



## Assessment of Compliance to Occupational Health and Safety Standards Amongst Automobile Mechanics in Port Harcourt

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### Abstract

This study assessed the compliance of automobile workshop operators (mechanics and technicians) to critical occupational health and safety standards in Port Harcourt metropolis in order to ascertain their level of compliance with set and expected occupational health and safety standards, especially in the context of the sustainable development goals #1 and #3. The study adopted a cross sectional research methodology involving the use of survey. 4435 registered workshop operators consisting of mechanical technicians, panel beaters, auto electrical technicians and auto-body spray painters formed the population for the study. A sample population of 400 was obtained. The responses from the respondents was analyzed using descriptive statistics to elicit associations and significant relationships. Results revealed that 97% of the respondents have an overall knowledge and awareness about compliance to safety standards in the operation of automobile workshops within the city, however, over 54% of these automobile workshop technicians do not strictly adhere to the laid down occupational health and safety rules and standards. Further results revealed factors that account low compliance to occupational health and safety standards. The implication of these results is that more needs to be done in terms of education and awareness by responsible agencies, such as the National Orientation Agency (NOA), in raising awareness on the need for better adherence to occupational health and safety procedures.

**Keywords:** OSHA; Human Health; Work Place Safety; HSQE; Niger Delta.

### Introduction

Automobile repairs and services are groups of activities targeted towards corrective, preventive and predictive actions on motor vehicles so as to ascertain their proper functioning when needed for use. These automobile repair services usually take place within designated workshops or environments. These workshops are operated and maintained by mechanical operators (mechanics, technicians, electricians, panel beaters and auto spray painters), who are daily to exposed to one form or another of auto-mechanical workshop based occupational health and safety hazards (Elenwo, 2018; Oche et al., 2020; Olarewaju et al., 2021; Umoh et al., 2023). Studies have shown that occupational health illnesses take place in a work place as a result of physical, chemical, social, educational, biological, mechanical and physical factors prevalent while discharging various duties at work place (OSHA, 2008; ILO, 2018; Kattof et al., 2022; Almutairi et al., 2022; Umoh et al., 2023). Most occupation involve direct or indirect health and safety risks; in this regard, occupational health and safety is geared towards achieving reduction of risks to its barest minimum and

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equally advancing the information on health and safety in the work place (Elenwo, 2018; Afolabi et al., 2021; Ozomata et al., 2022).

Occupational health and safety related concerns are closely related to all actions engaged in the work place that eliminate or reduce injuries and diseases, as it pays significant attention on the prevention of hazards and risk in the workplace (OSHA, 2008; Kattof et al., 2022). Several factors can significantly influence the safety, productivity and health of workers in the workplace, which could significantly impair their functioning and result in work place injuries or accidents (World Health Organization, 2017). The primary goal of occupational health and safety is to improve the general wellbeing of workers so as to eliminate or reduce to the barest minimum, actions, events or factors that could result or cause physical, biological, chemical or psychological harm to workers in any given workplace (Jam & Rao, 2011; Ozomata et al., 2022).

The apparent insensitivity to occupational health, safety and ignorance to occupational hazards has caused some negative health impacts on artisans in Nigeria, most especially in Obio-Akpor local government Area in Rivers State (Elenwo, 2018). In 2013, the United States Department of Labor recorded 4,585 fatal work injuries (U.S. Bureau of Labor Statistics, 2015).

Nigeria is a developing country that places little importance on occupational health and safety incidents especially in the less aesthetically appealing professions or workplaces such as auto-mechanic workshops and construction industries (Inah et al., 2019, Oche et al., 2020; Ozomata et al., 2022). As a result of this, some of the workers who engage in professions that may be defined as less glamorous may not be completely aware of the effects of the work environment and the type of substances used on their jobs and their implications on their health and wellbeing. Due to the less attention given to these so-called less glamorous workplaces, workers would tend to engage in several otherwise harmful practices in the course of carrying out their respective duties or services. Common amongst these practices is the application of diesel to bruised parts of their bodies, working, eating and sleeping in poor sanitary environments. Workshop operators also suffer a lot of mechanical injuries resulting from poor manual handling procedures. Many of these workers also work in garages or workshops where they may fall from elevated platforms, ladders and trip on wet greasy floors. It has earlier been determined by Elenwo (2018) and Onawumi et al., (2022), that there exist occupational health hazards amongst automobile workshop workers in Nigeria. This present study therefore, is an attempt to identify and determine the awareness and compliance of these automobile workshop workers to set down occupational health and safety standards.

## **Materials and methods**

### **Study area description**

This study was conducted in Port Harcourt metropolis of Rivers State, Nigeria. Port Harcourt is the administrative headquarters of Rivers State and the de facto headquarters of the oil industry in Nigeria. It is found in the Southern part of Nigeria in the renowned Niger Delta, region. Automobile workshops in the City were identified (Figure 1). The cross-sectional research method, involving the use of survey was adopted for the research. Workers from these automobile workshops constituted the population for the study. The study area and the Niger Delta region has been described as one of the most socio-economically and infrastructure deficient regions of the world, typified by high unemployment, social deprivation and extreme poverty (NDDC; 2006; UNDP, 2006; UNEP, 2011). Rivers State has about 47.2% of its population living in extreme poverty (National Bureau of Statistics NBS, 2017). This means that quite a significant number of people migrate from the hinterlands of the region into Port Harcourt, for better economic opportunities. One of the easiest forms of jobs to get into, is one offered by different automobile workshops distributed across the region.

### **Study population and sampling methods**

The population of this study is made up of auto-mechanic technicians, panel beaters, auto electricians and auto spray painters, operators who operate in Obio Akpor Local Government Area of Rivers State. According to of the workshop operators association, there are 4435 registered workshop operators (Mechanic, Panel Beater, Auto Electrician and Spray Painter) at Alakahia, Rumuekeni, Rumuokoro, Eliozu and Iwofe communities all in Obio, Akpor Local Government Area, Rivers State (Pillars of Association Rives State, 2022). The workshops are made up of 4435 workers, with Mechanic workshop having 940 workers, Panel Beater 990, Panel Beater 1200 and Spray Painter 750. Out of this figure, 2129 are male technicians, while 1751 are female mostly clerks and sales girls. This figure

constitutes the target population of this study. The overall occupational makeup of the population comprises technicians, office clerks, account clerks, computer operators, secretaries, drivers, machine operators, security officers and messengers. The choice of the selection of Alakahia, Rumuekeni, Rumuokoro, Eliozu and Iwofe communities is hinged on the fact that they have a wider coverage of artisanal workshops in the study area.

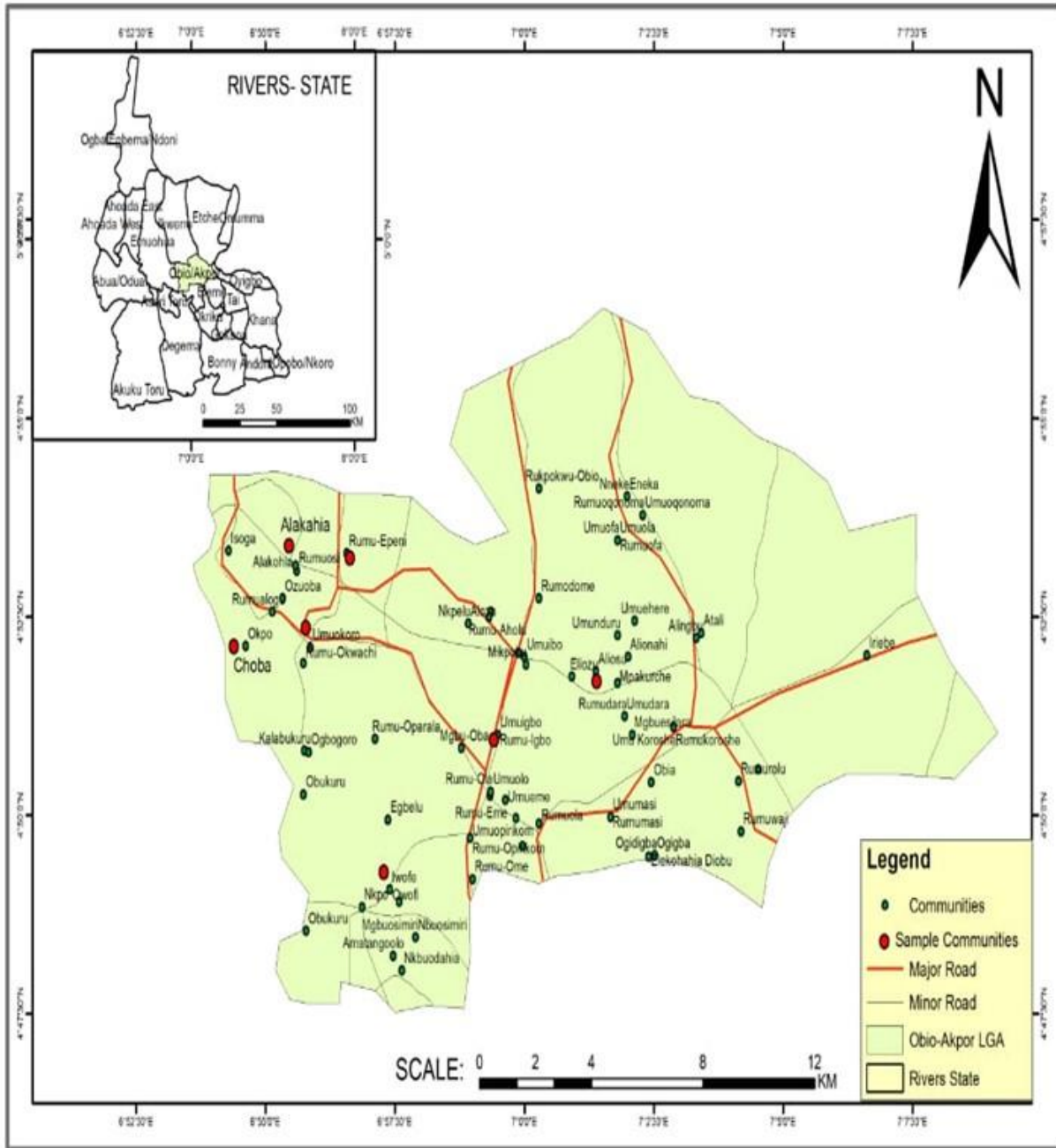


Figure 1. The study area showing locations of sampled automobile workshop

**Table 1.** Determination of sample size

Taro Yamane	Computation	Sample size
$n = \frac{N}{1 + N(e)^2}$	N = 3880	<b>400</b>
	(e) <sup>2</sup> = .05 x .05 = 0.0025	
	0.0025 x 4435 = 3.1625	
	1 + 11.09 = 12.09	
	: - n = 4435 ÷ 12.09 = 400	

**Sample size determination**

The sample size for this study was determined using the Taro Yamane Formula which is  $n = N / 1 + N (e)^2$  (Table 1). Where n is the expected sample population, N is the population of study and e is level of significance. Thus, adopting 0.05 level of significance for the study, the sample size is 400 (Table 1).

**Administration of research instrument**

A four points modified Likert Scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) was developed for this study and used for rating the questionnaire instrument administered to respondents across the study area.

Where,

- SA = strongly agree (4)
- A = Agreed (3)
- SD = Strongly Disagree (2)
- D = Disagree (1)

The reliability of the survey instrument (questionnaire) was validated using the test re-test method. The instrument was further discussed with expats to ensure the instrument was consistent in collecting needed information.

**Presentation of results**

**Table 2.** Questionnaire administration and retrieval summary

Community	Number of questionnaires administered		Number of questionnaires retrieved	
<b>Alakahia</b>	80	20%	78	20.21%
<b>Rumuekeni</b>	80	20%	77	19.95%
<b>Rumuokoro</b>	80	20%	76	19.69%
<b>Eliozu</b>	80	20%	79	20.47%
<b>Iwofe</b>	80	20%	76	19.69%
<b>Total</b>	400	100%	386	97%

Source: (Research fieldwork, 2023).

Table shows the summary of response rate to the research instrument administered. 97% of the total questionnaire administered were completed and returned, representing a total of 386 copies of questionnaire. This 386 formed the sample size for the study.

**Table 3.** Gender composition of respondents

Community	Male	Percentage	Female	Percentage
Alakahia	40	20	38	20.43
Rumuekeni	38	19	37	19.89
Rumuokoro	37	18.5	36	19.35
Eliozu	43	21.5	35	18.82
Iwofe	42	21	40	21.51
<b>Total</b>	200 (51.81%)	100	186 (48.17%)	100

Source: (Research fieldwork, 2023).

Across the various locations where the research instrument was administered to respondents, 51.81% of the respondents with 200 responses identify as males, while 186 respondents accounting for 48.17% responses identify as females. This shows that a significant proportion of auto-mobile or auto-mechanical workshop technicians are males with over 50% of the respondents being male. This may be attributed to the auto-mechanical related profession being seen in Africa and Nigeria a male job.

**Table 4.** Age distribution of respondents

Community		Below 18 Years	19-45 Years	46-65Years	>66	Total Count and Percentage
Alakahia	Count	102	114	80	60	386
	% of total	26.42	29.53	20.71	15.54	100
Rumuekeni	Count	98	124	89	75	386
	% of total	25.39	32.12	23.07	19.43	100
Rumuokoro	Count	100	140	95	51	386
	% of total	25.91	36.27	24.61	13.21	100
Eliozu	Count	112	154	89	31	386
	% of total	29.02	39.90	23.07	8.03	100
Iwofe	Count	67	200	54	65	386
	% of total	17.36	51.18	13.99	16.84	100

Source: (Research fieldwork, 2023).

Table 4 shows the age distribution of the respondents. Those aged below 18 account for 17.36% of the respondents. This age group are often made of respondents who are mainly apprentices, who are undergoing training. Those aged 19-45 account for 51.18% of the respondents. Those aged 46-65 account for 13.99% of the respondents. Respondents aged 66 and above account for 16.84% of the respondents surveyed in this study.

**Table 5.** Educational level of respondents

Community	Answer Alternatives						Sum and percentage
		No Formal Education	Primary Education	Secondary Education	Tertiary Education	Vocational Education	
<b>Alakahia</b>	Count	54	90	100	95	47	386
	% of total	13.99	23.32	25.91	24.61	12.18	100
<b>Rumuekeni</b>	Count	10	70	156	100	50	386
	% of total	2.59	18.13	40.41	25.91	12.95	100
<b>Rumuokoro</b>	Count	26	75	155	100	30	386
	% of total	6.74	19.43	40.16	25.91	7.77	100
<b>Eliozu</b>	Count	20	60	86	130	90	386
	% of total	5.18	15.54	25.91	33.68	23.32	100
<b>Iwofe</b>	Count	60	90	135	70	31	386
	% of total	15.54	23.32	25.91	18.13	8.03	100

Source: (Research fieldwork, 2023).

Table 5 shows the educational attainment of the respondents surveyed for the study. 15.54% of the respondents have no formal education. Those with primary school education account for 23.32 percent of the respondents. Those with secondary education account for 25.91% of the respondents. This class represents the largest class of people engaged in the auto-mechanical service industry. 18.13% of the respondents have attained one tertiary institution or the other. Respondents with vocational education account for 8.03% of those surveyed.

**Table 6.** Respondents knowledge of risks technicians are exposed to in the workshops

Answer Alternatives	Aware	Not Aware	%
Falls from ladders, stairs, elevated platforms etc., and falls into inspection pits Falls on the level, esp. on wet, slippery or greasy garage floors	201 (52.07%)	118 (30.57%)	48 (12.43%)
Injuries due to collapse of jacking, lifting or hoisting equipment, and vehicles falling from lifting equipment them crushed toes resulting from falls of heavy objects	200 (51.81)	138 (35.75%)	21 (5.44%)
Crushed toes resulting from falls of heavy objects	230 (59.59%)	126 (32.64%)	13 (3.37%)
Eye injury from splinters and flying objects from grinding, and machining operations, while operating compressed-air equipment and during cleaning and similar operations	240 (62.18%)	126 (32.64%)	13 (3.37%)
Injuries as a result of being caught in or between moving and stationary objects Injuries caused by rotating parts of machine tools	210 (54.40%)	138 (35.75%)	21 (5.44%)

**Table 6.** Respondents knowledge of risks technicians are exposed to in the workshops (Continued)

Burns due to contact with hot surfaces, exhaust pipes or hot-melt chemicals; sudden release of hot water and steam lines, radiator and cooling system pipes; soldering, brazing and welding operations, etc.	225 (86.85%)	115 (28.79%)	21 (5.44%)
Electrocution as a result of defects, short circuits or improper use of electromechanical equipment, or contact with live wires	230 (59.59%)	127 (32.90%)	15 (3.89%)
Carbon monoxide poisoning	222 (57.51%)	136 (35.23%)	21 (5.44%)
Burns due to contact with hot surfaces, exhaust pipes or hot-melt chemicals; sudden release of hot water and steam lines, radiator and cooling system pipes; soldering, brazing and welding operations,	230 (59.59%)	120 (39.09%)	22 (5.70%)
Electric shocks from portable power tools			
Fires and explosions of spilled or leaked flammable/explosive substances, or by ignition of hydrogen released from batteries, or during flame cutting and welding operations,	240 (62.18%)	120 (39.09%)	19 (4.92%)
Increased rate of road accidents during test driving	190 (49.22%)	96 (27.87%)	66 (17.10%)
Punctures and cuts caused by sharp edges of hand tools, vehicle parts and sheet materials	180 (46.63%)	101 (26.17%)	68 (17.62%)
Bursting of compressed-air lines or containers	218 (56.48%)	140 (36.27%)	20 (5.18%)

**Source: Research field work (2023).**

Table 6 shows the awareness of automobile mechanic workshop operators to the set occupational health and safety standards. The table presents a summary of individual occupational health and safety questions and the allocation of responses to each question.

**Table 7.** Level of compliance to occupational health and safety rules

Answer Alternatives	Frequency	Total/%
Very High	62	16.01
High	112	29.01
Moderate	112	29.02
Low	100	25.91
Total	386	100

**Source: Research field work (2023).**

Table 7 shows the compliance responses of respondents to occupational health and safety standards. 16.01% of the respondents aver that their adherence to occupational health and safety standards is very high. 29.01% percent claim that their adherence to safety standards in the work place is high. Moderate adherence to occupational health and safety standards accounts for 29.02% of the responses, which is the bulk of level of compliance response. Low compliance to occupational health and safety standards account for 25.91% of responses. The implication of this response is that over half of respondents with 54.92% of the responses acknowledge that their adherence to

occupational health and safety standards need significant improvement to avoid disastrous work place related accidents or injuries.

**Table 8.** Factors that discourage compliance with occupational health and safety standards

Answer Alternatives	Frequency	Total/%
Expensive PPE	162	41.97
Lack of enforcement of regulations	62	16.06
Training issues	77	19.95
Fear of punishment	66	17.10
Shame	19	4.92
<b>Total</b>	<b>386</b>	<b>100</b>

Source: Research field work (2023).

Table 8 shows responses of the respondents to factors that they think discourage compliance with occupational health and safety standards in the auto-mechanical workshops within the study area. The majority of respondents agree that expensive personal protective equipment (PPE) discourages compliance with occupational health and safety standards. This reason for non-compliance accounts for 4.97% of the responses. Lack of enforcement of regulations account for 16.06% of the responses. Issues that have to do with work place training account for 19.95% of the responses. The fear of punishment account for 17.10%, while shame makes people not to comply with occupational health and safety standards.

**Discussion of Results**

This study *assessed the compliance of automobile mechanic operators to stipulated occupational health and safety standards in the operations of the workshops in Port Harcourt, Nigeria.* Compliance to safety standards in the operations of mechanic auto-mobile workshops a very serious safety challenge among the workshop operators. The non-compliance safety effect lives a trail of ill health, sickness, diseases, accidents and death. Many operations of mechanic auto-mobile workshops operators have had one form of accident or the other due to poor housekeeping, using wrong tools, unsafe practices and non-compliance to best safety practice.

**Level of compliance to occupational health and safety standards**

Non-compliance with set occupational health and safety standards can compromise and or jeopardize the efficient and effective functioning of an auto-mechanical workshop due to injuries or illnesses that can cause downtime in the workplace thereby increasing operational costs and reduced productivity. In Most parts of Sub-Saharan Africa, a vast majority of workers who engage in professions such as auto-mechanical technicians, are paid on a pro rata basis of earn as you work, with no fixed contracts (Zin & Ismail, 2012). As such, when injuries or illness occur due to workplace safety issues, they earn no money and would eventually deplete their savings and may lead them into further extreme poverty scenarios.

From the results presented in Table 7, it can be seen that compliance to set occupational health and safety standards amongst auto-mechanical workshop operators in Rivers State vary. Over 54% of the respondents with 212 responses agree that their level of compliance to laid down occupational health and safety standards need to be improved upon as their present level of moderate and low compliance may not be adequate to safeguard them from workplace related accidents and illnesses that may arise from their work This finding agrees with the findings of Afolabi et al., (2011) on their work on auto-mechanical workshops and safety compliance in Enugu State, Nigeria. This low compliance to set occupational health and safety standards is not only peculiar to the auto-mechanical workshop service industry as similar low adherence to set safety standards have been reported by Zin & Ismail (2012). Those who comply more to laid down occupational healthy and health standards seem to be the ones who have acquired more education (tertiary education). This suggests that higher education can help improve adherence to workplace health and safety standards. In order to bridge the gap that exists between the level of education of most auto-mechanical technicians, targeted



training, retraining and orientation programmes need to be intensified to improve the compliance with health and safety standards.

### **Factors that discourage compliance to occupational health and safety standards by auto-mechanic workshop operators in Port Harcourt**

Compliance to set occupational health and safety standards by auto-mechanical workshop operators in Port Harcourt is quite low as has already been established in the preceding section. This low compliance with the set standards is accounted for by a number of broadly categorized factors which may not be mutually exclusive given the right conditions. The most significant factor that leads to low compliance with health and safety standards amongst auto-mechanical workshop operators in Port Harcourt is the expensive nature of personal protective equipment (PPE). 162 respondents accounting for 41.97% of the responses agree that insufficient funds to purchase the appropriate PPE needed for their specific tasks results in low compliance with the standards they are supposed to meet up with.

The second most significant contributor to low compliance with occupational health and safety standards amongst auto-mechanical workshop operators in Port Harcourt is the lack of adequate training on health and safety issues as well as the proper handling of appropriate use of available PPE and equipment. 77 respondents accounting for 19.95 responses agree that inadequate and improper training can cause low compliance with workplace health and safety standards. Training and retraining of auto-mechanical workshops is very important as the wrong use of PPE when they are available is the same as not having the PPE available in the first place. Other issues such as the training on the proper ways to perform manual handling and lifting would likely improve compliance to health and safety standards as suggested by Zin and Ismail (2012). Other factors that reduce compliance with health and safety standards include lack of enforcement of regulations with 16.1%. Fear of punishment also makes people not to report accidents, injuries and near misses in the work place because of the fear of punishment or dismissal especially in the auto-mechanical workshops industry in Sub Saharan Africa with little or no work place injury insurance or compensation packages. This lack of reporting injuries or near misses therefore does not improve workplace safety management systems and awareness creation. This factor accounted for 17.1% of responses which is quite significant. Another factor that makes workers in the auto-mechanic services industry not to comply with set standards is the issue of shame. 4.92% of respondents agree that this is factor that contributes to non-compliance. The auto-mechanic services industry is seen as a male dominated industry. These men have certain testosterone driven egos which may prevent them from complying with standards. For example, some men would lift a heavy machinery or equipment alone because they want to win a bet on who is the stronger man.

### **Conclusion and recommendations**

Compliance to safety standards in the operations of mechanic auto-mobile workshops are very serious safety challenges among the auto-mechanical workshop operators in the study area. The non-compliance to occupational health and safety standards could lead to injury, sickness and even death. Many operations of mechanic auto-mobile workshops operators have had one form of accident or the other due to poor housekeeping, using wrong tools, unsafe behaviors and non-compliance to best safety practice. The data collected from the field and extant literatures were used to achieve the outlined objectives which points to the fact that noncompliance to safety standards in the operations of mechanic auto-mobile workshops results to fatality and therefore needs to be put into practice.

Overall, this study, has been able to explore the issue of compliance to occupational health and safety standards in Port Harcourt, Nigeria, as well as identify the factors that lead to non-compliance with these set standards. This is important information to have in planning response and sensitization efforts improve the health and safety conditions of automobile mechanics in the city especially in the context of the sustainable development goals number 1 and number 3.

Arising from the findings of this research, it is therefore recommended that; education and awareness programmers need to be created specifically for automobile workshop technicians in Port Harcourt on the need to engage in proper safety practices in the work place.

Greater attention also needs to be paid to ensure that automobile workshop owners provide and enforce the use of personal protective equipment for their workers.

### Data Availability Statement

The data sources that support the findings of this study have been provided in the body of the work.

### Conflict of Interest Statement

The authors declare that they do not have any conflict of interest.

### Ethics Statement

No ethical considerations were required for this study.

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