Asian Journal of Advanced Research and Reports

Volume 16, Issue 12, Page 109-118, 2022; Article no.AJARR.88825
ISSN: 2582-3248

Assessment of the Level of Awareness of Health Hazards and Practices of Waste Scavengers in Enugu State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJARR/2022/v16i12454

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/88825

Original Research Article

Received: 18/05/2022
Accepted: 02/07/2022
Published: 21/12/2022

ABSTRACT

Waste scavengers in developing countries are informal actors in the recycling of tons of waste generated in urban centers. These scavengers are often poor and uneducated persons who may be ignorant or too poor to mind the hazards of their profession. The aim of this study is to assess the level of awareness of health hazards associated with waste scavenging among scavengers in Enugu, Nigeria, as well as assess their attitude towards health hazard and safety. Three hundred and ninety-five (395) waste scavengers were picked via multistage and random sampling technique from the three senatorial zones in Enugu State and administered close ended questionnaire. Results showed 72.7% poor level of awareness of health hazards among waste pickers and 63.6% poor level of attitude towards precautionary measures to health hazard and safety. There is a

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positive relationship between level of education, marital status and awareness of health hazards, and between age, religion, level of education, marital status, income and attitude towards health hazards and safety. As a recommendation, waste scavenger should be educated to appreciate the real dangers of their occupation and to change their work attitude, in other to safeguard their health.

Keywords: Waste scavengers; awareness; attitude; marital status.

1. INTRODUCTION

Waste scavenging in a general sense is the act of selecting possible useful or recyclable items like plastics, metals, clothes and other materials from waste materials especially at waste dump sites, for the purpose of making a living [1]. Waste scavenging is seen to be the lowest in social and economic hierarchy of activities within the unorganized sector and does not require any form of education nor specific skills [2]. It is mostly practiced by disadvantaged and vulnerable segments of the population [3].

Waste scavengers occupy a unique niche in the informal economies of low and middle income countries, providing significant economic benefits to the local economy centered on the landfill, as well as provide larger societal benefits in terms of recycling and lessening the pressure on resources used in the production of material goods [4]. In Nigeria, waste scavengers play an important, but usually unrecognized role in the waste management system of many cities [2].

Waste scavengers are usually exposed to several kinds of occupational health hazards, owing to the filthy environments and condition under which they work [1,3]. These health hazards ranges from cuts and needle stick injury, exposure to particulate matter, disease causing organisms, contaminated food and water, unhygienic working environment, among other health hazards [1,5,6].

Waste scavenger work with little or no protection against health hazards and do not have any consideration for the health risks involved [5,7-9]. It is generally believed that illiteracy, ignorance of the health hazards of their occupation, lower socioeconomic condition (poverty), inability to use proper equipment and lack of training on safe waste, are the main reasons why waste scavenger suffer from different kinds of diseases [1,10,11].

This study aims to assess the level of awareness of health hazards associated with waste scavenging among scavengers in in Enugu, Nigeria, as well as assess their attitude towards health hazard and safety.

2. MATERIALS AND METHODS

2.1 Study Area

Enugu State located at 6°30' North and 7°30' East of Latitude, covering a land mass of 7,223 km2 (2,894 sq m), is amongst the 36 states of Nigeria and the five eastern states. The population of the state going by 2006 Nigerian census was 722,664 [12]. There are three senatorial districts that makeup the state, and sixteen Local Government Councils. The state has major cities booming with commerce and industry, and enjoys a good climatic condition all the year round for agriculture.

The Enugu State Waste Management Authority (ESWAMA), established in 2004, is responsible for the enhancement of the environment with the aim of achieving positive and substantial change in living conditions as well as reducing diseases or health problems in the state through proper waste management [13].

2.2 Study Population

The populations of this study consist of all waste pickers operative in active solid waste dump sites in three senatorial areas of Enugu state.

2.3 Sample Size

The sample size was obtained using the mean descriptive studies sample size determination formula, as given below:

$$n = \frac{Z^2\, pq}{e^2}$$

Where;

n = Sample size to be obtained
Z = 1.96 at 95% Confidence Interval
e = margin of precision (5%)
p = 37.2% of the waste pickers with good level of practice of safety [10].
q=100-p

A minimum sample size of 395 waste scavenger, was obtained.

2.4 Sampling Method

A multistage sampling method was used first, to identify active dump sites in the three senatorial zones in Enugu State; secondly to select three (3) active dumping sites from each of the three (3) senatorial zones by random sampling by balloting to make a total of nine (9) selected active dumping sites and lastly**,** random sampling by balloting of forty-four (44) waste scavengers each, so as to make the total sample size of three hundred and ninety-six (396). These waste scavengers were subsequently administered with the questionnaire after obtaining informed consent from them.

2.5 Study Instrument

A structured interviewer administered and close ended questionnaire was used to collect data in this study. The questionnaire consists of 3 sections; Section A assesses the socio-demographic characteristics of the participants; Section B assesses the level of awareness health hazard and Section C assesses the attitude towards precautionary measures.

2.6 Validity and Reliability of Instruments

The questionnaire was given to academicians in the field of occupational health to assess the face and content validity of the instrument and their comments were either validated or modified for the study before administration. The reliability of the instrument was determined by test-retest method. The findings of the pre-test using 40 sample size, revealed that the internal consistency of the tool was considered substantial as the alpha scores, recorded were above 0.50 which is considered desirable.

3. RESULTS

Table 1 reveals that most respondents 265 (66.9%) were of the age 20-29, majority 388 (98.0%) were males and most 355(89.6%) were of the Igbo tribe. Most of the respondents [356 (89.9%)] were Christians, 209 (52.8%), had secondary level of education [280 (70.7%)], single [341 (86.1%)] and earned above #2000 as range of income.

Table 1. Socio-demographic characteristic of the respondents

Variables	Frequencies (n=396)	Percentage (%)
Age		
20-29	265	66.9
30-39	78	19.7
40-49	40	10.1
≥50	13	3.3
Mean±SD =		
Gender		
Male	388	98.0
Female	8	2.0
Tribe		
Igbo	355	89.6
Hausa	38	9.6
Others	3	0.8
Religion		
Christianity	356	89.9
Islam	37	9.3
Other	3	0.8
Level of education		
Primary	118	29.8
Secondary	209	52.8
Tertiary	64	16.2
None	5	1.3
Marital status		
Single	280	70.7
Married	110	27.8
Widower	5	1.3
Cohabiting	1	0.3
Range of income		
#500-#1000	10	2.5
#1001-#1500	17	4.3
#1501-#2000	28	7.1
Above #2000	341	86.1

Table 2 reveals that preponderance of respondents [346 (87.4%)] were aware of the hazardous nature of the job, 298(38.5%) identified physical hazard as a type of hazard, 365(92.2%) knew that exposure to hazard can cause health problems, 375(94.7%) knew that broken bottles and sharp objects are hazards and 371(93.7%) were aware that creeping insects and human waste have potentials to cause harm. Again, majority 322(81.3%), 363(91.7%) and 320(80.8%) of respondents were aware that creeping insects and human waste have potentials to cause harm, working under extreme heat can result in illness and that irritation to the skin or eyes could be due to exposure to harmful chemical substance respectively. The table also indicates that majority [358 (90.4%)] of participants knew that unidentified materials could be explosives and could cause harm, 344 (86.9%) affirmed that bacteria and fungi diseases could be due to improper handling of infectious waste and 331 (83.6%) knew that abuse from the public is a form of psychosocial hazard.

Table 3 indicates (72.7%) poor level of awareness of health hazards among waste scavengers.

Table 2. Level of awareness of health hazards among waste scavengers

Variables	Frequencies (n=396)	Percentage (%)
Aware of the hazardous nature of the job		
Yes	346	87.4
No	50	12.6
Type of hazards		
Physical	298	38.5
Chemical	176	22.7
Biological	100	12.9
Ergonomic	66	8.5
Psychological	134	17.3
Aware if exposure to the hazard can cause health problem		
Yes	365	92.2
No	31	7.8
Do you know that broken bottles and sharps are hazard		
Yes	375	94.7
No	21	5.3
Perception of chocking smell is an indication of chemical hazards		
Yes	368	92.9
No	28	7.1
Aware that creeping insects and human waste have potentials to cause harm		
Yes	371	93.7
No	25	6.3
Do you know that noise and vibration from garbage trucks cause harm		
Yes	322	81.3
No	74	18.7
Are you aware that working under extreme heat can result in illness		
Yes	363	91.7
No	33	8.3
Do you know that irritation to the skin or eyes could be due to exposure to harmful chemical substance		
Yes	320	80.8
No	76	19.2
Do you know that unidentified materials could be explosives and could cause harm		
Yes	358	90.4
No	38	9.6

Variables	Frequencies (n=396)	Percentage (%)
Bacteria and fungi diseases could be due to improper handling of infectious waste		
Yes	344	86.9
No	52	13.1
Do you know that abuse from the public is a form of psychosocial hazard		
Yes	331	83.6
No	65	16.4

Table 3. Level of awareness of health hazards among waste pickers

Variables	Frequencies (n=396)	Percentage (%)
Poor	288	72.7
Good	108	27.3

Table 4 reveals that preponderance [334 (84.3%)] of respondents took their bath twice a day, 391 (98.7%) took their bath every day, 394(99.5%) washed their hands before eating, 276 (69.7%) do not seek for lifestyle advice on healthy behaviour, 293 (74.0%) normally pick metals from refuse dumps, 356(89.9%) visited the refuse dumpsites daily, 209 (52.8%) have not attempted to stop waste picking, 236 (59.6%) consumed fruits and vegetables every day and 209 (52.8%) ate twice a day. Also, the table reveals that most [260 (65.7%)] respondents washed their work clothes every day and less than half of the respondents 109 (46.8%) visited the chemist when they have physical injury.

Table 5 shows (63.6%) poor level of attitude towards precautionary measures.

Table 4. Level of precautionary measure

Variables	Frequencies (n=396)	Percentage (%)
How many times do you bath in a day		
Once	55	13.9
Twice	334	84.3
Thrice	7	1.8
Do you take your bath everyday		
Yes	391	98.7
No	5	1.3
Do you wash your hand before eating		
Yes	394	99.5
No	2	.5
Do you seek for lifestyle advice on healthy behavior		
Yes	120	30.3
No	276	69.7
What type of waste do you normally pick from the refuse dump		
Metals	293	74.0
Plastics	57	14.4
Bottles	23	5.8
Cartons	23	5.8
How often do you visit the refuse dumpsites		
Daily	356	89.9
Few Times In A Week	33	8.3
Weekly	7	1.8
Have you attempted to stop waste picking		
Yes	187	47.2
No	209	52.8

Variables	Frequencies (n=396)	Percentage (%)
Do you consume fruits and vegetables everyday		
Yes	236	59.6
No	160	40.4
How many times do you eat food in a day		
Once	19	4.8
Twice	209	52.8
Three Times	145	36.6
More Than Three Times	23	5.8
How many times do you wash your work clothes		
Everyday	260	65.7
Few Times A Week	90	22.7
Weekly	46	11.6
What do you do when you have physical injury		
Self-care	109	46.8
Treat in chemist	108	46.4
Nothing	16	6.9

Table 5. Assessment of level of attitude

Variables	Frequencies (n=396)	Percentage (%)
Poor	252	63.6
Good	144	36.4

Table 6 shows that there was a statistically significant association between level of education completed (p=0.0001), marital status (p=0.0001) and awareness of health hazards. There were no statistically significant associations between age, gender, tribe, religion, income at (p > 0.05) and awareness of health hazards. Hence, there is a positive relationship between level of education, marital status and awareness of health hazards.

Table 7 shows that there was a statistically significant association between age (p=0.05), religion (p=0.003), level of education completed (p=0.0001), marital status (p=0.0001), income (p=0.0001) and attitude towards health hazards and safety. There were no statistically significant associations between gender at (p > 0.05) and attitude towards health hazards and safety. Hence, there is a positive relationship between age, religion, level of education, marital status, income and attitude towards health hazards and safety.

Table 6. Association between socio-demographic characteristics and awareness health hazards

Variables	Awareness Health Hazards				
	Good n (%)	**Poor n (%)**	**Total**	**df**	**Chi-Square (p-value)**
Age (years)					
≤29	196 (74.0)	69(26.0)	265(100)	1	0.616 (0.433)
≥30	92(70.2)	39(17)	131(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Gender					
Male	284(73.2)	104(26.8)	388(100)	1	2.126(0.145)
Female	4(50.0)	4(50.0)	8(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Tribe					
Igbo	262(73.8)	93(26.3)	355(100)	1	2.000(0.157)
Others	26(63.4)	15(36.6)	41(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Religion					
Christianity	254(71.3)	102(28.7)	356 (100)	1	3.379(0.066)
Others	34(85.0)	6(15.0)	40(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		

Variables	Awareness Health Hazards				
	Good n (%)	Poor n (%)	Total	df	Chi-Square (p-value)
Education completed					
Below tertiary	358(78.9)	69(21.1)	327(100)	1	36.04(0.0001)*
Tertiary	30(43.5)	39(56.5)	69(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Marital Status					
Single	186(66.4)	94(33.6)	280(100)	1	19.11(0.0001)*
Married	102(87.9)	14(12.1)	116(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Income					
≤N 2000	0 (0.0)	55(100)	55 (100)	1	170 (0.000)
≥ N 20001	288(84.5)	53(15.5)	341 (100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		

P≤0.05 (statistically significant)

Table 7. Association between socio-demographic characteristics and attitude towards health hazards and safety

Variables	Attitude towards Health Hazards and Safety				
	Good n (%)	Poor n (%)	Total	df	Chi-Square (p-value)
Age (years)					
≤29	160 (60.0)	105 (39.6)	265 (100)	1	3.677 (0.05)*
≥30	92 (70.2)	39 (17)	131 (100)		
Total	**288 (72.7)**	**108 (63.8)**	**396 (100)**		
Gender					
Male	248(63.9)	140(36.1)	388(100)	1	0.656(0.418)
Female	4(50.0)	4(50.0)	8(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Tribe					
Igbo	226(63.7)	129(36.3)	355(100)	1	0.001(0.975)
Others	26(63.4)	15(36.6)	41(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Religion					
Christianity	218(61.2)	138(38.8)	356 (100)	1	8.776(0.003)*
Others	34(85.0)	6(15.0)	40(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Education completed					
Below tertiary	222(67.9)	105(32.1)	327(100)	1	13.67(0.0001)*
Tertiary	30(43.5)	39(56.5)	69(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Marital Status					
Single	150(53.6)	130(46.4)	280(100)	1	41.85(0.0001)*
Married	102(87.9)	14(12.1)	116(100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		
Income					
≤N 2000	0 (0.0)	55(100)	55 (100)	1	111.7(0.0001)*
≥ N 20001	252(73.9)	89(26.1)	341 (100)		
Total	**288 (72.7)**	**108(63.8)**	**396 (100)**		

P≤0.05 (statistically significant)

4. DISCUSSION

This study found that more than two-third (87.4%) of the respondents were aware of the hazardous nature of the job and most of the participants identified physical hazard as a type of hazard. The findings revealed that majority of the respondent knew that exposure to hazard can cause health problems, broken bottles and sharp objects are hazards, creeping insects and human waste have potentials to cause harm. Also, the findings revealed that more than three-quarter of the respondents were aware that creeping insects and human waste have potentials to cause harm, working under extreme heat can result in illness, irritation to the skin or eyes could result from exposure to harmful chemical substance. Furthermore, the study indicated that majority of the participants knew that unidentified materials could be explosives and could cause harm, most stated that bacteria and fungi diseases could result from improper handling of infectious waste, majority of the participants asserted that abuse from the public is a form of psychosocial hazard. The study found that most (72.7%) of the respondents had poor awareness of health hazards. Findings in this study is in keeping with the finding by Thirarattanasunthon et al. [14], who reported a low level of awareness among waste scavengers regarding the health risks which their occupation exposed them to. There is similarity between findings in this study and findings by Popoola et al. [15], who found that majority (76.7%) of the scavengers were aware of the possible health hazard which their occupation exposed them to.

On the other hand, findings in this study do not agree with Cardozo and Moreira [16], who reported that most of the participants were unaware of the potential risks of exposures to health hazards, ill-health amongst others. Similarly, Vasina [17] reported that all the workers were aware that that their work was dangerous and involved risks to their health. This study differed from report that less than half 45.1% of the waste pickers were aware that the exposure to heavy metals as a result of handling or dealing with e-waste could contribute to major health problems [18]. From the findings in this study, it implies that most of the respondents had poor awareness of health hazards.

Findings in this study revealed that more than two-third of the respondents took their bath twice a day, as majority took their bath every day, most washed their hand before eating while most of the participants do not seek for lifestyle advice on healthy behavior. This study found that three-quarter of the participants normally pick metals from refuse dumps, most of them visited the refuse dumpsites daily, most participants and less than half had attempted to stop waste scavenging. Also, this study indicated that more than half of the respondents consumed fruits, vegetables every day, and ate twice a day. Findings showed that most of the respondents washed their work clothes every day and less than half of the respondents visited the chemist when they had physical injury. This study found that more than half (63.6%) of the participants had poor level of attitude towards precautionary measures.

There is similarity between findings in this study and findings by Thirarattanasunthon et al. [14], who found that about (70%) of the participants had a negative attitude towards self-protective behaviors (precautionary measures) which were necessary to keep them safe while scavenging at the dumpsites. Al-Khatib et al. [19] found that participants had poor attitude towards the precautionary measures, that safety tools were poorly used and hygiene practices poorly adhered to during their work. Also, Al-Khatib et al. [19] reported that majority of scavengers engaged in these hygiene practices after their work by having their baths or washing their work clothes with disinfectants in order not to be a source of infection transmission to their families. Similarly, Adeoye et al. [9] reported the manifestation of poor attitude of waste scavengers to the use of personal protective equipment considering their low levels of use of personal protective equipment while working. Based on the findings in this study, it is inferred that more than half of the participants had poor level of attitude towards precautionary measures.

5. CONCLUSION

This study shows that preponderance of the respondents had poor awareness of health hazards and poor level of attitude towards precautionary measures. There is a positive relationship between level of education, marital status and awareness of health hazards. There is a positive relationship between age, religion, level of education, marital status, income and attitude towards health hazards and safety.

ETHICAL APPROVAL AND CONSENT

Ethical clearance for the study was obtained from the Ethics Committee of University of Port

Harcourt, Nigeria. Ethical clearance for the study was obtained from the Ethics Committee of Enugu State Ministry of Health. Consent was obtained from ESWAMA and all participants after explaining the purpose of the study and requesting that they willingly participate in the study. The participants were informed that their responses will be kept confidential and only be used for academic purpose.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Retrieved 27th December, 2021.
Available:https://doi.org/10.1155/2020/3780431

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/88825