

ELECTRICAL SAFETY MANAGEMENT PRACTICES AND ITS INFLUENCE ON THE INCIDENCE OF ACCIDENTS IN PUBLIC SECONDARY SCHOOLS IN LAGOS STATE

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Abstract

Electrical safety is a critical concern, particularly within educational institutions, where daily exposure to electrical hazards impacts students, teachers, and staff. This research employs a descriptive survey research design to investigate the practices of electrical safety management and their effects on accident prevention in public secondary schools in Lagos State, Nigeria. The study addressed a research question and hypothesis concerning electrical safety management practices and accidents in schools. The population of the study encompassed all school management and staff from secondary schools in the six educational districts of Lagos State. The sample, consisting of one hundred and eighty-four (184) respondents selected through a simple random sampling technique. Data were collected using a modified standardized instrument titled Electrical Safety Management Practices Questionnaire (ESMPQ) with a reliability of $r=0.87$ and analyzed through descriptive statistics of frequency counts, percentages, bar charts, pie charts, mean and standard deviation. Additionally, inferential statistics of Chi-square test was used at a significance level of 0.05. The research findings indicated the rejection of the null hypothesis, signifying a statistically significant influence of the variables under study. As a result, it was concluded that a reinforcement of safety practices is imperative. Consequently, the study recommends that schools promptly address damaged appliances, engage certified local electricians, implement thorough supervision, and prioritize safety education for staff and students to mitigate the risk of electric shock.

Key Words: *Accidents, Electric, Practices, Safety management, Schools*

Introduction

Effective electrical safety management practices within public secondary schools are of paramount importance to ensure the well-being and security of students, teachers, and support staff. These institutions rely heavily on electricity to power essential lighting, equipment, and technology required for effective teaching and learning. However, the everyday interaction with electrical systems can lead to potential hazards if not managed appropriately, resulting in accidents that carry severe consequences. These accidents not only jeopardize the safety of individuals but also impose a significant economic burden, straining school resources and budgets (Ahmadi & Lukman, 2017). As Guest (2017) aptly noted, electrical safety management is a critical aspect of safety within educational institutions, as it safeguards the individuals in these environments. This study delves into the state of electrical safety management practices in public secondary schools, with a

specific focus on Lagos State, Nigeria, and its implications for accident prevention and mitigation.

Educational institutions, especially public secondary schools, provide a dynamic and diverse environment where students, teachers, and support staff engage with electrical systems daily. Electricity is an indispensable resource, powering classrooms, laboratories, and administrative facilities. However, its improper management can introduce substantial risks, including electrical accidents such as shocks and fires. These incidents can result in injuries, damage to property, and disruptions to the educational process. Thus, the significance of effective electrical safety management practices within these institutions is clear (Ehrenwerth, 2021). In Nigeria, a study conducted in Lagos reported that 9.4% of acute burns treated over a five-year period were a result of electrical injuries (Abikoye et al., 2008). Globally, electrical burn injuries are recognized as the second most common cause of admission to burns units (Bajaj, 2010). The incidence of electrical burn injuries varies across regions, with rates ranging from 6% in the United States to as high as 20% in certain Asian and African burn units (Bajaj, 2010). As Nigeria continues to drive for increased power generation and utilization, the risk of electrical accidents is expected to rise. To counter this growing concern, preventive programs and safety measures must be integrated into educational institutions early on (Innih & Oludiran, 2011).

The effective management of schools involves a series of coordinated actions encompassing planning, organization, coordination, and control. These actions aim to optimize the utilization of available resources to achieve the desired goals swiftly and effectively. Management, as a process, revolves around setting goals for the school and mobilizing resources, such as financial assets, facilities, and equipment, to attain those goals (Oboegbulem, 2018). Educational institutions, including public secondary schools, face a multitude of potential dangers that can impede the achievement of educational goals and objectives. Therefore, comprehensive planning is vital for effective school management, particularly in the domains of safety and security. Establishing a secure and conducive learning environment, with a focus on fostering safety awareness and discipline among students and staff, is essential. Additionally, the learning and teaching processes can flourish in the presence of secure educational facilities and an encouraging atmosphere. It is well-documented that the school environment significantly impacts the effectiveness of administrative decisions (Okorie, 2019; Kolawale & Arikpo, 2018).

Creating and maintaining a safe atmosphere within the school environment is a collective effort involving school personnel, students, and administration. Potential hazards may manifest in various areas, including schoolyards, farms, classrooms, science labs, and technology/technical workshops. These hazards encompass both chemical risks and physical risks, such as the risk of falls, trips, and slips. A well-managed school requires meticulous planning and proactive management by the institution's principal and teachers. This entails the provision of a suitable learning environment while ensuring the safety and security of students and staff (Trump, 2017). To create a safe learning and teaching environment, educational institutions must implement safety rules and regulations. School planners play a crucial role in planning for safety, as they need to schedule a multitude of activities while ensuring the development and implementation of safety programs.

Additionally, they must take necessary actions in response to potentially dangerous circumstances (Carter, 2018). School administrators must also prioritize school safety as one of their top responsibilities, ensuring that the school building is adequately secure. Effective safety management strategies should involve all stakeholders. Neglecting security measures, such as maintaining a low perimeter fence, lax control over access to the school complex, or the absence of experienced professional security staff, can introduce risks into the educational system, leading to discontent and hindering the efficient functioning of the school (Gbesoevi et al., 2022).

Safety encompasses the state of being safeguarded against various potential undesirable events. It extends to protection across diverse domains, including physical, social, spiritual, financial, political, emotional, occupational, psychological, and educational aspects. Effective safety management maintains risks at an acceptable level, safeguarding individuals against occurrences or exposures that may jeopardize their health or result in financial losses. This includes the protection of individuals and property. The health and safety of students and teachers are paramount, necessitating the provision of healthcare services within schools and through government programs. Management of the school must prioritize staff well-being, not only in terms of physical safety but also in emotional and mental well-being, as mental health holds equal importance to physical health (Nicole, 2014).

Lagos State, as a prominent center of education in Nigeria, is home to numerous public secondary schools. Understanding the state of electrical safety management in these schools is imperative for ensuring the safety of residents and the continuity of educational services. There is a pressing need to address the existing research gap by conducting a comprehensive examination of electrical safety practices and their influence on accident incidence in public secondary schools in Lagos State. The insights gained from this study have the potential to inform policies, enhance safety measures, and contribute to a safer educational environment in Lagos State and similar regions.

Research question

1. Will electrical safety management practices influence the incidence of accidents in secondary schools in Lagos state?

Hypothesis

1. Electrical safety management practices will not significantly influence the incidence of accidents in secondary schools in Lagos state.

Methodology

This study adopts a descriptive survey research design, a widely recognized approach for investigating the current state and characteristics of a specific population or phenomenon (Creswell & Creswell, 2017). The study focuses on the population of teachers in junior secondary schools in Lagos State, numbering 9,114 individuals across the state's six educational districts (Lagos State Ministry of Education, 2019). For the sake of feasibility, a sample of 184 respondents was selected. A combination of sampling techniques was

utilized to ensure the representativeness of the data. Initially, two out of the six educational districts, namely, Education District IV (48 schools) and VI (54 schools), were selected using the simple random sampling technique of fishbowl. Subsequently, 30 schools were randomly selected with 14 and 16 schools respectively from the districts, and the research instrument, a web-based questionnaire created using Google Forms, was administered in these selected schools. To ensure an unbiased and fair sample, simple random sampling technique was employed, providing an equal chance for every member of the target population to be selected (Gorard, 2016). Ethical principles and research integrity were diligently upheld throughout the study. A letter of introduction was written to the school authorities to secure permission for conducting the study within the schools. Consent from the respondents was obtained before attempting the questionnaire items. The research instrument, titled "Electrical Safety Management Practices Questionnaire (ESMPQ)," was adapted from previous studies by Nwobodol and Udebunu (2017) and Aigbodion et al. (2014). The questionnaire comprised three main sections: Section A: Collected demographic information, including age, gender, years of service, and educational level. Section B: Included seven questions concerning electrical safety management practices, rated on a 5-point Likert scale, spanning from "strongly agreed" to "strongly disagreed." Two of these questions were open-ended. Section C: Contained six questions related to the incidence of accidents within the school, also rated on a 5-point Likert scale, from "never" to "often." One question in this section was open-ended.

The research instrument was validated and the reliability of the instrument was ascertained after test-retest reliability using Pearson Product-moment Correlation with a coefficient of $r=0.87$. The research instrument, along with the informed consent, was shared with school principals. Subsequently, the principals facilitated the distribution of the instrument to teachers in their respective schools, employing various media platforms such as WhatsApp and email. To ensure a representative response, the instruments were randomly forwarded to teachers, taking into account gender diversity. Responses were then collected from the participants.

Results

Data collected through the questionnaire were subjected to a thorough analysis. Descriptive statistics, including frequency counts, percentages, and graphical representations such as bar and pie charts, were used to present the data comprehensively; mean and standard deviation were also deduced. Inferential statistics, specifically the Chi-square test, was employed to identify associations and differences, with a significance level set at 0.05. The data analysis was conducted using the SPSS statistical package. This comprehensive approach to data analysis ensured that the study's findings were both descriptive and statistically valid.

Demographic Characteristics of Respondents

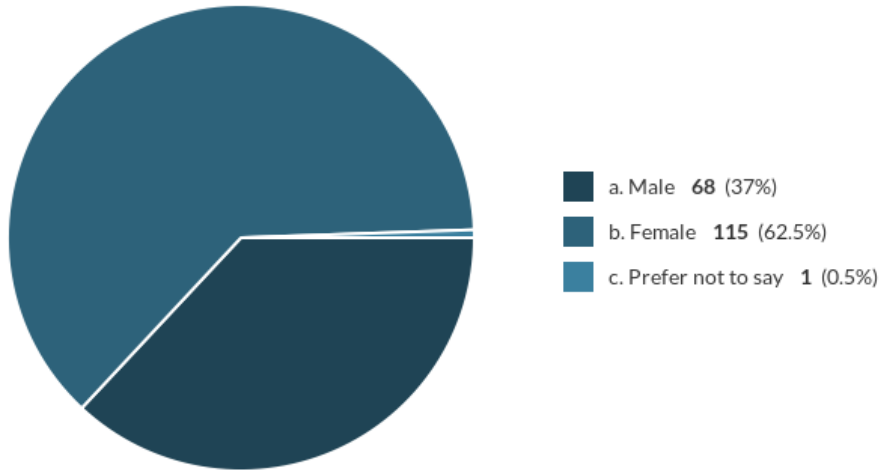


Figure 1: Gender of the respondents

Regarding gender distribution among the participants, 37% of the respondents identified as male students, while 62.5% were female. A small percentage, specifically 0.5%, chose not to disclose their gender. Consequently, the majority of the study's participants were females.

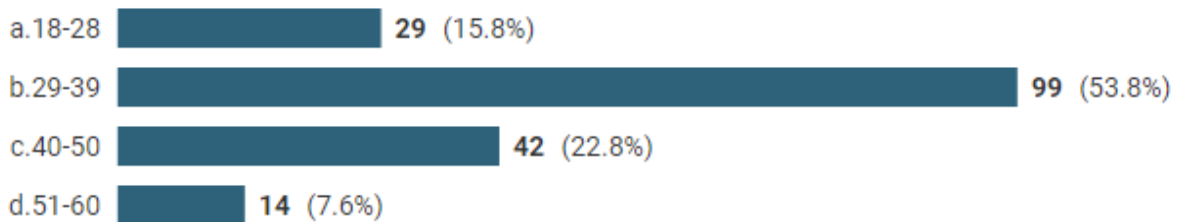


Figure 2: Age of the respondents

In terms of age distribution, 15.8% of the total sample fell within the age range of 18 - 28 years, 53.8% were in the age range of 29 - 39 years, 22.8% were in the age range of 40 - 50 years, and 7.6% were in the age range of 51 - 60 years. Consequently, the highest participation in the study was observed among respondents aged 29 to 39 years.

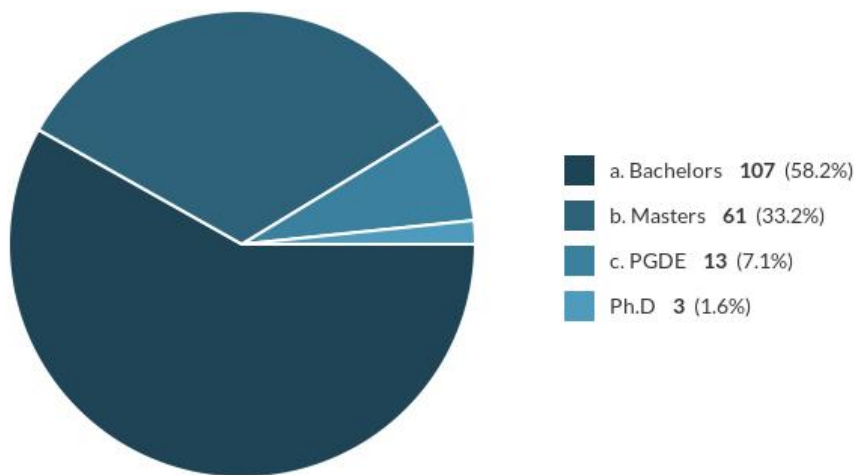


Figure 3: Education level of the respondents

Regarding the educational background of the participants, as illustrated in Figure 3, the findings reveal that 58.2% of the total sample held a Bachelor's degree, 7.1% possessed a Postgraduate Diploma in Education (PGDE), 33.2% had obtained a Master's degree, and a smaller portion, specifically 1.6%, had earned a Ph.D. Consequently, the majority of study participants held a Bachelor's degree.

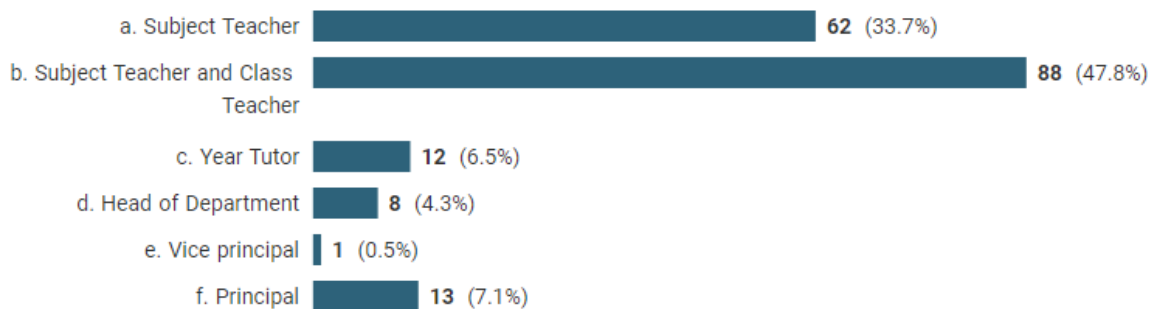


Figure 4: Category of the respondents

In terms of the categorical classification of the participants, it is notable that 33.7% of the total participating staff held positions as subject teachers, while a substantial 47.8% occupied dual roles as both subject teachers and class teachers. A smaller percentage, 6.5%, served as year tutors, and 4.3% held the position of Head of Department. Additionally, 0.5% of the participants held the position of vice principals, and the remaining 7.1% assumed the role of principals. Consequently, the category of participants predominantly represented in this study consisted of those who served in dual roles as subject teachers and class teachers.

Research question

Will electrical safety management practices influence the incidence of accidents in secondary schools in Lagos state?

Table 1: Electrical safety management practices influence the incidence of accidents in secondary schools in Lagos state

| S/N | Statement | SD | D | UN | A | SA | Mean | SD |
|-----|-----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|------|-------|
| 1 | Students are advised on electrical safety rules and procedures | 2.7% | 4.9% | 5.4% | 58.2% | 28.8% | 4.05 | 0.885 |
| 2 | The school monitors electrical outlets | 3.3% | 9.2% | 5.4% | 56.5% | 25.5% | 3.92 | 0.986 |
| 3 | There are naked wires, and damaged sockets within the school | 6.5% | 21.2% | 8.2% | 39.7% | 24.5% | 3.54 | 1.249 |
| 4 | Students leave electrical appliance or sockets without switching off after closing | 8.2% | 32.1% | 8.7% | 32.6% | 18.5% | 3.21 | 1.295 |
| 5 | The electrical outlets or switches with broken, cracked or missing protective covers are used | 7.1% | 22.3% | 12.5% | 38.6% | 19.6% | 3.41 | 1.229 |
| 6 | I have come across a faulty appliance? | 54.9% | | | | 45.1% | 0.55 | 0.499 |

Information on Table 1 reveal that 28.8% and 58.2% of the teachers strongly agreed and agreed respectively that students are advised on electrical safety rules and procedures; 5.4% were undecided, 4.9% disagreed, while 2.7% strongly disagreed. Moreover, 25.5% and 56.5% of the teachers strongly agreed and agreed respectively that the school monitored electrical outlets; 5.4% were undecided, 9.2% disagreed, while 3.3% strongly disagreed. Similarly, 24.5% and 39.7% of the teachers strongly agreed and agreed respectively that there were naked wires, and damaged sockets within the school; 8.2% were undecided, 21.2% disagreed, while 6.5% strongly disagreed. Furthermore, 18.5% and 32.6% of the teachers strongly agreed and agreed respectively that students would leave electrical appliance or sockets without switching off after closing; 8.7% were undecided, 32.1% disagreed, while 8.2% strongly disagreed. Moreover, 19.6% and 38.6% of the teachers strongly agreed and agreed respectively that the electrical outlets or switches with broken, cracked or missing protective covers were used; 12.5% were undecided, 22.3%

disagreed, while 7.1% strongly disagreed. Lastly, 45.1% of the teachers strongly agreed that when they have come across a faulty appliance, while 54.9% said they have not. Hence, electrical safety management practices influence the incidence of accidents in secondary schools.

Table 2: Attention given to the situation when you came across a faulty appliances

| Response | Frequency | % |
|----------------------------------------------------------|-----------|------------|
| Employed the use of an electrician | 33 | 39.8 |
| Got it fixed immediately | 19 | 22.9 |
| By reporting the case to the school authority | 11 | 13.3 |
| By making sure no one has access to the faulty appliance | 10 | 12.0 |
| Disconnect power supply to the appliances | 6 | 7.2 |
| Such appliances are abandoned. | 4 | 4.8 |
| Total | 83 | 100 |

Regarding measure taken to the situation when you came across a faulty appliances, Table 2 indicates that 39.8% agreed that they employed the use of an electrician; 22.9% said they got it fixed immediately; 13.3% revealed that they reported the case to the school authority; 12% showed that they made sure no one had access to the faulty appliance; 7.2% showed that they disconnect power supply to the appliances; while 4.8% said such appliances are abandoned

Testing of the hypothesis

Hypothesis 1: Electrical safety management practices will not significantly influence the incidence of accidents in secondary schools in Lagos state.

Table 3: Chi-Square analysis showing influence of the electrical safety management practices on the incidence of accident

| Variables | N | df | Mean | SD | X ² | Sig. |
|----------------------------------------------------------------------|-----|----|------|-------|----------------|-------|
| Electrical safety management practices and the incidence of accident | 184 | 4 | 4.05 | 0.885 | 209.043 | 0.000 |

P < 0.05

Data in Table 3 showed a significant influence of the electrical safety management practices on the incidence of accident, because null hypothesis was rejected given ($P = 0.000 < 0.05$) at 4 degree of freedom and 0.05 level of significance. Hence, the electrical safety management practices significantly influence the incidence of accident in Lagos state.

Discussion of findings

The result of hypotheses 1 which showed a significant influence of the electrical safety management practices on the incidence of accident, because null hypothesis was rejected given ($P = 0.000 < 0.05$) at 4 degree of freedom and 0.05 level of significance. The results are consistent with those of Mukhtar and Kantsi (2019), Araneo, Dehghanian, and Mitolo (2019), and Afeez (2016) who described electric shock as an event that occurs in educational settings like as classrooms, workshops, and labs and necessitates sufficient care. Accidents in the workshop and laboratory can be reduced or even completely avoided by adopting safe behaviours and abiding by all laws and regulations. Kalte et al. (2014) who carried out an analysis on electrical accidents and causes revealed that the causes of electrical accidents and the frequency of their occurrence clearly indicated that in order to lower the accident rate, it is important to emphasis the establishment of a safety culture in diverse parts of different communities, particularly among workers in construction and the electrical industry. This suggests that the government and other interested parties should concentrate on the electrical fixtures inside the school to prevent electrical shock caused by faulty wiring and nailed wire. The immediate necessity for government intervention in staff and student training to provide them with adequate knowledge on accident cases and prevention in school settings follows from this.

Conclusion

Electrical safety management practices significantly influence the incidence of accident in Lagos state. This could be as a result of the school management and teachers not paying adequate attention to the damaged of exposed electrical appliances thereby exposing the students to electric shock. The findings of this investigation clarified a few issues with the school's management of its material and human resources. The inability to adequately manage safety procedures results in damage, destruction of school property, and loss of life, endangering the daily activities that take place inside the citadels of learning and affecting the goals and objectives of the school's condition. This necessitates the implementation of suitable interventions and adherence to best practices among school stakeholders; doing so will lessen the frequency of accidents that occur in school settings in Lagos State, Nigeria. Educational institutions and their administrators may consider implementing the following suggestions:

1. Swiftly address electrical safety concerns, promptly repairing or removing damaged appliances. Certified local electricians situated nearby are essential to minimize the risk of electric shock for staff and students.
2. Uphold standards and oversight by engaging top-level administrators, including those from the Ministry of Education, Health, Environment, and Labor, to ensure comprehensive supervision and monitoring within the school.

3. Prioritize safety education for both staff and students to enhance preparedness during emergencies, ensuring that all members of the school community are informed about appropriate actions to take in emergency situations.

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