanitation facilities were not infected in urinary tract infection cause their percentage is 0.0. The finding represents that urinary tract infection is highly associated with sanitation facilities and the difference is statistically significant ($P < 0.006^{**}$).

Women's mental health is affected when public restrooms are difficult to reach (Caruso et al., 2018). Poor sanitation was linked to feelings of worry, melancholy and distress, while having easy access to latrines was connected with higher rates of happiness. The current findings additionally investigate the connection between the state of sanitation facilities and women's reported mental health issues, finding that 38.1% of respondents residing in unimproved sanitation facilities have experienced depression. The finding represents that depression is highly associated with sanitation facilities. The finding also represents that losing confidence is highly associated with sanitation facilities and the difference is statistically significant. Moreover, the study reveals the relationship between the present condition of sanitation facilities and the feeling unhappy of women.

V. Conclusion

Poor sanitation infrastructure disproportionately affects women and girls, negatively harming their psychological and physical health. This study depicts significant sanitation-related physical and psychological health difficulties faced by women at various phases of life in urban slums, rural and indigenous communities, and the Khulna railway slum. The description of a range of sanitation practises should persuade policymakers that sanitation extends beyond the four walls of a latrine. Women's health and sanitation are linked since they spend more time in slums. When establishing gender-sensitive

sanitation policies and initiatives, a broader picture of sanitation and open defecation is required, including an awareness of the physical and psychosocial impact of environmental, social, and sexual stresses and women's varied risk profiles. Furthermore, the Delhi Summit on Water and Sanitation in 2008 proclaimed that guaranteeing safe water and sanitation for 1000 million people in the eight South Asian countries by 2012 was unavoidable. As a founding member of the South Asian Regional Cooperation (SARC), Bangladesh has prioritised safe water and sanitation services. As a result, the findings of this study have significant policy implications that could assist shape the focused policy of guaranteeing water and sanitation facilities in the country, which will benefit women's health, particularly those living in slum regions. The government should enhance the slums' living conditions by providing adequate water and sanitation. Introducing this service could lower the government's expense of providing free treatment in government hospitals. Because of their reliance on slum inhabitants for their services, society might contribute to managing this facility as a social and moral obligation. Society may also help to raise awareness about cleanliness, the environment, and women's health. Finally, separate restrooms and safe disposal sites should be constructed to provide privacy and dignity.

References

- [1]. Alam, M. S. and Mondal, M. (2019). Assessment of sanitation service quality in urban slums of Khulna city based on SERVQUAL and AHP model: A case study of railway slum, Khulna, Bangladesh. *Journal of Urban Management*, 8(1), 20–27.
- [2]. Alam, M. Z., Rahman, M. A. and Firoz, M. A. (2013). Alam, M. Z., & Firoz, M. A. R., Md. Abdullah Al. (2013). Water Supply and Sanitation Facilities in Urban Slums: A Case Study of Rajshahi City Corporation Slums. *American Journal of Civil Engineering and Architecture*, 1(1), 1-6.
- [3]. Bangladesh Bureau of Statistics (BBS). (2015). S Census of slum areas and floating population programme 2014. <http://203.112.218.65:8008/WebTestApplication/userfiles/Image/Slum/FloatingPopulation2014.pdf>
- [4]. Caruso, B. A., Cooper, H. L. F., Haardörfer, R., Yount, K. M., Routray, P., Torondel, B. and Clasen, T. (2018). The association between women's sanitation experiences and mental health: A cross-sectional study in Rural, Odisha India. *SSM - Population Health*, 5, 257-266. <https://doi.org/10.1016/j.ssmph.2018.06.005>
- [5]. Fisher, J. (2006). For Her It's the Big Issue: Putting Women at the Centre of Water Supply, Sanitation and Hygiene. Water Supply and Sanitation Collaborative Council (WSSCC). International Environment House, 9 Chemin des Anémones, 1219 Châtelaine, Geneva, Switzerland.
- [6]. Group, W. B. (2016). Digital Dividends: World Development Report 2016. The World Bank 1818 H Street NW, Washington DC.
- [7]. Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. 2nd Edition, New Age International Publishers, New Delhi.
- [8]. Mudey, A., Kesharwani, N., Mudey G. and Goyal, R. (2010). A cross-sectional study on awareness regarding safe and hygienic practices amongst school going adolescent girls in rural area of Wardha district, India. *Global Journal of Health Sciences*, 225-231. <https://doi.org/10.5539/gjhs.v2n2p225>
- [9]. Nobi, M. N. (2021). Willingness to Pay to Prevent Water and Sanitation-Related Diseases Suffered by Slum Dwellers and Beneficiary Households: Evidence from Chittagong, Bangladesh.
- [10]. Tanni, T. T., Hasan, M. J., Azad, A., and Bakali, B. (2014). State of the Environment in Slum Area: A Case Study on Khora Slum, Khulna. *Journal of Environmental Science and Natural Resources*, 7(1), 295–304. <https://doi.org/10.3329/jesnr.v7i1.22187>
- [11]. Telmo, A. C. (2002). A water supply and sanitation study of the village of Gouansolo in Mali, West Africa. MS Thesis. Michigan Technological University, USA
- [12]. Wankhade, K. (2015). Urban sanitation in India: key shifts in the national policy frame. *Environment and Urbanization*, 27(2), 555–572. <https://doi.org/10.1177/0956247814567058>