



CORRELATION BETWEEN SAFETY AWARENESS AND OCCUPATIONAL HEALTH RISK FACTORS AMONG WASTE WORKERS IN SELECTED GOVERNMENT HOSPITALS IN NIGER- DELTA

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Abstract

This study investigated the correlation between safety awareness and occupational health risk among waste workers in selected government hospitals in Niger-Delta region. Safety awareness was operationalized using modified safety awareness scores while knowledge of occupational health risk exposure was captured using physical factors, biomechanical factors, biological Factors and psychosocial factors. Cross-sectional and inferential designs were adopted. The population comprised hospital waste workers in three selected government hospitals in Niger-Delta States namely Imo, Rivers and Akwa-Ibom State. Data collection was done using questionnaire designed based on a 5-point Likert. Data analysis was done using descriptive statistics and Pearson correlation. The results of the descriptive statistics using weighted average (WA) revealed that knowledge of waste workers on occupational health risk factor is good (WA = 4.09 > 3.00) and the waste workers have substantial level of safety awareness (WA = 3.76 > 3.00) The Pearson correlation revealed that positive and significant relationship exists between safety awareness, physical factors and psychosocial factors. The results also showed that there is positive but insignificant relationship between safety awareness and biomechanical factor (BMF) however, safety awareness has negative and significant relationship with biological factors (BF). It was therefore concluded that safety awareness has a positive relationship with occupational health risk factors among waste workers in government-owned hospitals in the Niger-Delta.

Keywords:

Safety Awareness, Occupational health Risk Factors, Waste Workers, Government-owned Hospitals, Niger-delta.

1. Introduction

Hospital wastes are increasing in quantity and in diversity worldwide because modern hospitals and healthcare facilities have become large establishments, producing not only hazardous wastes but also general waste such as stationery wastes and food wastes (Harhay et al., 2014; Yves et al., 2019). World Health Organization (WHO) defines healthcare or medical waste to include all the wastes generated within healthcare facilities, health-related research centers, and

laboratories related to medical procedures, as well as from minor and scattered sources, including wastes produced in the course of healthcare undertaken in the home such as home dialysis, self-administration of insulin, and recuperative care (Yves et al., 2019). These wastes are special type of wastes carrying a high potential of hazard and very infectious (Shahida et al., 2015). There are serious health effects from public health standpoint if these wastes are not managed properly. Thus, hospital waste management means the management of waste produced by hospitals using techniques that will check the spread of diseases through hospital waste. Hospital waste management is a significant environmental and social obligation and it is the responsibility of the medical waste management team which comprise of medical waste workers and their supervisors (Shahida et al., 2015)

Medical waste management workers are workers in hospitals, health-centers and health-based research institutes who, primarily, engage in collection and disposal of medical waste generated from diagnosis and treatment of medical cases (Harhay et al., 2014). They make important contributions and are critical to the functioning of the health systems globally. Medical waste workers face a wide range of hazards on the job including needle stick injuries, back injuries, latex allergy, violence, and stress. Medical waste workers (MWWs) need protection from these workplace hazards just as much as doctors, nurses, lab-technician and other principles personnel in the hospital and health-centers. Yet, because their job is to collect, sort and disposal waste, medical waste workers are often viewed as “minor or irrelevant”. Thus, their activities and duties are considered first before their health and safety (Yves et al., 2019). Therefore, there is urgent need to pay more attention to the health and safety of medical waste workers which will involve assessing the various occupational risk factor that could jeopardize their health and safety and by extension reduced their safety awareness

Generally, workers, in the context of their activities, are in contact with some occupational risks and exposure to these occupational risk factors is a major public health issue, and also generates a huge economic impact for organizations (Dogbla et al., 2023). An assessment and detailed understanding of those occupational risk factors is needed to build an efficient preventive strategy (Menzel, 2018). These risk factors can be exposure to some agents (chemical, biological, biomechanical, or physical) or constraints, either organizational or relational. Medical waste workers working in different health care facilities are exposed to the occupational risk of a wide array of hazards at work, including infections due to sharps injuries, harmful exposures to radiation wastes and dangerous drugs, physical violence, and mental stress (Mathieu, et al., 2020; Pearce et al., 2021). Though biological hazards such as infections are commonly recognized worldwide, the non-biological hazards and their importance are generally ignored (Nataletti, et al., 2014; Themann et al., 2019). The health hazards faced by the medical waste workers due to bacterial and viral respiratory infections (biological hazard), including COVID-19, are higher than the general population. Hence, there is need to assessment the prevalence and level of the various occupational risk factors faced by medical waste workers.

It has been established that hospitals and medical centers generate hazardous wastes because of the peculiarity of their work processes and activities (Harhay et al., 2014; Yves et al., 2019). Thus, medical waste workers need to operate at high level of safety awareness in other to prevent possible work-related accident and occupational disease while providing their waste collection and disposal service. Poor management of the hazardous waste in the hospital environment could cause threat toward both health personnel and patients, and also results to medical failures. So, having a good level of safety awareness by medical waste workers protect then as well as health personnel from these dangers and also protecting patients form medical failures. Hence, in other to minimize the potential risks, it is necessary to investigate and determine the factors that could affect the level of safety awareness of medical waste workers and also encourage then to comply with the accreditation standards in waste management

especially for infectious and hazardous waste as such could help to enhance the safety performance of the hospital and health-centers. Therefore, it could hypothesize that enhancement of safety awareness of workers could improve their level of identification and proper management of the occupational risk factors in the hospital and health-centers while poor level of safety awareness of the waste workers could results to low level of identification and improper management of the occupational risk factors in the hospital and health-centers. Hence, these hypotheses gave credence to the baseline of this study which was focused on investigating the correlation between safety awareness and occupational risk factors among waste workers in selected hospitals operating in Niger-Delta with the objectives of investigating the level of safety awareness among waste workers in selected hospitals operating in Niger-Delta, examining the prevalence of occupational health risk factors in the selected hospitals operating in Niger-Delta and ascertaining the correlation between the safety awareness level of the waste workers and the prevalence of occupational health risk factors in the selected hospitals operating in Niger-Delta

2. Methodology

2.1 Study Area

The geographical area of coverage for this study was Niger-Delta States of Nigeria which comprises Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Imo, Edo Ondo, and Rivers and it is made up of different ethnic groups such as Igbos, Yorubas, Ijaw and others. According to Hogan (2013), the Niger Delta is the delta of the Niger River sitting directly on the Gulf of Guinea on the Atlantic Ocean in Nigeria, consisting of nine oil producing states of Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo, and Rivers. Niger Delta is Nigeria centre for oil and gas exploration activities and home to Nigeria's MOA prolific oil and gas zones. The region has a land area of 70,000km², representing about 7.5% of the total land mass of Nigeria (Akalonu, 2019). In terms of coordinates, the region lies between lat. 5°19'¹,20.40'¹¹N of the equator and long 6°28'¹,8.99'¹¹E of the Greenwich meridian line. The region is densely populated with more than 40million people living in it and bounded on the south by the Gulf of Guinea within the Atlantic Ocean and on the east by Cameroon (Akalonu, 2019). Predominant occupation of the indigenous people is farming and fishing.

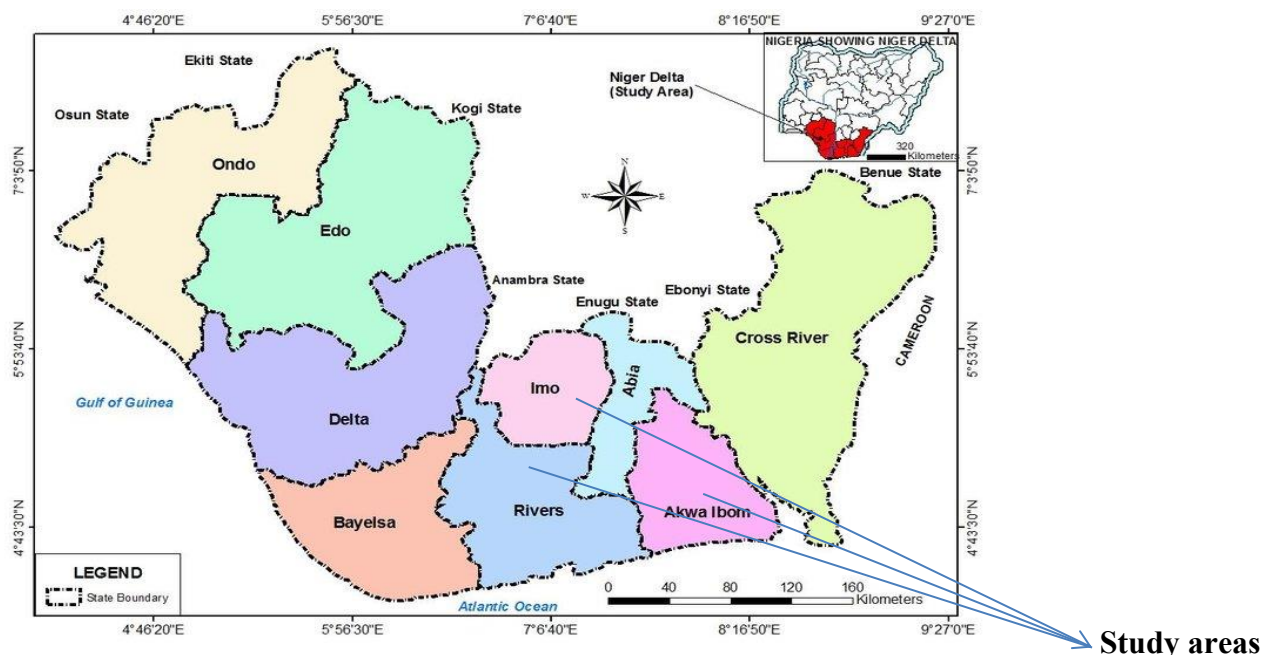


Figure 1: Map of Niger-Delta Showing the Selected States

2.2 Population, Sampling technique and Sample size determination

The population of this study comprised medical waste workers in the selected hospitals in the Niger-Delta region. However, Multi-stage sampling technique was used to sample the respondents needed in this study.

Stage 1: A random sampling technique was used to sample three states out of the nine states that made up the Niger Delta and the three states are Akwa-Ibom, Imo State and Rivers States.

Stage 2: Purposive sampling technique was used to select the most popular government-owned hospitals in the states listed in the first stage, namely; University of Uyo Teaching Hospital, Uyo. (UUTH), Federal University Teaching Hospital, Owerri (FUTHO) and University of Port-Harcourt Teaching Hospital (UPTH).

Stage 3: Involved sampling only waste workers working in the hospital mentioned in stage two. Table 1 below shows the states and the hospitals sampled along with the population of waste workers in the hospitals.

The sample size was determined using the Taro Yamane sample size determination formula presented in equation (1). The population of medical waste workers in the selected hospitals is shown in Table 1. The sample size for the hospitals were subsequently determined proportionately based on the total sample size calculated for the study.

$$n = \frac{N}{(1 + N)(\epsilon)^2} \quad (1)$$

Where n is the Sample size, N is the total population of the respondents under study (638) and ϵ is the level of significance (0.05). Then, the sample size was 400, adding 10% of the sample size to cover for the possibility of errors in the questionnaire, the final sample size became 440. This sample size was distributed to the three sampled hospitals in the States as a ratio to their population. Thus, UUTH with 197 waste workers was allotted 135 respondents, FUTHO with 203 medical waste workers was allotted 140 respondents, while UPTH with 238 waste workers was allotted 165 respondents.

Table 1: Sampled States, their population and sample sizes for waste workers

S/N	States	Sampled Hospitals	Population of waste workers	Sample Size
1	Akwa-Ibom State	University of Uyo Teaching Hospital Uyo. (UUTH)	197	135
2	Imo State	Federal University Teaching Hospital Owerri (FUTHO)	203	140
3	Rivers State	University of Port-Harcourt Teaching Hospital (UPTH)	238	165
Total			638	440

2.3 Method and instrument of Data Collection

Cross-sectional and inferential research designs were adopted in this study. Survey study was used in this study to obtain data from waste workers in selected hospitals in the Niger-Delta. Data were collected using a structured printed questionnaire which was administered to the respondents on a one-on-one basis. The questionnaire consisted primarily of questions rated

on a five-point Likert scale together with questions relating to the socio-demographic characteristics of the respondents.

2.4 Validity and Reliability of Study Instrument

Test and pre-test reliability of the questionnaire was carried out using a sample size of 10% and their reliability was determined using Cronbach's alpha coefficient. A Cronbach's alpha coefficient of 0.70 or above will be considered "Suitable" for the research.

2.5 Data Analysis

The data collected for the study were analyzed using descriptive and inferential statistical methods (correlation analysis). The descriptive statistics were used to summarize the responses of the respondents and assess the level of safety awareness and occupational health risk factors among the medical waste workers. The inferential statistical method (correlation analysis) was on the other hand employed to examine the relationship between safety awareness and occupational health risk factors among medical waste workers in the selected hospitals in the Niger-Delta.

3. Results and Discussion

3.1 Level of occupational health risks factors in the selected hospitals in Niger-Delta

The level of occupational health risk (OHR) was operationalized using six constructs, namely physical factors, biomechanical factors, biological factors, and psychosocial factors, Table 3 present the outcome of the descriptive statistical analysis conducted on the sampled waste workers in the selected hospitals with emphasis on their knowledge of exposure to occupational health risk in the study areas.

On the physical factors, the results in Table 3 showed the response of the hospital waste workers. The concept of physical factors was operationalized using three statement items and the results revealed that the hospital waste workers disagreed to all the three item because their weighted average score of the three items 2.12, 2.01 and 2.10 respectively were less than 3.00 minimum critical level for agreeing or accepting any item in a construct at 5-point Likert scale. This result means that the most of the hospital waste workers disagree that they are exposed to the aforementioned physical occupational health risk in the hospitals during their daily activities in the hospital. Moreover, the mean weighted average score of 2.08 affirms the fact that most of the hospital waste workers disagree that they are exposed to "unbearable level of noise, excessive temperature and excessive level of vibration in their workplace" in the hospital.

On the biomechanical OHR factors, the results in Table 3 revealed the hospital waste workers agreed to all the three statement items used to operationalize the constructs because their weighted averages of 3.38, 4.42 and 3.47 respectively are greater than 3.00 critical limit for agreeing or accepting item of any construct This results implied that most of hospital waste workers agreed that they are substantially exposed to the three biomechanical occupational health risk capture in the items which includes exposure to bad work posture, exposure to handling of heavy objects and exposure to repetitive motion. Also, the mean of the weighted average score of 3.76 also confirm that most of the hospital waste workers accept that they are substantially exposed to the aforementioned biomechanical occupational health risk during their discharge of their daily responsibilities in the hospital.

On the biological OHR factors, the results in Table 3 also revealed the hospital waste workers in the study area agreed on the all the three statement items used to operationalize exposure to biological occupational health risk in the hospital. This is because the weighted average of the three items 4.80, 4.72 and 4.55 respectively are where greater than 3.00 critical limit for

agreeing or accepting any item in the constructs at 5-point Likert scale. This result means that most of the respondent accept that they are substantially exposed to contaminated human or human products, contaminated waste during handling and treatment, and contact with contaminated animals or animal products. Also, the mean of weighted average of 4.69 confirm that overwhelming majority of the hospital waste workers agreed that they are exposed to aforementioned biological occupational health risk in their activities on daily bases in the hospital.

Finally, on psychosocial occupational health risk factors, the results in Table 3 also revealed that the sampled hospital waste workers agreed to all the four statement items used to operationalize exposure to psychosocial occupational health risks factors because the weighted average of the four items 4.72, 4.55, 4.11 and 4.15 respectively are were greater than 3.00 critical limit for agreeing or accepting any item in the constructs at 5-point Likert scale. These results implied that the substantial majority of the hospital waste workers accept that they are exposed to aforementioned psychosocial hazards which include emotional stress, fear sacking, poor financial compensations and poor support and recognition. Also, the mean of weighted average of 4.47 confirm that most of the hospital waste workers accept that they are exposed to massive level of psychosocial hazards in the hospital.

Overall, the mean of weighted average of the four occupational risk are 2.52, 3.71, 4.71 and 4.47 with overall mean of weighted average of 4.09 suggest that the hospital waste workers in the hospital within the Niger-Delta region agreed that they are massively exposed to occupational health risk in their various hospitals with lowest level of physical risks and highest level of atypical work-hour risks.

These outcomes aligned with the work of Dogbla et al. (2023) who carried out empirical study on Occupational Risk Factors by different Sectors using observational Study of 20,000 Workers. Occupational risk factors were assessed by workers followed by the Occupational Health Service of Chart, using self-reported questionnaires. The sectors of activity were grouped into seven sectors; manufacturing, construction, Trade and repair of motor vehicles and motorbikes, administration, transportation, and public administration. The occupational risks factors were grouped into six occupational exposure groups; physical, bio-mechanical, biological and Psychosocial factors. The results revealed that workers from the human health and social sectors had more chance of being exposed to biological agents, atypical working hours and psychosocial factors.

Table 2: Level of occupational health risk exposure of the hospital waste workers in Niger-Delta

SN	Physical Factors	SA	A	UN	D	SD	WA	Remark
1	There is unbearable level of noise in my workplace and it affects my concentration at work	11.00 3.30%	62.00 16.10 %	79.00 20.70 %	45.00 11.80%	189.00 48.10%	2.12	Disagreed
2	The temperature level in my work station is very (high or low) and it affects my concentration at work	29.00 7.80%	35.00 9.30%	83.00 21.70 %	48.00 12.65%	190.00 48.40%	2.01	Disagreed
3	The equipment and machine used in hospital generate high level of vibration it affects my concentration at work	29.00 7.80%	30.00 8.30%	84.00 21.70 %	52.00 13.90%	190.00 48.40%	2.10	Disagreed
	Mean of WA score						2.08	Disagreed
	Biomechanical factors	SA	A	UN	D	SD	WA	Remark
4	My work requires me to be in difficult and awkward postures, most times, and it affect my performance	63.00 4.80%	168.00 42.80 %	27.00 7.30%	109.00 28.00%	19.00 17.10%	3.38	Agreed
5	My daily work routine requires handling and carrying heavy loads	238.00 59.60 %	120.00 31.30 %	0.00 0.00%	8.00 4.15%	20.00 5.18%	4.42	Agreed

6	My daily work routines are always the same and requires repetitive motions.	102.00 25.70 %	115.00 31.70 %	89.00 22.40 %	24.00 6.00%	56.00 14.10%	3.47	Agreed
	Mean of WA score						3.76	Agreed
	Biological factors	SA	A	UN	D	SD	WA	Remark
7	My work requires contact with humans or products of human origin	301.00 84.0 8%	85.00 15.9 2%	0.00 0.00 %	0.00 0.00%	0.00 0.00%	4.80	Agreed
8	I am involved in waste handling, treatments and disposal	256.00 72.0 8%	130.00 27.9 2%	0.00 0.00 %	0.00 0.00%	0.00 0.00%	4.72	Agreed
9	My work requires contact with animals or their products	206.00 53.2 0%	180.00 46.8 0%	0.00 0.00 %	10.00 0.00%	0.00 0.00%	4.55	Agreed
	Mean of WA score						4.69	Agreed
	Psychosocial factors	SA	A	UN	D	SD	WA	Remark
16	The emotional demand of my work is very high	256.00 72.0 8%	130.00 27.9 2%	0.00 0.00 %	0.00 0.00%	0.00 0.00%	4.72	Agreed
17	I am in constant fear of being sacked or suspended	206.00 53.2 0%	180.00 46.8 0%	0.00 0.00 %	10.00 0.00%	0.00 0.00%	4.55	Agreed
18	The financial compensation from my work is not worth the work requirement	70.00 11.1 7%	315.00 88.8 3%	0.00 0.00 %	0.00 0.00%	0.00 0.00%	4.11	Agreed
19	I hardly get the needed support and recognition from my co-workers and management	84.00 15.0 8%	302.00 84.9 2%	0.00 0.00 %	0.00 0.00%	0.00 0.00%	4.15	Agreed
	Mean of WA score						4.47	

3.2 Level of safety awareness of the waste workers in selected hospitals in Niger-Delta

The level of safety awareness of the sampled waste workers on the occupational health and safety practices was operationalized using eight safety awareness scores modified into eight statement items, Table 3 presents the outcome of the descriptive statistics analysis conducted on the sampled waste workers in the hospitals exploring the level of safety awareness of waste workers regarding occupational health and safety in the study areas.

The results showed that the sampled hospital waste workers agreed to seven out of the eight statement items because the weighted average score 3.89, 3.00, 3.69, 3.76, 3.38, 3.78, 3.36 and 3.26 for the first, third fourth, fifth sixth, seventh and eight items respectively were higher than 3.00 minimum critical level for agreeing or accepting any item in a constructs at 5-point Likert scale and they were undecided on the second item because the weighted average is 3.00 which is equal to the 3.00 critical point suggesting that there are equal number of workers who accepted and rejects or agreed and disagreed to the position of the second item, hence the respondents are undecided. These results implied that the most of the hospital waste workers agree that they have substantial level of safety awareness on the occupational health and safety regarding hospital waste management in the hospital. Moreover, the mean weighted average score

of 3.51 affirms the facts that most of the hospital waste workers agree that they have a good level of safety awareness concerning occupational health and safety of waste management in the hospital.

The outcome aligned with the work of Akter et al. (2019) who carried out similar study to find the level of knowledge and awareness in Medical Waste Management (MWM) practices. Questionnaire was used to find the occupational health safety practice and the difficulties faced by the employees in his study. The results revealed that knowledge and awareness level of waste workers in the sampled medical facilities are good however, level of knowledge and awareness among waste workers in government-owned medical facilities were found higher than the those in private medical facilities.

Table 3: Level of safety awareness of waste workers in selected hospitals in Niger-Delta

	Safety Awareness	SA	A	UN	D	SD	WA	Remarks
1	Workers and employers must share the responsibility for occupational health and safety	160.00 41.5% %	105.00 27.30%	68.00 17.60% 0%	24.00 6.20% %	29.00 7.50% %	3.89	Agree
2	I am aware of existence of Safety and Health policies	35.00 8.10% %	97.00 23.10%	142.00 39.40% 0%	88.00 25.60% 0%	24.00 3.9% %	3.00	Undecided
3	I have a right to know about any potential hazard to which I may be exposed at the workplace	175.00 47.20% %	45.00 12.20%	83.00 21.40% %	41.00 10.00% 0%	38.00 9.20% %	3.69	Agree
4	I have a right to be part of the process of identifying and resolving workplace health and safety concerns	132.00 33.90% %	118.00 30.80%	72.00 20.00% 0%	40.00 11.10% 0%	23.00 4.20% %	3.76	Agree
5	It is important to know and follow safe work procedures.	153.00 40.20% %	40.00 8.20%	82.00 22.70% 0%	43.00 11.50% 0%	48.00 11.8% %	3.38	Agree
6	It is important to report injury or illnesses immediately.	130.00 33.20% %	120.00 30.60%	79.00 20.30% 0%	37.00 10.30% 0%	20.00 5.50% %	3.78	Agree
7	I have had a training on occupational health and safety at the workplace	150.00 40.00% %	35.00 8.20%	86.00 22.50% 0%	50.00 12.10% 0%	50.00 12.1% %	3.36	Agree
8	I have a right to refuse hazardous work	135.00 36.01% %	49.00 12.20%	76.00 21.40% %	48.00 11.90% 0%	67.00 17.20% %	3.26	Agree
	Mean of WA score						3.51	Agreed

3.3 Relationship between safety awareness and occupational health risk factors

Two major constructs were considered in this study and they include safety awareness and occupational health risk. Safety awareness (SA) was considered as single indicator,

occupational health risk was captured using four key OHR indicators namely physical factors (PF), Biomechanical factors (BMF), biological factors, (BF) and psychosocial factor (PSF). Table 4 shows that outcome of the Pearson correlations carried out among the seven indicators and only the relevant relationships were discussed.

The results of the Pearson correlations on the relationship between safety awareness (SA) and the occupational health risk constructs revealed that, positive and significant relationship exist between safety awareness and physical factors (PF) with ($r = 0.510$, $p = 0.000$), and psychosocial factors ($r = 0.117$, $p = 0.001$). The results also showed that there is positive but insignificant relationship between safety awareness and biomechanical factor (BMF) ($r = 0.015$, $p = 0.369$) while biological factors showed negative and significant relationship with safety awareness (BF) ($r = -0.333$, $p = 0.000$). These results implied that improvement in safety awareness of waste workers positively improved the prevalence of occupational risk factors in the hospital in terms of physical risk, biomechanical risk and psychosocial risk, however, the improvement in safety awareness has negative effect on biological risk factors

The findings aligned with work of Patrick et al (2019) who carried out study aimed to determine whether occupational safety and health (OSH) awareness among health workers and health management hindered implementation of OSHA in public dispensaries and health centres, using Machakos County. Linear regression results indicated strong negative relationship between safety awareness and hindrance in the implementation of OSHA. The prediction factor was -0.6400 , $p < 0.05$. These showed that a unit increase in safety awareness predicted an increase of 0.64 units of implementation of OSH Act.

Table 4: Summary of Pearson correlation results on the relationship between safety awareness and occupational health risk factors

S/N	Occupational Health Risk factors	Correlation Coefficient	p-value	Remark
1	Physical factors (PF)	0.510,	0.000	Positive and Significant
2	Biomechanical Factors (BMF)	-0.333,	0.000	Negative and Significant
3	Biological Factors (BF)	0.015	0.369	Positive but insignificant
4	psychosocial Factors (PSF)	0.117	0.000	Positive and Significant

4. Conclusion

The relationship between safety awareness and occupational health risk factors among waste workers in selected hospitals operating in Niger-Delta was investigated, based on the finding of the study it was concluded that the waste workers in the government-owned hospitals in Niger-Delta have a substantial level of safety awareness as regards to their work environment and work conditions. In addition, safety awareness has positive relationship with the level of occupational health risk exposure among waste workers in the government-owned hospitals in the Niger-Delta.

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