The Works and Lives of the Informal Waste Picker: A Case Study at Anandabazar Open Dumping Site, Chattogram City Corporation, Bangladesh

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ABSTRACT---- ***The study examined the sociodemographic characteristics, health and working conditions of waste pickers at the Anandabazar dumping site, Chattogram, Bangladesh. Through questionnaire surveys data was gathered from waste pickers. The study identifies that 61% of respondents were men and 39% were women. The mean age of the participants was 28.29 ± 9.85 and 84% were uneducated. The majority of them work 8-10 hours per day. Daily average income from recyclables was found BDT 443.5 (US$ 5.15). In terms of health conditions, they were suffering mostly from digestive gastrointestinal issues, such as episodic diarrhea (39%), intestinal worms (57%), and hepatitis A (2.5%). The waste pickers' living status was appalling, working conditions were hazardous. Yet, many were drawn to informal recycling due to the lack of alternatives. Therefore, special attention is required to enhance their health and working conditions as well as to integrate them into the city's formal SWM system.***

Keywords--- Waste picker, income, Waste management, Anandabazar dumping site, Occupational health hazards.

1. INTRODUCTION

The rapid increase in waste generation coinciding with economic growth is one of the most important social issues in developing countries [1]. According to the Global Waste Management Outlook, the global annual growth in MSW amounts to around 2 billion tons [1]. Developing countries frequently lack the necessary infrastructure and resources to properly collect and dispose of waste [2]. Despite being a victim of social prejudice, waste picking is "a matter of survival, not a choice" for many individuals in the world. Nearly 15 million people are employed in developing countries' informal waste sector [3]. This profession is becoming more common as a result of causes such as joblessness, hunger, increasing amounts of solid waste, and expanding marketplaces for recyclables [4]. In developing countries, informal waste pickers are an essential participant [5]. Successful integration of all parties is required to develop a long-term and effective waste management system [6].

Various interventions have been made in the informal waste management sector. A thorough evaluation of the ramifications for society at large, the economy, the environment, as well as human health should be performed. Since it provides revenue and develops employment for the local economy [7]. This sector also helps facilitate things by lowering the total amount of waste that is collected and fostering recycling and reuse policies and procedures [8]. Now, it is vital to take into account their different local, regional, and national levels [9]. In general, people who pick up trash seem to be poor, homeless, engaged in criminal activity, and backward [10]. Social animosity against the sector is a result of these circumstances. People in developing countries have a repressive attitude against scavengers, especially among the government and the general population [11]. Their opinions are not taken into consideration when making decisions or developing waste management policies [12]. Currently, the informal sector is flourishing in various regions [13]. They have established groups and networks, and have become government and corporate sector, partners [14]. Nonetheless, an overwhelming "nuisance value" is associated with them, which diminishes all of these dynamics [15].

Many developing countries, including India [16] [17], Indonesia [18], Mexico [19] [20], Nigeria [21] [22] [23], Nepal [24], Peru [20] Brazil [25] [26], Nicaragua [27] [28], Pakistan [29] [30], Tanzania [31], Argentina [32], Zimbabwe [33], Chile [34], and others have conducted studies on informal waste collection and recycling. Still, in Bangladesh, there has only been a minimum amount of research done on informal waste pickers. A study conducted in Dhaka city highlights the insecure and vulnerable circumstances that waste pickers face in terms of their means of subsistence [35]. Hamidur et al., [36] discovered that several levels of waste collectors, a variety of hierarchical recycle shops, and local companies participate in the recycling process in the Rajshahi municipality. Another study [37] analyzes the formal waste collector's

role in waste management as well as the solid waste management system in Chattogram city. However, the sociodemographic characteristics, health, and working conditions of informal waste pickers were not explored in detail.

A case study on Anandabazar, the final disposal site for waste generated in Chattogram, the second-largest city in Bangladesh with spectacular industrial prosperity, could be significant from both an academic and a practical standpoint. The purpose of this study is to evaluate the sociodemographic profile, health, living, and working conditions of waste pickers at the Anandabazar dumping site, who play a vital role in waste management. To accomplish this, the study looked at the actions of those who make a living by collecting waste in the Anandabazar slums.

2. MATERIALS AND METHODS

Study site

The slums around the final disposal sites in Anandabazar, Chattogram, were chosen as the survey location. On an area of around 15 acres, it is governed by Chattogram City Corporation (CCC), Bangladesh, and is located in 37 no Ward, Central Halishahar, which is the middle-western part of the city.

In the words of Chattogram City Corporation's Chief Conservancy Officer (CCC) formally, 20-25 employees serve here for waste management; roughly 250 trucks of waste are gathered from various areas throughout the city, each vehicle containing approximately 3-4 tons of waste, and then dumped here.

Primary data collection

Our investigation employed a mixed-methods strategy. Using site visits and personal interviews with randomly selected waste pickers of different gender and age, questionnaires were filled out and observations were made. More than 250 waste pickers have been found in the Anandabazar open dumping area, according to a thorough investigation. Due to people's reluctance to engage in the study, all of the waste pickers cannot be investigated. Of nearly 220 individuals approached, 200 waste pickers consented to participate in the study.

A reconnaissance survey was carried out in early October 2021 to gain an understanding of the overall situation of the study area. From the 12th of November to the 30th of November, 2021, all data, including their name, age, residence, family, education, income, health condition, and personal opinion, were obtained in detail through the interview.

Data compilation and analysis

The data was meticulously documented and put in a spreadsheet format. After that those were analyzed and processed using Microsoft Excel and SPSS version 25.

3. RESULTS AND DISCUSSIONS

Socio-demographic characteristics of the waste pickers

Gender

The demographic characteristics of the survey participants are presented in Table 1. Males constituted 61% of the total, with females constituting 39%. Regarding the sex composition of the waste pickers, the proportion of men is significantly larger than the proportion of women. They are accountable for providing for their families, but their wives and children provide assistance to them in this endeavor. Male waste pickers (73% and 97%, respectively) were also found in large numbers in the study conducted in Pretoria, South Africa[38] [39] . Another study found that the male and female waste pickers constitute 62% and 38% in Bahawalpur, Pakistan [4].

Age

Men, women, and children of various ages participate in waste services. They ranged in age from 11 to 50 years (mean 28.29, ±SD 9.85 years) (see Table 1). The majority of waste pickers (24%) were between 26 and 30 years old. After that, 17.5% of them were aged 31 and 35 years old, 15% were aged 21-25 years old, 13% were aged 11-15 years old, 10.5 % were aged 36-40 years old, 9% were aged 16-20 years old, 6.5% were aged 41-45 years old, and remaining 4.5% were aged 46-50 years old. It appears that young and middle-aged individuals are more physically suited for and capable of waste collection than older individuals, as it takes long hours of standing near a dumpsite and strenuous physical labor. A study revealed that the majority of the participants in Brasilia, Brazil ages ranged from 36 and 46 years[40], again another study also found in Dhaka city Bangladesh, the majority of the participant's ages ranged from 20 to 30 years [41].

Furthermore, the majority of children between the ages of 11 and 15 years take it up simply because it was their parent's profession. Since their mothers have nowhere else for their children to go, they used to bring them with them when they were much too young to participate in scavenging. Child labor is still common in this sector, as evidenced by the proportion

of participants aged 11-15 years (13%), which is similar to other blue-collar jobs in developing countries [42]. According to Asim et al., children between the ages of 1 and 10 years old made up 12.3% of waste pickers in Lahore, Pakistan [43]. In Tafila, Jordan, where another study was conducted by Aljaradin et al., it was found that 38% of child waste-pickers were between the ages of 4 and 16 years old [44].

Education

The respondent's highest educational attainments are listed here (Table 1), 84% of respondents were uneducated, 13% completed primary school, and 3% completed secondary schooling. Waste pickers have poor educational attainment, which is a contributing reason to their failure to locate better-paying work. They stated poverty or a lack of money as the primary cause for their school dropout when asked about it in the survey's questionnaire. Many were unable to afford the school fees and uniforms because of the financial hardships they faced. A quantitative study reported that 35% of Nigeria's dumpsite waste pickers had no formal education, while 41% had attended primary school and 24% had attended secondary school [45].

According to another study in Latin America [46], 27.3% of waste pickers did not attend school at all, while 47.7% received only primary education, a scenario that is significantly better than the current study.

Family

34.5% of families with 4 or fewer people, 39% of families with 5 to 10 people, and the remaining 26.5% of families with more than 10 people (see Table 1). The study found that the average family size of waste pickers was 6.9. As per the findings of previous research[47], the average family size of waste pickers in Kanpur, India was 7, which is the most relevant to the present study.

Working hours

Picking through waste can be a profession with a fluid schedule because of the nature of the labor. They begin their day at about nine or ten in the morning, depending on the season and the time of day when the city corporations' workers arrive at the dumpsite with waste gathered from the entire city. Working hours might vary from six to more than ten hours a day.

Among the respondents, 19% work 6-8 hours per day, 72% work 8-10 hours per day, and the remaining 9% work more than 10 hours per day (Fig. 4). Of the waste pickers surveyed in Brasilia, Brazil identified that there were 6.9% of respondents worked fewer than five hours per day (W- 5.5% and M- 4%), 48.6% of respondents (W- n 320 and M- n 160) worked between five and eight hours per day[48]. When compared to these findings, it is apparent that male and female working hours do not differ much at Anandabazar, and that working hours are also longer than the results show.

Sorts of recyclables and their selling price

The degree to which a specific material is recycled is dependent upon several factors, including levels of income, the existence of local and national markets, the requirement for secondary raw materials, the level of financial and regulatory intervention by the government, prices of virgin materials, global trade in recycled products, and pertinent treaty obligations [10].

Table 2 presents a classification of the different sorts of recyclables along with a price list for each category in 2021. In 2009, according to a quantitative study[49] conducted in Chattogram, Bangladesh the average sale value (per kg) of recyclables such as soft plastic was BDT 25, hard plastic was BDT 5, the paper was BDT 5, glass was BDT 3, and aluminum was BDT 31. Except for paper, the average sale value of recyclable materials has increased slightly over the past 12 years. The average selling price is affected by the final-buyer prices fixed by recycling factories, which are influenced by the international pricing of recyclables. Bhangari (the local term for the sale point for recyclables) shopkeepers offer their own purchasing prices to waste pickers. They work as the middle man who buys recyclables and then send them on to recycling factories.

Income level

The estimated average daily individual income in the data set (see Table 3) was BDT 443.5 (US$ 5.15). Over 53% of all recyclables consisted of soft and hard plastics, which were two of the primary sources of income for waste pickers. Specifically, soft plastics accounted for more than 44% of total income. On the other hand, glass was not one of the most significant sources of cash for the waste pickers working at the site, even though waste pickers in developed countries regularly collect glass bottles as recyclables [50].

The average monthly income of the site's waste pickers was around BDT 10,644 (US$ 123.78) (see table 4). For obtaining the estimates of individual incomes per month, daily earnings from the sale of recyclables, which are estimated in Table 3,

are multiplied by the number of working days (Average 24 days). Compared to the income, the Brazilian waste pickers earn higher money; on average US$268 per month [51].

The economic standing of waste pickers relative to the poverty threshold

According to World Bank statistics[52], the national poverty line threshold in Bangladesh is BDT 163 or US$ 1.90 per capita per day, the threshold for the lower-middle-income class poverty line is BDT 275 or US$ 3.20 per capita per day, and for the upper-middle-income class poverty line is BDT 472 or US$ 5.50 per capita per day. The average daily income of waste pickers at the site was approximately BDT 443.5 or $5.15, which equated to the upper-middle-income class poverty criterion in Bangladesh. So far, collecting recyclables at the site has been a good source of cash for dumpsite waste pickers as pointed out by Sasaki et al., [53].

However, variations in the price of recyclables have a substantial impact on the relative economic situation of waste pickers at the site. In particular, since 2014, the prices of soft plastics, which are the primary sources of income for them, have witnessed a slight increase. The national economic level determines the costs of living for waste pickers, whilst the worldwide price of recyclables has a significant impact on their incomes. In countries where the national economy is expanding, incorporating them into formal municipal solid waste management may have struggling issues. Because the involvement of the informal sector necessitates additional costs, which is one of the reasons that integrating the informal sector into solid waste management remains a significant difficulty in developing countries [54].

Particularly, it should be underlined that because of the lack of marketable skills, scavengers cannot simply change employment. There are many individuals who are unable to find work in the formal sector due to a lack of education or physical impairment. Interventions aimed at changing the role and working practices associated with informal recycling should consider this.

Poor living and working conditions

Even though they have made major contributions to waste management, their living and working conditions are terrible. Scavenging communities are defined by their poor living circumstances, limited access to utilities and infrastructure, lack of urban services such as water supply and sewage, and lack of social security networks [55]. Due to the proximity of their houses to hazardous waste dumps, their living circumstances were appalling due to the stink of garbage and the abundance of flies, mosquitoes, and roaches. Whether it's hot and humid or pouring down rain, they're required to toil all day. Gloves, gumboots, and aprons are just a few of the personal protective equipment (PPE) they are missing.

In some cases, the City Corporation authority place restrictions on their activities due to health concerns. Furthermore, they are commonly misunderstood and underestimated by the general public despite their crucial importance. The act of waste picking is not considered an honorable or reputable occupation. It’s considered as something that serves a "part of society" distinct from the rest. They are typically regarded as members of a lower social caste. Despite having the fundamental right to a decent and respected existence, they are sometimes considered "thieves" by the local community.

Occupational Health Hazard

Accidents

During overloaded periods, the waste pickers compete for access to vehicles while also attempting to avoid being injured by the waste truck or pick-up truck. Unavoidable accidents do occur, though, even when drivers are at their most cautious. According to the findings, 13% of them were injured by the hit of waste truck. In comparison to the previous study, the accident rate for waste pickers in Kerala, India was 22% [56], which is higher than the current study.

Cuts and burns

They are frequently wounded when working with a variety of dangerous things such as shattered glass, knives, needles, and so on. A young boy was discovered with one of his fingers severed by a sharp object. Additionally, another man was struck by a tree trunk, resulting in the loss of one of his legs. 32% of respondents have reported being burned by latent fires, combustibles, or caustic compounds, and this number is expected to rise. Deonar dumpsite waste pickers in Mumbai are at risk of disease and injury, according to research done by [57]. Shattering glass and other sharp objects wounded 17% of the workers here. In New Delhi, 28% of waste pickers reported getting injured frequently by being cut or burned, as shown in a study [58].

Skin diseases

Multiple skin diseases are caused by waste-collecting without proper safety measures. They are not equipped with any safety equipment such as a face mask, hand gloves, an apron, or other protective clothing. Some of them were discovered merely wearing a pair of gumboots. It was for this reason that 26% of them were suffering from parasitic infections, meningitis rash, and skin irritations. Skin disease was shown to be prevalent among waste pickers in a study conducted in Matuail sanitary landfill, Dhaka with a prevalence of 17%, which is lower than that found in this study [59].

Muscle pain and headache

The ache in the arms and legs that comes with carrying large garbage items is serious. 14% of them suffer from migraines and muscle discomfort as a result of the noise from passing trucks and working in the sun all day. In Gaza strip, Palestine a study[60] discovered that headache and back discomfort are prevalent among waste pickers at rates of 37% and 68%, respectively, which is significantly higher than the current study.

Digestive gastrointestinal problems

Due to the filthy dumps, there are a lot of hazardous insects that contaminate water and food. Scavengers in the area are at risk of contracting food poisoning and other waterborne and vector-borne diseases. Data showed that they were continuously exposed to episodic diarrhea (39%), intestinal worms (57%), and hepatitis A (2.5%). A study found that scavengers in the Estrutural, Brazil, suffered cases of waterborne disease through episodic diarrhea (24.9%), intestinal worms (12.6 %), hepatitis A (1.7%), and leptospirosis (0.7%) [61].

4. CONCLUSIONS AND RECOMMENDATIONS

The study of Anandabazar's dump waste pickers indicated that they are unskilled, have a poor level of education, and fall outside the formal job sector. There is a need for greater investigation into the entire circumstances of child workers. The research found that among all of the respondents, 13% of waste pickers are aged 15 or younger. Steps should be taken to prevent children from working in the informal recycling sector and to get them back to school.

Aside from that, the stink of trash and the swarms of pests at the place made for a miserable living situation. Medical waste and other sharp waste made their jobs much riskier. Additionally, they are exposed to several occupational health hazards. 32% have said being burned by latent fires and combustible materials, and 26% of them were suffering from various skin disorders. Because of the loudness of passing trucks and the fact that they had to labor in the sun all day, 14% of them were suffering from headaches and muscle pain. Along with these other health risks, they were regularly exposed to episodic diarrhea (39%), intestinal parasites (57%), and hepatitis A (2.5%).

The use of protective gear and promoting physical activity as a means of reducing muscle discomfort are two important steps in addressing these health concerns. Education on health issues, in particular about health and hygiene practices, is desperately needed for them. Research performed in Thailand demonstrated that the Health Risk Reduction Behaviour Model (HRRBM) considerably improved waste pickers' knowledge, attitudes, and behaviors, hence decreasing their healthcare expenditures [62].

If municipal authorities, recycling firms, and non-governmental organizations were to consider recognizing waste pickers as an integral part of the waste management chain, they may contribute to a solution by partnering to better the position of these individuals. This could include the provision of essentials such as personal hygiene, pure drinking water, washing clothes, toilets, and shelters.

In spite of the social, health, and environmental issues involved with the informal recycling system in Anandabazar, they were drawn to it because of their educational deficits and lack of competitive abilities to switch jobs. Current research [63] suggests a number of options, including organizing waste pickers to give them a greater voice, considering their needs in policies, and honoring their contribution to the environment as well as recognizing them as part of the formal waste management system of the cities. Each of these proposals has merit. In addition, specific considerations are required to integrate the informal sector into official waste management when their incomes are equivalent to the poverty threshold for the upper-middle-income class. Their average monthly income is roughly US$123.78, and it should be emphasized that if they are incorporated into the formal waste management system, their monthly wage will be higher than or equivalent to their current income.

5. ACKNOWLEDGEMENT

The authors are thankful to all of the respondents who gave up their important time and shared their honest ideas, which helped this research tremendously. The authors would also like to express their gratitude to Easmat Ara Afrin, BSc(Hons) in Environmental Science, Institute of Forestry and Environmental Science, Chittagong University for her technical assistance.

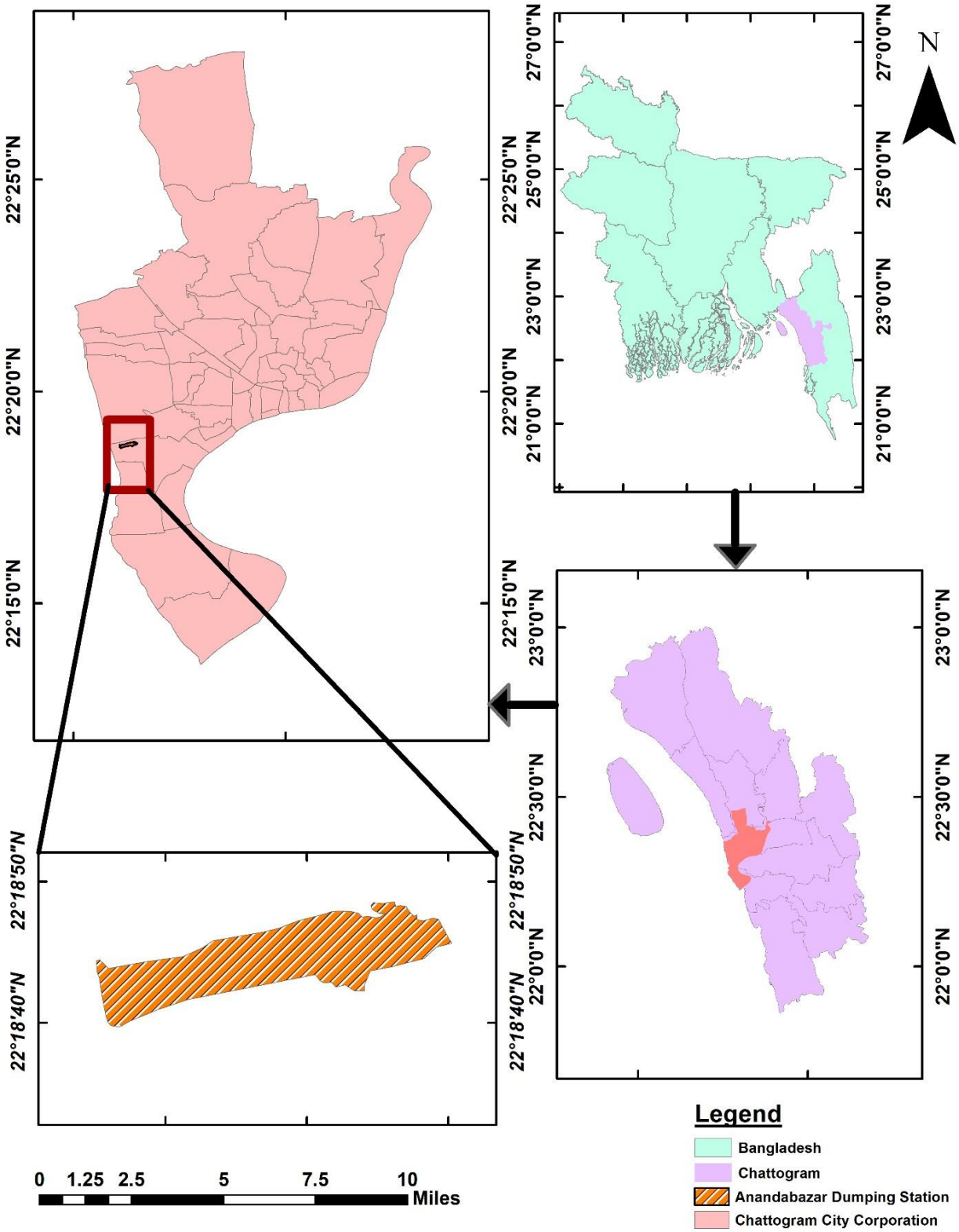

Fig.1 Study area map

(a)

(b)

(c)

(d)

Fig.2 a) Waste collectors (Tokai), b) vegetable has grown in waste site! burning the waste heap, (c) reducing the waste by burning- creating gas generation, pollution and bad smell, (d) children are separating recyclable items from the waste heap.

(a)

(b)

(c)

(d)

Fig.3 (a) Materials gathered at the bhangari store and organized by type, (b) sorted metal items such as cans, and pots, (c) sorted plastic items, (d) the bhangari store's shopkeeper is busy processing recyclables.

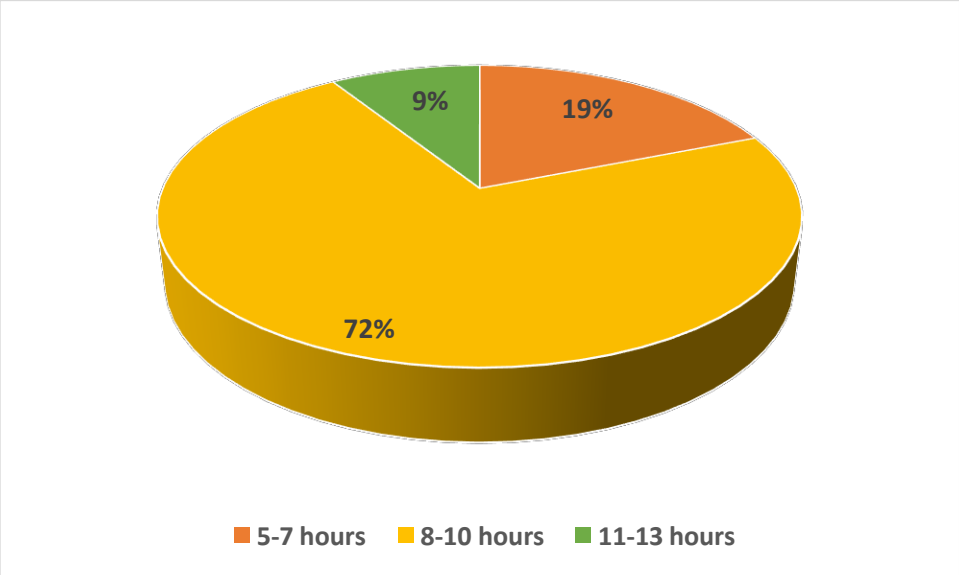

Fig.4 Estimation of the average working hours/day

Table 1: Socio-demographic profile of the waste picker

Gender	**Waste pickers (n=200)**
Male	61%
Female	39%
Age	
Mean ± SD	28.29±9.85
11-15 years	13%
16-20 years	9%
21-25 years	15%
26-30 years	24%
31-35 years	17.5%
36-40 years	10.5%
41-45 years	6.5%
46-50 years	4.5%
Educational qualification	
Uneducated	84%
Primary level	13%
Secondary level	3%
Family Member	
Mean ± SD	6.9±3.22
2-5 people	34.5%
6-9 people	39%
10-13 people	26.5%

Table 2: Price list of selling recyclables in 2021

Recyclable materials	**Selling Price/kg**
Plastic (Soft)	28 (US$0.40)
Plastic (Hard)	10 (US$ 0.11)
Paper	22 (US$ 0.29)
Aluminum	31 (US$ 0.40)
Glass	5 (US$0.06)
E-waste	20 (US$ 0.23)
Rubber	25 (US$ 0.32)
Iron	40 (US$ 0.46)

Table 3. Breakdown of average daily income of the selling recyclables

Recyclables	**Average quantity collected(kg)**	**Money received (BDT/USD)**	**Percentage (%)**
Plastic (Soft)	7	BDT196(US$2.27)	44.19
Plastic (Hard)	4	BDT 40 (US$ 0.46)	9.01
Subtotal (Soft and hard plastic)	**11**	**236**	**53.2**
Paper	2	BDT 44 (US$ 0.51)	9.92
Aluminum	1	BDT 31 (US$ 0.36)	6.98
Glass	3	BDT 15 (US$ 0.17)	3.38
E waste	2	BDT 40 (US$ 0.46)	9.01
Rubber	1.5	BDT 37.5(US$0.43)	8.45
Iron	1	BDT 40 (US$ 0.46)	9.01
Total (Avg)	**21.5**	**BDT 443.5 (US$ 5.15)**	**100**

Table 4: Average individual monthly income of the waste pickers

Daily earnings from waste selling (1)	BDT 443.5 (US$ 5.15)
Average number of active days (2)	24
Total monthly earnings (1X2)	BDT 10,644 (US$ 123.78)

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