European Journal of
Health Sciences
(EJHS)

ASSESSMENT OF OCCUPATIONAL HEALTH AND SAFETY AMONG SOLID WASTE WORKERS IN ABUJA MUNICIPAL AREA COUNCIL

Oyelayo A. Adekiya, John Y. Magaji, and Kate O. Ogbonna

European Journal of Health Sciences
ISSN 2520-4645 (online)
Vol.7, Issue 1, pp 23 - 35, 2022

www.ajpojournals.org

ASSESSMENT OF OCCUPATIONAL HEALTH AND SAFETY AMONG SOLID WASTE WORKERS IN ABUJA MUNICIPAL AREA COUNCIL

Oyelayo A. Adekiya[1], John Y. Magaji[1] and Kate O. Ogbonna[2]

[1]Department of Geography and Environmental Management, University of Abuja.

[2]Abuja Environmental Protection Board, Abuja

Corresponding author's e-mail: oyelayoadekiya@gmail

ABSTRACT

Purpose: Risks occur at every step in the waste management process, from the point of collection at homes, during transportation and at the sites of recycling or disposal. This study aimed at assessing the occupational health and safety of solid waste workers in Abuja Municipal Area Council.

Methods: Descriptive survey research was employed for the study. A sample population of 327 waste workers was obtained by using the Krejcie & Morgan, (1970) model for sample size determination. The random sampling technique using the table of random numbers was employed in selecting the waste workers. The instrument used for this study was a structured questionnaire. The questionnaire collected information on socio-demographic characteristics of waste workers, safety tools and hygiene practices, occupational injuries and diseases and awareness on Covid 19, disease. Descriptive statistics were employed in analyzing the data, with the aid of the Statistical Package for Social Sciences (SPSS).

Results: The results were presented in tables and charts. The results revealed that aprons and face masks were the most commonly used PPE among waste workers. It accounted for 73% and 52% among the waste collectors/ sweepers respectively. Among the crewmen, it also accounted for 45% and 23% respectively. Only about 46 % of the waste workers take their baths after work. Injuries from vehicles accounted for the highest among the waste workers. This accounts for 34 % among the domestic waste collector/sweepers and 29% among the crewmen.

Conclusion: The several types of occupational diseases among the solid waste workers include fatigue (78% among the domestic waste collector/sweepers and 66% among the crewmen), back pain, chest pain, and cough. There is a significant difference in the prevalence of occupational health diseases among solid waste workers.

Recommendations: The study, recommends that waste workers should be trained on occupational and health safety and the use of personal protective equipment (PPE) should be encouraged among the workers.

Keywords: *Diseases, Injuries, Personal Protective Equipment (PPE), Waste and Waste workers.*

INTRODUCTION

Municipal solid waste (MSW) is the outcome of economic productivity and consumption and it includes wastes from households, commercial establishments, institutions, markets, industries and construction, demolition, process. The handling and disposal of solid waste are now of environmental and public‐health concern (Porta et al 2009). Municipal waste management is the collective process of sorting, storage, collection, transportation, processing, resource recovering, recycling and disposal of waste. (Abila & Kantola 2013). According to Cointreau‐Levine (2006), risks occur at every step in the waste management process, from the point of collection at homes, during transportation and at the sites of recycling or disposal. The Bruhat Bengaluru Mahanagara Palike (BBMP) solid waste management Bylaws (2020) define waste workers as all persons who are involved in waste management. They include- street sweepers who collect streets sweeping waste and carry out the cleaning of public places – Helpers who assist in the collection of waste from doorsteps in the primary collection vehicles and loading of waste in secondary transportation vehicles. - Drivers who drive the primary collection and secondary transportation vehicles. - Supervisors who are assigned to a mustering location or block to supervise the activities of the above waste workers. Waste workers face numerous occupational hazards, such strains from lifting, injuries from sharp objects and contact with pathogens when manually handling the wastes (Patil &Kamble, 2017). Workers are exposed to a wide variety of health hazards, which can occur via skin contact, injection, ingestion and inhalation (Health and Safety Executive, 2007; Tchobanoglous & Kreith, 2002; Suleman et al., 2015).

The Municipal Solid Waste (MSW) workers in the developing countries are at more risk than those in the developed countries where direct handling of the waste is limited to enhance process efficiency and ensure worker protection. This is because in many developing countries the authorities do not give attention to waste workers due to various reasons such as lack of proper planning, weak waste management system and unequal resource distribution. Waste workers are often at the bottom of the social ladder and are often deprived of education and health care (Baral 2018). Waste workers are mostly overridden by the social, economic, and environmental deprivations (Jayakrishnan, et al 2013). Municipal solid waste workers (MSWWs) have a risk of fatal occupational injuries that is much higher than for the general workforce (Dorevitch & Marder, 2001)

Worldwide, it is estimated work-related diseases and injuries were responsible for the deaths of 1.9 million people in 2016, according to the first joint estimates from the World Health Organization (WHO) and International Labour Organization (ILO). Asia had the highest number of fatalities among 5 regions (of Africa, Asia, America, Europe and Oceania) followed by Africa (Hamalainen et al 2017). Occupational health and the well-being of working people are crucial for productivity and are important for overall socio-economic and sustainable development. One of the targets of Sustainable Development Goal number 3(SDG 3) is to reduce injuries and deaths from accidents, prevention of occupational accidents, injuries, diseases and the protection of workers against physical and minimize the unnecessary loss of human and material resources. (Mamuya & Badi 2019).

In Nigeria, collection and transportation of solid waste to the final disposal site from the communal disposal site are done by State, Local government authorities, or appointed private contractors. The Abuja Environmental Protection Board (AEPB) is responsible for solid waste management in

Abuja. Like all other waste management agencies in Nigeria, AEPB is faced with numerous problems like inadequate budgetary provision, lack of institutional framework, inadequate bylaws and regulations (Abur et al 2014). In Nigeria and FCT in particular there has been little study of the health and injury incidence of solid waste workers. Most of the reviewed studies are in the southern part of Nigeria (Oyelola et al 2018, Adeyi, & Adeyemi, 2019). No studies have been conducted thus far in Abuja Municipal Area Council regarding occupational health effects among workers engaged in solid waste collection, processing and disposal.

The National Policy on Labour section 17, subsection 3c of the 1999 Constitution of the Federal Republic of Nigeria states that – ″ The health, safety and welfare of all persons in employment are safeguarded and not endangered or abused ″ and 3d states that – ″ There are adequate medical and health facilities for all persons.″ (ILO 2016) It is against this background that this study attempted to assess the occupational health and safety of solid waste collectors and roadside sweepers in Abuja Municipal Area Council.

METHODOLOGY

Study Area

The Federal Capital Territory (FCT) was created in1976, it is 1,100km away from Lagos. It is located in the heartland of the country, it lies between Latitudes 8^0 25'and 9^0 21' north of the equator and Longitudes 6^0 45'and 7^0 39'east of the Greenwich meridian. Its area of land coverage is 8,000 km^2. The Federal Capital Territory is divided into six area councils namely: Abaji, Kwali, Kuje, Bwari, Gwagwalada, and Abuja Municipal Area Council (AMAC). The Federal Capital City (FCC) is located within the Abuja Municipal Area Council. The AMAC which is the study area has an estimated land of 1,769km^2. According to the National Population Commission, the projected population of AMAC is 1,967,500 in figure 1 (City population 2020).

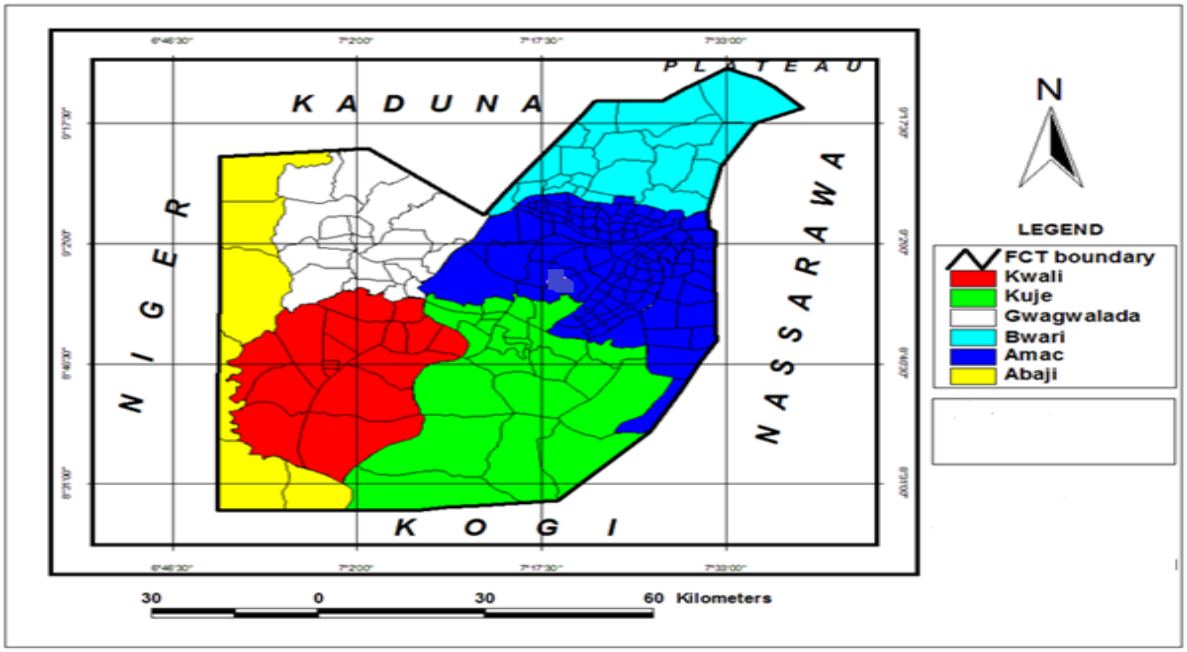

Figure 1: FCT shows the six are councils including Abuja Municipal Area Council (AMAC)
Source: Dept. of Geography, University of Abuja

Study population

Descriptive survey research was employed for the study. The population consisted of 2172 waste management workers (crewmen 587, sweepers/domestic waste collectors-1585) from 42 registered service providers in Abuja Municipal Area Council (AMAC) of the FCT. A sample population of 327 waste workers was obtained by using the Krejcie & Morgan, (1970) model for sample size determination. The random sampling technique using the table of random numbers was employed in selecting the 327 waste workers.

$$S = \frac{X^2 NP(1-P)}{d^2(N-1)+X^2 P(1-P)}$$

Where:

S = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be 0.50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

Instrumentation and Data Analysis

The instrument used for this study was a structured questionnaire. The questionnaire was divided into four sections. The first section collected information on the socio-demographic characteristics of waste workers. The second section collected information on safety tools and hygiene practices. The third section was on occupational injuries and diseases and the fourth section was on awareness on Covid 19, disease. Descriptive statistics were employed in analyzing the data, with the aid of the Statistical Package for Social Sciences (SPSS). The results were presented in tables and charts. Chi-square statistics were used in testing the stated hypothesis that "there is no significant difference in the prevalence of occupational health diseases among the solid waste workers".

RESULTS AND DISCUSSION

Demographic Characteristics of the Respondents

The results of this study are presented in five sections. The first section deals with the socio-demographic characteristics of respondents. The second section deals with, types of personal protective equipment (PPE) of solid waste workers. The third section deals with the hygiene practices of solid waste workers. The fourth section deals with occupational injuries of solid waste workers while the fifth and sixth sections deal with occupational health diseases of solid waste workers and routine medical check-ups and knowledge of Covid -19 among solid waste workers respectively.

Table 1: Socio-Demographic Characteristics of Solid waste workers

Variables		Domestic waste collectors/ Sweepers		Crewmen	
		Frequency	Percentages	Frequency	Percentages
Gender	Male	82	34.3	88	100
	Female	157	65.7	-	
Total		239	100	88	100
Age(in years)	15-25	32	13.4	17	19.3
	26-36	98	41	33	37.5
	≥ 37	109	45.6	38	43.2
Total		239	100	88	100
Educational Status	No Education	111	46.4	44	50
	Primary	71	29.7	27	30.7
	Secondary	56	23.4	17	19.3
	Tertiary	1	0.4		
Total		239	100	88	100
Number of working hours per day	1-4	41	17.2	12	13.6
	5-8	190	79.5	72	81.8
	≥9	8	3.3	4	4.5
Total		239	100	88	100
Years of working	< 1	11	4.6	9	10.2
	1-6	86	36	39	44.3
	>6	142	59.4	40	45.5
Total		239	100	88	100
Monthly income	< N30,000	193	80.8	62	70.5
	N31,000-N60,000	37	15.5	24	27.3
	>N61,000	9	3.8	2	2.3
Total		239	100	88	100

Source: Field Survey, 2021

In Table 1, about 66% of the domestic waste collector/sweepers are female, while all the crewmen (100%) were males. The table shows that 19.3% of the solid waste workers are between the ages of 15-25 years, 41 % are between 26-36 years, and 43.2 % are 37 years and above. Over 46% of solid waste workers have no formal education. The study revealed that 80 % of the solid waste workers for 5-8 hours per day. Over 46 % of the waste worker have over 6 years of working experience. The wages for the waste workers reported in this study were meager to support their living, in urban areas. The majority of the waste workers (70%) earn about N30, 000 per month.

Types of Personal Protective Equipment (PPE) Of Solid Waste Workers

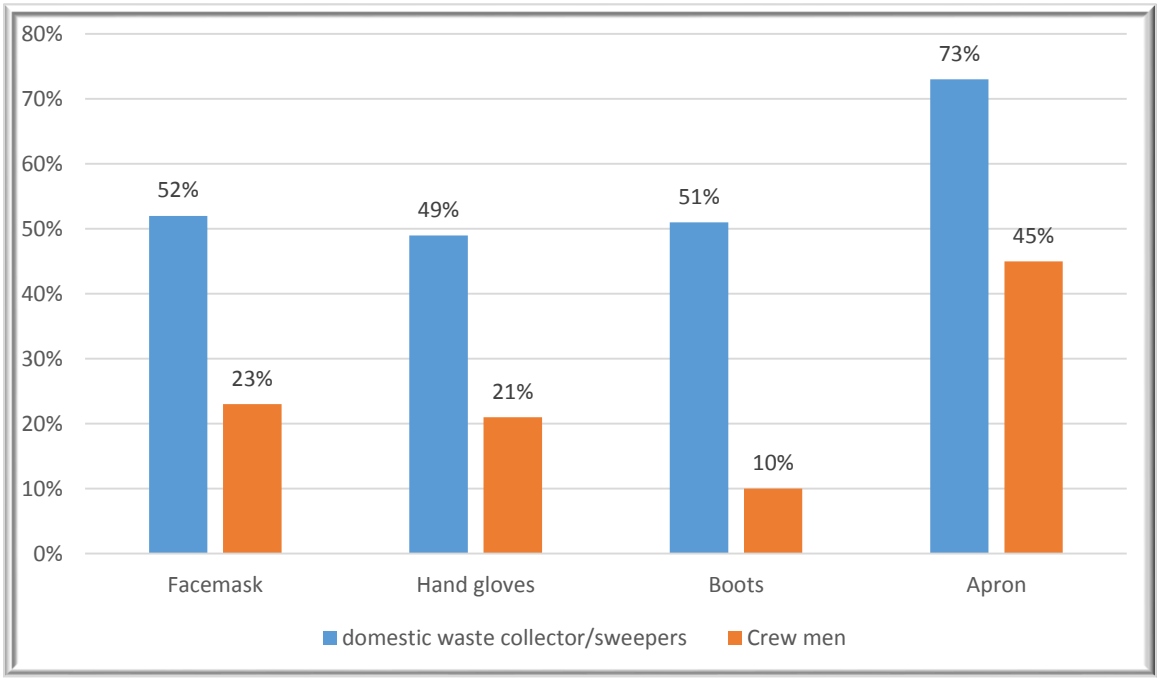

Figure 1: Types of Personal Protective Equipment (PPE) of solid waste workers

The usage of Personal Protective Equipment (PPE) among solid waste workers differs. Figure 1 revealed that the domestic waste collectors/sweepers use more personal protective equipment than the crewmen. The apron was the most commonly used PPE among the domestic waste collectors/sweepers (73%), followed by face masks (52%), boots (51%) and hand gloves (49%). Also among the crewmen, the use of apron accounted for 45%, followed by face mask (23%), hand gloves and boots.

Hygiene Practices of Solid Waste Workers

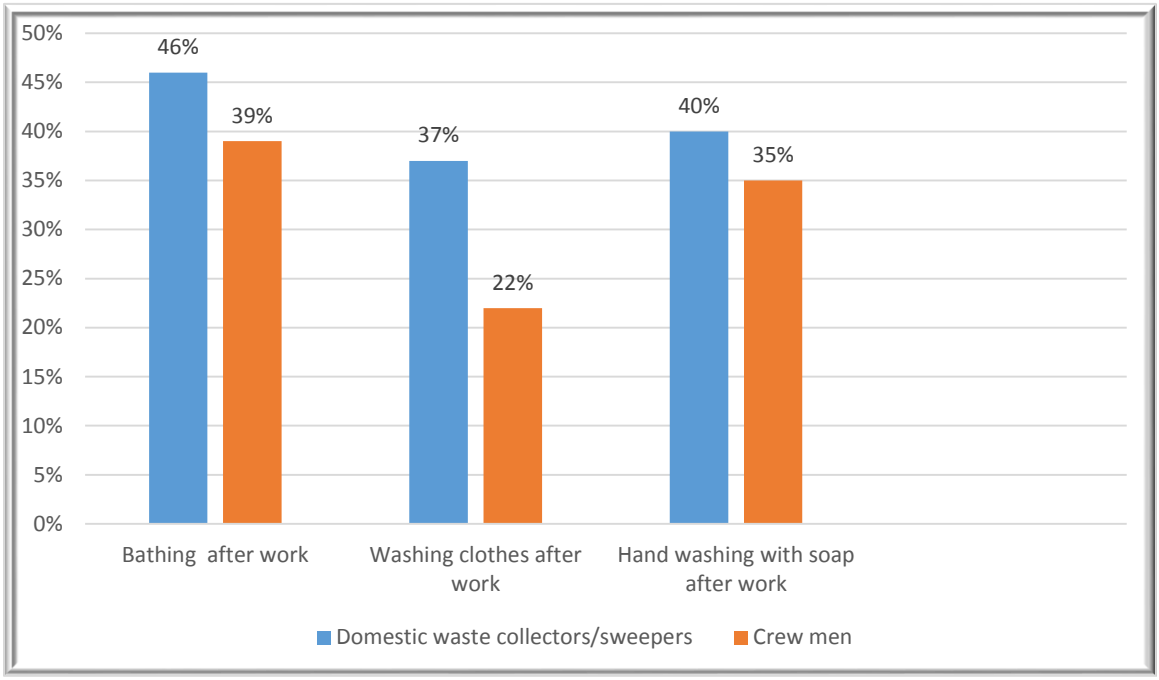

Figure 2: Hygiene Practices of solid waste workers

Figure 2, also revealed poor hygiene practices among the solid waste workers. Only about 46 % of workers take their baths after work. About 37 % of them wash their clothes after work and 40 % of the workers do not wash their hands with soap after work.

Occupational Injuries of Solid Waste Workers

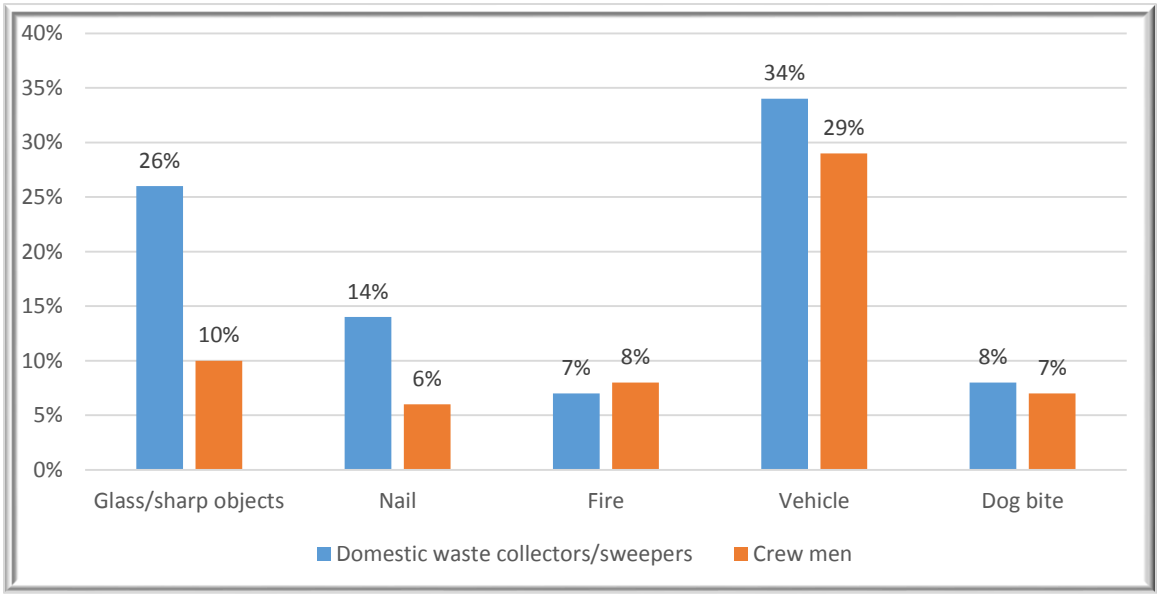

Figure 3: Occupational Injuries of solid waste workers

Figure 3, revealed the occupational injuries of solid waste workers. Injuries from vehicles account for the highest numbers both with the domestic waste collector/sweepers and the crewmen. This accounts for 34 % among the domestic waste collector/sweepers and 29% among the crewmen. Injuries from broken glass and sharp objects account for 26 % among the domestic waste collectors/sweepers and 10% among the crewmen. Other forms of injuries among the waste workers include nails (14% domestic waste collector/sweepers and 5% among the crewmen) and dog bites.

Occupational Health Diseases of Solid Waste Workers

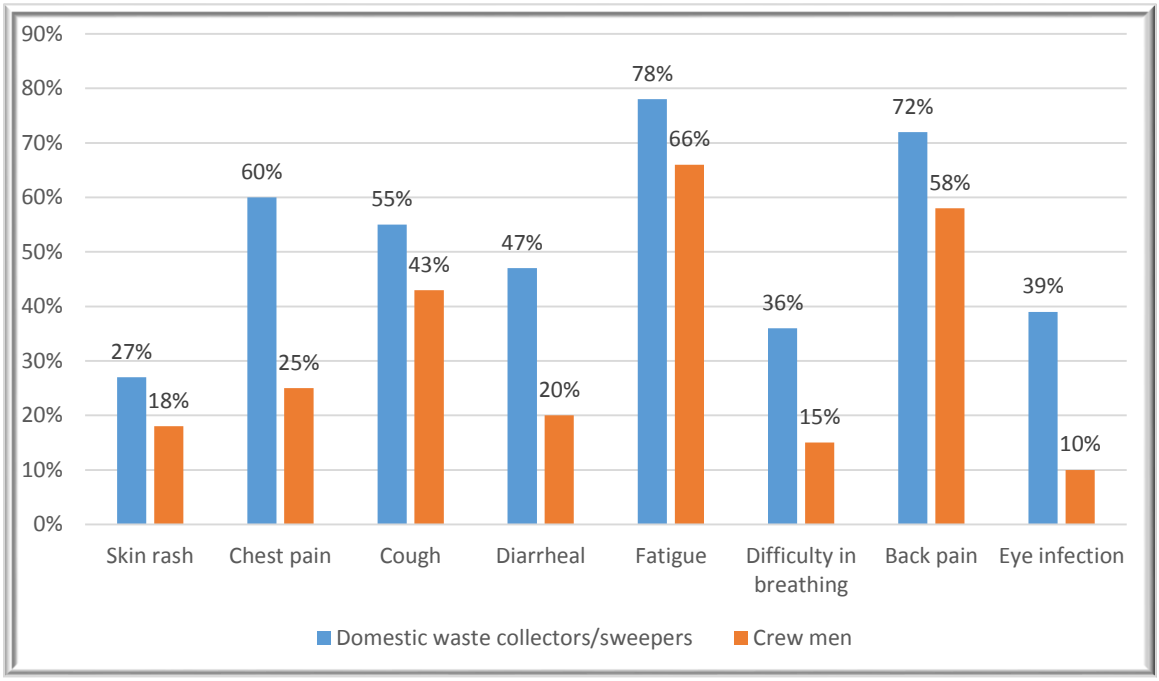

Figure 4: Occupational Health Diseases of solid waste workers

The several types of occupational diseases among solid waste workers are shown in figure 7. These include fatigue (78% among the domestic waste collector/sweepers and 66% among the crewmen), back pain (72% among the domestic waste collector/sweepers and 58% among the crewmen), chest pain (60% among the domestic waste collector/sweepers and 25% among the crewmen). Other diseases are cough, diarrheal, eye infection, difficulty in breathing and skin rash

ROUTINE MEDICAL CHECK-UPS AND KNOWLEDGE OF COVID -19 AMONG SOLID WASTE WORKERS

In table 2, about 82 % of domestic waste collector/sweepers and 77 % of the crewmen did not have routine medical checks. Over 81 % of solid waste workers believe in the existence of Covi-19 disease. About 64 % of the solid waste workers are not afraid of contracting Covid-19 disease while discharging their duties. Only 7 % of the workers have gotten the Covid-19 vaccination. The reason given by the majority (63%) of the solid waste workers is that it is not necessary to take the vaccine. A small fraction (11%) of the solid waste workers also noted that fear of death is also a reason for not taking the vaccine.

Table 2: Routine Medical check-up and Knowledge of Covid -19 among solid waste workers

Variables		Domestic waste collectors/ Sweepers		Crewmen	
		Frequency	Percentages	Frequency	Percentages
Routine medical check-up	Yes	45	18.8	20	22.7
	No	194	81.2	68	77.3
Total		239	100	88	100
Do you believe in the existence of Covid-19	Yes	204	85.4	72	81.8
	No	35	14.6	16	18.2
Total		239	100	88	100
Are afraid of contacting Covi-19 as you discharge your work	Yes	84	35.1	32	36.4
	No	155	64.9	56	63.6
Total		239	100	88	100
Have you taken the Covid- 19 injection	Yes	9	3.8	6	6.8
	No	230	96.2	82	93.2
Total		239	100	88	100
If not, give reasons	Not necessary	162	70.4	52	63.4
	Non-availability of vaccine	42	18.3	19	23.2
	Fear of death	26	11.3	11	13.4
Total		230		82	100

Source: Field Survey, 2021

Table 3: Chi-square testing prevalence of occupational health diseases among the solid waste workers in Federal Capital City Abuja

Variable	**X^2 computed**	**df**	**The critical value of X^2 at 0.05 SL**	**Remarks**
Prevalence of occupational health diseases among the solid waste workers	20.23	7	14.07	Rejected

In Table 3, the calculated X^2 valve is 20.23 and the table value is 14.07, this shows that the calculated value is greater than the table value. This implies that the null hypothesis is not acceptable. Therefore, it is concluded that "there is a significant difference in the prevalence of occupational health diseases among the solid waste workers". The reasons for the differences could be as a result of respondents' educational status, nature of the job and personal hygiene among others.

DISCUSSION

A large proportion of the solid waste workers have less than secondary education in the study area this might be due to their economic status. This concurs with Ramitha et al (2021) studies. Most solid waste collectors wore incomplete PPE while at work. It was rare to find out workers in their complete PPE wear, this is in line with studies by Mamuya & Badi (2019). Municipal solid waste collectors who used only a mask were 2 times more likely to have occupational health symptoms compared to those who used a full body suit (Melaku & Tiruneh 2020). Non-compliant use of PPE or lack of its provision at the workplace has been reported in studies across many countries (Gebremedhin, et al 2016, Lissah et al 2020). Jayakrishnan (2013) noted that non-use of PPE exposes waste workers to many pathogens (bacteria, fungi, viruses, and parasites and cysts), toxic substances (endotoxin and beta-glucans) and chemicals that come from waste. In developing countries, poor working conditions, poor personal hygiene and lack of protection among solid waste workers increase injuries and accidents this is in line with Gebremedhin et al (2016) studies. The majority gave a history of strains from lifting, falls and injuries from sharp objects. This concurs with of findings Krajewski (2000), Jayakrishnan (2013), Patil & Kamble, (2017)

Several types of occupational diseases were reported among solid waste workers. These include fatigue, back pain, chest pain cough, diarrheal, eye infection, difficulty in breathing and skin rash. These findings corroborated studies by Gizaw et al (2014), Baral (2018), Mol et al (2019) and Adeyi & Adeyemi (2019). Only a small fraction of the waste workers go for routine medical checks. The findings are in line with studies by Adeyi & Adeyemi (2019), where it was observed that lack of medical insurance scheme for the different categories of solid waste managers is responsible for many of them not having routine medical check-ups to take care of their health. The majority of the solid waste workers have no formal education, this may adversely affect their understanding about Covid 19, disease and the importance of vaccines, and this concurs with findings by Adekiya (2021).

CONCLUSION

The majority of the solid waste workers have no formal education, this may adversely affect their understanding of the Covid 19 disease, the importance of personal hygiene and the use of personal protective equipment (PPE). Poor personal hygiene and poor use of personal protective equipment (PPE) also contributed to them being prone to injuries and illnesses. The finds of the study provide evidence that solid waste workers are suffering from several occupational injuries from vehicles, sharp objects, nails, fire and dog bites. Several occupational diseases such as fatigue, back pain, chest pain cough, diarrheal, eye infection, difficulty in breathing and skin rash were also reported among the solid waste workers

RECOMMENDATIONS

Based on the findings, the study, recommends that waste workers should be trained on occupational and health safety, awareness of the potential dangers and risks associated with their job. The use of personal protective equipment (PPE) should be encouraged among the workers. Along with this waste workers, should be encouraged to go for a regular health checkup. There should be a continuous awareness program on Covid- 19 disease in Nigeria by government and non-governmental organizations, especially among the urban poor.

REFERENCES

Abila, B., & Kantola, J. (2013). Municipal solid waste management problems in Nigeria. Evolving knowledge management solution. World Academy of Science, Engineering and Technology *International Journal of Environmental, Chemical, Ecological, Geological and Geophysical Engineering* 7(6).

Abur, B.T., Oguche, E. E., & Duvuna, G. A. (2014). Characterization of municipal solid waste in the Federal Capital Abuja, Nigeria. *Global Journal of Science Frontier Research (H) Environment& Earth science: 14*(2). Online ISSN: 2249-4626.

Adekiya, O. A. (2021). Assessment of occupational health risk and awareness of scavengers to covid- 19 in Abuja Municipal Area Council, Nigeria *American Journal of Health, Medicine and Nursing Practice (AJHMN) 6*(1), 18 - 31. ISSN 2520-4017 (online)

Adeyi, A. A., & Adeyemi, A. M. (2019). Potential occupational health effects of municipal solid waste management in Nigeria, the case of Lagos and Ibadan. *Ife Journal of Science* 21(2) https://dx.doi.org/10.4314/ijs.v21i2.15

Baral, Y. R. (2018). Waste workers and occupational health risks. *International Journal of Occupational Safety and Health, 8* (2) 1-3. https://www.nepjol.info/index.php/IJOSH

Cointreau‐Levine, S. (2006). Occupational and Environmental Health Issues of Solid Waste Management. Special Emphasis on Middle‐And Lower‐Income Countries. Urban papers. Washington D.C: World Bank Group, Urban Sector Board. Available from: http:// www worldbank.org/INTUSWM/Resources/up‐2.pdf.

Dorevitch, S., & Marder, D. (2001). Occupational hazards of municipal solid waste workers. Occupational me**d**icine (Philadelphia, Pa.). 16, 125-33.

Gebremedhin, F., Debere, M. K., Kumie, A., Tirfe, Z .M., & Alamdo. A.G. (2016). Assessment of knowledge, attitude and practices among solid waste collectors in Lideta Sub-city on prevention of occupational health hazards, Addis Ababa, *Ethiopia. Sci J Public Health* 4:49-56.

Gizaw, Z., Gebrehiwot, M., & Teka, Z. (2014). . Assessment of occupational injury and associated factors among municipal solid waste management workers in Gondar town and Bahir Dar City, northwest Ethiopia. *Journal of Medicine and Medical Sciences* 5(9), 181–192.

Hamalainen, P., Takala, J., & Kiat, T. B. (2017). Global estimates of occupational accidents and work-related illnesses. *World*, *2017*, 3-4.

Health and Safety Executive. 2007. Health hazards in the waste and recyclable industry. Waste15. Retrieved on 23 November, 2021 at www.hse.goc.uk/pubns /waste15.pdf

ILO (2016) Nigeria Country Profile on Occupational Safety and Health 2016. www.ilo.org>publication>wcms_ 552748 assessed on 29/11/2021

Jayakrishnan, T., Jeeja, M.C., & Bhaskar, R. (2013). Occupational health problems of municipal solid waste management workers in India. *Int J Env Health Eng, 2(3)*

Krajewski, J.A., Tarkowsk,i S., & Cyprowski, M. (2000). Hazardous health effects in communal waste collection and disposal workers. *Med Pr*; 51,159‑72.

Krejcie, R. V., & Morgan, D. W. (1970): Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607-610

Lissah, S.Y., Ayanore, M. A., Krugu, J., & Ruiter, R.A.C. (2020). Psychosocial risk, work-related stress, and job satisfaction among domestic waste collectors in the Ho Municipality of Ghana: A phenomenological study. *Int J Environ Res Public Health 17*, 2903.

Mamuya, S., & Badi, S. (2019). Factors contributing to occupational injuries among solid waste collectors: across sectional study in a municipal in Tanzania *MOJ Public Health. 8*(6), 37–241.

Melaku, H. S., & Tiruneh, M. A. (2020). Occupational health conditions and associated factors among municipal solid waste collectors in Addis Ababa, Ethiopia. *Risk Management and Healthcare Policy*. Available at https://www.dovepress.com/ by 197.210.77.142

Mol, M. P. G., Cairncross, S., & Greco, D. B. (2019). Urban waste collectors in Belo Horizonte, Brazil: Their perceptions of occupational health risk. *Qual Health Res* 29 (3):371–381.

Patil, P., & Kamble, R. (2017). Occupational health hazards in municipal solid waste collecting workers of Chandrapur City, Central India. *International Journal of Environment.* 6. 46. 10.3126/ije.v6i1.16867.

Porta, D., Milani, S., Lazzarino, A. I., Perucci, C, A., & Forastiere, F. (2009,) Systematic review of epidemiological studies on health effects associated with management of solid waste. *Environ Health, 8:60*. Available from: http://www.ehjournal.net/content/8/1/60.

Ramitha, K. L., Ankitha, T., Alankrutha, R. V., & Anitha C T. (2021) A cross-sectional study on occupational health and safety of municipal solid waste workers in Telangana, *India. Indian J Occup Environ Med* [serial online] 25:169-77. Available from: https://www.ijoem.com/text.asp?2021/25/3/169/327914

Oyelola, O.T., Babatunde, A I., Abiodun, A.A., & Popoola, E.O. (2018). Occupational health hazards associated with dumpsite scavengers and high way workers in Lagos metropolis. *Journal of Environmental issues 1* (1),13-21

Suleman, Y., Darko, E.T., & Agyemang-Duah, W. (2015). Solid waste disposal and community health implications in Ghana: Evidence from Sawaba, Asokore Mampong Municipal Assembly. *J Civil Environ Eng. 5* (6), 202

The Bruhat Bengaluru Mahanagara Palike. (BBMP) (2020). Solid waste management Bylaws (March2020). No:Addl.Comm/SWM/PR/266/2019-20 www.lawinsider.com>waste assessed on 23/12/2021

Tchobanoglous, G. & Kreith, F. (2002). *Handbook of Solid Waste Management*. Second Edition. McGraw-Hill Inc., New York.