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Assessment of Occupational Risks of Wastes Scavenging in Ilorin Metropolis

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Abstract

Background: *Economic situations in the third world nations had made wastes scavenging a means of sustenance for millions of youth and women. Poor source segregation of wastes in developing countries has increased the potential for exposure to infections and other occupational hazards.*

Objectives: *This study addressed issues relating to the potential occupational risks among scavengers in Ilorin metropolis.*

Methods: *A cross-sectional study was conducted among the scavengers working on wastes dumpsite in Ilorin metropolis, Kwara State and 109 respondents were administered with questionnaires. The data was analysed using statistical package for social science for descriptive and inferential (t-test) at 5% level of significance. Examinations of hazardous conditions exposed to by the waste's scavengers and assessment of personal protective equipment knowledge and usage among them.*

Results: *Scavenging was found to be male dominated venture with over 90 percent respondents being of male gender and most respondents are in their prime as they are mostly between ages 21 – 30years and usage of PPE among scavengers was found to be very low. Most scavengers had not undergone any training prior to commencement of the job and prevalent diseases among them are fever, diarrhoea, cough and skin diseases with fever having highest occurrence.*

Conclusions: *Regular trainings on occupational safety for scavengers, enforcement of personal hygiene practices, proper monitoring by regulatory agency and inclusion of scavengers in mandatory health insurance scheme will help to improve health status of scavengers.*

Keywords: Hepatitis B Virus, Scavengers, Prevalence, Personal Protective Equipment (PPE), Ilorin metropolis, Health Insurance Scheme.

Introduction

Scavenging is an economic activity that provides employment for more than 15 million people worldwide [1]. In Nigeria, scavenging is a major source of income and generation of employment for unemployed youth. It also serves as a major source of raw material for industries, bottling plants and plastic manufacturers [2]. Wastes are materials considered unfit, unwanted or discarded due to economic reasons or ignorance of alternative technologies to re-use them [3, 4]. Wastes are generally inevitable remains from activities of human and animal and actions are required to manage the wastes from its inception to its final disposal [3]. International Labour Organisation (ILO) has defined wastes scavenging as physical selection of recyclable matter from muddled waste discarded at landfills, dumpsites, and places where waste is collected [4]. People who recover materials to sell for reuse or recycling and these individuals are generally known as 'scavengers' or rag pickers and the activity they undertake are called 'scavenging' [5]. Furthermore, Medina cites waste-picking as an example of sustainable development, emphasising that waste-picking activity enhances environmental protection by increasing the amount of waste collected, reused, and recycled, resulting in high indicators for energy saving, pollution prevention and pollution reduction [5, 6].

The system of waste salvaging, reclaiming or recycling is fast gaining ground in most cities today [6]. Poverty and lack of environmental regulations and enforcement in many developing countries made disposal to remain predominately by open dumping, often with associated open burning, which creates thick smoke that contains carbon monoxide, carbon dioxide, soot and nitrogen oxides, all of which are hazardous to human health, degrade air quality and contribute to global warming [7-14]. The generation of waste and the collection, processing, transport and disposal is important for both the health of the public and aesthetic, and environmental reasons [15, 16].

Health risk assessment is a systematic approach in response to public health concern about the increasing incidences of health effects associated with occupational hazards due to industrialization, urbanization and agricultural activities. Thus, occupational exposure can be proximate exposure or directly leading to health conditions (such as physical, chemical and microbiological agents) and distal exposure or indirectly leading to health conditions (such as socioeconomic conditions, climate change and other broadly scale environmental issues). Proximate exposure occurs through inhalation, ingestion and skin contact. Whereas, distal exposure can cause adverse health issues directly by changing proximate exposure and indirect through change in ecosystems and other support systems for human health [17].

Lack of proper municipal waste segregation and transportation techniques has increased the potential for the transmission of pathogens such as hepatitis B virus (HBV) [10]. In the course of wastes scavenging activities, these individuals are regularly exposed to varying physical, biological and chemical hazards in addition to the dangerous exposure to poisonous gases, chemicals and fire hazards [14, 18]. Indiscriminate sorting of mixed wastes by scavengers has the potential for increased environmental exposure to air pollution, toxic emissions from combusted or burnt municipal waste, proliferation of vermin and spread of diseases like hepatitis [11, 19, 20].

The use of protective devices has been proven to provide a reasonable measure of protection against accidents and incidents that present health risks to which scavengers are daily exposed in the course of their daily duties [21]. The lack of awareness, provision and none usage of protective equipment coupled with the ignorance of the waste handlers results in occupational health hazards due to different types of external injuries and infectious diseases [22].

There are evidences of occupational exposure in scavenging work because they are exposed to a wide variety of health hazards and risks which can occur via skin contact, injection, ingestion and inhalation [23-25]. The most common routes to some of the hazards includes incineration, skin contact, falling objects and electrocution. However, the hazards addressed in this study are those concerned with dump sites, wastes scavenging and refuse disposal.

It is against this backdrop that the author decided to embark on a study to assess the occupational risks of wastes scavenging and the practice of the use of simple personal protective devices among scavengers at dumpsites in Ilorin metropolis.

Methods

Study Area

The city of Ilorin lies on latitude North 8°30' and longitude East 4° 35' near the southern fringe of the savannah and forest zone. It had a population of 777,667 in the 2006 census. It is surrounded by a wall about 10 miles in circumference and as high as 20 feet in some places. A large part of the province is located on grass plains with undulating landscapes which are well watered and highly agricultural. By the southern Nigeria provincial borders, at an elevation of 1,500 feet, there is a watershed with a river generally running from west to east and flowing into the River Niger [17-19]. The ecology of the region plays an important role in people's decisions to settle in a particular area. It has a mean annual rainfall of 1,318 mm (51.9 inches), which allows inhabitants to practice arable farming. The mild climate has also attracted northern pastoralists to the region. Ilorin city is the commercial and administrative center of Kwara State. It is made up of four local government areas (Ilorin South, Ilorin West, Ilorin East and Asa) [19].

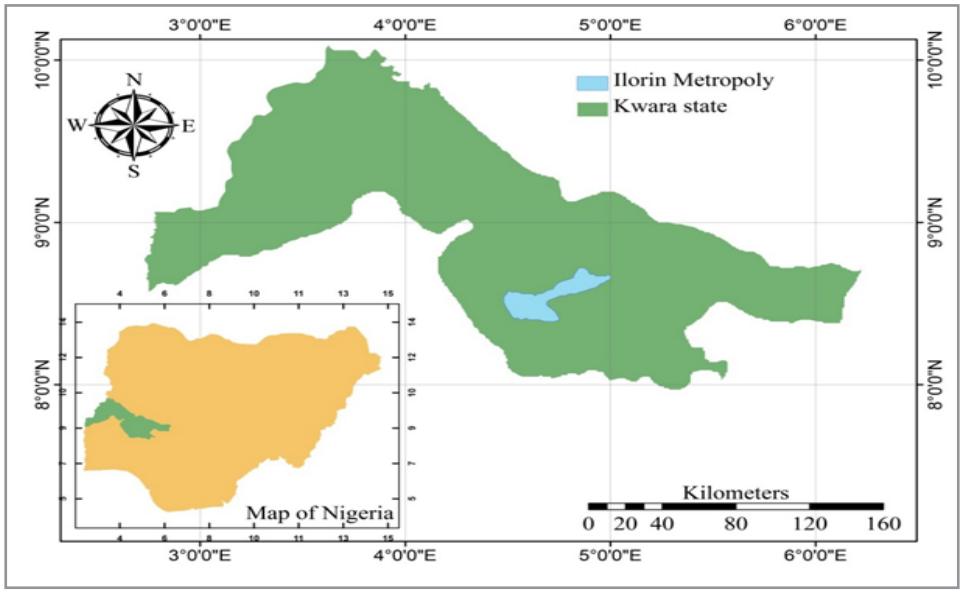

Figure 1: map of kwara state showing the study area. adapted from sawyerr et al., [17].

Sampling Techniques

The sampling technique employed in the study was purposive, as only those identified as waste scavengers working with major scrap dealers and on the dumpsites were administered with questionnaires. Scavengers were selected from government dumpsites as well as registered scrap dealers through the Kwara State Environmental Protection Agency who oversee the wastes management of the metropolis. The sample size was determined using fishers sample size formula, the total sample size was determined as 110 including 10% non-response rate.

Data Instrument

The instrument used for this study was structured questionnaire. The questionnaires were interviewer-administered to the scavengers and where necessary the questions were translated to Hausa and Yoruba languages. Both open-ended and closed-ended questions were included in the questionnaire. The questionnaire was administered to the scavengers both on the dumpsites and in the evening at the scrap dealers' sites where the scavengers' gather after the day's work to sell their materials. All the participants were informed of the field research aims before the study, this was done to facilitate the data collection processes and to obtain their consents.

Data Analysis

Data was analysed using SPSS 23, using descriptive statistic such as mean, frequencies, charts and graphs.

Ethical Approval

Ethical clearance for this study was obtained from the Kwara State Ministry of Health Ethical Review Committee. Informed consent of participants was sought before taking part in the study.

Results

Socio-Demographic Characteristics of Respondents

Presented below are the results of the respondents based on their age, marital status, educational level and tribal status respectively.

Table 1: Socio-demographic Characteristics of Respondents

AGE	Frequency	Percent
10 – 20	29	26.4
21 – 30	42	38.2
31 – 40	20	18.2
41- 50	11	10
51-Above	8	7.2
Total	110	100.0
GENDER	**Frequency**	**Percent**
Male	103	93.7
Female	7	6.3
Total	110	100.0
TRIBE	**Frequency**	**Percent**
Hausa	96	87.3
Yoruba	14	12.7
Total	110	100.0
MARITAL STATUS	**Frequency**	**Percent**
Single	63	57.3
Married	47	42.7
Total	110	100.0
EDUCATIONAL QUALIFICATION	**Frequency**	**Percent**
None	34	30.9
Primary level	43	39.1
Secondary level	18	16.4
Tertiary level	1	0.9
Islamiyah	14	12.7
Total	110	100.0

Source: Authors' Field Survey, 2022

In table 1 above, the socio-demographic characteristics of scavengers revealed that majority of respondents are able-bodied individual with majority in the ages 21 – 30years with 38.2% with the least being ages 51years and above constitute the least age bracket with 7.2%. The gender distribution of respondents showed scavenging to be male dominated occupation with the population of male scavengers being 103 which constitute 93.7% of the total respondents. Tribal or ethnic distribution of respondents showed that majority of them are immigrants Hausa by tribe with 87.3% of total respondents and vast majority are unmarried with population of single respondents being 57.3% while the constitute 42%. Majority of the scavengers, 39.1% are with primary education while closely followed by those without formal education with 30.9%.

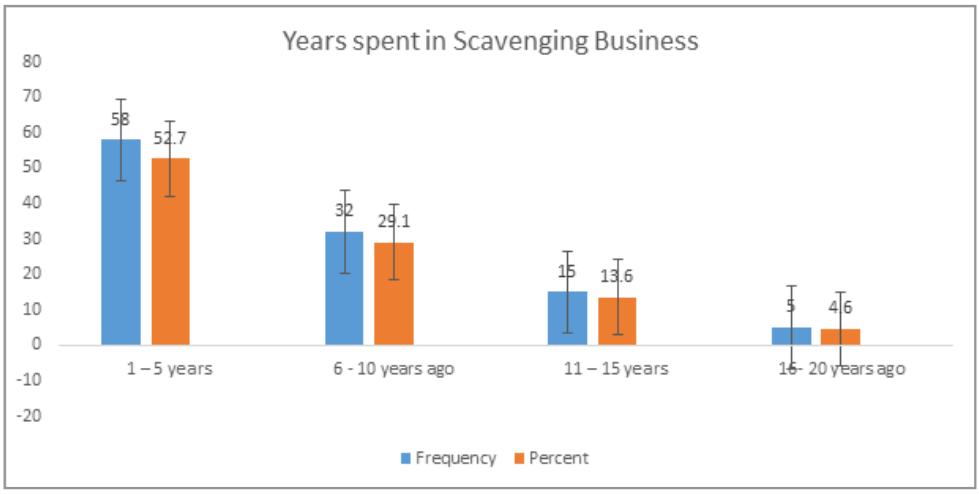

Figure 2: Chart Showing the Number of Years Spent in Scavenging Work

Assessment of years spent in scavenging occupation showed in figure 2 above and majority of the respondents has been scavenging for 1-5 years and that made up of 52.7% with the least being 16-20 years with 4.6%.

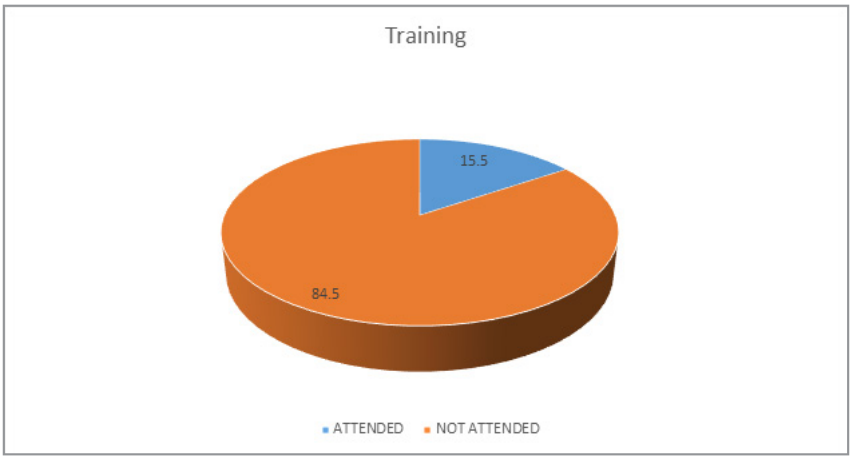

Figure 3: Attendance of Any Form of Training on Scavenging Work

The figure 3 above assess training in wastes handling and occupational health among the wastes scavengers and it showed that majority of scavengers 84.5% have never received any training in wastes handling and safety procedures in terms of occupation health. Handful number 15.5% of scavengers indicated that they have attended a training.

Figure 4: Cross-Section of Scavengers at Work on Government Dumpsite at Sokoto Aiyekale

The figure above showed a cross-section of scavengers working on the government owned dumpsite, they can be seen in scouting for recyclables within the co-mixed wastes stream entering into the dumpsites via different wastes disposal vehicles. This gives glimpse of occupational and health hazards exposed to by scavengers as most of them are not wearing protective gears.

Table 2: Unsafe Practices and Risks in Scavenging Work

Variables		Frequency	Percentage
BURNING OF WASTE	No	26	23.6
	Yes	84	76.4
Total		7	6.3
INHALING SMOKE	No	33	30
	Yes	77	70
Total		35	31.8
INJURIES DURING SCAVENGING	Always	20	18.2
	some time	83	75.5
	at no time	7	6.3
Total		110	100
TREATMENT OF INJURIES	leave to heal	17	15.4
	Self-treatment	35	31.8
	Clinic	29	26.4
	Chemist	29	26.4
Total		110	100.0
USAGE OF PPE	Yes	26	23.6
	No	84	76.4
Total		110	100.0

Source: Authors' field survey, 2022

Table 2 above displayed information concerning unsafe practices and risks in wastes scavenging, burning of wastes was found to be rampant as majority 76.4% indicated that they burn wastes to remove recyclables they needed. Also, most respondents 70% revealed they inhale smoke from the wastes burning. In terms of injuries during scavenging, it was found that 75.5% revealed that sometimes get injured during work while 18.2% said they always get injured during the course of their daily activities and those that said they don't get injured are just 6.3%. Treatment of injuries sustained during scavenging are mostly by self-treatment which 31.8% followed by clinic and chemist which are 26.4% each while the least to leave the wound to self-heal is 15.4%. Usage of personal protective equipment (PPE) is found to be 42.7%.

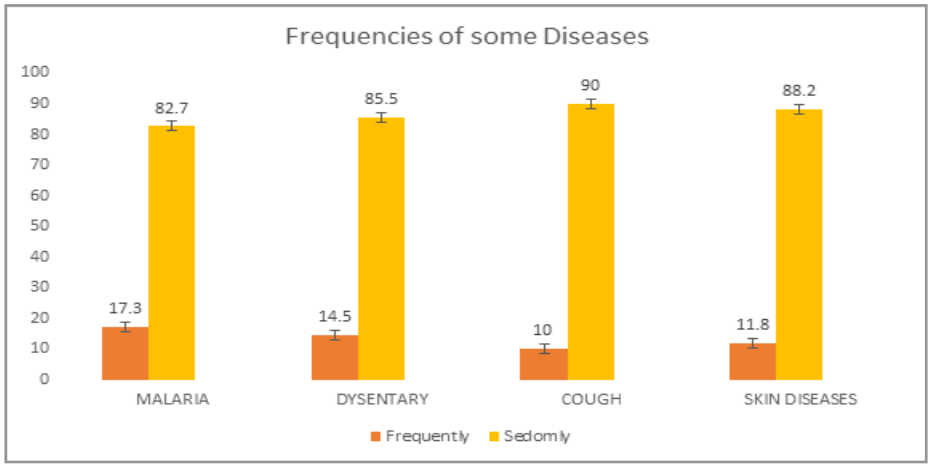

Figure 5: Prevalent diseases among scavengers and their frequencies of occurrence

Figure 5 showed diseases that are common among scavengers and the rate of occurrence of malaria is the most frequently occurred with 17.3% and malaria sedomly occurred 82.7%, this is closely followed by dysentery which occurred at 14.5% and sedomly occurred at 85.5% and the least frequent disease is cough with occurrence of 10%.

Discussion

Scavengers are exposed to numerous hazards: such as infectious waste from hospitals, smoke and fumes from burning waste faeces, contaminated needles, toxic paper, heavy metals from batteries, bottles, chemical waste containers and harsh weather conditions [41].

As one author has noted, "In every session of the UN Permanent Forum on workers' safety, since it was created in 2002, occupational safety has presented reports on how industries' corporations have caused occupational hazards, environmental degradation, cultural ethnocide, and gross human rights violations" [27]. The results of this study revealed that majority of the respondents are able-bodied youths with highest percentage within 21 – 30years age bracket. This agrees with the findings of Irabor that concluded that the highest population of scavengers i.e. 36% are in the age bracket 20 - 29 years and Yusuf et al., in his study that revealed that the majority of the scavengers in his study are in the age bracket 21-30 years which is 45.4% [29, 20].

Scavenging is a male dominated occupation as seen in the results with male constituting 93.7% of respondents. This is in line with many studies among which are Mustafa, Oteng-Ababio which stated that about 90% of the scavenger population are male while female scavengers constitute approximately 10% in Kumasi. Similarly, in another study male made up 86% of e-waste scavengers found at the Agbogbloshie e-waste scrap yard in Accra as reported by Rankokwane and Gwebu [30-32]. Also, Yusuf et al., concluded that Scavenging job was found to be male dominated because 93.6% of respondents are male, while Afon also corroborated the submission [28, 24].

Educational attainment of respondents showed that the highest number of scavengers are primary school certificate holders with 39.1% of respondents, this also conform with the Adebola et al. in his work on wastes worker and scavengers where he found that majority (51.1%) of scavengers in Ibadan are primary school leavers [34]. Yusuf et al., also concluded that majority of respondents are primary school leavers and Sawyerr et al., which also corroborated the other findings [20, 18].

The years spent in scavenging was examined and it was found that most respondents have spent between 1-5 years on the job and that constitute of 52.7% of the scavengers and this agreed with the findings of Isaac et al., in which majority of scavengers had also worked for similar durations [42].

Training on wastes handling and occupational safety was found to be very low as majority 84.5% have never received any training in wastes handling and safety procedures before commencing scavenging and after starting the job.

Unsafe practices and risks exposed to by scavengers during the course of their daily activities were examined and it was found that scavengers engaged in unsafe practises like wastes burning to remove precious components like copper from electric wires and to harvest some valuable recyclables embedded in the mixed wastes. The results showed that 76.4% of the respondents engaged in wastes burning and which those that said they inhale the smoke are 70% of the respondents which agreed with conclusion of Hashim et al., that said scavengers set fire on wastes but never utilized dust or smoke mask while picking and sorting materials in their respective work place [35].

The incidence of occupational injuries was found to be cumulatively high with 93.7% among which those that said they frequently get injured among them are 18.2% and those that sedomly sustained injuries are 75.5% this aligned with the findings of Adekiya that said majority (90 %) of scavengers have sustained injuries from glass and sharp objects and about 71 % from nails and also in agreement with Ali and Yusuf which found total of 78.6% scavengers sustained different kind of injuries during their scavenging activities [36, 37]. Majority of the respondent in this study relied on self-treatment which is similar to conclusion of Ali and Yusuf, Yusuf et al., Hashim et al., who also found that scavengers mostly treat their wounds by themselves [37, 20, 35].

Usage of Personal protective equipment was found to be 42.7% which pointed to deficiency of safety information and occupational sensitization. Those that make use of PPE are not properly making use of the safety gadgets. This finding is similar to the conclusion of Osunkalu who stated that high level of awareness of impending health risk associated with the non-use of protective devices at dump sites did not translate to increase in the actual use of these protective devices [19].

Some prevalent diseases were examined and it found that fever constituted the most reported complaint among the respondents, this is similar to the findings of Osunkalu which concluded that it is apparent that the protective device usage among scavengers is still poor [19]. The finding has also been supported by other study on some scavenger population in Nigeria by Nzeadibe [38]. Though occurrence of malaria fever in the Nigerian population is relatively high but high cases among the respondents may be connected to exposure to wide array of infectious pathogens and constant mosquito bites on the dumpsites.

Conclusion

Scavenging is becoming an occupation for all, male, female, old or young, especially with the current economic realities in the third world nations. The study revealed that scavengers are exposed to risk due to inhalation of smoke and dusts and they mostly suffered from malaria fever, cough, diarrhoea and skin rashes. It was also found that the majority of scavengers do not use personal protective devices and there is lack of knowledge on the dangers and health risks associated with scavenging among them which also contributed to them being prone to diseases.

The researchers hereby recommend that scavenging be legalised, supervised and regulated with proper registration and clear guide lines for operatives. It is also advised that the government or non-governmental organisations help educate scavengers and institute strict measures to ensure compliance to safety procedures.

Efforts should be made by the government and other stakeholders to provide scavengers with PPE, thorough instructions on usage and enforcement of PPE usage among scavengers by relevant agencies of the government. In addition, educational campaigns, regular training on occupational health and safety programs, emphasis on good work practices and immunization of members of this occupational group against some infectious

diseases like Hepatitis B Virus and compulsory enrolment in health insurance scheme of the government.

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