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ORIGINAL ARTICLE

Health and Safety Issues in Selected Nigerian Medium-Sized Manufacturing Firms

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ABSTRACT

Introduction: Medium-sized firms around the world are confronted with several challenges which have continued to hamper their growth chances. One of these issues is lack of global best practices in health and safety. This issue is pronounced among medium-sized manufacturing firms in Nigeria. It was against this backdrop that the study investigated the state of health and safety issues in selected Nigerian medium-sized manufacturing firms. **Methods:** Survey research design was adopted involving leading medium-sized manufacturing firms in Nigeria. Issues pertaining to health and safety were identified and analyzed. Data were gathered through administration of structured questionnaire and observation check list. Analyses were presented through appropriate statistical means. **Results:** Relatively secured work environment, workers' exposure to hazard, absence and inadequate protective devices for workers, archaic fire system infrastructure, lack of insurance cover for workers, irregular health and safety training, inconsistent compliance to health and safety rules were found as the issues in selected Nigerian medium-sized manufacturing firms operating in Nigeria. **Conclusion:** Health and safety issues is a cog in the wheel of Nigerian medium-sized manufacturing firms. It is imperative to address this issue to strengthen the operations of the industry. The promotion and practice of hygienic health system and safety culture by workers and management must be the way of life in manufacturing firms.

Keywords: health, manufacturing firm, medium-sized manufacturing firm, safety

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INTRODUCTION

Globally, health and safety issues have remained contentious in the world of work with demands for improvements to get the best out of the efforts at bringing resources together to produce optimally (Ali *et al*., 2021; Seuwandi and Gunasekara, 2023) Issues range from poor health and safety awareness to absence or lack of health and safety training, non-availability of insurance and protective devices, to mention a few (Ayuni, Yusuf and Dwiyanti, 2022; Afsharian *et al*., 2023).

Businesses around the world are confronted with this challenge which has continued to hamper their survival and growth chances. There are calls to change the narrative and this is yielding positive results in developed climes which have continued to record fewer industrial hazards and accidents when compared to developing climes (Aka *et al*., 2023). According to Onyi-Ogelle and Green (2023), Nigeria as a developing clime has recorded an increase in work-related fatality over the years and there seems to be insignificant reduction in the fatality caused by industrial hazards.

Experience of health and safety issues no doubt cut across different echelons of business; micro, small, medium and large. However, studies have suggested the implications of declined performance of medium-sized manufacturing firms are related to the prevalence of health and safety challenges. This is because workers in the manufacturing firm of this caliber are exposed to different forms of harmful and hazardous substances during their duties which have resulted into injuries and disabilities (Afsharian *et al*., 2023). This suggests one of the reasons why the medium-sized manufacturing firms in Nigeria have not metamorphosized into large entities. If this trend should continue, these

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medium-sized manufacturing firms will not grow and can eventually die. However, if the health and safety issues are timely addressed, the firms might contribute significantly to the economic prosperity of the country which is presently dwindling. Nigeria is a leading African nation and the issue of health and safety is no doubt affecting medium-sized firms which, if unaddressed, in time will continue to hamper the growth of this category of firms. It was based on the above positions that the study examined health and safety issues in selected Nigerian medium-sized manufacturing firms.

Manufacturing firms are enterprises that engage in the transformation of raw materials to either semi-finished or finished products. These firms operate at different scales depending on the assets, number of employees, industry, and country among others. According to Joseph *et al*., (2023), medium manufacturing firms refers to those enterprises that have a fulltime workforce that does not exceed 100 or whose annual sales turnover is capped at Kshs. 150 million while Akinbode *et al*. (2023) described medium-sized enterprises in this category as those manufacturing with 100million yen paid up capital and 300 employees. In Nigeria, Eid, Abdelmoety and Agag (2020) define medium enterprises are those enterprises whose total assets excluding land and building are above 50 million Naira but not exceeding 500 million Naira with a total workforces of 50 to 200 and above while Oloyede and Akinbode (2021) described medium enterprises as entities with an asset base of N50 million and not more than N500 million (excluding land and buildings) with labor force (employees) of between 50 and 200. These definitions do not capture the nature of enterprise because this tends to vary with industries.

Health is a dynamic state of complete physical, mental, spiritual and social well-being which is the level of functional or metabolic efficiency of a human being. It represents human conditions of mind and body which can be described as 'healthy' or 'unhealthy.' When someone is healthy, it encapsulates absence of illness, injury or pain, otherwise the person is unhealthy (Rajput, Sharma and Joshi, 2023). According to Benson *et al*. (2024), variation in individual health status is a function of where individuals live, work and consume. Pujianti and Djunaidi (2022) identified social and economic environment, the physical environment, and the person's individual characteristics and behaviors as determinants of an individual's health status.

On the other hand, safety is prevention of risk of death, or injury against an individual (Rajput, Sharma and Joshi, 2023). This can be a state of being 'safe' or protected against any form of physical, social, emotional, occupational, and psychological harm (Ayuni, Yusuf and Dwiyanti, 2022). It is control of recognized hazards or accidents which can cause health damage in human beings (Rajput, Sharma and Joshi, 2023). From the positive angle, safety is a means of identifying, evaluating and controlling hazards in the workplace. This is carried out through setting up measures, techniques, methods or processes to forestall workers' exposure to unsafe work practices (Bayramova *et al*. , 2023).

Studies Joseph *et al*., (2023); Okeroghene, John and Patricks (2023) have shown that health and safety issues pervade the African continent. For instance, in the study of Okeroghene John and Patricks (2023) health and safety practices in the workplaces were found to have received less attention and this has been responsible for the numerous health and safety issues like hazards and disease, industrial accidents, among others.

The selected health and safety issues are so many. First is exposure to hazards. This is any situation or state of events which poses a threat to a human being (Ebeloku, Akinbode and Sokefun, 2018). Hazard issues are such as discharges from the manufacturing process the forms of substance or noise from equipment, human behavior, and objects that are capable of inflicting injury, disease, disability or death of human resources (Ali *et al*., 2021). Seuwandi and Gunasekara (2023) established an increased number of workers' daily exposure to hazards in developing countries.

Second is absence or inadequate provision of protective devices. These are gadgets provided by management for the use of workers at work to guide against any form of injuries to sensitive aspects of their body (Diannita, 2022). These are helmet, clothing, hand glove, hard shoes, among others. The use of such gadgets has to do with the nature of the job, comfortability, availability, and affordability. However, lack of access to these gadgets has subjected workers to injuries and death (Rajput Sharma and Joshi, 2023). In the study by Kasim, Alabi and Wusu, (2020) reduction in the number of injuries among public hospital was found to have been as a result of the availability and use of the protective devices by workers while Benson *et al*. (2024) disclosed that lack of access to such devices is a major issue.

Third is lack of health and safety insurance which ordinarily is to avert human health deterioration by providing for care in a timely

manner through the provision of insurance support that the management have enlisted workers on. Studies like Akinwale, Kuye and Akinwale, (2023) have found consistently positive and significant relationships between health and safety insurance coverage to health outcomes. Therefore, individuals without health insurance can be exposed to untimely resolution of health and safety challenges for which the firm must be pay ab insurance premium (Okeroghene, John and Patricks, 2023).

Fourth is lack of fire control system that can make it difficult to check fire outbreaks which remain one of the frequent tragedies to the human race (Templeton *et al*., 2023). Fire-related risks are frequent in manufacturing firms because of the activities therein such as electrical, mechanical, and from human errors (Addai *et al*., 2016). The knowledge of this and government regulations have made it mandatory for firms to put in place fire control systems. However, some firms have no such control system while others have an ineffective fire control system. There are measures such as having fire extinguishers in strategic places, guiding explosive materials properly, signs of highly inflammable points, and adequate resources in place to meet a potential increase in fire-related incidents (Isni *et al*., 2023).

Fifth is lack of detailed health and safety training that makes it difficult to transfer health and safety specific competencies (Benson *et al*., 2024). Such training typically consists of instruction in hazard recognition and control, safe work practices, proper use of personal protective equipment, and emergency procedures and preventive actions (Diannita, 2022).

Sixth is unsecured work environment as regard structure, air, machinery, furniture, products, chemicals, materials and production processes in the workplace (Dewanti, Jingga and Wahyudiono, 2024). By extension, it includes organizational culture, attitudes, values, beliefs and daily practices in the enterprise that affect the mental and physical well-being of employees. Lohela-Karlsson, Nybergh and Jensen (2018) discovered that poor environment is a serious health concern while an unfriendly work environment can cause health and safety issues.

Seventh is lack of compliance to health and safety rules. Compliance is changing one's behavior in line with certain dictates. In context, it is adhering to health and safety dictates during work in a formal enterprise (Subramaniam *et al*., 2016; Rajput, Sharma and Joshi, 2023) According to Bazan-Bulanda (2019), workers' safety in the workplace depends on compliance of both employees and the employer with applicable regulations. In the study conducted by Kasim, Alabi and Wusu, (2020), it was found that lack of attention to safety by senior personnel significantly related to low frequency of reporting dangerous work procedures. It was based on the review that this study investigated the state of health and safety issues in selected Nigerian medium-sized manufacturing firms.

METHODS

The study adopted survey design to study 16 leading medium-sized manufacturing firms in Nigeria comprising of three metropolitan cities, Lagos, Kano and Port Harcourt, between February and June 2023. Details are provided in Table 1.

A structured questionnaire with two parts covering both respondents' personal data and discourse issue with nine items each pf the constructs on a 5-point Likert type scale was administered on the employees of the firms. Therefore, part of the data for the study was collected in the twelve leading medium-sized manufacturing firms with the administration of structured copies of questionnaire on 600 respondents who were workers of these firms while a personal observation check list on the subject, as modified from Kasim, Alabi and Wusu, (2020) with six parts covering issues on office area, floor surfaces and walls, equipment, wash rooms, stores and production area, was used to observe using a factors scale of 1 to 5. Researchers personally filled the observation checklist in each of the medium-sized manufacturing firms with assessment based on five yardsticks: Not Sure (1): The respondent is uncertain or does not have enough information to form an opinion or judgement. Not At All (2): The respondent believes the statement or condition does not apply in any way. Some Extent (3): The respondent believes the statement

Table 1. Summary of Selected Firms and Respondents

Major Metropolitan Cities in Nigeria	Number of leading Medium-Sized Manufacturing Firms	Total Respondents
Lagos	4	200
Kano	4	200
Port Harcourt	4	200
Total	12	600

Source: Authors' Compilation (2023)

or condition applies to a moderate degree. Great Extent (4): The respondent believes the statement or condition applies to a significant degree. Very Great Extent (5): The respondent believes the statement or condition applies to the highest possible degree.

Data collected were analysed with IBM SPSS version 29 using descriptive statistics(mean and standard Deviation). Mean score between 4:21 – 5.00 is strongly agreed/ very great extent; 3.41- 4.20 is agreed/great extent; 2.61 – 3.40 is indifferent/some extent;1.81 – 2.60 is disagreed/not at all while 1.00 – 1.80 is strongly disagreed/not sure. Finally, this study proposal was submitted for ethical clearance to the Bowen University Teaching Hospital Health Research Ethical Committee with registration number: NHREC/12/04/2012 and the approval number: BUTH/REC-1132.

Observation Process

A structured observation approach was used to research health and safety issues in selected Nigerian medium-sized manufacturing firms as one of the data collection methods of the study. The observation was guided by a checklist based on key indicators of compliance to health and safety. These key indicators were adapted from occupational health and safety standards: PPE, emergency preparedness, safety protocols practice, workplace cleanliness, and ergonomics. The observations were made during regular working hours, which means the different shifts were covered in order to capture a wider understanding of practices across various operational periods. It targeted peak hours, especially to capture high-risk scenarios and interactions between employees with machinery and tools. This observation methodology has provided key insights into how health and safety measures are applied in real-life situations and has identified areas where intervention is urgently needed for improved workplace safety and welfare of the employees.

RESULTS

Health and safety issues were acknowledged to be of serious concern in the medium-sized Nigerian manufacturing firms studied, to the extent that most of the respondents were unhappy with the development. Based on items generated and presented in Table 2, workers exposure to hazard was 3.89 and this depicts that workers are exposed to hazards in the selected medium-sized manufacturing firms. This high mean shows that, on average, participants perceive workers as being highly exposed to hazards in the workplace. This would therefore suggest that hazardous conditions are a common concern within the observed manufacturing firms. Consistent compliance with health and safety rules has a mean of 2.16. The low mean reflects that compliance with health and safety rules is very poor and inconsistent. Workers and management do not adhere to laid down safety protocols, which shows a gap in safety practices. Furthermore, secured work environment has a mean of 2.41. This mean shows a low perception of workplace security, implying that most of the respondents believe that the work environment has insufficient measures put in place to ensure safety from potential hazards or threats. Regular health and safety training has a mean value of 2.01. This very low mean indicates that health and safety training is seldom provided, if at all, in the firms. This could also be a contributing factor to unsafe practices and a lack of proper knowledge regarding safety procedures among the workers. Secured work environment with a mean value of 2.41 shows a low perception of workplace security, implying that most of the respondents believe that the work environment has insufficient measures put in place to ensure safety from potential hazards or threats.

Regular health and safety training with a very low mean value of 2.01 indicates that health and safety training is seldom provided, if at all, in the firms. This could also be a contributing factor to unsafe practices and a lack of proper knowledge regarding safety procedures among the workers. Effective fire system has a mean value of 2.88.

Table 2. Health and Safety Issues in Selected Nigerian Medium-Sized Manufacturing Firms

Health and Safety Issues	Mean	Standard Deviation
Workers' exposure to hazard	3.89	1.103
Consistent compliance to health and safety rules	2.16	1.426
Secured work environment	2.41	1.614
Regular health and safety training	2.01	1.216
Effective fire system	2.88	1.776
Adequacy of protective devices for workers'	2.11	1.415

Source: Data Processed Output (2023)

This moderate mean level shows that the fire safety system is felt to be inadequate. While there are some measures, they may be incomplete or not always properly maintained. Adequacy of protective devices for workers' mean is 2.11 This low mean level indicated that protective devices, including helmets, gloves, and goggles, are not adequately provided or easily accessible to workers. This leads to a hazardous situation of sustaining accidents and being injured.

The comments "Fair" or "Good" are thus granted based on observation using a structured checklist that was aligned with health and safety standards. "Good" means appropriate compliance with safety, cleanliness, and maintenance, while "Fair" shows partial compliance with noticeable deficiencies in the form of clutter, poor lighting, or a lack of safety equipment. These, therefore, give a qualitative view of the status of different areas in the workplace concerning health and safety practices.

On the consistent compliance of management to health and safety rules, this is at 2.16 which implies that workers disagree with the compliance level of management to health and safety rules and by implication, it could be said that both employees and management have not kept to the rules that governs health and safety in the surveyed medium-sized manufacturing firms. The level of work environment security with the mean 2.41 represents disagree. It can be deduced that the medium-sized manufacturing firms surveyed lacked a secured work environment. Again, on the frequency of health and safety training, respondents' mean was at 2.01 representing disagree. By implication, the firms hardly run health and safety training. On the existence of effective fire system, the mean score was 2.88 which represents indifferent. It captures on the average and this should not be the case as well. Lastly, the adequacy of protective devices for workers has the mean 2.11 that is disagree. This implies lack of protective devices for workers in the firms surveyed.

Observation Report

In summary, the six areas observed (office area, floor surfaces and walls, equipment, washrooms, stores and production area) were not at their best. See summary in Table 3.

The production areas received a rating of "Fair." This rating suggests that while these areas meet basic standards of cleanliness and organization, there are notable areas for improvement. Enhancing hygiene and efficiency practices could elevate the standard of the production areas.

The office area was rated as "Good." This indicates that the office is well-maintained, clean, and effectively supports administrative functions. While the area is generally in good condition, there may be minor enhancements that could further improve its functionality and appearance.

The condition and cleanliness of floor surfaces and walls were also rated as "Good." This reflects that these surfaces are generally clean and well-kept, with only minor issues that do not significantly impact overall cleanliness or safety.

The washrooms received a "Fair" rating. This suggests that while the washrooms are usable and meet basic cleanliness standards, there are areas where hygiene practices could be improved. More frequent cleaning and better supply management could enhance the overall hygiene of the washrooms.

The store area was assessed as "Good." This rating indicates that the store area is generally well-organized and clean. Addressing minor issues could further improve its organization and cleanliness, ensuring it supports efficient storage practices.

The equipment area received a "Fair" rating. This suggests that while the area is functional, there are noticeable areas where maintenance and cleanliness could be enhanced. Improving these aspects could ensure better performance and longevity of the equipment.

The summary provides a concise overview of the condition and maintenance of various areas within the facility. Each area was rated based on specific criteria relevant to its function, offering a comprehensive and actionable evaluation. This approach guides efforts to enhance the overall environment of the facility, identifying strengths and pinpointing areas that require improvement.

Table 3. Summary of Observation Report

Areas	Remarks
Production areas	Fair
Office area	Good
Floor surfaces and walls	Good
Washroom	Fair
Store area	Good
Equipment area	Fair

Source: Researchers' Compilation (2023)

DISCUSSION

Based on the issues of health and safety considered, the selected medium-sized manufacturing firms' results indicate that while some areas of the work environment are in relatively good condition, significant improvements are needed in the production, washroom, and equipment areas to meet global health and safety standards. Addressing these issues is crucial for ensuring the well-being of employees and enhancing overall productivity and safety within the firms. Implementing comprehensive health and safety policies, regular maintenance schedules, and thorough hygiene practices will be essential steps toward achieving these improvements. The finding corroborates the studies of Lohela-Karlsson *et al*. (2018) and Dewanti, Jingga and Wahyudiono (2024) which discovered poor environment to be a serious concern. In the same manner, the findings of Taylor and Ali (2012), Kyarizanna *et al*. (2021) and Aka *et al*, (2023) reported that the work environment of most medium-sized manufacturing firms was unsecured, and this remains a leading cause of unhealthy and unsafe work environment in developing countries. However, this contradicts the findings of Pujianti and Djunaidi (2022) as well as that of Rajput, Sharma and Joshi (2023) who acknowledged the preference for conducive work environment in manufacturing companies in developed climes.

Similarly, the study revealed mild exposure of workers to hazards in the selected medium-sized manufacturing firms. The study revealed that workers in the selected medium-sized manufacturing firms in Nigeria face mild exposure to various occupational hazards. This exposure, while not classified as heavy, still poses significant health and safety risks. Workers are frequently exposed to hazards such as inadequate ventilation, leading to poor air quality, noise pollution from machinery, and insufficient personal protective equipment (PPE). The mild exposure is characterized by intermittent rather than constant contact with these hazards, reducing but not eliminating the risk of adverse health effects. To mitigate these risks, it is crucial for firms to improve workplace conditions by enhancing ventilation systems, providing adequate PPE, implementing regular safety training, and conducting routine hazard assessments. These measures will help reduce the frequency and severity of exposure, promoting a safer and healthier work environment for employees. This result corroborates the studies of Afube, Nwaogazie and Ugbeboe, (2019) and Seuwandi and Gunasekara, (2023) which found increased in workers' exposure to hazardous situations at work in developing countries. Although this was not perceived to be an ideal situation as management does not support it. However, the study of Ebeloku, Akinbode and Sokefun, (2018) revealed that management are often confronted with the negligence of workers themselves and neglect of work protocols. This attitude of employees' might be what is responsible for the mild exposure of workers to hazards as against the best global practices of zero hazard level.

Furthermore, it was established that protective devices for workers were absent in some of the medium-sized manufacturing firms while in others, these protective devices were inadequate. These findings agree with the studies of Ayuni, Yusuf and Dwiyanti (2022) and Afsharian *et al*. (2023) which pointed out the reluctance of management of many manufacturing firms in providing protective devices for workers use and or replacing bad protective devices on time as well as that some firms find it difficult to get adequate protective devices for all workers. In contrast, the study of Seuwandi and Gunasekara (2023) in Sri Lanker confirms the adequacy of protective devices for workers in the studied manufacturing firms. This suggests that the manufacturing firms adhere to global best practices as regard to this and developing countries like Nigeria can learn from this. With this, the pace of occupational accidents will no doubt be reduced when compared with the selected medium-sized manufacturing firms in Nigeria.

Also, the study reported the use of archaic fire system infrastructure in the selected medium-sized manufacturing firms in Nigeria as against the modern firm system infrastructure in developed climes. The study highlights the critical need for updating fire system infrastructure in medium-sized manufacturing firms in Nigeria, which currently rely on outdated systems such as manual fire alarms, basic fire extinguishers, and a lack of automated sprinkler systems. These firms often neglect regular maintenance and inspection, increasing the risk of non-functional equipment during emergencies. In contrast, developed countries employ advanced fire detection and suppression systems, including automated smoke and heat detectors, integrated building management systems, and sophisticated suppression methods like water mist and gas systems. These modern systems provide faster detection and response times, comprehensive

coverage for various fire scenarios, and higher reliability due to stringent regulatory compliance and regular maintenance. By transitioning to modern fire safety systems and implementing regular training and drills, Nigerian firms can significantly enhance their emergency preparedness, protect lives and property, and align with global best practices. Fire system inadequacy as found by Adeyemi *et al*. (2020) was further reaffirmed in this study while the findings of Templeton *et al*. (2023) condemned the use of archaic fire system infrastructure in firms and admonished firms to embrace modern fire response infrastructure. Close to this in the study was the management compliance level to health and safety rules which was reported to be inadequate and this agrees with the study of Isni *et al*. (2023) that found management compliance level to health and safety rules to be minimal.

The study found lack of insurance cover for workers. This is unacceptable with what the global standard practices require in the case of injuries that might be sustained at work. This study agrees with the finding of Okeroghene *et al*. (2023) which reported the importance of insurance cover for workers in manufacturing firms to serve as indemnity in case of injuries or death of worker. Lastly, insurance issue agrees with Okeroghene *et al*. (2023) who identified inadequate insurance coverage significantly.

CONCLUSIONS

Health and safety issues is a cog in the wheel of medium-sized manufacturing firms. The six issues investigated, namely exposure to hazards, protective devices, health and safety insurance, fire control system, health and safety training, secured work environment and compliance to health and safety rules, have clearly shown to be issues of concern in the selected firms and must have been factors affecting improved performance in the firms. Against the findings, the study recommends the following: The promotion and practice of hygienic health system and safety culture by workers and management must be way of life in the medium-sized manufacturing firms; Review of health and safety policies to capture realities, national legislations and incorporate other stakeholders' inputs. Therefore, it is important to integrate health and safety into the medium-sized manufacturing firms' policy and strategy. Fine-tune compliance rules to health and safety practices by stakeholders; Use of effective communication about health safety precautions in both written and virtual display at the appropriate places within the environment of the firm. Regular training on health and safety is also germane.

CONFLICT OF INTEREST

The authors have no competing interests to declare that are relevant to the content of this article.

AUTHOR CONTRIBUTION

*AJ conceived the idea of the research after extensive literature review which identified the gap. He was able to assign responsibilities for the study, wrote introduction and got the full paper ready after other team members' contributions.

*EA was actively involved in the methodology design, data collection and facilitated the funding of the research,

*UF was co-data collector as well as analyzed the data.

*A-A J worked extensively on literature sourcing and summarized literature review. She assisted in data coding and typesetting the report.

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