

## **AN ASSESSMENT OF HEALTH HAZARDS AND AWARENESS OF WASTE PICKERS: A CASE STUDY OF MATUAIL SANITARY LANDFILL OF DHAKA CITY**

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### **Abstract**

Waste picking is one of the most accessible means of livelihood for the impoverished in Bangladesh as it requires minimal skills, knowledge or capital investment. Waste pickers work in health threatening environment for survival. Health problems are one of the major hazardous risks for waste pickers. This study aims to assess the health hazards and to examine the health awareness among the waste pickers in the study area. The present study was conducted in Matuail Sanitary Landfill, the largest dumping site for Dhaka, Bangladesh. Questionnaires, Focus Group Discussion (FGD), Key Informal Interview (KII) and field observation were the techniques used to obtain data and information. About 200 waste pickers were selected from study site with the combination of male and female. MS Excel and SPSS tools were used for statistical analysis and map was created using the ArcGIS software. The result reveals that waste pickers face various health problems like injury, itching, skin diseases, cough and cold, anemia, joint pain, back pain, headache, fever, stomach pain and asthma that they suffer from more than one week. They are affected by these types of disease for not practicing good sanitation and hygiene system. Most of them are dependent on self-treatment because of their low income. They are more careless about their drinking water, sanitation and hygiene system. To overcome the various problems related to sanitation and hygiene, various measures are required to improve conditions and opportunities of the waste pickers. This study will be helpful for policymakers and administrator to develop effective measures and safety guidelines for protecting the health of waste pickers.

**Key words:** *Sanitary landfill, Sanitation system, Hygiene practices, Health diseases, Safety guidelines.*

### **Introduction**

Health hazards are considered chemical, physical or biological factors in our environment that can have adverse impacts on our short- or long-term health (Rushton, 2003). A health hazard occurs when material contaminated with  $\alpha$ -emitting radionuclide is eaten or

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inhaled, or otherwise absorbed inside the body, so that organs and tissues more sensitive than skin are exposed to  $\alpha$  radiation (Peirce *et al.*, 1998). Waste pickers are highly vulnerable to health hazards (Uddin & Gutberlet, 2018). Health hazards include exposure to harmful gases, cardiovascular degeneration, musculoskeletal disorders, infections, skin problems and respiratory system problems (Tiwari, 2008). Waste pickers are those who forage the waste dumpsites searching for the hidden treasure in the waste (Wachukwu *et al.*, 2010). They are in the lowest level of the waste recycling system and considered one of the key stakeholders in the informal recycling sector in the solid waste management system (Uddin & Gutberlet, 2016). The waste pickers face a whole range of health hazards such as insect bite to major health concerns such as bronchitis, hepatitis, and physical injury (Parveen & Faisal, 2005). Waste picking is one of the most dangerous activities where waste pickers exposed to unfriendly weather conditions, enclosed by stray animals, contagious solid waste and spoil wastage of food items that may cause different health diseases of waste pickers (Niloufer *et al.*, 2013). It is the big challenge in solid waste management to deal with this informal sector to promote their living conditions, working environment as well as skill in recycling in developing countries (Wilson *et al.*, 2006). An estimated million scavengers in developing countries are involved in the sanitation of our surroundings. The working environment of these workers is unchanged for over a century (Tiwari, 2008). Waste picker worked throughout the year except during extreme winters and rainy season (Barki & Manhas, 2013). Waste picking is one of the inferior economic activities in the informal sector. Generally, as an informal workers, waste pickers status are very low compared to the formal workers in terms of employment security and working conditions (Ludermir & Lewis, 2003).

In the developing countries informal recycling system works along with the formal municipal waste management system. Waste pickers buy recyclable material, for example, paper, plastic, glass and old clothes from home, thus restraining these things from dumping (Wee, 2004 & Wee, 2005). It is estimated that 10% of the municipal wastes are removed by waste pickers of Mexico (Bartone *et al.*, 1991). Similarly, the informal collection of wastes in Karachi was also 10% by waste pickers (Ali *et al.*, 1993). In addition, 15% municipal wastes are prevented from dumping in Bangalore, India by waste pickers (Baud & Schenk, 1994). The available global research (Hartmann, 2018; Andrianisa *et al.*, 2016; Matter *et al.*, 2015; Asim *et al.*, 2012; Zhang *et al.*, 2010; Wilson *et al.*, 2006 and Haan *et al.*, 1998) demonstrate that studies explored the issue of waste pickers are very latest (about ten years) and found in developing countries like Bangladesh, Bulgaria, China, Côte d'Ivoire, India, Jordan, Mozambique, Nicaragua, Pakistan, Philippines, and Singapore (Dutra *et al.*, 2018). Very limited studies are found

in the literature in the investigation of health hazards involved in this work. Hunt 1996 reported the results of a comparative study conducted in Bangalore, India investigating health status of child waste pickers. He found that most of the waste pickers came from lower families verifying their house condition, food habit, health status and socio-economic status. In developing countries, public policies towards the informal sector are not neutral (ILO & WIEGO, 2017).

Bangladesh is one of the densely populated countries in the world where about 1015 people live per square kilometer (BBS, 2012). The majority people who are living in the urban areas of this country earn less than \$1.25 a day stay in a very unhealthy environment (Parvin & Begum, 2017). In Bangladesh, many individual waste pickers and dealers have been performing recycling activity as an income source (Quazi & Fukuhara, 2011). There are 400,000 waste pickers in Bangladesh according to a calculation of Grambangla Unnayan Committee (Maksud, 2017). These poor people are vulnerable to several kinds of occupational health hazards and risks (e.g. flu, bronchitis, body injuries/pain, ulcers, high blood pressure) (Uddin & Gutberlet, 2016).

Dhaka city in waste picking clearly more dangerous than others is Matuali Sanitary Landfill site (Mitra, 2016). About 10 million population of Dhaka city generated 4000-4500 tons of solid wastes every day. Half of these wastes are disposed at Matuail Sanitary Landfill which is collected by Dhaka City Corporation (DCC) and rests are dumped in open fields, ditches and along road sides making severe health complications (Parveen & Faisal, 2005). The DCC employs crude waste dumping at the Matuail landfill site, an unregulated dumpsite having no sanitary landfill arrangement (Mitra, 2016). Mitra, 2016 also found that about 1800 tons (50%) of wastes are dumped at the Matuail and unofficial sites (Mitra, 2016). Many child waste pickers work in this waste dumping site for their marginal and impoverished social status, in the most unhygienic conditions (Parveen & Faisal, 2005). However, no studies were conducted to explore their health hazards in this area. Therefore, the main objective of this study was to assess the health hazards and to examine the health awareness among the waste pickers.

## **Material and Methods**

### **Study area**

The Dhaka City is almost covered by the river Buriganga and all the existing Landfill sites in Dhaka are besides different rivers (Talukder *et al.*, 2011). There are three landfill sites found used by DCC, namely Matuail, Beri Band and Uttara. Among all the dumping sites within Dhaka City, only the largest dumping site, Matuail Sanitary Landfill

(empower, 2014 & Jahan *et al.*, 2016) was selected as the study area because of most of the waste pickers worked in this site in hazardous environment. The landfill site is surrounded by embankments and is free from flooding. Matuail is the only official dumping site owned by Dhaka City Corporation (DCC) (Yousuf & Rahman, 2009). It is located on the north of Dhaka-Demra highway which lies between latitude 23°43.35' and 23°42.97'N and longitude 90°26.83' and 90°27.2'E (Azim *et al.*, 2011 & Jahan *et al.*, 2016). It is a semi-aerobic landfill which is in pipe system, half circle of it is solid in lower part and upper half is perforated (Jahan *et al.*, 2016). It is operated 24 hours a day in 3 shifts (Waste Portal, 2012). Out of the 3200-3500 tons of garbage in Dhaka, 1200 of these tons make their way to Matuail each day (Empower, 2014). About 44 percent of the total generated waste (3,340 tons/day) is disposed at 3 landfill sites (Matuail, Beri Bund and Uttara) and the remaining 46 percent remains uncollected and contributes to unhealthy and environmentally degrading condition. Matuail receives 65 percent of the total disposal volume (Begum, 2009). The environmental condition of the landfill site had the usual characteristics of an open dump site - filthy, smelly, and breeding ground of flies and mosquitoes (Jalil, 2017) According to field officer, Shahid at Matuail dumping site, there were around 300-400 waste pickers picked the wastes in this hazardous site daily (Field survey 2018-19).

### **Data set and sources**

In order to conduct the survey, a great deal of information was needed which was fulfilled through the primary sources (field surveys). Before conducting the study, a reconnaissance or pilot survey was carried out to have a good idea about the study area. Then a semi-structured questionnaire, Focus Group Discussion (FGD), field observations and Key Informal Interview (KII) were conducted to collect data. A total 200 waste pickers are chosen for interview from Matuail Sanitary Landfill out of 400. Males and females above the age of 15 were selected for the interview. Based on predesigned questionnaire, the authors randomly interviewed 200 waste pickers of the study area. The waste pickers were questioned about their socioeconomic conditions, work shifts, health status, general health impairments (accidents, injuries, complaints, and diseases), and knowledge, attitudes, and practices regarding self-protective behaviors through the interview. The survey was carried out from 11<sup>th</sup>-14<sup>th</sup> December in 2018 and also from 6<sup>th</sup>-7<sup>th</sup> February in 2019. Some secondary information was collected from various report of waste picker's health hazard related journal, Guidelines of KAP (Knowledge, Attitude, and Practices) Survey on WASH (Water, Sanitation and Hygiene), review of literature, statistical document, thesis reports, newspapers and websites.

### **Data processing**

For the analysis and interpretation of the data, content analysis was used and graphics were constructed with the MS Excel Program and Statistical software. The data collected were analyzed using the statistical program SPSS (Statistical Package for Social

Sciences), where the descriptive statistics (table, graph, diagram etc.) were applied. ArcGIS software was used to prepare the study area map.

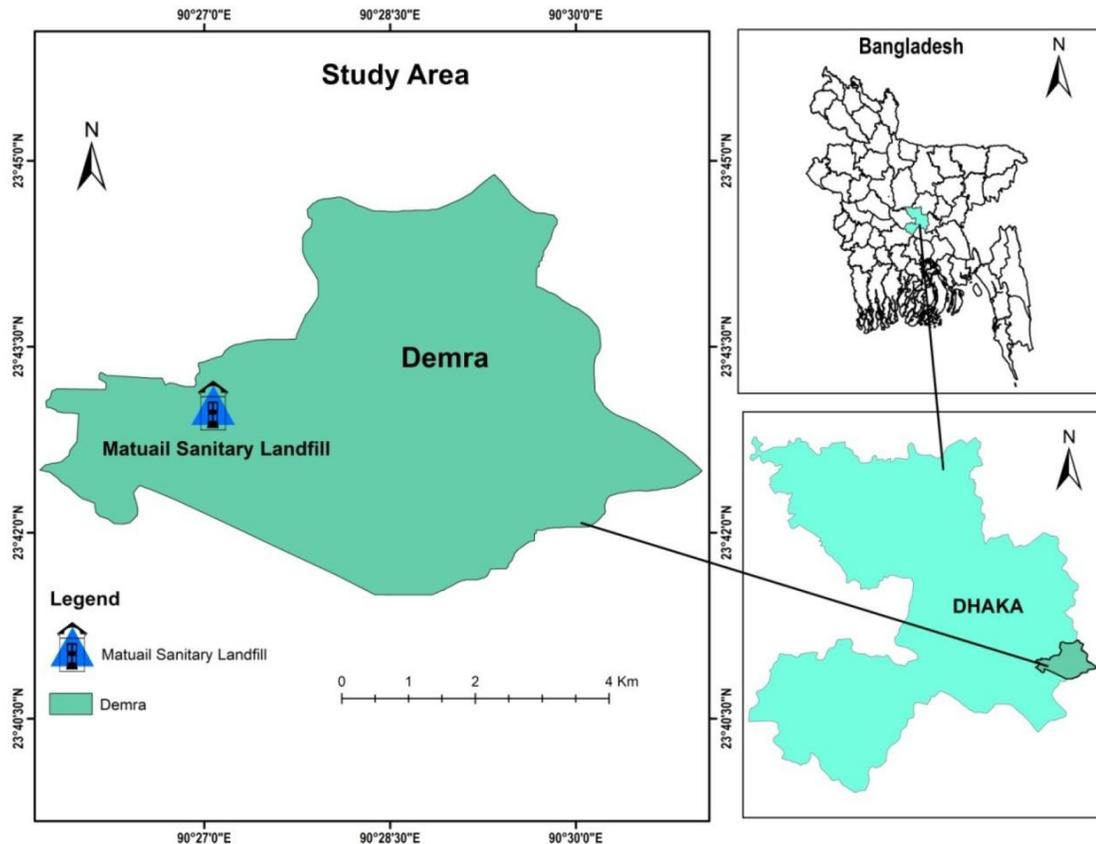


Figure 1. Location of the study area in the context of Bangladesh

## Results and Discussion

This study focused on the assessment of the health hazards and health awareness among waste pickers in the study area. There are different health hazards in waste picking caused by dumpsite's germs and parasites.

### Common diseases

Hazardous condition is one of the key indicator for assessing the vulnerability of waste pickers. The work of waste-pickers involves frequent static postures (Silva *et al.*, 2005) and this has been previously linked with musculoskeletal pain (Putz-Anderson *et al.*, 1997). The present study reported the most common health hazard related disease is malaria which was 19 percent (Figure 2). The second most common health hazard

related disease were guinea worm disease and cholera as reported by 17 percent and 16 percent of waste pickers, respectively. Others were affected by diarrhea, trachoma, typhoid, intestinal worm and arsenicosis, as reported by waste pickers of the study area. They are usually affected by different types of diseases. Chokhandre, 2017 found that the prevalence of morbidities are higher among the waste-pickers, particularly injuries, respiratory illness, eye infection, and stomach problems and Thirarattanasunthon, 2012 found on his study that most suffered with common colds, skin rashes, headaches, fatigue, shortness of breath, and impetigo. Cruvinel *et al.*, (2019) found on their study that the most common reported diseases among waste pickers in open garbage dump in Latin America were: osteomuscular disorders; arboviruses; episodic diarrhea; hypertension; bronchitis; intestinal worms and diabetes.

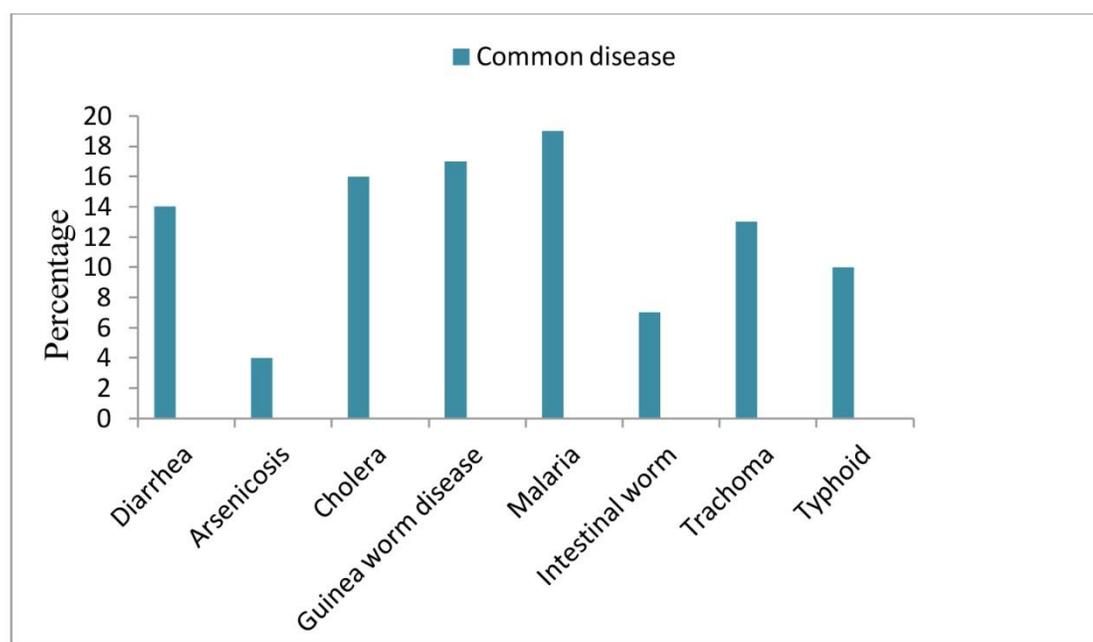


Figure 2. Common diseases

### Frequency of diseases

Waste pickers working in municipality dump sites are exposed to various health risks while working. A few studies found that infections may occur by direct contact with biological pathogens like, hepatitis-B. Food poisoning was one of the common risks of waste pickers in the present study. Table 1 represents different types of health risks of waste pickers face during waste picking in unhygienic condition.

Table 1. Frequency of diseases

Diseases	Frequency	Percentage (%)
Food poisoning	34	17
Gastroenteritis	32	16
Diarrhea	24	12
Pneumonia	16	8
Trachoma	22	11
Skin disease	34	17
Hepatitis	20	10
Cold and cough	18	9

About 17 percent of waste pickers in the study area were often affected by different types of germs and parasites which cause food poisoning and skin infection for maximum time.

### Sanitation related problems faced by female waste pickers

Sanitation facilities in working area are so poor. Waste picker's claimed that there were no sanitation facilities in working area. For not having good sanitation system waste pickers go for different sites like here and there, into the working area boundaries, at one's back, outside of working area etc. Most of the waste pickers go for toilet into their working area (36.5 percent). About 31 percent were go here and there for toilet, 20.5 percent did their toilet at one's back and 12 percent waste pickers of study area go outside of working area for toilet (Fig. 03). The present study was also found that no one used public toilet because of expensiveness (Survey, 2019). In the following Table 2, it showed that female waste pickers faced many problems for not having any toilet for them. Most of the time they faced security problem which was percentage in 31 percent. About 27.5 percent faced problems in their monthly period. All adult female waste pickers faced this menstrual problem for not having separate toilet, 25 percent female waste pickers have faced lots of risk of harassment.

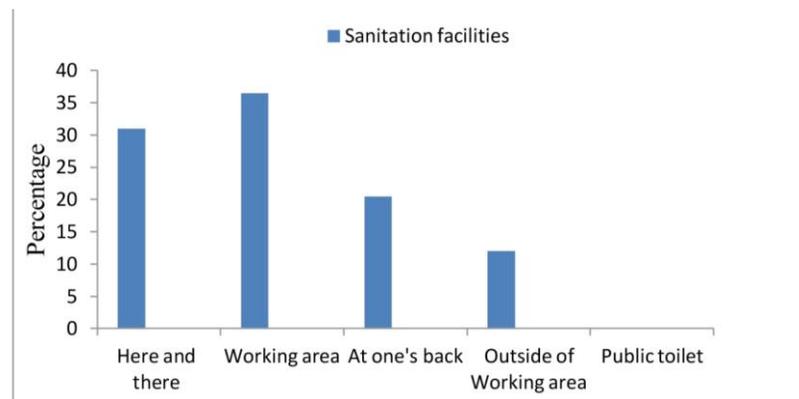


Figure 3. Sanitation system for female in the study area

The female waste pickers are more vulnerable than others whereas the basic amenities as water and sanitation are not available to waste pickers. There is only one tube well in the entire Matuail area and no sanitary toilet at the site (Parveen & Faisal, 2005).

Table 2. Major problems for not having proper sanitation system for female

Major problems of female waste pickers	Frequency	Percentage (%)
Security problem	37	31
Risk of harassment	30	25
Menstrual problem	33	27.5
No bin to use	20	16.5

Majority of female waste pickers did not use any things after using toilet. About 36 percent use only water after using toilet, 34.5 percent waste pickers use mud, 29.5 percent use ash after using toilet. They use soap only for bathing and washing their dirty clothes. Only 23 percent waste pickers use sandal and rest 31.5 percent use sandal sometimes before using toilet and reported that, they were suffering from multiple illnesses.

### **Mental Health Issues**

Waste picking is a type of informal employment that occurs worldwide. Waste pickers often live in isolation as a result of stigma and may experience low self-esteem, which may negatively affect their psychological wellbeing (Chokhandre *et al.*, 2017). Waste picking is associated with a range of risk factors for common mental disorders (Makhubele *et al.*, 2019). The present study found that waste pickers remained from morning to evening in the working place with hazardous environment. As they stay long time in the working place so that they get easily sick by mentally. Majority of waste pickers fell in depression (26 percent). About 20 percent of waste pickers felt illiberal when they always remain in unhygienic environment (Table 3). A research by Mote *et al.*, 2016 exposed that waste pickers more frequently reported physical and mental health problems. Majority of them were associated with mild depression and mild anxiety as common mental disorders. Substance abuse itself is one of the mental disorders present among waste pickers (Mote, *et al.*, 2016).

Table 2. Mental health issues (related to poor hygiene)

Mental health issues	Frequency	Percentage (%)
Self-neglect	78	21
Loneliness with poor hand and oral hygiene	62	17
Depression	96	26
Ungenerous	57	16
Illiberal	72	20

### **Treatment patterns of waste pickers**

Most of the waste pickers in the study area did not go medical care even in their crucial health problems because of their lowest income. Only about 44.5% went for medical care for health problems and rest 55.5% did not take any medical treatment. The Table 4 outlined that among 44.5 percent of waste pickers about 40 percent were took medical treatment from dispensary, 34 percent took from govt. hospital, and rest 26 percent took their medical treatment from NGO (Non- Governmental Organization). Almost 96 waste pickers were gone to doctor for one time in last one year for their treatment which was about 48 in total percentage. Only 20 waste pickers were gone to doctor more than three times in last one year (10%). Waste pickers of the study area claimed opined that maximum time they did not go to doctor because of shortness of their money.

Table 3. Treatment pattern

Treatment pattern	Frequency	Percentage (%)	Kind of treatment	Frequency	Percentage (%)
Govt. hospital	30	34	Allopathic	42	26
Private	0	0	Homeopathic	30	19
NGO	23	26	Kabiraji	17	11
Dispensary	36	40	Self	72	44

The Table 4 also showed that treatment pattern of waste pickers found different in the study area. Maximum waste pickers could not bear their treatment coast. About 72 waste pickers were treated by themselves which was 44 percent in total waste pickers. Around 26 percent were dependent on allopathic, 19 percent were dependent on homeopathic and

rest 11 percent were dependent on kabiraji for their medical treatment. The past study revealed that among those who reported to be suffering from any kind of health problem, about forty percent did not sought any health care for their ailment, 74.9% from pharmacy, 18.6% from traditional healer and 6.5% from Homeopath (Andalib *et al.*, 2011).

### Safety Measures and Support Services

The level of awareness while handling waste among the waste pickers and handlers is not good enough to manage the waste systematically (Khan *et al.*, 2016). The working place of waste pickers is unhealthy and pickers are usually not trained on safety and hygiene procedures (Dutra *et al.*, 2018). Waste pickers of study area were less careful about their safety guidelines. Most of them were not careful about their safety treatment. About 44 percent waste pickers were not use safety equipment and 20 percent were sometimes used their safety equipment. This study also revealed that only 36 percent waste pickers were maintained their safety equipment. Among the 36%, only 27% used boot, 22% used shoe, 15% used socks, 13% used slipper and mask, rest 10% used gloves which showed in the following Figure. 4. (Castilhos Júnior *et al.* 2013) identified a similar situation in their study with pickers in the South, Southeast and Northeast regions of Brazil. Many waste pickers do not use safety practices including wearing of hand gloves, and have skin injuries (Alvarado-Esquivel, *et al.*, 2015).

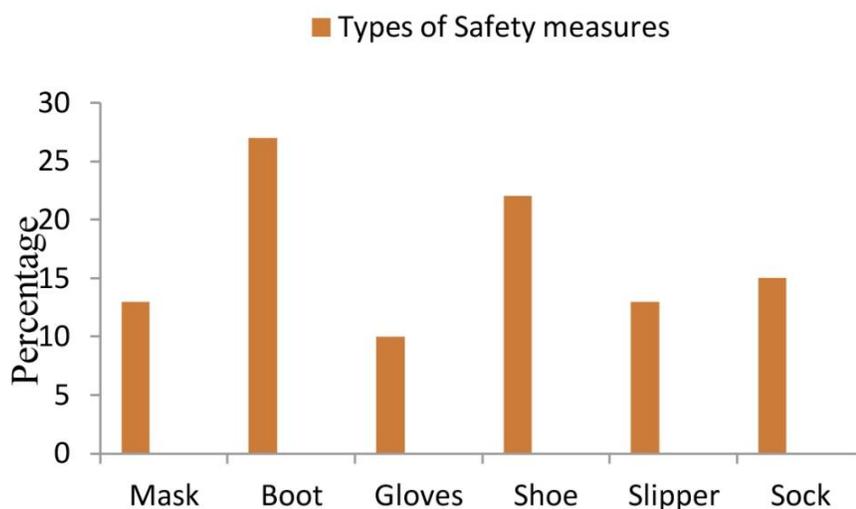


Figure 4. Safety measures and support services

Waste pickers of the study area reported that they get support only from non-governmental organization named Gram Bangla Unnayan Committee and this were so less in percentage. About 13.5% were got support from Gram Bangla Unnayan

Committee. A study on waste pickers in Thailand mentioned about their self-protective attire, 46% used PPE (Personal Protective Equipment) every time and 55% used PPE sometimes (Thirarattanasunthon *et al.*, 2012). However in Bangladesh the scenario of waste picker's self protection is quite different. Majority of the waste pickers were not using any protective clothing such as gumboot, gloves and masks, which enhanced their health vulnerabilities. They are not using any protective clothing due to their ignorance and poverty.

### **Cleaning waste picking equipments**

About 51% waste pickers in study area claimed that they have no waste picking equipment's to wear and rest 49% were agreed to have their waste picking equipments. Waste picking equipment's cleaning is one of the important things in hygiene practices. In the following Figure 5 showed that about 39.5% waste pickers cleaned their equipment one time in a week.

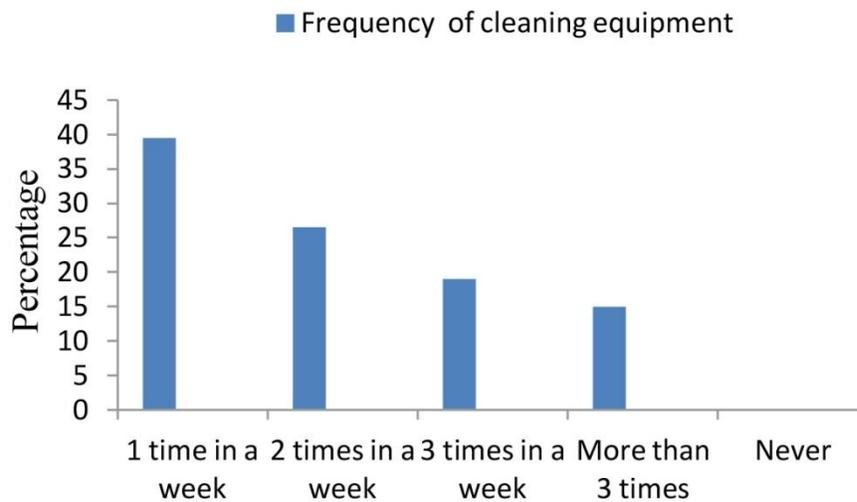


Figure 5. Frequency of cleaning waste picking equipment

### **Hygiene awareness of waste pickers**

The waste pickers live in worse conditions supporting the argument that the occupation is a survival strategy (Huysman, 1994). Waste picker's work in harsh environment with overheating, vibration, dirt, poor ventilation, annoying odors, and disease-causing animals. They are more careless to clean and waited until their work was finished each day (Sunthonchai & Phoelpoksin, 2006). This study of sanitation and hygiene practices found that most of the waste pickers took bath one time in a day (68.5%). Though all were

staying in a dirty and hazardous environment they used to take bath in one time in a day except 25.5% and 6% who's took bath two and three times per day respectively in the study area (Table. 5).

Table 4. Frequency of bath, washing clothes and nail cutting among waste pickers

Frequency of bath	Percentage (%)	Frequency of washing clothes	Percentage (%)	Frequency of nail cutting	Percentage (%)
One time	68.5	Daily	10	1 week interval	29
Two times	25.5	Weekly	35.5	2 weeks interval	31.5
Three times	6	Monthly	54.5	3 weeks interval	24
More than three	0	More than a month	0	4 weeks interval	15.5

About 20 waste pickers were liked to wash their clothes daily (10%) and 54.5% waste pickers washed their clothes monthly when they got time. About 31.5% of waste pickers reported that they cutting their nail after two week's interval. 29% waste pickers used to cut their nails after 1 week interval. And rest of waste pickers claimed that they were too busy to cut their nails weekly. The above Table.05 also signified that they cut their nails after 3 weeks or 4 weeks' interval which was 24% and 15.5%, respectively. Some waste pickers also reported that they would be suffered from various diseases if they do not cut their nail regularly. The past study indicates that 40% waste pickers take bath only once in two weeks. Similarly, 45% waste pickers take bath once a week. More importantly none of them reported to take a bath daily or even once in two days (Avasthi, 2010).

Waste pickers of the study area brushed their teeth daily. But most of the waste pickers brushed their teeth once in a day. Almost 82% were of waste pickers brushed their teeth once a day. Some waste pickers brushed their teeth twice in a day (14%). However in the past study by Santa Mitra in 2016 found that about 23.5% of waste pickers do not brush their teeth regularly (Mitra, 2016). Coal was a common thing for brushing found which practiced by most of the waste pickers of the study area. Coal used by about 26% of waste pickers. Waste pickers used ashes and tooth powder which was 21% and 20% respectively. Only few waste pickers of the study area used tooth paste (16%).

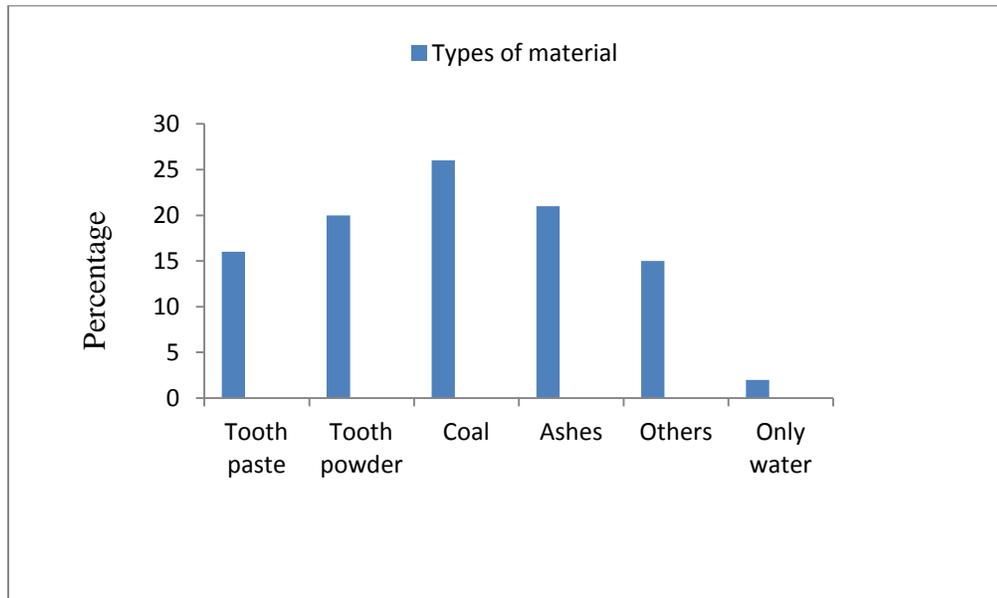


Figure6. Types of brushing materials

Though waste pickers were conscious about their teeth but maximum were not go to dentist for their teeth treatment or check up in study area. Only 42% of waste pickers go for dentist when they required. And a few numbers of waste pickers go for dentist at least once a year.

## **Conclusion**

This study aimed to assess the health hazards and to examine the level of awareness and safety guidelines with the occupation of waste picking. Matuail Sanitary Landfill, the largest dumping site for Dhaka city of Bangladesh, was used a case study. Questionnaires, FGD and field observation techniques were used to acquire the required data. Most (about 60%) of the waste pickers of study area were female. Majority of the waste pickers were found as lower middle class people with lower standard of living. Though they worked hard, their income was not sufficient to lead their life smoothly. The present study found that the most common disease spread by not maintaining good sanitation and hygiene were cholera and skin disease and the next most common disease was dengue. It also revealed that the most common diseases which they were affected by diarrhea, cholera, trachoma, typhoid, intestinal worm and arsenicosis. Waste pickers were exposed to various risks while working. They were often attacked by different types of

germs and parasites which causes food poisoning. The study found that waste pickers remained from morning to evening in the working place with hazardous environment. As they stay long time in the working place so that they get easily sick by mentally. The study also explored that waste pickers were more vulnerable to sanitation and hygiene related disease because of their poor knowledge about awareness and safety equipment.

The results of this study were associated with a number of limitations, which may influence the outcomes. The study requires lots of criteria to explore various diseases of waste pickers which they are affected by not maintaining good sanitation and hygiene. In the study, we used only primary data source, it would be more validate and strong if we use the secondary data also. However, acquiring data at the local level and processing it is not easy. In addition, Matuail sanitary landfill site is a not open for all general people so some obstacles were faced to get entry the study area. Another drawback is that, the qualitative feedback collection was also encumbered to waste pickers due to their time constraint and hesitating behavior. These drawbacks can be addressed in future studies. The following actions can be implemented to overcome waste pickers health hazard related issues

It is required to ensure safety tools for all waste pickers and making it compulsory. If it is maintained then the possibility of health hazards will decrease. Ensuring first aid treatment for little injuries, which will cover the initial medical treatment. Further, it is essential to providing hygienic food, safe water, and basic infrastructures for a healthy life.

At dumping ground, toilet facilities should be provided for ladies. Better environment and place for their living should be ensured so that they are not harassed by anyone in day or evening. Self-help group should be developed for understanding of various problems of female at working site. Drinking water and hygienic shelter (for eating food) should be available in dumping ground. Waste pickers should be immunized against life-threatening diseases—such as tetanus, meningitis, and hepatitis—that can be contracted while working within the dump sites. In conjunction with immunization, periodic health checks should be undertaken on at least an annual basis. Different non-governmental organizations also should come forward for providing facilities and medical care for them.

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