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OCCUPATIONAL HEALTH AND SAFETY (OHS) COST MEASURES FOR THE SWEEPERS AT JASHORE AND BENAPOLE PAURASHAVA IN BANGLADESH

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ABSTRACT

Background: Jashore, the oldest and Benapole, a new municipality in Bangladesh which total area is 32 square km having 0.6 million people including 516 enlisted cleaners. They are living with limited services, though the National Policy on OHS was formulated which summarizes the existing policies, laws, and guidelines in the country. **Methods:** Respondents were selected through homogeneous sampling method. They were directly interviewed and provided their data which was analyzed using secondary data **Objectives:** To find out the monthly health and safety cost of a sweeper and how much additional cost they will agree to spend to ensure their occupational health and safety. **Results:** Their income sources are restricted, which is average 12187 BDT and expenditure is around 12679 BDT monthly. They do not have any savings options or any insurance for their financial security. Their profession as well as the health and safety issues are not secured by any authorities. Considering the types of profession, 18% are doing septic tank cleaning, 21% doing pit latrine cleaning and 61% are doing both. **Findings:** Study shows only 7% respondents use PPE set at the time of toilet/drain cleaning and 30% nothing used. But reality is, almost all know about the benefits of using PPE. The consequences for not following safety measures were about 25% suffered accidental injury and 28% of their family were affected by skin disease. For precautionary and treatment purpose, they need to spend an additional 8% of their monthly income. **Conclusion:** This study sought to offer recommendations on how PPE would be more usable, respondents positively responded. Traditional manual profession is reducing day by day and it has been increasing the vulnerable situation of the sweeper community. The priority is reducing, and they are considering it as a secondary profession.

Keywords: Cleaner; Sweeper; Income-Expenditure; OHS; Cost-Measures; PPE
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Introduction

Bangladesh has achieved a remarkable economic development and progress, with an average GDP growth rate of 6.5 percent over the past decade. But while poverty is being reduced through economic development, yet the country faces ongoing challenges including over population, economic disparities, natural calamities, and limited natural resources. Inadequate working conditions and labor rights issues are serious threats to workers' health and safety, further obstructing the country's growth prospects. To achieve its growth aspiration of becoming an upper-middle income country, the government needs to ensure

the continuity of developing initiatives with increasing dignity and ensuring the recognition of socially excluded community's rights as well as their profession.

The study discloses that the sweeper community has been living in a dark and vulnerable situation. In addition, they have been suffering discrimination in different forms, though the Constitution prohibits discrimination by the state on the ground of religion, race, sex, or place of birth under Article 28(1) and in 28(4). They have dedicated their lives for emptying and cleaning of septic tanks/pit latrines in our community and are treated as untouchable cast as they are sweeping human sludge. Mahatma Gandhi honored them with the title "Harijan" which means children of God. Historically, this community has been employed in sweeping and cleaning human waste and garbage. Habitually, they think themselves as sweepers from generation to generation. According to the international convention on the elimination of all forms of the racial discrimination agreement, the governments are bound to fulfill the basic needs of the employment, houses, education, and healthcare services of lower caste people.

There are about 3.5 to 5.5 million sweepers in Bangladesh, where the total number of registered sweepers in Jashore is 445 and in Benapole municipality 71, most of them are directly involved with manual emptying services. All sweepers are living in a scattered settlement both in Jashore and Benapole municipality. Both municipalities are providing them free accommodation and engage them with conservancy activities under temporary or master roll basis. Their monthly salary is not adequate as per their basic needs. So, they are involved with some other additional income sources. Jashore and Benapole municipality has developed an emptier/sweeper database and identified the dedicated sweepers who are directly involved with septic tank/pit latrine emptying. Both municipalities have been provided them OHS training with the support from WASH SDG project of SNV Netherlands Development Organization. There are 54 sweepers in Jashore and 30 sweepers from Benapole who received training. So, a major portion of sweepers are using unhygienic, traditional, and vulnerable strategy for doing their job. Considering the safety security during COVID-19, both municipalities provided them 600 sets of PPE in 2020 free of cost as a temporary protection. As most of the sweepers are involved in individual sweeping with manual approach, they have been suffering a health and safety crisis.

The National Policy on Occupational Health and Safety was formulated and adopted on 5th November, 2013 and summarizes the existing policies, laws, institutions and situation on workplace health and safety in the country. The policy obligates to provide training, guidelines on safety and Personal Protective Equipment (PPE) to the workers and to ensure their use in the workplace (Clause 4.d.7). It suggests to follow OSH-related guidelines provided by the employers to the workers (Clause 4.e.1). It also states that workers should take care of their own as well as co-workers' health and safety (Clause 4.e.2). The BLA Section 78A also sets clear guidance on using safety appliances for personal safety at work: Where applicable, the employer shall supply safety appliances, and shall not employ any person before ensuring the use thereof.

According to SDG's goal 1,2,3,4,6,8,10 and 11, there are many developing initiatives indicated under specific targets which need to be addressed in the national development plan through proper study, research, or survey findings. So far, some studies have been conducted regarding the history of the sweeper community, their culture, socialism, their traditional life, inclusion, way of living, etc. Most of the studies were taken in the learning topics except for a few for improving their equal access in every sphere of life. In this study we attempt to find out their existing occupational health and safety measures, their knowledge of OHS issues, importance of PPE, willingness of using PPE, how it influences their income with sustainability, etc. Which will help to take necessary holistic development initiatives from central level. As the Jashore and Benapole municipalities have been trying to implement the OHS plan working with the sweeper community as per their OHS guideline, we have selected those cities.

The main objective of the study is to find out the monthly health and safety cost of a sweeper and how much additional cost will be agreed to spend to ensure their occupational

health and safety as well as to increase their dignity. The specific objectives of the study are; find out the awareness level of PPE using and willingness to pay for it, find out treatment cost with including health and safety measures of a worker comparing with their income and identify possible ways to improve the livelihood status of the community. To achieve the objectives of this study, we have formulated some basic questions based on the respondent's culture, attitude, limitations, and level of education. All the research questions are consequential from the objectives. The study produces the answers as per step by step of the questions like; what is primary profession of the respondents and how much their monthly income, what equipment they are using at the time of septic tank/pit latrine emptying, how much money they must spend for precautions against diseases, how much time they need for emptying one septic tank/pit latrine, what is their willingness to pay for PPE to ensure their health and safety, how much is their savings or do they get any insurance coverage from somewhere, what types of chronic diseases they have and how much are their monthly expenses for that?

Literature Review

Manual pit-emptying – the removal of fecal sludge from pits and tanks using hands or basic tools – is a widespread practice in Bangladesh, and in other low- and middle-income countries. We find that government employees and self-employed groups are deprived of basic rights, fear a loss of income brought about by mechanization and cannot access alternative livelihoods (Zaqout et al., 2020; Hossain, 2022). Due to the manual handling process, the street sweepers are often exposed to a variety of risks factors – exhaust fumes, extreme noise, toxic substances, and dust particles. Frequent infections and injuries were reported commonly as they lack basic safety equipment during works. Low perceived health hazards were dominant. Strong faith-based explanations were found to rationalize possible health hazards (Ali et al., 2015)**.** Islam et al. (2007) mentioned, occupational safety and health is a key element in achieving sustained decent working conditions and strong preventive safety cultures.

Street sweepers play an important role for keeping the cities clean. However, this sector is often neglected (Lagura & Ligan, 2018*)***.** Hossain et al. (2015) said that, among the 110 respondents who are associated with waste generation, storage, and dumping, 63% were affected by one or more diseases such as diarrheal, chloral, hepatitis B and C, skin disease, infection with sharp wastes, etc. Among the 50 respondents associated with handling medical waste, more than 90% were affected by one or more of the above-mentioned diseases.

Lack of adherence to the Occupational Safety and Health (OSH) standards in many factories puts workers at exposure to risks, endangering their lives and could be fatal, as stated by Ahsan et al. (2019)**.** The National OSH Policy and the National Child Labor Elimination policy include clauses regarding disease(s) prevention and safeguarding. The National OSH Policy calls for identifying the risk of health and safety (Clause. A3), giving orientation to the persons engaged in formal and informal workplaces on the risk of possible accident, health risk and safety issues (Clause 3.4 (Tahmid, 2020)**.**

Scavenging is an inhuman economic activity that is harmful for health because of working in an unhygienic and unpleasant environment; but there is no other opportunity for livelihoods. The most common diseases amongst these scavengers are back pain, digestion problems and skin problems. Regarding their consultations for treatment, they cannot afford treatment by the doctors due to the reasons of lack of awareness and poverty. Opel et al. (2012) said demand is growing globally for appropriate technology and viable business solutions to pit-emptying and transportation services. There is a growing body of experiments on technological innovations in different contexts to find an effective solution.

The Bangladesh Labor Act 2006 is the key labor legislation that sets Occupational Health and Safety standards, and compensation for injury and accidents in the workplace. In 2013, significant amendments were made to the BLA 2006, regarding occupational health and safety

(Al Imran, 2020). The BLA 2006 also emphasizes on PPE under Section 78A, where it shows a clear guidance on using safety appliances for personal safety at work, like: where applicable, the employer shall supply safety appliances, and shall not employ any person before ensuring the use there of (Behnam et al., 2020). Roy (2022) said that the Bangladesh Labour Act 2006 is the country's primary statute governing the occupational health and safety of workers. This Act has put obligations upon employers and others toward workers in most industrial and commercial settings. The policy applies to all workplaces in Bangladesh, including formal and informal sectors of industries, factories, enterprises, business and commercial entities and farms (Department of Inspection for Factories and Establishments, 2019).

The National OSH Policy, the National Labor Policy, and the National Industrial Policy deal with the issues of workplace accident prevention. In the OSH Policy it clearly stipulates the need to ensure workplace health and safety protection considering international declarations/ recommendations (Art. 3.a.1). This policy obligates to provide training, guidelines on safety and Personal Protective Equipment (PPE) to the workers and to ensure their use in the workplace (Clause.4. d.7). It suggests following OSH-related guidelines provided by the employers to the workers (Clause 4.e.1). It also states that workers should take care of their own as well as co-workers' health and safety (Clause 4.e.2). (Behnam et al., 2020). Occupational health intervention has a positive effect toward the improvement of awareness level among the women sweepers which may change their health habits (Das et al., 2013).

There is no doubt that the direct, respectful, and unequivocal recognition of the status, cultural identity and integrity of all the people of Bangladesh is important, not the least, to correctly reflect the country's multicultural composition and heritage in the constitution. It is to be hoped that the situation will be corrected through an amendment soon (Roy, 2009). Sharma (2015) stated that, based on BLA, the compensation for work-related injury or death is not adequate and makes discrimination between adult and adolescent workers. Walker and Pratap (2012) said the law is silent on the provision of medical and life insurance and pension. The problem with most of the laws is that they do not specify the standards for various aspects of occupational health and safety, and they are only general in nature. As such, the prevalent rules and regulations are insufficient or inadequate in terms of standards and permissible limits.

Research Methods

To complete the study, technical and logical strategies were addressed to get the proper and realistic information data from field level. Date collections were done from primary and secondary data sources along with different literature reviews relevant with the topics. As many as 105 sweepers were the main respondents and municipal representatives like mayor, councilors, civil surgeon, and municipal officials were also interviewed under the primary data collection process. Some national and international level studies, reports, municipal databases, project reports, and case studies were reviewed under the literature review process. So, concluding the whole process of this study some significant stages were considered, such as developing concepts. Through this concept, we got the provisions of the Bangladesh Labor Law, 2006 and Bangladesh Labor Rules, 2015 and the OSH Profile which is the vital elementary step in the process of building an effective national OSH program.

Before preparing the structure of survey and designing the contents, a reconnaissance survey was conducted to get the overall ideas about the study's geographical area, livelihood, size of population, diversify of the professions, culture, level of education, social barriers, tenure ship, access to basic services, status of social inclusion, etc. After getting that information, it helped to determine the study objectives, selection of areas, selection of respondents and eventually a standard questionnaire was developed for the study.

For conducting the study, it was determined to use homogeneous sampling method. Selection of sample depends on the nature of the universe. It says that if the nature of universe

is homogeneous then a small sample will represent the behavior of the entire universe. This will lead to selection of a small sample size rather than a large one. Considering the similarity of profession, the sweeper community has been selected for sample data collection. Based on the questionnaire, 105 sweepers were selected as respondents from Jashore and Benapole municipal areas. Selected respondents are the main source of data in this study.

Most of the data have been collected from the respondents as per predesigned questionnaire following individual interview. In interview sessions both closed and open-ended questions were used to find the information. Questions related to profile were open-ended including profession, income, expenditure, health and safety cost, willingness to pay, status of using personal protective equipment, awareness level of PPE, importance of PPE, age, sex, family members, medical treatment cost, etc. Profession status of the sweeper has been segregated into primary and secondary variable. Their monthly income and expenditure were segregated in different levels of variables with different values. Willingness to pay was measured through a payment card approach. Some non-financial data have been taken by ordinal form.

Sometimes we conducted some KII with the city level relevant officials to find out the existing situation of the sweeper community's improvement initiatives, plan of actions for livelihood development, implementing status of OHS related policies, formulation of new policies or guideline regarding OHS, remuneration packages of sweepers, types of jobs of the community, jobs security, etc. Through this process it was also identified as to the causes and way forwards to overcome the situation. Though there were few secondary data relevant to this dissertation, we basically obtained them from online media, some surveyed data conducted by experts, statistical reports of INGOs, published reports, news covered and literature review.

After receiving all data from primary and secondary sources, they were composed and illustrated using computer software like MS Word, MS Excel and SPSS. All graphical and regression analysis was done by SPSS, which provided accurate information with small missing values. After a series of consecutive reviews, the supervisor suggested to finalize the report with some significant efforts and finally the study has been completed through an interactive presentation and publication.

Results and Discussion

Profession Details of Respondents

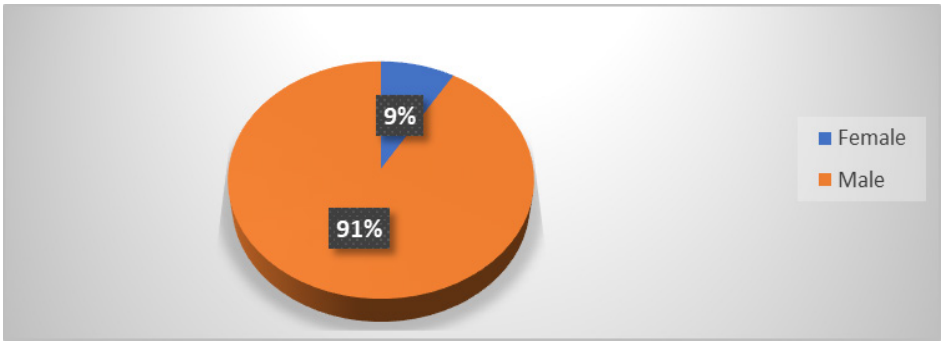

Figure 1: Sex of Respondents

During data collection period, we interviewed a total 105 respondents where male is 91% and female near about 9%. This report shows (Figure 1) that being an excluded as well as challenging job, women have been engaged with it for surviving alongside male respondents.

Nature of Respondent's Profession

The main profession or income source of the respondents is human waste cleaning,

like septic tank, pit latrine, drain, etc. As per Figure 02, 18% of respondents' profession is only septic tank emptying/cleaning, 21% is only pit latrine emptying and 61% are involved with emptying both.

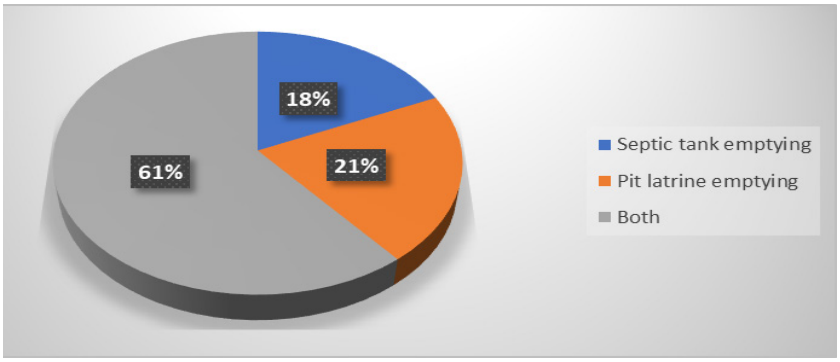

Figure 2: Respondent's profession

Priority of Respondent's Profession

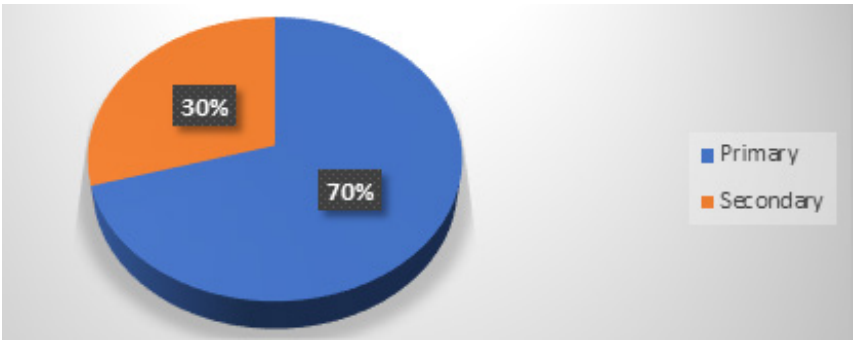

Figure 3: Primary & secondary profession

Their waste cleaning profession is also different based on their priority. Some respondents took it as primary, and some respondents took it as secondary profession. Figure 03 shows that only 30% respondents took it as primary profession and 70% took it as secondary profession. As Jashore municipality (70% respondents from Jashore) has been implementing human waste cleaning under FSM service of the WASH SDG project and discouraging manual cleaning service and Benapole municipality has started the same, s the respondent's traditional manual profession might be in a vulnerable situation and gradually its priority is being reduced and they are considering it as secondary profession.

Average Income & Expenditure

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Dev
Total monthly income (BDT)	105	3500	21000	1279700	12187.62	3880.045
Total monthly expenditure (BDT)	105	1000	22000	1331350	12679.52	3834.420
Total monthly savings (BDT)	105	0	1000	24050	229.05	318.257
Valid N (listwise)	105					

Both city's sweepers are mainly dependent on their primary profession like septic tank cleaning, pit latrine cleaning and drain cleaning. They do it manually through individual corresponding with the consumers. They settle their remuneration/emptying charge based on bargaining with the consumers. At the time of data collection, we obtained the details of their monthly income and expenditure based the emptying profession. As per Table 2, the average

monthly income of a respondent is 12187 BDT, and their monthly average expenditure is around 12679 BDT. So, it shows that they do not have any options to save for their financial crisis. In some cases, they have a small option to save such as a monthly average 229 BDT, which is not mentionable.

Analysis of Emptying Charge & Details

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Variance
Average emptying time for one emptying	105	1	4	2.20	.354
Average charge for one emptying	105	1000	5000	2169.52	636946.886
Daily cost of devices using	105	50	500	182.95	5034.469
How many septic tanks/pits emptying weekly	105	1	4	2.28	.760
How long you have been working in a day	105	3	10	6.01	1.567
Valid N (listwise)	105				

Another descriptive analysis shows (Table: 3) that only two septic tank/pit latrines are now being cleaned in a week on an average and the required cleaning time is two hours for each toilet. The remuneration is average 2170/- BDT and the required expenditure only for this purpose is average 183/- BDT daily and effective working time is average six hours daily.

Average Income as per City Location

Table 3: Group Statistics

	Name of City	N	Mean	Std. Deviation	Std. Error Mean
Total monthly income (BDT)	Jashore Paurashava	70	12195.71	3469.763	414.716
	Benapole Paurashava	35	12171.43	4649.388	785.890

A group statistic was done to find out the average monthly income of the respondents based on the city, where we found the monthly average income of Jashore is around 12196/- BDT and of Benapole is around 12171/- BDT as per Table 4.

Significance of Location for the Income level

Table 4: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Total monthly income (BDT)	Equal variances assumed	2.953	0.089	0.030	103	0.976	24.286	807.132	-1576.470	1625.041
	Equal variances not assumed			0.027	53	0.978	24.286	888.601	-1757.613	1806.185

An independent-samples t-test was conducted to compare the mean monthly income of Jashore and Benapole municipality. There were not found any significant difference in the scores for Jashore (M=12196, SD= 3470) and Benapole (M=12171, SD=4649) with t(103) =0.030, p=0.976 and t(53)=0.27, p=0.978. As per Table 5 and 4.

So, these results suggest that the monthly income of respondents for Jashore and Benapole municipality are not significantly different.

Occupational Health & Safety (OHS) Measures Status of PPE using level

Table 5: Use of PPE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	55	52.4	52.4	52.4
	No	32	30.5	30.5	82.9
	Sometimes	18	17.1	17.1	100.0
	Total	105	100.0	100.0	

Both municipalities approved OHS guideline for ensuring occupational health and safety issues of the enlisted sweepers and developed OHS plan. According to the plan, both municipalities trained up a group of OHS trainers who provided OHS training to the enlisted septic tank/pit emptiers and handed over full PPE sets free of cost. It was tried to identify the practice level of PPE using while emptying toilets. As per Table 6, we found 52% respondents use some PPE, 17% use sometimes and 30% respondents use nothing at the time of emptying septic tank/pit.

Types of Equipment at the Time of Emptying

Table 6: Equipment used at the time of emptying regularly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Only free hand	29	27.6	27.6	27.6
	Mask, Alcohol	18	17.1	17.1	44.8
	Use of full PPE set	7	6.7	6.7	51.4
	Bucket and bamboo	6	5.7	5.7	58.1
	Alcohol/kerosene	1	1.0	1.0	59.0
	One-time hand gloves	2	1.9	1.9	61.0
	One-time masks	12	11.4	11.4	72.4
	Gumboot	1	1.0	1.0	73.3
	Others	2	1.9	1.9	75.2
	Bucket, bamboo, alcohol, hand loves, masks, gumboot	4	3.8	3.8	79.0
	Bucket, bamboo, alcohol, masks	22	21.0	21.0	100.0
	Total	105	100.0	100.0	

According to the analytical Table 7, about 7% respondents are using a full PPE set at the time of septic tank/pit/drain cleaning. It seems like a positive change while 27.6% respondents work only with a free hand, which is very risky for getting injury. About 6% of respondents only use bucket and bamboo as a traditional approach.

Assess the Relationship between Monthly Income and Other Variables

A multiple regression test was conducted to assess the relationship between monthly income of respondents (dependent variable) and other independents variables as per Table 8**.** The result shows that, there are some independent variable's probability value or p value less than .05 (p=.000, .008, .026, .021). So, the report suggests that there are some significant positive relationships between respondent's monthly income with average charge for one emptying, family members are in same profession, average emptying time for one emptying,

daily cost of using devices, female member and what was the PPE purchase cost (B=.391, .322, .163, .294, .265, t=4.726, 3.799, 2.260, 3.762, 2.718). However, there was not any significant positive relationship between the mentioned dependent variable and independent variables (B=.094, .041, .001, .120, t=1.275, .529, .013, 1.296, p=.205, .598, .989, .198).

Table 7: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1.	(Constant)	2003.208	2466.731		812	0.419	-2895.933	6902.348
	How long have you been working in a day	289.683	227.149	0.094	1.275	0.205	-161.454	740.821
	How many septic tanks/ pits emptying weekly	179.444	339.406	0.041	0.529	0.598	-494.646	853.534
	Average charge for one emptying	1.886	0.399	0.391	4.726	0.000	1.094	2.679
	Have any family members in same profession	2407.595	633.792	0.322	3.799	0.000	1148.829	3666.362
	Average emptying time for one emptying	959.896	424.749	0.163	2.260	0.026	116.307	1803.485
	Daily cost of devices used	16.080	4.275	0.294	3.762	0.000	7.590	24.569
	Age of respondent	-0.329	24.898	-0.001	-0.013	0.989	-49.778	49.120
	Male members	-473.543	365.269	-0.120	-1.296	0.198	-1198.998	251.912
	Female members	-1092.629	401.929	-0.265	-2.718	0.008	-1890.896	-294.363
	What was your PPE purchase cost for the last 3 months	3.673	1.561	0.186	2.353	0.021	0.573	6.774
	What is your last month's normal precautionary expenses	1.394	0.848	0.116	1.644	0.104	-0.290	3.078
	How much is your monthly exceptional cost regarding your profession? (Drug, alcohol, kerosene, cigarettes, etc. it would not be mentioned in final report)	-0.594	1.006	-0.042	-0.591	0.556	-2.591	1.403

a. Dependent Variable: Total monthly income (BDT)

Assumption Level of Variables

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.755[a]	0.570	0.514	2705.928

a. Predictors: (Constant), How much is your monthly exceptional cost regarding your profession? (Drug, alcohol, kerosene, cigarettes, etc. it would not be mentioned in final report)? Have you any family members in the same profession? How long you have been working in a day? Age of respondent, Average emptying time for one emptying. What was your PPE purchase cost in the last three months? What were your last month's normal precautionary expenses? How many septic tanks/pits need emptying weekly? Male members; Daily cost of devices used; Average charge for one emptying; Female members

The value of adjusted R square is .514 as per Table 9**.** So, **t**his multiple regression test justifies only 51.4% of our assumptions.

Health Cost Status of the Respondents

Table 9: Types of diseases generally suffered

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Asthma	21	20.0	20.0	20.0
	Others	2	1.9	1.9	21.9
	Skin diseases+corona	36	34.3	34.3	56.2
	Asthma+Dengue+Skin disease	2	1.9	1.9	58.1
	Asthma+corona	1	1.0	1.0	59.0
	No	3	2.9	2.9	61.9
	Flu	21	20.0	20.0	81.9
	Tuberculosis	1	1.0	1.0	82.9
	Corona	1	1.0	1.0	83.8
	Diarrhea	2	1.9	1.9	85.7
	Jaundice	1	1.0	1.0	86.7
	Skin Disease	11	10.5	10.5	97.1
	Leprosy	3	2.9	2.9	100.0
	Total	105	100.0	100.0	

Respondents concern about different types of diseases as they usually suffer by them. The important diseases are asthma, skin disease, diarrhea, various flues, etc. As we are going through a very hard time during the COVID-19 pandemic, respondents are also suffering from it. As per Table 5.9, 34% respondents suffered skin diseases and corona, 20% respondents suffered asthma and 20% respondents suffered viral flu.

Types of Diseases needing to take Medicine or Hospitalization

Table 10: Types of diseases requiring to take medicine/hospitalization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Asthma	3	2.9	2.9	2.9
	Injury/accidental	26	24.8	24.8	27.6
	Asthma+Skin disease+Injury/ accidental	10	9.5	9.5	37.1
	Asthma+Diarrhea	11	10.5	10.5	47.6
	No	6	5.7	5.7	53.3
	Flu	11	10.5	10.5	63.8
	Diarrhea	6	5.7	5.7	69.5
	Skin disease	30	28.6	28.6	98.1
	Leprosy	2	1.9	1.9	100.0
	Total	105	100.0	100.0	

It is a major concern that, due to professional nature, all respondents always live with accidental risk. Sometimes death also happens as well as injury, fracture, gas reaction, heart attack, friction bar, etc. As a result, a financial damage occurs for the treatment purpose. Based on the severity of injury, sometimes work efficiency also reduces. As per Table 11, about 25% respondents suffered accidental injury, 29% suffer skin diseases, 10% suffer diarrhea and asthma and sometimes they suffer flu and leprosy.

Types of Diseases Affected in last Six Months

During the last six months of the reporting period, respondents and their family were affected by skin diseases, corona, asthma, diarrhea, flu, accident, etc. As per the graphical diagram below Figure 04 shows at least 28% respondents and their family were affected by skin disease and more than 10% suffered diarrhea.

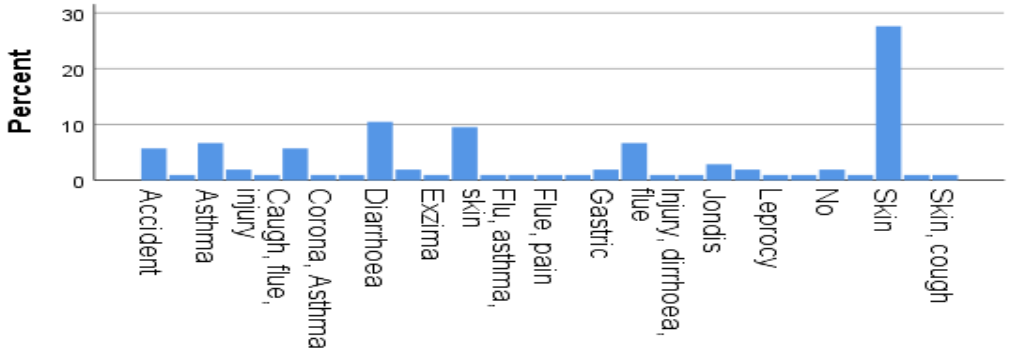

Figure 4: Nature of affected diseases

Precautionary Expenses (Before Sickness)

Table 11: Descriptive Statistics of Precautionary Expenses

	N	Range	Min	Max	Mean	Std. Dev
What were the last 6 months expenses for preventing purpose	105	7750	1250	9000	4155.71	1759.006
Valid N (listwise)	105					

To be safe from diseases, respondents take some precautions, which creates an extra burden on their monthly income. As per descriptive statistics, Table 12 shows that respondent have to spend an average 4156 BDT per six months for precaution purposes and monthly average is 693 BDT which is about 6% of their monthly income.

Treatment Expenses (After Sickness)

Table 12: Descriptive Statistics of Treatment Expenses

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
What was the total current month expenses for the treatment	105	0	1200	640.48	283.19	80196.88
Valid N (listwise)	105					

To be released from sickness, respondents have to spend some additional cost, which creates an extra burden on their monthly income such as for precautionary purpose. As per descriptive statistics, Table 13 shows that respondents must spend an average monthly 640 BDT for treatment purpose which is about 5% of their monthly income.

So, as per precautionary and treatment purpose, every respondent spends an additional 11% of their monthly income excluding all other monthly expenses.

Willingness to pay for PPE & Safety Measures

Reasons of not using PPE

PPE is very much essential for ensuring health and safety of the sweepers at the time of their cleaning works. We obtained the status as per Table 6 which shows there are

30.5% respondents who are not using any PPE at the time of their jobs. As per Table 14, 31% mentioned that PPE is very costly, 46% mentioned that it is costly, and they do not get it free. On the other hand, 10% do not know how it can be properly used.

Table 13: reasons of not using PPE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	It is costly	33	31.4	31.4	31.4
	Don't get it free	11	10.5	10.5	41.9
	Don't know its usage	11	10.5	10.5	52.4
	It is costly+don't get it free+don't know its usage	48	45.7	45.7	98.1
	It is costly+don't get it free	2	1.9	1.9	100.0
	Total	105	100.0	100.0	

Awareness Level regarding the Necessity of PPE

Table 15: Why PPE is necessary

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	To protect from personal risks	16	15.2	15.2	15.2
	Easily doing works	1	1.0	1.0	16.2
	Safe for environmental pollution	3	2.9	2.9	19.0
	Ensure physical health	6	5.7	5.7	24.8
	To protect from personal risks+easily doing works+safe for environmental pollution+ensure physical health	25	23.8	23.8	48.6
	Protect personal risks+easily doing works+others	13	12.4	12.4	61.0
	To protect from personal risks+easily doing works	16	15.2	15.2	76.2
	Protect from personal risk+ensure physical health	25	23.8	23.8	100.0
	Total	105	100.0	100.0	

Considering the awareness level of the importance of PPE using, almost all respondents know about the different types of benefits for using PPE (Table 15). Respondents clearly described why they are not using PPE.

How PPE will be Acceptable

Table 16: How PPE will be more acceptable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Materials will be comfortable	4	3.8	3.8	3.8
	Material will be comfortable	13	12.4	12.4	16.2
	Easily usable	2	1.9	1.9	18.1
	Low cost/free supply	14	13.3	13.3	31.4
	If provided free	23	21.9	21.9	53.3
	Reusable	5	4.8	4.8	58.1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Provided by Paurashava	33	31.4	31.4	89.5
	Provided by NGOs	1	1.0	1.0	90.5
	Others	2	1.9	1.9	92.4
	Low cost+free supply+provided by NGO	8	7.6	7.6	100.0
	Total	105	100.0	100.0	

Based on their discussion regarding PPE using, feedback was sought from respondents on how PPE using would be ensured. They suggested some significant recommendations as per Table 16; such as, 31% said that PPE should be provided by the municipality, 22% suggested that it should be got free from somewhere, 12% emphasized that material should be comfortable, 13% mentioned that it is costly so price should be low and 8% requested it to be provided by NGOs.

Willingness to Pay for Safety Measures

A payment card method was tested through case processing summary of SPSS among the respondents where existing septic tank/pit latrine cleaning cost was discussed in comparison with moderately improved and highly improved cost. After discussion, respondents were requested to choose one viable option among three options: lower bid, initial bid and upper bid. Table 17 shows 100% of respondents were agreed to live with a moderately improved cleaning procedure.

Table 17: Case Processing Summary[a]

	Cases					
	Included		Excluded		Total	
Total	N	Percent	N	Percent	N	Percent
Current Price level 1100/-taka (moderately improved) * Will you want to purchase PPE considering your safety?	100	100.0%	0	0.0%	100	100.0%

a. Limited to first 100 cases.

Findings

Based on the detailed discussion regarding occupational health and safety measures and its relevant cost, we found some significant information regarding the livelihood style of the sweeper community. The local tradition, socioeconomic situation, culture, and diversity of professions have been influencing them to be developed, but their overall situation has not yet changed holistically. Such as, 18% of respondents' profession is only septic tank emptying/cleaning, 21% is only pit latrine emptying and 61% are involved with emptying both. Considering the secured earning source, only 30% respondents took it as primary profession and 70% took it as secondary profession. One of the major concerns is that the traditional manual profession is being reduced day by day and it has been increasing the vulnerable situation of the sweeper community.

The average monthly income of a respondent is 12187 BDT, and their monthly average expenditure is around 12679 BDT. So, they do not have any options to save for ensuring their financial security. Seven percent of respondents use full PPE set at the time of septic tank/ pit/drain cleaning but 30% respondents use nothing at the time of cleaning works. About 25% respondents suffered accidental injury and 28% respondents and their family were affected by skin disease. They have to spend an average 4156 BDT per six months for precaution purpose. On average, 11% of their monthly income is being used for precaution and treatment purposes,

excluding all other monthly expenses. Considering the awareness level of the importance of using PPE, almost all respondents know about the different types of benefits for using PPE, and 100% of respondents were agreed to live with a moderately improved cleaning procedure, which is very promising toward livelihood development.

Conclusion

The sweeper community is one of the most vulnerable poverty groups in our country. They are excluded from the mainstreaming development approach. They are also living with discrimination as the lowest caste among the Hindu religion. So, they are facing many inhuman adversities such as their education level is marginal, their personal safety security knowledge is poor, their financial structure is weak, they are not capable enough to manage their daily needs, they are living under unhygienic environments and so on. The United Nations, with the ILO as its lead agency on work-related issues, is working to improve the OSH situation of Bangladesh alongside several international labor and human rights organizations.

SNV Netherlands Developments Organisation has been working with wastewater workers and sweepers of Jashore and Benapole municipality to ensure their OSH in the workplace especially at the time of emptying septic tanks/pit latrines. This INGO has developed a detailed OSH plan along with OSH guidelines under the WASH SDG project for the sweepers or wastewater workers at the city level. The major objective of this study is to analyze the awareness level of PPE use and willingness to pay for it and to find out treatment cost with health and safety measures of a sweeper compared with their income. After completing the research, some significant knowledge was gathered such as their occupational safety measures are not so strong due to their financial incapability though their awareness level of safety measures is significantly high.

Many research and relevant documents were reviewed to get the relationship among PPE using, health and safety issues and monthly income increasing ratio, which was not found. This was the major research gap in this study. In all modes, sustainable livelihoods are delayed by deep-rooted social and financial barriers. Organizations can support the sweeper community by designing sanitation interventions that prioritize the human right to decent work, focusing not only on the beneficiaries of universal sanitation, but also on those who work to implement this ambitious goal. In the concluding remarks, it can be said that the overall social inclusions of the sweeper community have been gradually improving with economical scarcity, but it does not meet the minimum standard of livelihood. We should move forward.

Limitations of the Study

This study was confined in a limited time for the interview with primary targeted respondents in the so-called untouched community. On the other hand, the areas are situated in a busy city level places where respondents were not available all the time, so, it was challenging to collect data from them. Total time was three months to complete the dissertation for the entire project including data analysis and reporting. Limited access to the secondary data sources available on the internet was also an extra time-consuming problem.

Declaration

Author declared on the following issues-

Conflict of Interest

The author declares that the research was conducted without any commercial or financial relationships.

Availability of Data and Materials

Author analysed the article with secondary and primary data. Primary data collected directly from respondents. All data are available, and it can be shared upon request.

Author's Contribution

Title setting, conceptualization, contents design, methodology, data collection, data analysis, content review, visualization, original draft, revised draft, and final editing.

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