



Perceived Health Effects from Exposure to Occupational Hazards and Safety Practices Among Industrial Cleaners in Port Harcourt Metropolis, Nigeria

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Abstract

This study aimed to assess the health effects of exposure to occupational hazards and safety practices among industrial cleaners in Port Harcourt metropolis. The study employed a descriptive survey design. The population consisted of all industrial cleaners in the Port Harcourt metropolis. A sample size of 593 was selected using a multistage sampling method. A structured self-administered questionnaire was used to get data from workers on the perceived health effects and the safety practices. The questionnaire had a reliability coefficient of 0.82. Statistical Packages for Social Sciences (SPSS) version 26.1 was used to analyze the data generated from the study. Specifically, means and standard deviations were used to analyze the health effects the workers were exposed to and safety practices. The result showed a moderate effect of hazard exposure on the health of industrial cleaners in Port Harcourt, with a mean rating of 2.59 ± 1.074 ; the industrial cleaners had poor safety practices (2.47 ± 1.163). The findings also showed a significant difference in the practice of safety based on age and level of education ($p < 0.05$), while there was no significant difference in the practice of safety based on gender and marital status ($p > 0.05$). The study concluded that industrial cleaners are moderately exposed to health effects occasioned by exposure to hazards in the work environment. Most common among these health effects are back pain, skin problem and breathing difficulties; also, industrial cleaners have poor safety practices. The study recommended that the state government should mandate companies to enforce safety practices for all workers without exception, to improve the safety practices of industrial cleaners

Keywords: Industrial cleaners, Health effects, Exposure, Hazards, and Safety practices

Introduction

The occupational health and safety of workers in the cleaning and sanitation industry has become an emerging global public health concern; this is particularly concerning in developing nations with weak regulatory policies and enforcement drives. Industrial cleaning by nature is a hazardous job; workers are exposed to physical, chemical, mechanical, ergonomic, biological, and growing psychosocial hazards (Chinda et al., 2023). Exposure to occupational hazards has resulted in severe morbidity and increased mortality rates among workers. The International Labour Organisation (ILO, 2019) estimates that approximately 2.78 million workers die annually from exposure to occupational accidents and work-related diseases, while a further 374 million suffer non-fatal injuries and illnesses each year.

A significant share of this burden occurs among workers in Sub-Saharan Africa due to weak policies and implementation and poor working conditions, such as inadequate provision of personal protective equipment (PPE),

no training, and poor access to occupational health services. The Nigerian context provides a peculiar situation where most industrial cleaners are engaged on contract, which usually excludes the worker from the privileges of full staff, such as access to health services or compensation for injuries. With the rapid urbanisation of cities in Rivers State and expanding industrial activities, there has been the proliferation of outsourced cleaning services (Chinda et al., 2023). The diversity of hazardous exposure confronting industrial cleaners reflects in the multiplicity of health effects associated with the job. Industrial cleaning has been associated with respiratory distress, skin problems, musculoskeletal disorders, chemical burns and, in some cases, carcinogenicity. Respiratory distress is a common occurrence among industrial cleaners caused by the inhalation of chemical fumes or aerosols. A study revealed industrial cleaners in the Oil industry were exposed to respiratory diseases as the most frequent health effects, and other health effects such as chemical burns, poisoning and skin diseases were also reported among the cleaners (Efa & Nwaogazie, 2023). A ten-year analysis of the prevalence of work-related asthma among cleaners exposed to cleaning agents revealed a prevalence of 12.4%; the greatest percentages were found among building cleaners (20.3%) and healthcare workers (41.1%) (Rosenman et al., 2020). Dang et al. (2022) reported a 35% increased risk of asthma among hospital cleaners in a meta-analysis of 10 studies. Another systematic review and meta-analysis concluded that working as a cleaner was associated with an increased risk of reversible and even irreversible obstructive airway diseases (Archangelidi et al., 2021).

Skin problems have been associated with exposure to cleaning agents among industrial cleaners, with some studies indicating a high prevalence of work-related skin disorders, commonly contact dermatitis. When a substance comes in contact with the skin, it results in four possible reactions: the skin acts as an effective barrier, the substance causes local irritation, the substance produces skin sensitisation, the substance penetrates the skin into the bloodstream. (Jain & Rao, 2015). Global epidemiological studies among health workers have shown the prevalence of skin-related symptoms in the past year to range between 18.9% and 66% from exposure to cleaning products (Sunday et al., 2021). Contact dermatitis usually occurs when the skin comes into contact with hazardous chemicals, with common symptoms like red or swollen hands, itchy skin or blisters. Tesfaye et al. (2022) reported a 52.1% prevalence of self-reported work-related contact dermatitis among cleaners in healthcare settings.

Musculoskeletal disorders (MSDs) are prevalent among industrial cleaners, commonly manifesting as pain at the lower back, knees and shoulders. MSDs are a common cause of morbidity among cleaners in developing nations as Melese et al. (2020) reported a 52.3% prevalence of musculoskeletal disorders among cleaners in the past 12 months and 31.8% in the last 7 days. A similar study reported MSD prevalence was 58.2%, with the lower back (35.9%), knees (23.1%), hips/thighs (15.9%), and right shoulder (15.6%) being the most often affected areas (Ojo et al., 2024). The high prevalence of MSD among industrial cleaners has been associated with extreme deadlines, awkward posture, number of working hours per day and repetitive work (Melese et al., 2020).

The corrosive properties of cleaning agents can result in chemical burns on the skin or irritation of the eyes. A survey of occupational exposure showed that one-fourth of all occupational cases evaluated by the Swedish Poisons Information Centre (PIC) used cleaning agents or disinfectants, and one-third of those cases were categorised as major risk cases, usually because of the possibility of corrosive skin and eye injuries. (Schenk et al., 2020). Every chemical comes with a safety data sheet that must be studied and followed strictly to avoid injuries from handling chemicals. Chemicals contain strong acids and bases such as bleach, drain cleaners, and ammonia that can burn on contact. Most of these cleaning products are a mixture of chemicals that may be corrosive or toxic (Chen, 2020). Efa and Nwagozie (2023) showed that chemical burn was reported by 32.92% of industrial cleaners in the oil and gas sector.

Health effects occur due to contact with substances at work; the occupational cause of the health effect may often be overlooked by health care workers. Clinical manifestations of the health effects are related to the dose and timing of exposure; occupational factors can act in combination with non-occupational factors to produce disease (Emeka & Benedicta, 2014). A worldwide reference list of occupational diseases has been created and updated by the International Labour Organisation (ILO) in response to the problem of reducing the emergence of occupational diseases. This list is periodically updated by an international tripartite meeting of specialists. The highlighting of criteria for identifying occupational disorders that are periodically added to the ILO List enhances the list. The List of Occupational Diseases was created to help nations prevent, document, notify, and, if necessary, compensate for diseases caused by their jobs. (ILO, 2014).

Safety is the condition of being safe; it may not connote the total absence of hazards but freedom from imminent danger. Safety is everyone's responsibility; workers are advised to always think about safety, irrespective of the task. However, management is in direct control of the safety of work environments. Management's role in safety includes adopting proactive safety measures, adequate training and supervision, and investigation of accidents, while employees' role includes reporting unsafe work conditions, use of personal protective devices, and attending safety training. (Emeka & Benedicta, 2014)

According to Emeka and Benedicta (2014), in the control of hazards, three factors should be taken into account: the source of the hazard, the transmission pathway of the hazard and the receiver. Every organisation should have a safety policy which is a basic guideline that shows the organisation's commitment to safe work and actions to achieve safety. The safety policy must possess the documentation that establishes the policy, staff responsible for enforcement, penalties for defaulters, a system of reporting violations, reward for compliance with the policy, among other things. Ziva Cleaning Services (2025) itemised some key elements of safe cleaning practice as use of task-appropriate PPE, pre-cleaning assessments of high-risk zones, staff training on safe use, storage and disposal of cleaning agents, maintenance of tools, and emergency preparedness. An industrial cleaner is an employee who does not use high-level reasoning or intellectual abilities in their line of work; the job does not usually require formal education and can be performed by the majority of individuals. Industrial cleaners tend to earn lower than the average salary compared to other jobs; these jobs are usually labelled blue-collar jobs. Industrial cleaners usually work in environments that expose them to unsafe conditions regularly, hence the need to assess their health exposure and safety practices.

The cleaning occupation carries inherent hazards that cause both acute and chronic health effects among workers. Industrial cleaners are exposed to a range of occupational hazards such as physical, chemical, biological, psychosocial, ergonomic and mechanical hazards. The cumulative effect of these exposures is responsible for the perceived and clinically confirmed health effects such as respiratory issues, skin problems and musculoskeletal disorders associated with the profession. The occurrence of these health problems among workers was shown by the International Labour Organisation to be responsible for 70% of deaths among workers globally. This health impact affects the quality of life among workers, reduces their productivity and affects the achievement of SDG goals on health and welfare of the populace. Industrial cleaners form a part of the large informal sector that is not usually captured by occupational health services; hence, the health effects of hazard exposure at work may not be detected early enough to prevent the occurrence of a disease condition. In Port Harcourt metropolis, where industrial cleaners are mostly engaged on a contract basis, with no health insurance policy, and sometimes an inadequate supply of personal protective equipment, the occurrence of health effects would have a detrimental impact on the well-being of these workers. Hence, the study aimed to assess the health effects of exposure to occupational hazards and safety practices among industrial cleaners in Port Harcourt metropolis.

This study aimed to assess the health effects of exposure to occupational hazards and safety practices among industrial cleaners in Port Harcourt metropolis. Specifically, the study had the following objectives:

1. To determine the health effects from exposure to occupational hazards among industrial cleaners in Port Harcourt metropolis, Nigeria.
2. To assess the safety practices of the industrial cleaners in Port Harcourt metropolis, Nigeria.
3. To examine the influence of the sociodemographic variables of age, gender, level of education and marital status on safety practices among industrial cleaners in Port Harcourt metropolis, Nigeria.

Hypotheses

The following hypotheses were formulated to guide the study at a 0.05 alpha level of significance.

1. There is no difference in the safety practices among industrial cleaners in Port Harcourt metropolis, Nigeria based on age.
2. There is no difference in the safety practices among industrial cleaners in Port Harcourt metropolis, Nigeria based on gender.
3. There is no difference in the safety practices among industrial cleaners in Port Harcourt metropolis, Nigeria based on level of education.
4. There is no difference in the safety practices among industrial cleaners in Port Harcourt metropolis, Nigeria based on marital status.

Materials and Methods

The study was carried out in Port Harcourt, a city in the Niger Delta region of Nigeria. Port Harcourt is of economic significance as the centre of Nigeria's oil industry and a leading supplier of wealth to the nation; many allied industries using products of crude refining, like construction companies, paints, cosmetics, rubbers, have sprung up in the city of Port Harcourt and its environs, creating employment opportunities but not without the associated physical, chemical and environmental hazards. The multiplicity of industries implies the need for cleaning services; the study captured the workers involved in industrial cleaning in Port Harcourt. This was done using 13 zones in the Port Harcourt metropolis.

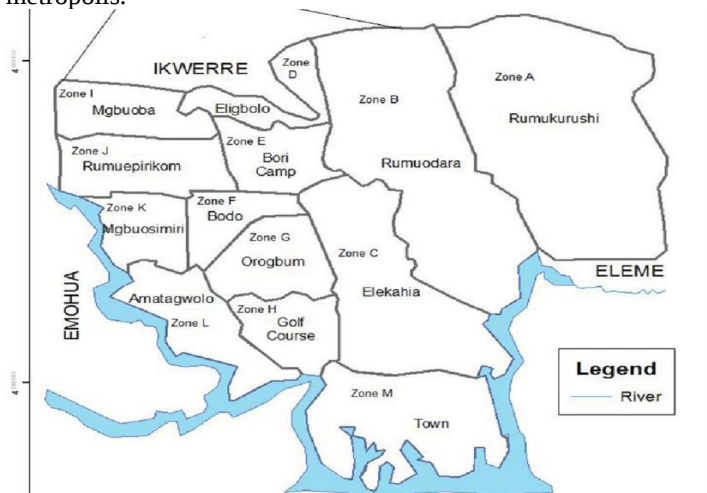


Fig 1.1. Map of Port Harcourt metropolis showing the 13 zones

Source: Survey Department, Port Harcourt (2007)

The study employed a descriptive survey design. The population consisted of all industrial cleaners (both public and private) in Port Harcourt metropolis. A sample size of 593 was derived using the Cochran formula. A multistage sampling method was used to reach the target population of workers. A structured self-administered questionnaire was used to get data from workers on the perceived health effects and the safety practices. The questionnaire was subjected to face and content validity. Reliability was ascertained using the Cronbach's alpha method. A reliability coefficient of 0.82 was obtained. The questionnaire was used to elicit responses from 593 participants using a modified 4-point Likert scale with response options: Always, occasionally, rarely and never. Statistical Packages for Social Sciences (SPSS) version 26.1 was used to analyse the data generated from the study. Specifically, mean and standard deviations were used to analyse the health effects the workers were exposed to and safety practices.

Results

Research Question 1: What are the health effects from exposure to occupational hazards among industrial cleaners in Port Harcourt metropolis, Nigeria?

Table 1: Mean and SD analysis of effects of identified health effects among Industrial cleaners in Port Harcourt

S/No	Items	Mean	SD	Remark
1	Skin problems	2.72	1.017	High
2	Breathing difficulties	2.70	1.060	High
3	Eye irritation	2.29	1.077	Low
4	Feeling drowsy	2.50	1.157	High
5	Frequent fatigue and exhaustion	2.69	1.107	High
6	Hearing difficulties	2.39	1.055	Low
7	Back pains	2.84	1.046	High
8	Difficulty sleeping	2.58	1.051	Moderate

Aggregate Mean **2.59** **1.074** **Moderate**

Table 1 showed the mean analysis of perceived health effects among industrial cleaners in Port Harcourt. From the ranking of the mean rating, the highest effect of hazards on industrial cleaners was back pain (2.84 ± 1.046), following this were skin problems (2.72 ± 1.017) and breathing difficulties (2.70 ± 1.060). The least effect of hazard exposure was eye irritation (2.29 ± 1.077). On average, the aggregate mean rating of 2.59 ± 1.074 showed a moderate effect of hazard exposure on the health of industrial cleaners in Port Harcourt.

Research Question 2: What are the safety practices of industrial cleaners in Port Harcourt metropolis, Nigeria?

Table 2: Mean and Standard deviation analysis of safety practices of Industrial cleaners in Port Harcourt

S/No	Items	Mean	SD	Remark
1	Pre-employment training is conducted for new employees	2.45	1.286	Poor
2	Pre-employment health examination is conducted for new employees	2.33	1.235	Poor
3	I use personal protective equipment (PPE) like safety boot, hand gloves	3.13	.961	Good
4	Hazards are eliminated once discovered	2.24	1.122	Poor
5	Personal protective equipment (PPE) is provided by the safe management	2.54	1.103	Good
6	We have health examinations periodically	2.46	1.137	Poor
7	Hazardous substances are substituted with less hazardous ones	2.35	1.276	Poor
8	There is a first aid box at work	2.53	1.222	Good
9	There is proper/timely treatment of medical issues of workers	2.21	1.129	Poor
Aggregate Mean		2.47	1.163	Poor

Table 2 showed that the safety practices by the industrial cleaners were the use of protective equipment (3.13 ± 0.961), company provision of PPE (2.54 ± 1.103), and the provision of a first aid box (2.53 ± 1.222). The least practised hazard control measures include proper and timely treatment of medical issues of workers (2.21 ± 1.129) and pre-employment health examination (2.24 ± 1.122). On average, the industrial cleaners had poor practices of hazard control measures (2.47 ± 1.163).

Research Question 3: What is the influence of sociodemographic variables of age, gender, marital status and level of education on safety practices?

Table 3.1: Mean and SD analysis of safety practices of sanitation workers in Port Harcourt metropolis based on age

S/N	STATEMENT	15-20		21-30		31-40		Above 40	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Pre-employment training is conducted for new employees	2.82	1.278	2.30	1.338	2.59	1.184	2.08	0.996
2	Pre-employment health examination is conducted for new employees	2.55	1.033	2.06	1.214	2.67	1.216	2.75	1.357
3	I use personal protective equipment (PPE) like safety boot, hand gloves	2.69	0.690	3.12	0.968	3.26	0.997	3.50	0.522
4	Hazards are eliminated once discovered	2.64	1.324	2.83	1.097	2.96	1.076	2.00	1.206
5	Personal Protection Equipment(PPE) is provided by management that is safe	2.31	1.260	2.84	1.066	3.03	1.038	2.33	1.497

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6	We have health examinations periodically	2.07	1.120	2.30	1.123	2.82	1.066	2.25	1.288
7	Hazardous substances are substituted with less hazardous ones	2.47	1.184	2.24	1.223	2.42	1.370	3.33	0.985
8	There is a first aid box at work	3.16	0.938	2.77	1.193	2.25	1.246	3.00	0.953
9	There is proper/timely treatment of medical issues of workers	2.44	1.302	2.17	1.107	2.13	1.092	3.50	0.522
10	There is a company health and safety policy that guides you	2.87	1.306	3.02	1.131	2.82	1.222	3.50	0.522
11	The safety measures of your company are effective	2.73	1.130	2.97	1.064	2.62	1.112	3.50	0.522
12	Serious accidents occur on site	3.02	1.194	3.46	0.793	3.57	0.496	3.50	0.522
13	I feel safe from accidents at work	3.11	0.832	3.26	0.625	3.31	0.462	3.50	0.522
14	Management encourages safe practices at work.	3.33	0.474	3.45	0.498	3.54	0.499	3.50	0.522
Aggregate		2.73	1.076	2.77	1.031	2.86	1.005	3.02	0.853

Table 3.1 shows the mean and standard deviation of safety practices of industrial cleaners in Port Harcourt metropolis, Nigeria, based on age. The result showed workers above 40 years had the highest mean rating (3.02 ± 0.853), and workers in the age group 15-20 had the lowest mean rating (2.73 ± 1.076).

Table 3.2: Mean and SD analysis of safety practices of industrial cleaners in Port Harcourt metropolis based on gender.

S/N	STATEMENT	Male		Female	
		Mean	SD	Mean	SD
1	Pre-employment training is conducted for new employees	2.35	1.268	2.57	1.299
2	Pre-employment health examination is conducted for new employees	2.29	1.215	2.38	1.262
3	I use personal protective equipment (PPE) like safety boot, hand gloves	3.08	1.000	3.20	0.906
4	Hazards are eliminated once discovered	2.96	1.121	2.69	1.109
5	Personal Protection Equipment (PPE) is provided by management that is safe	2.85	1.083	2.84	1.130
6	We have health examinations periodically	2.46	1.108	2.46	1.175
7	Hazardous substances are substituted with less hazardous ones	2.33	1.289	2.37	1.262
8	There is a first aid box at work	2.59	1.192	2.69	1.259
9	There is proper/timely treatment of medical issues of workers	2.17	1.114	2.26	1.147
10	There is a company health and safety policy that guides you	2.96	1.191	2.93	1.156
11	The safety measures of your company are effective	2.86	1.077	2.81	1.116
12	Serious accidents occur on site	3.54	0.704	3.36	0.824
13	I feel safe from accidents at work	3.31	0.607	3.21	0.582
14	Management encourages safe practices at work.	3.47	0.500	3.46	0.500
Aggregate		2.80	1.034	2.80	1.052

Table 3.2 shows the mean and standard deviation of safety practices of industrial cleaners in Port Harcourt metropolis of Rivers State, Nigeria based on gender. The result showed that male and female sanitation workers had equal mean rating (2.80).

Table 3.3: Mean and SD analysis of safety practices of industrial cleaners in Port Harcourt metropolis based on level of education.

S/N	STATEMENT	No formal education		Primary		Secondary		Tertiary	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Pre-employment training is conducted for new employees	2.82	1.291	2.35	1.246	2.37	1.314	2.23	1.008
2	Pre-employment health examination is conducted for new employees	2.81	1.266	2.33	1.249	2.16	1.185	2.20	1.153
3	I use personal protective equipment (PPE) like safety boot, hand gloves	3.09	0.928	3.46	0.803	3.03	1.027	3.02	0.792
4	Hazards are eliminated once discovered	2.83	1.053	3.06	0.970	2.73	1.181	3.00	1.220
5	Personal Protection Equipment(PPE) is provided by management that is safe	2.74	0.993	2.80	1.004	2.85	1.160	3.23	1.198
6	We have health examinations periodically	2.68	1.216	2.38	1.087	2.38	1.146	2.64	0.917
7	Hazardous substances are substituted with less hazardous ones	2.27	1.284	2.24	1.266	2.38	1.279	2.59	1.263
8	There is a first aid box at work	2.52	1.208	2.51	1.210	2.71	1.236	2.80	1.173
9	There is proper/timely treatment of medical issues of workers	2.11	1.173	2.23	1.074	2.17	1.090	2.66	1.346
10	There is a company health and safety policy that guides you	2.84	1.181	3.05	1.145	2.98	1.179	2.68	1.196
11	The safety measures of your company are effective	2.94	1.101	2.65	1.069	2.90	1.076	2.70	1.212
12	Serious accidents occur on site	3.47	0.738	3.54	0.675	3.43	0.805	3.39	0.784
13	I feel safe from accidents at work	3.26	0.575	3.34	0.565	3.28	0.582	3.00	0.778
14	Management encourages safe practices at work.	3.36	0.482	3.77	0.425	3.40	0.492	3.34	0.479
Aggregate		2.84	1.035	2.84	0.985	2.77	1.054	2.82	1.037

Table 3.3 shows the mean and standard deviation of safety practices of industrial cleaners in Port Harcourt metropolis, Nigeria, based on level of education. The result showed workers with no formal education and primary education had the highest mean rating and an equal mean (2.84), and workers with a secondary education certificate had the lowest mean rating (2.77±1.054).

Table 3.4: Mean and SD analysis of safety practices of industrial cleaners in Port Harcourt metropolis based on marital status.

S/N	STATEMENT	Single		Married		Divorced		Widow(er)		Co-habiting	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Pre-employment training is conducted for new employees	2.42	1.335	2.54	1.277	2.61	1.365	2.16	0.978	2.29	1.288
2	Pre-employment health examination is conducted for new employees	2.14	1.191	2.62	1.253	2.24	1.179	2.39	1.176	2.02	1.280
3	I use personal protective equipment (PPE) like safety boot, hand gloves	3.12	0.943	3.06	0.974	3.34	0.883	2.74	1.078	3.71	0.582
4	Hazards are eliminated once discovered	2.74	1.138	2.83	1.112	2.92	0.896	2.93	1.387	3.17	0.953
5	Personal Protection Equipment(PPE) is provided by management that is safe	2.63	1.155	2.83	1.019	3.22	0.966	3.07	1.208	3.15	1.031
6	We have health examinations periodically	2.30	1.109	2.54	1.199	2.61	1.034	2.61	0.978	2.46	1.237
7	Hazardous substances are substituted with less hazardous ones	2.38	1.232	2.33	1.315	2.14	1.293	2.70	1.375	2.12	1.104
8	There is a first aid box at work	2.88	1.181	2.57	1.241	2.27	1.229	2.46	1.181	2.42	1.182
9	There is proper/timely treatment of medical issues of workers	2.26	1.142	2.23	1.136	1.85	1.031	2.46	1.151	2.02	1.041
10	There is a company health and safety policy that guides you	3.02	1.168	2.84	1.180	2.75	1.240	3.19	1.060	3.06	1.192
11	The safety measures of your company are effective	2.93	1.093	2.72	1.082	2.78	1.131	2.88	1.103	3.00	1.072
12	Serious accidents occur on site	3.33	0.923	3.59	0.630	3.47	0.626	3.49	0.601	3.40	0.736
13	I feel safe from accidents at work	3.21	0.662	3.36	0.581	3.15	0.485	3.30	0.499	3.21	0.544
14	Management encourages safe practices at work.	3.46	0.500	3.46	0.500	3.59	0.495	3.33	0.476	3.54	0.504
Aggregate		2.77	1.055	2.82	1.036	2.78	0.99	2.84	1.018	2.83	0.982

Table 3.4 shows the mean and standard deviation of safety practices of industrial cleaners in Port Harcourt metropolis, Nigeria, based on marital status. The result showed workers who were widowed had the highest mean rating (2.84 ± 1.018), and single workers had the lowest mean rating (2.77 ± 1.055).

Hypotheses

Table 4: Summary of One-way ANOVA of safety practices of industrial cleaners in Rivers State based on socio-demographic variables of age, gender, marital status and education.

Variable	Test Statistic	Df	p-value	Decision	Remark
Age	F=3.683	3,589	0.01	Ho Rejected	Significant
Gender	Z=1.509	591	0.19	Ho Not Rejected	Not Significant
Marital Status	F = 1.828	4,588	0.12	Ho Not Rejected	Not Significant
Level of education	F = 3.037	3,589	0.01	Ho Rejected	Significant

P<0.05 = Significant

Table 4 showed the summary of statistical tests conducted to examine differences in the safety practices of industrial cleaners in Port Harcourt, Rivers State based on selected demographic variables including age, gender, marital status, and level of education. The one-way ANOVA result for age showed the F-value at Degree of freedom of 592 and 0.05 alpha level was 3.683 with a p-value of 0.01. Since the p-value was less than 0.05, the null hypothesis, which states that there is no significant difference in the safety practices among industrial cleaners in Port Harcourt, Rivers State, based on age, was rejected. Therefore, there was a significant difference between age and the safety practices of industrial cleaners in Port Harcourt, Rivers State. This implies safety practices vary significantly across the age groups.

The summary of the Z-test analysis result for gender unveiled that the Z_{cal} at the 0.05 alpha level was 1.509 with a degree of freedom of 591 and a P-value of 0.193. Based on the fact that the P-value was greater than 0.05 ($P > 0.05$), the null hypothesis, which argued that there is no significant difference in the safety practices of industrial cleaners in Port Harcourt based on gender, was accepted. Therefore, there was no significant difference in the safety practices of male and female industrial cleaners in Port Harcourt, Rivers State, based on gender.

The summary of the one-way ANOVA result for marital status revealed that the F_{cal} at a degree of freedom of 592 and 0.05 alpha level was 1.828 with a p-value of 0.12. Since the p-value was greater than 0.05, the null hypothesis, which states that there is no significant difference in the safety practices among industrial cleaners in Port Harcourt based on marital status, was accepted. Therefore, marital status does not significantly influence the safety practices of industrial cleaners in Port Harcourt, Rivers State. The summary of the one-way ANOVA result for level of education revealed that the F-value at a degree of freedom of 592 and 0.05 alpha level was 3.037 with a p-value of 0.009. Since the p-value was less than 0.05, the null hypothesis, which states that there is no significant difference in the safety practices among industrial cleaners in Port Harcourt based on level of education, was rejected. Therefore, there was a significant difference in the safety practices of industrial cleaners in Port Harcourt, Rivers State, based on level of education. This implies that sanitation workers with different educational levels demonstrate significant differences in their safety practices.

Discussion

The results from Table 1 revealed moderate exposure of industrial cleaners to health effects, with the most common health effects being back pain, skin problems, and breathing difficulties. This finding is in line with the findings of Efa and Nwagozie (2023) in Rivers State, which reported respiratory issues, skin diseases and burns as common health effects among the industrial cleaners. Lower back pain (LBP) was the most prominent health effect in this study, and it supports Olatubi et al. (2022), who showed the lifetime, 12-month and 7-day prevalence rates of LBP among healthcare workers in Nigeria to be 87.3%, 84.7%, and 54.5%, respectively. This was also supported by Yunoos and Dankoly (2021), who reported a 12-month Lower Back Pain prevalence rate of 78.2% and a 7-day prevalence rate of 55.1% among street cleaners in Northeastern Nigeria. The homogeneity in the findings may be attributed to the strenuous nature and inherent hazards of industrial cleaning.

The result in Table 2 revealed that Industrial cleaners had poor safety practices with a mean rating of 2.47 ± 1.163 . The following safety practices had poor ratings; pre-employment training for new employees, pre-employment health examination for new employees, eliminating hazards once they are discovered, periodic health examination, and timely treatment of injured workers. This finding supports that of Degavi et al. (2021) which reported only 8.9% of sanitary workers in West Guji Zone, Oromia, Ethiopia, demonstrated good practice in preventing occupational health hazards, despite 64% of them having good level of awareness of this risks, this finding also aligns with Marahatta et al. (2018) study on municipal solid waste handler in Kathmandu Metropolitan City which showed only about 45% of the study participants had practiced the utilization of PPEs, these PPEs were provided for the workers to encourage usage even though they lacked safety training. Also, Johnson and John (2020) studied street sweepers, which showed 98% utilised only reflectors, none used goggles or boots. This was also buttressed by Richard, (2020) which revealed that majority of the sanitary workers (71.4%) did not use PPE (Mask, Hand Gloves, Safety Apron, Safety Shoes, Cap) for work, the few who used it bought it themselves, among the few (28.6%) who used PPEs, most of them indicated that the equipment were not adequate (75%). The similarity in the findings may be attributed to lack of enforcement of safety rules among lower cadre workers in most industries.

Influence of demographics on safety practices of sanitation workers

The result from table 4 revealed that there was a significant difference in the safety practices among sanitation workers in Rivers State based on age ($p=0.012$), this implied that safety practice varied by age, this finding aligns with Ugwu and Ezedum (2019) in Anambra, Nigeria which showed a relationship between age and safety practice as the older workers adopted more safety practices than the younger workers, however this finding does not align with Okafoagu et al. (2017) which saw no relationship between the ages of the respondents and safety practices in a study of textile workers but found a relationship between age and knowledge of workplace hazards ($p=0.022$).

The result from Table 4 also revealed that there was no significant difference in the safety practices among industrial cleaners in Rivers State based on gender. ($p=0.193$). This was expected because the results analysis showed both genders were moderately exposed to occupational hazards, and a large population of the cleaners had no formal training on the job that influences safety practice. This finding was in line with Ugwu and Ezedum (2019) in Anambra, Nigeria, which showed workers may differ in attitude to safety by gender, but when they have equal access to safety training, the gender difference in the practice of safety becomes insignificant. The homogeneity in the findings may be attributed to the level of exposure to safety training among workers.

The result from Table 4 also revealed that there was a significant difference in the safety practices among industrial cleaners in Rivers State based on level of education. ($p=0.009$). This result was expected because education is a major factor that determines health-seeking behaviour of workers. Awosan et al. (2018) recorded a significant association between education and prevention practices among sawmill workers in Nigeria ($\chi^2 = 0.918$, $p = 0.038$); a higher percentage of respondents with secondary and tertiary education had good knowledge of the workplace hazards (63.4%) than those with primary education and below (50.0%). In the event of inadequate occupational safety training at work, workers with little or no education are less likely to be able to obtain additional information about their workplace hazards from other sources, such as the internet.

The result from Table 4 also revealed that there was no significant difference in the safety practices among industrial cleaners in Rivers State based on marital status ($p=0.122$). This result was expected because a change of marital status without formal training on the job is not sufficient to influence safety practice. This finding does not align with Olufemi et al. (2016) in Nigeria, which showed marital status was significantly associated with respondents' perception of occupational hazards ($p = 0.039$). The heterogeneity of the findings may be attributed to the poor level of training received by workers in this study, resulting in poor safety practices of workers; marital status alone is not enough to create a significant association with knowledge of hazards or safety practices; marital status would be a motivational factor in practising safety after formal training.

Conclusion

Industrial cleaners are moderately exposed to health effects occasioned by exposure to hazards in the work environment. Most common among these health effects are back pain, skin problems, and breathing difficulties. Also,

industrial cleaners have poor safety practices; the only safety practice item that had a good rating was the use of PPE because it was provided by the management in this region of the country.

Recommendations

The study's conclusions led to the following recommendations being made:

1. The state government, through the Ministry of health should expand a health insurance plan to accommodate contract workers like industrial cleaners to ensure access to health services as a solution to reducing the health effects associated with the job.
2. The state government should ensure companies enforce safety practices for all workers without exemption to improve safety practices of industrial cleaners.
3. Managing directors of companies should enforce safety training as a part of the onboarding exercise for contract workers like cleaners.
4. Industrial cleaners' welfare union should be established and registered with the country's Corporate Affairs Commission to protect the rights and health of members.

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