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### Occupational hazards and safety practices among street cleaners in Port Harcourt

<sup>1</sup> Chibuzor Chika, <sup>2</sup> Righteous Innime

<sup>1,2</sup> Department of Human Kinetics, Health and Safety Studies, Ignatius Ajuru University of Education, Rumuolumeni, Port Harcourt, Rivers state, Nigeria

Corresponding Author: **Chibuzor Chika**

#### Abstract

This study investigated the occupational health hazard and safety practices among street cleaners in Port Harcourt metropolis. A descriptive survey was adopted, with an estimated population of two thousand two hundred and fifty-six (2256) and sample size of four hundred and eighty (480) respondents which represent 21% of the total population, simple random method was used to select the respondents from the selected streets of the study area. A questionnaire entitled: occupational health hazard and safety practice (QOHHSP) was developed and used for data collection. The questionnaire was validated by the supervisor and two other experts in the department. A reliability coefficient index of 0.6 using Pearson Product Moment correlation coefficient; the research question was answered using mean and standard deviation whereas the null hypotheses were tested at 0.05 level of significance using z-test statistics. The findings are as follows: high and low temperature, high

ionizing radiation, from early morning sun, extreme heat, among others, mosquito bites, inhale of microbial agents, bacterial and spore infections, exposure to toxic gases and corrosive gases, combustible and flammable gases due to heavy vehicular movement; lack of co-operation from co-workers, feeling of job insecurity, work overload, stress and frustration from poor wages characterized psychological health hazards. Ergonomic hazards resulting from handling of oversized objects and moving overweight load over a distance and musculoskeletal pains among others. Two hypotheses were accepted while four was rejected. Based on the research finding it was recommended that proper occupational health education and training of street cleaners should be adopted and appropriate personal protective equipment should be provided for street cleaners to reduce fatigue, musculoskeletal disorders and injuries for effective work processes.

**Keywords:** Personal Protective Equipment, Occupational hazards, Biological Health Hazard

#### Introduction

Work related health hazards and safety practices have become health issue of concern globally; especially within the low- and middle-income countries which have had little or no research in this regard (Ashraf, Nadir, Farzana, Shahana & Ahsan. 2015) <sup>[3]</sup>, Street cleaners are those who are saddled with the responsibilities of maintaining health and hygiene within the cities (Biswas, Tofazzal, Rahman, Khan, & Afroz, 2012) <sup>[4]</sup>. This type of occupation exposes workers to a variety of risk factors such as dust, toxin, exhaust pollution and infective material which make them vulnerable to develop certain occupational diseases or health hazard.

The issue of work-related safety practice is gradually gathering momentum in the public health domain. International Labour Organization, (March, 2000) <sup>[19]</sup> outlined working environment related factors to include exposure to traffic accident, diesel exhaust, sun heat, dust, glare, smell, noise, harassment and street crime. Furthermore, International Labour Organization, March, 207 indicates that street cleaners have experienced illness such as: occasional flu and cough, eye irritation, rash or skin irritation and others such as diarrhea and stomach upset as well as chronic coughing and eye disease, revealing that these set of workers have more than one incidence of environmental occupational related illnesses or diseases. The advancement of technology in most developed countries where standard and norms for management of waste have substantially reduced the occupational related diseases among these group of workers. (Ajayi, Vatsala, & Danyakumar 2014) <sup>[2]</sup>.

Street sweeping involves a repetitive motion, awkward working position, forceful hand exertion and frequent manual handling, dim lightening in the early hours; rains which are sometimes inevitable are such conditions that may contribute to the ergonomic problem faced by the workers. Street cleaners also face social atrocities by virtue of their occupations (Daniel, Abere, & Worku, 2014) <sup>[8]</sup>. The use of personal protective equipment by workers from occupational health hazards depend on availability and proper utilization of the, equipment which in low- or middle-income countries is in short supply or no, supply

with limited supervision for usage, moreover training of workers may also be lacking thereby making its effective use irrelevant to the work force (Merson, Black, & Mills, 2011)<sup>[27]</sup>.

Port Harcourt city is among the fast-growing cities in Nigeria. It is an oil rich centre of industrial and commercial activities in the south-south of Nigeria where people from various parts of the country and beyond move in view of socio-economic, industrial, cultural and political activities which results to increase in human and vehicular activities that will generate production of various kinds of waste within its streets and environs such as solid waste, paper wraps, cans, metals containers, perishables, dust, vehicular exhaust, fumes, human faecal matter, bottles, chemical residue, sharp and infectious waste from hospital, batteries and heavy metals, solvent, household or domestic waste.

Port Harcourt metropolis is a city that hosts major international, national and local activities that will also increase waste on its environs as tourists or residents have low information on waste disposal methods; This increase in waste production makes it enormous for the workers whose jobs involve repetitive motion, frequent manual handling, awkward working positions, forceful hand exertion and most times inevitable rains within the early hours. All such conditions, potentially contribute to occupational health challenges which include physical health challenges, chemical, biological and ergonomic problems. It is on this backdrop that the knowledge of street cleaners in Port Harcourt metropolis has become crucial for developing and designing appropriate methods for overall improvement and their well-being to ensure effective and efficient cleaning of the city.

### Statement to problem

Street sweeping in Port Harcourt metropolis poses a serious concern, exposure of the workers to certain unfavorable weather working conditions have become a cause to worry in recent times. This situation will manifest in various occupational health hazards among the workers; such as physical, chemical, biological, psychological and ergonomic hazards. Exposure to these various occupational health hazards will influence their day-to-day life and family wellbeing; consequently, this hazard may be attributed to negligence on the part of the workers to use various safety measures or employers to provide adequate safety measures while carrying out their responsibility. Therefore, it is this concern that necessitated the study as it seeks to address the occupational health hazard and safety practices among street cleaners in Port Harcourt metropolis.

### Research questions

This study will attempt to answer the following research questions:

1. What is physical hazard among street cleaners in Port Harcourt metropolis?
2. What are the biological health hazards among street cleaners in Port Harcourt metropolis?
3. What is chemical health hazard among street cleaners in Port Harcourt metropolis?
4. What are the psycho-social health hazards associated with street sweeping in Port Harcourt metropolis?
5. What are the ergonomic health hazards among street cleaners in Port Harcourt Metropolis?

### Various health hazards encountered during sweeping chemical health hazard

All street cleaners are possibly at high risk to chemical hazards and its difficulties. The disturbing element is that they need fundamental learning identifying with their occupational health hazards, and also the items used to play out their day-by-day work process and how to utilize, blend and store them securely and substitute risky chemicals with less hazardous ones. Street cleaners utilize diverse compound cleaning substances to encourage tidy or soil expulsion, for sterilizations and surface upkeep which are wellspring of synthetic hazards. Introduction to substance hazards relies upon the items utilized and conditions which they are being utilized, for example, recurrence, sum and way of utilization. The specialists' breathing rate could be influenced amid and subsequent to sweeping (cleaning). Productivity of ventilation and utilization of safety measures to constrain introduction and admission of concoction substances amid and subsequent to cleaning is essential. (Nazaroff, Weschler, 2004<sup>[32]</sup> and Bello, Quinn, et al., 2009). The compound contained in some cleaning operators might be combustible or dangerous, the off-base utilization of specific items (e.g., over dose, hazardous blending of various items, wrong cleaning techniques) can expand the hazard for cleaners (cleaners). Besides, the soil itself which the laborer goes for evacuating might be wellspring of compound and also natural. As per Wolkoff, Schneider, Kildeso, Degerth, Jaroszewski, Schunk, H; 1998<sup>[20]</sup>.

### Biological health hazard

Next to chemical health challenge, sweeping staff can be additionally be faced with various sorts of biological disease carrying agents, for example, miniaturized scale life forms-microorganisms, infections and molds-and their items, for example, mosquito, parasitic discharge items and bacterial end poisons, display all the more especially in clean and pressurized canned products discharged amid the sweeping procedure or vacuuming (Zock, 2005)<sup>[56]</sup>. The presentation courses to biological operators are the same with respect to chemical hazards, which means for the most part inward breath, dermal take-up and by chance ingestion. Introduction to shape happens especially when purging dust gatherers, channels and so on. (ILO-International Labor Organization, 2009)<sup>[19]</sup>. Introduction to molds or form spores possibly prompts antagonistic health impacts in labourers. Cleaning labbers may likewise be faced with biological operators from blood and body liquids (Zock, 2005)<sup>[56]</sup>.

### Physical health hazards

Physical health challenge encountered in sweeping or cleaning work encompass among others falls from ladders and elevated platforms, wet or slippery floors, falling objects, sharp objects, moving or rotating machinery parts, not only from the work equipment used but also from the environment where the cleaning work is performed. The challenges linked to the work equipment, such as buffers, mops or vacuums, are strongly related to the particular tool used and also to whether it is adapted to the characteristics and specific needs of the worker in terms of anthropometry, physical strength, etc., or else muscles and joints illness could be the consequence. (Munar Suard, Schiettecatte & Lebeer, 2003<sup>[31]</sup>, Health and Safety Executive, Slip and trips, 2005)<sup>[18]</sup>.

### Postural and Ergonomics hazards

The task of sweeping is physically demanding and it is a labour-intensive work. Several studies on sweeping or cleaning all acknowledge the significant ergonomic risks associated with the work (Sogaard, Blangsted, Herod & Finsen 2006)<sup>[44]</sup> (Woods & Buckle, 2006)<sup>[53]</sup> (Kumar and Kumar, 2006)<sup>[24]</sup>. Most cleaners have to perform various types of assignment during one single working day. Although this can imply that there is a high variety of tasks and postures, which are only, maintained during short periods, still, these postures are frequently and repetitively adopted. Sweeping tasks have been identified as strenuous and demanding for the muscle, joint, hearts and lungs systems (Woods & Buckle, 2006)<sup>[53]</sup>. The weight of loads handled by cleaners (cleaners) is an important risk factor to consider (Aickin, 1997)<sup>[1]</sup>.

### Level of Awareness or Education

(Luiz, Anaelnadia, Elaine, & Farm work 2006)<sup>[26]</sup>, individuals who live near Real Street for long time and have low instruction will probably experience the ill effects of respiratory manifestations and diminish lung work (Tamara, Dorothee, Verena, Beate, Ulrich, and Ursula 2008)<sup>[48]</sup>. Numerous specialists are unconscious of potential hazards display in their workplace, which let them to be more helpless against damage (Tam & Fung, 2008)<sup>[47]</sup> and other business-related sicknesses. Labourers don't wear appropriate defensive gear causing genuine health issues (Monga, Singh, Bharclna & Singh, 2012)<sup>[30]</sup>. The way that that the street cleaners once in a while utilized any defensive gadgets, for example, confront veils and were presented to a clean level produced at the test destinations may have added to increment in the pervasiveness of respiratory manifestations and lung work issues (Nku, Peter, Etiset, Oku, & Osirn 2005)<sup>[33]</sup>.

### Financial status

Fund is a determinant of wellbeing and is extraordinary to expect a basic part in the change of a couple of ailments, respiratory ailment among them, money related status, smoking introduction is growing level of common air defilement which related with negative effect on respiratory wellbeing and destruction (Tamara, Dorothee, Verena, Beate, Ulrich, & Ursula 2008)<sup>[48]</sup>. With cut down budgetary status being connected with higher rates of dismalness and obstructive respiratory ailment and diabetes (Simon, Anne, Eric, & Kim, 2009)<sup>[42]</sup>.

### Dust and Respiratory health symptoms

Dust is considered as the solid matter that is produced by any processes during mineral working, rock disintegrations and any construction activities which is borne by air. According to ISO and BSI, 1994, it is defined to be small solid particles ranging from 1-75µm. Particles smaller than 1µm are referred to be fumes or smokes (Oija & Huang 2008)<sup>[47]</sup>. Dust can be subdivided into respirable and non-respirable dust with the boundary of 10µm. Dust as an occupational hazard (ISO 4225-ISO, 1994) dust is small solid particles, conventionally taken as those particles below 75µm in diameter, which settles out under their own weight but which may remain suspended for some time. Dust effects on people have been identified as rising, from increases in airborne dust concentrations and deposition

levels, the amount of dust retained in the lung particle size, and where in the respiratory tract the particles are deposited (Schwarze, Overerwick, 1-letland, Behr, Cassese, & Lagm 2007)<sup>[41]</sup>. Respiratory morbidity, such as admission for asthma and chronic obstructive pulmonary diseases, was more strongly related to coarse particles that more often are of crustal origin (Brunekeef & Forsberg, 2005)<sup>[6]</sup>. The work of street cleaners is to sweep waste materials thrown at public streets. This is considered unhealthy due to the close contact that exposes workers to agents present in the urban waste. Apart from dust also road traffic produces volatile organic compounds, suspended particulate matter, oxides of sulphur oxides of nitrogen and carbon monoxide which makes adverse health effects on the exposed population (Sopan, Bliushan, Nilesh, Vijnybhai & Sanjay, 2005)<sup>[45]</sup>.

### Use of Personal Protective Equipment and Respiratory health symptoms

Personal protective equipment is anything used or worn by a person to minimize risk to the person's health or safety and includes a wide range of clothing and safety equipment. Where in any factory or workplace, workers are employed in any process involving exposure to any injurious or offensive substance or environment, effective protective equipment shall be provided and maintained by employer for the use of the persons employed (United Republic of Tanzania. The occupational health and safety Act supplement no 4 2003)<sup>[49]</sup>. The street cleaners are not given appropriate and efficient/equipment's/tools to perform their duties effectively, while citizens continue to throw waste on the streets throughout the day, even after cleaning of streets (Da, Asnani, Chris, & Ebustian 2008)<sup>[7]</sup>. Street cleaners play an important role in maintaining the health and hygiene in the cities. This job makes them vulnerable to a variety of risks factors such as dust, bio aerosol, volatile organic matters and mechanical stress which make them susceptible to certain occupational diseases (Yogesh, & San jay, 2008)<sup>[54]</sup>.

A study undertaken to Find out the prevalence occupational related respiratory and non- respiratory symptoms in female cleaners in Davangere, Karnataka India shows that the prevalence of respiratory symptoms in cleaners were nose irritation (5%), sneezing (46.6%), rhinitis (40%), cough (36.6%) phlegm (26.6%) wheezing (23%). Then the most common non respiratory symptom was back pain. This occupational exposure to dust among cleaners and sweeping without precautionary measure many predisposes to respiratory and non-respiratory symptom, recommending that workers should use protective face mask, do wet sweeping instead of dry sweeping during work and use of long handled brooms, (Samuel, Jatalakshmi, Dhanyakurnar, & Bondade 2014)<sup>[43]</sup>.

### Research design

Descriptive survey research design was adopted for this study. The design is considered appropriate, as it was useful in gathering data about the belief, opinion, attitude, behaviour and records of events that will be analysed and interpreted to measure the relationship between variables. Nwankwo, (2010)<sup>[35]</sup> defined descriptive survey as the study which the researcher collect data from large sample drawn from a given population and describes certain features of the sample as they are at a point in the time of study.

**Population for the study**

The study population comprised of all street cleaners in Port Harcourt Rivers State, and estimated Two Thousand Two Hundred and Fifty-Six (2256). Source: Rivers State Waste Management Agency (2016).

**Sample and sampling techniques**

A sample size of 480 which represent 21% of the total population used from the above estimate. The stratified random sampling technique will be applied based on the selected streets of the study area. The streets include;

**Table 1:** Street include

S. No	Items	Estimated No.	Sample Size
1	Port Harcourt/Aba Road	85	35
2	East/West Road	85	35
3	Air force/Road	65	35
4	Airport Road	52	25
5	Stadium Road	52	30
6	Ikwerre Road	105	55
7	Trans-Amadi Road	65	35
8	Station Road	45	30
9	Ada-George Road	65	30
10	NTA/Choba Road	70	35
11	Eneka/Igwuruta Road	50	20
12	Evo Road GRA	60	30
13	Iwofe/COE Road	75	30
14	Aggrey Road	55	30
15	Rumuola/Rumuokwuta Road	50	25
	Total No of	956	480

Source: Rivers State Waste Management Agency (2016)

Simple random sampling technique was used to select respondents from each of the 15 streets of the areas making a total of 480 respondents.

**Instrument for data collection**

The research instrument was a self-developed structured questionnaire tagged “Occupational Health Hazard and Safety Practices among Street Cleaners (OHHASP). The use of questionnaire for the study was necessary as was considered appropriate where factual information was desired and usually used to obtain fact about the past, present and anticipated events and also about prevailing conditions and practices.

The research instrument was divided into section A and B. Section A dealt with the demographic data of the respondents; Section B elicit information on the occupational health hazard and safety practices among street cleaners in Port Harcourt, Rivers State. A modified likert’s scale format summated four (4) rating designed with the response options of Strongly Agree (SA) = 4, Agree (A) =3, Disagree (D) = 2, Strongly Disagree (SD) =1 this implies that  $4 + 3 + 2 + 1 = 2.50$  as criterion mean.

**Presentation and analysis of data**

The results of the analysis of the data collected are presented on tables according to the corresponding research questions using mean and standard deviation, and hypotheses are tested using z-test as the statistical tool at 0.05 level of significance.

Discussions of the findings were presented on each of the research questions and hypotheses. The total number of street cleaners used for the study was four hundred and eighty (480) street cleaners in Port Harcourt Metropolis.

**Answers to research questions**

**Research Question 1:**

What are the physical health hazards among streets cleaners in Port Harcourt metropolis?

**Table 2:** Mean Scores and Standards deviation of Respondents on Physical Health hazards among street cleaners in Port Harcourt Metropolis

S. No	Physical Hazard	N	Mean ( $\bar{X}$ )	S.TD	Criterion Mean	Remarks
1	I have been a victim of accident during sweeping week process.	480	1.72	0.90	2.50	Disagreed
2	I have suffered from High and Low temperature during work process	480	3.55	0.90	2.50	Agreed
3	High ionizing radiations from the early morning sun affect me.	480	3.60	0.73	2.50	Agreed
4	I have suffered heat stress/extreme heat during work process.	480	3.93	0.26	2.50	Agreed
5	I have had slip and fall during work process.	480	2.32	0.78	2.50	Disagreed
6	I have suffered from skin irritation from chemical contact during cleaning chemical	480	2.82	0.63	2.50	Agreed

Data in table 2, above revealed the opinion of the respondents on physical health hazards among street cleaners. Items 2, 3, 4 and 6 had mean scores above the criterion mean of 2.50 this indicated that street cleaners have suffered from high and low temperature during work process, with mean score 3.55, high ionizing radiation from the early morning sun affect them, with mean score 3.60, suffered heat stress/extreme heat during work process, with mean score 3.93, and suffered from skin irritation from chemical contact during cleaning chemical, with mean score 2.82.

However, items .1 and 5 had mean scores below the criterion mean of 250. This showed that street cleaners have

been victim of accident during sweeping work process with mean score of 1.72 and have slip and fall during work process with mean score of 2.32. Therefore, physical hazards among street cleaners include: high and low temperature during street cleaners, high ionizing radiation from the early morning sun, stress/ extreme heat during work process and skin irritation from chemical contact during cleaning-chemical.

**Research Question 2: What are the Biological Health Hazards among Street Cleaners in Port Harcourt Metropolis?**

**Table 3:** Mean scores and standard deviation of respondents on biological health hazards among street cleaners in Port Harcourt Metropolis

S. No	Physical Hazard	N	Mean ( $\bar{X}$ )	S.TD	Criterion Mean	Remarks
7	I have suffered from upper respiratory tract infection from inhaling serious pollutants during the sweeping process.	480	0.09	0.67	2.50	Disagreed
8	I encounter mosquito bites, during sweeping	480	3.77	0.47	2.50	Agreed
9	I encounter rodent bit during sweeping process.	480	1.85	1.04	2.50	Disagreed
10	I inhale microbial agents while sweeping	480	2.55	0.88	2.50	Agreed
11	I have had fungi, bacterial and spores infection during work process.	480	2.73	0.85	2.50	Agreed
12	I have been exposed to death plants and animals odour/smell during sweeping	480	3.40	0.88	2.50	Agreed

Data in table 3, above revealed the opinion of respondents on biological health hazards among streets cleaners in Port Harcourt metropolis. Items 8, 10, 11 and 12 had mean scores above the criterion mean of 2.50. This indicated that street cleaners encounter mosquito bites during sweeping, with mean score of 3.77, inhale microbial agents while sweeping with mean score of 2.55, had fungi, bacterial and spores' infection during work process with mean score of 2.73, and have been exposed to dead plants and animals odour/smell during sweeping with mean score of 3.40, However, items 7 and 9 had mean scores below the criterion mean of 2.50. this showed that street cleaners; have suffered from upper

respiratory tract infection from inhaling serious pollutants during sweeping process, with mean score of 2.09, and encounter rodents bite during sweeping with mean score of 1.85. Therefore, biological hazards among street cleaners includes; mosquito bites, inhale of microbial agents, fungi, bacterial and spores' infection and exposed to dead plants and animal's odour/smell.

**Research Question 3**  
**What are Chemical Health Hazards among Street Cleaners in Port Harcourt Metropolis?**

**Table 4:** Mean scores and standard deviation on chemical health hazards among street cleaners in Port 1-larcourt metropolis

S. No	Physical Hazard	N	Mean ( $\bar{X}$ )	S.TD	Criterion Mean	Remarks
13	I have been exposed to toxic gases during work process.	480	2.54	0.61	2.50	Agreed
14	I encounter corrosive gases that causes discomfort/irritation	480	2.79	0.84	2.50	Agreed
15	I have been exposed to combustible or flammable gases during to vehicular movement during sweeping.	480	3.48	0.79	2.50	Agreed
16	I inhale dust, vapour and solvent during sweeping.	480	3.88	0.32	2.50	Agreed
17	I have suffered from skin irritation as a result of cleaning chemicals.	480	2.61	0.61	2.50	Agreed

Data in Table 4, above revealed the opinion of respondents on chemical health hazards among street cleaners in Port Harcourt metropolis. Items 13, 14, 15, 16 and 17 had mean score above the criterion mean of 2.50, this indicated that street cleaners have been exposed to toxic gases during work process with mean score of 2.54; encounter corrosive gases that causes discomfort! irritation with mean score of 2.79; have been exposed to combustible or flammable gases due to vehicular movement during sweeping with mean score of 3.88; have suffered from skin irritation as a result of cleaning chemicals with mean of 2.61. Therefore, chemical

hazards among street cleaners include; explosive to toxic gases, corrosive gases that causes discomfort/irritation, exposure to combustible or flammable gases due to vehicular movement, inhale dust, vapor and solvent during sweeping and suffered from skin irritation as a result of cleaning chemicals.

**Research Question 4**  
**What are the psychological hazards among street cleaners Port Harcourt Metropolis?**

**Table 5:** Mean scores and standard deviation on psychological hazards among street cleaners in Port Harcourt metropolis

S. No	Physical Hazard	N	Mean ( $\bar{X}$ )	S.TD	Criterion Mean	Remarks
18	Lack of co-operation from co-workers	480	2.67	0.06	2.50	Agreed
19	Feeling of job insecurity and work overload	480	3.70	0.46	2.50	Agreed
20	Violence from members of the public such as rape, molestation and sexual harassment.	480	1.60	0.61	2.50	Disagreed
21	Stress and frustration from work process.	480	2.95	1.02	2.50	Agreed
22	Frustration from poor wages or salary for work done.	480	3.60	0.61	2.50	Agreed
23	Use of have headache during to work process.	480	3.41	0.84	2.50	Agreed

Data in table 5, above revealed the opinion of the respondents on psychological health hazard among street cleaners in Port Harcourt metropolis. Items 18, 19, 21, 22 and 23 had mean scores above the criterion mean of 2.50. This indicated that street cleaners; lack co-operation from co-workers with mean of 2.67; feeling, of job insecurity and workload with mean score of 3.70; stress and frustration from work process with mean score of 2.95; frustration from poor wages or salary for work done with mean score of 3.60, use to have headache due to work process with mean scores

below the criterion mean of 2.50. Thus however, item 20 had mean scores below the criterion mean of 2.50. This showed that street cleaners face violence from members of the public such as rape, molestation and sexual harassment with mean of 1.60. Therefore, psychological health hazards among street cleaners include; lack of cooperation from co-workers, feeling of job insecurity and work overload, stress and frustration from work process, frustration from poor wages or salary for work done, and use to have headache due to work process.

**Research Question 5: What are the ergonomic Hazards among streets cleaners in Port Harcourt Metropolis?**

**Table 6:** Mean scores and Standard deviation on psychological health hazards among street cleaners in Port Harcourt metropolis

S. No	Physical Hazard	N	Mean ( $\bar{X}$ )	S.TD	Criterion Mean	Remarks
24	I have been handling over size objects, regardless of weight.	480	2.51	0.84	2.50	Agreed
25	I have been moving loads over long distance.	480	3.46	0.88	2.50	Agreed
26	I have been working with bent neck and wrist.	480	3.28	0.99	2.50	Agreed
27	I have been standing for long period.	480	3.58	0.68	2.50	Agreed
28	Musculoskeletal pains due to work with one or both arms above shoulder level.	480	3.77	0.53	2.50	Agreed
29	Poor body posture due to too much bending.	480	2.07	0.95	2.50	Disagreed
30	Working with body twisted and bent during seeping process.	480	3.15	0.95	2.50	Agreed
31	I have been constantly exposed to slippery, obstructed pathways.	480	2.53	0.93	2.50	Agreed

Data in table 6, above revealed the opinion of respondents on ergonomic health hazard among street cleaners in Port Harcourt Metropolis. Items 24, 25, 26, 27, 28, 30 and 31 had mean scores above the criterion mean of 2.50. this indicated that street cleaners; have been handling oversize objects, regardless of weight with mean score of 3.51, have been moving loads over long distance with mean score of 3.46, have been working with bent neck and wrist with mean score 3.28, have been standing for long period with mean score of 3.58, musculoskeletal; pains due to work with one or both arms above shoulder level with mean score of 3.77, working with body twisted and bent during sweeping process with mean score of 3.15 and have been constantly exposed to slippery, obstructed pathways with men score of 2.53. However, item 29 had mean scores below the criterion mean of 2.50. This showed that street cleaners have poor body posture due to too much bending with mean score of 2.07. Therefore, ergonomic health hazards among street cleaners includes; handling o oversize objects, regardless of weight moving load over distance, working with bent neck and wrist, standing for long period, musculoskeletal pains due to work with one or both arms above shoulder level, working with body twisted and bent during sweeping process and constantly exposed to slippery, obstructed pathways.

**Summary**

1. Physical health hazards among street cleaners in Port Harcourt metropolis include; high and low temperature during work process, high ionizing radiation from the early morning sun, stress/extreme heat during work process and skin rotation tram chemical contact during cleaning chemicals.
2. Biological health hazards among street cleaners in Port Harcourt metropolis include: mosquito bites, inhale of microbial agents, fungi, bacterial and spores infected and exposure to dead plants and animals' infections, odours/smell.
3. Chemical health hazards among street cleaners in Port Harcourt metropolis includes exposure to toxic gases, corrosive gases that causes discomfort/irritation, exposure to combustible or inflammable gases due to vehicle movement, inhaling dust and solvent during sweeping and suffered from skin irritation as a result of cleaning-chemicals.
4. Psychological health hazards among street cleaners in Port Harcourt metropolis includes; lack of cooperation from co-workers, feeling of job insecurity, work overload, stress and frustration and experiences headache due to work process.

5. Ergonomic health hazards among street cleaners in Port Harcourt metropolis includes; handling of oversize objects regardless of weight, moving overload weight. over distance, working with bent neck and wrist, standing for long period, musculoskeletal pains due to work with one or both arms above shoulder level. Working with the body twisted and bent during sweeping process.
6. Most streets cleaners in Port Harcourt metropolis use protective devices and their work process, and maintain personal cleanliness.
7. There is statistically significant difference between the opinion of male and female street cleaners on physical health hazard in Port Harcourt metropolis.
8. There is no statistically significant difference between the opinion of male and female street cleaners on biological health hazard in Port Harcourt metropolis,
9. There is statistically significant difference between the opinion of male and female street cleaners on chemical health hazard in Port Harcourt metropolis.
10. There is statistically significant difference between the opinion of male and female street cleaners in psychosocial health hazard in Port Harcourt metropolis.
11. There is statistically significant difference between the opinion of male and female street cleaners on ergonomic health hazards in Port Harcourt metropolis.
12. There is no statistically difference between the opinion of male and female street / cleaners on safety practices in Port Harcourt metropolis.

**Conclusions**

The occupational health hazards challenges and safety practices depend on the environment and workplaces where the street cleaners work. The hazardous substances to which street cleaners can be exposed to go beyond chemical substances contained in the cleaning products use while sweeping, but include chemicals and biological agents contained for examples 'in dust, dirt, flammable gases due to vehicle movement, skin irritation etc. Biological hazards to which street cleaners are exposed to include mosquito bites, inhaling of microbial agents, fungi and spores' infections and exposure to dead plants and animal infections. Physicatlaards among street cleaners low and high ionizing radiation due to early morning sun, stress from extreme heat and skin irritation from chemical contacts, which are linked to poor ergonomics of working equipment or work environment. Variety of health challenges facing street cleaners should be raising concern on safety, work practice and health risk management especially, ergonomic and psychological

hazards. Employees should be aware of the occupational process and environmental health challenges of street cleaners in Port Harcourt metropolis, to provide the appropriate measures for health risk prevention.

### Recommendations

1. Employers of street cleaners should provide personal protective equipment for them.
2. There should be proper education and training of street cleaners in their occupational health hazards.
3. Respiratory protection should be used to prevent respiratory-act infections.
4. There should be a conveniently accessible control point providing good washing facilities (including showers and where practicable), a cloakroom with arrangements for changing and drying clothes, a mess room and a first aid room.
5. Personal protective equipment (PPE) should be provided for street cleaners such as chemical protective gloves appropriate for chemicals potentially contacted and respiratory protective devices.
6. Efforts should be made to reduce fatigue and musculoskeletal disorder by providing rolling containers to carry weights.
7. Street cleaners should be trained properly in ways of avoiding hazards such as lifting techniques so as to reduce incidence of injury, musculoskeletal pains etc.
8. Street cleaners should be trained to always read and understand the label instructions or the MSDS before using any cleaning agent.
9. There should be periodical medical examination for street cleaners to ascertain their health status.

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