SAFETY COMPLIANCE AND CHALLENGES AMONG QUARRY WORKERS IN AKAMKPA LOCAL GOVERNMENT AREA, CROSS RIVER STATE, NIGERIA

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Abstract
The quarry industry plays a crucial role in economic growth but poses significant health and safety risks. This study examined safety compliance and challenges among quarry workers in Akamkpa Local Government Area, Cross River State, Nigeria. Using a mixed-method approach—surveys, interviews, and field observations—data were collected from 400 respondents, including workers, managers, consultants, and regulatory bodies. Descriptive statistics of simple percentage were used to analyze the data. Findings indicate that safety compliance is influenced by awareness of regulations, availability of personal protective equipment (PPE), management commitment, and worker attitudes. Challenges included inadequate training, weak enforcement of safety laws, and economic pressures. The study highlights the need for improved safety communication, stronger management support, and stricter regulatory enforcement. The study recommended targeted interventions such as enhanced oversight, comprehensive safety training, and better access to PPE to mitigate risks and improve compliance in the quarrying sector.

Keywords: Quarry industry, Safety compliance, Personal protective equipment (PPE), Regulatory enforcement, Occupational hazards, Akamkpa Nigeria.

Introduction

In a rapidly evolving global landscape characterized by urbanization, industrialization, and economic development, the mining and quarrying sector plays a crucial role in meeting the increasing demand for raw materials and construction supplies. Quarrying—the extraction of stone, sand, and gravel from the earth's crust—has been a fundamental component of infrastructural development and urbanization for centuries. Despite its undeniable economic significance, the quarrying industry faces numerous environmental, social, and health challenges (Venovcevs, 2023). The global demand for construction materials, driven by rapid urban expansion and infrastructure development, has led to exponential growth in quarrying activities. According to the World Bank (2021), global construction output is projected to reach $15.5 trillion by 2030, with developing countries accounting for a significant share of this growth. Consequently, the demand for raw materials, including those sourced from quarries, is expected to rise substantially. This industry expansion underscores the need to prioritize the health and safety of quarry workers.

Akamkpa Local Government Area, located in the southern part of Cross River State, Nigeria, holds a strategic geographical position within the southeastern region of the country. Covering an area of approximately 4,300 square kilometers, Akamkpa is situated between latitudes 5°30′N to 5°40′N and longitudes 8°00′E to 8°45′E. It shares boundaries with Odukpani and Biase to the east and extends to the international border with Cameroon, which contributes to cultural exchanges and economic interactions in the region (Fig. 1). The area is home to an estimated population of 228,000 residents, according to the latest data from the Nigeria

Population Commission (NPC, 2021). This diverse population represents the cultural richness of Nigeria, with each individual contributing to the social and economic fabric of the region. To determine the sample size for this study, the Taro Yamane formula was applied, assuming a 95% confidence level and a 5% margin of error.

The nature of quarrying often requires workers to operate in remote and hazardous environments, increasing their vulnerability to occupational accidents and health-related issues. Safety compliance is essential in mitigating these risks, yet several factors hinder effective implementation.

Aim of Study

This study aims to explore the safety compliance in the Akamkpa quarrying industry and the challenges associated with maintaining a safe working environment.

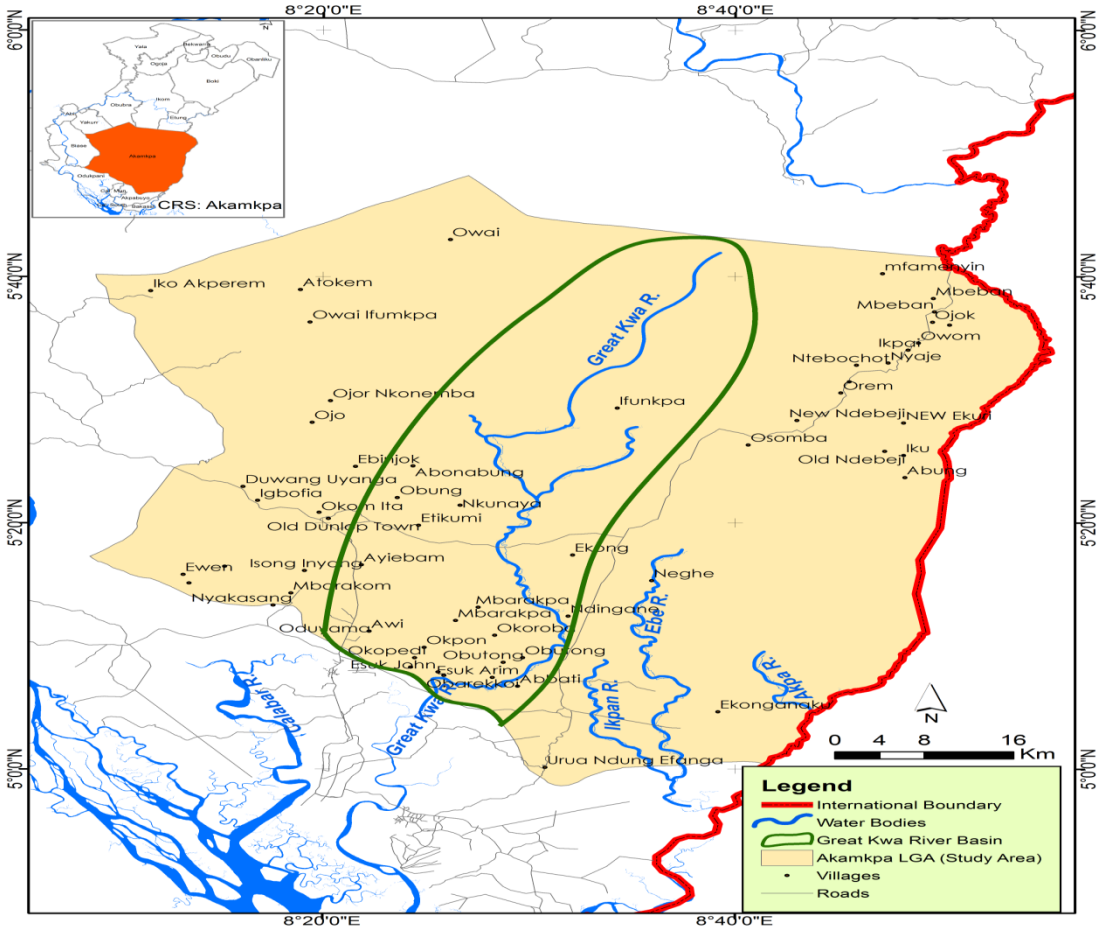

Fig. 1: Map of Akpamkpa Local Government Area
Source: Department of Geography and Environmental Science (GIS lab)

Literature review

The quarrying industry in Akampka Local Government, Cross River State, Nigeria, has grown significantly in response to the increasing demand for construction materials driven by urbanization and infrastructure development. While this growth has contributed to economic development, it has also brought to light a pressing issue: the health and safety compliance of quarry workers (World Bank, 2020). The quarrying industry is recognized globally as one of the most hazardous sectors for workers (Islam, Biswas, Saha, Sayem and Khan, 2023). Quarry workers face a multitude of occupational risks, including exposure to hazardous materials, accidents involving heavy machinery, respiratory issues due to dust inhalation, and

musculoskeletal problems from manual labor. These hazards can lead to severe injuries and fatalities, making the industry's safety record a significant cause for concern.

One critical factor contributing to the health and safety challenges faced by quarry workers in Akampka is inadequate training and awareness. Education (awareness) is a critical central development index to rural planning and community well-being (Uttah, Onuoha, Awan and Ebok, 2023). Many workers in the sector receive limited or no formal training on safety practices and are unaware of the risks associated with their work. This lack of knowledge can lead to unsafe practices and a higher likelihood of accidents (Magda, Yustiarini and Nurasiyah, 2023). However, the remoteness of quarry sites and the absence of healthcare facilities in close proximity can result in delays in receiving medical care, exacerbating the severity of injuries and health conditions. The effectiveness of safety regulations and their enforcement also poses a challenge in Akampka's quarrying sector. While Nigeria has regulations in place to protect workers in the mining and quarrying industry, including the Minerals and Mining Act of 2007, enforcement can be inconsistent (Akinleye,2023).

Adinma, Ezeama, Adinma and Asuzu (2009) examined the knowledge and practice, as well as factors influencing universal precautions practices amongst Nigerian House officers and Nurses. They revealed that knowledge of universal precautions measures was high for both categories of respondents - 97.0% for doctors and 92.0% for nurses, although practice was better for the nurses, 75.0%, compared to the doctors, 15.2%, $p < 0.05$. The most important factor influencing universal precautions practice is the lack of provision of adequate protective equipments. The effective knowledge and practice of universal precautions amongst hospital workers are of absolute necessity to prevent infections from blood and body fluid pathogens. And also to prevent impact on the natural environment because the safety workers depends on it (Uttah, Awan, Onuoha and Eneji, 2023).

Materials and methods

This study adopts a purposive sampling technique which involves purposefully selecting quarry site from various quarry industries in the study area ensuring diversity in size, Occupational Safety, Health Performance, and location. Within selected quarry site, employees were randomly sampled for surveys and interviews, minimizing bias. Occupational Safety and Health experts were selected based on their expertise, and organizational documents were sampled purposively for analysis.

Data were collected using a mixed method approach combining quantitative and qualitative methods to provide a holistic understanding of the subject. Structured employee surveys were conducted to quantitatively assess employees' perceptions and experiences regarding Occupational Safety and Health practices in their workplaces. Qualitative data was gathered through in-depth interviews with Occupational Safety and Health professionals, managers, and workers, allowing for a deeper exploration of Occupational Safety and Health practices and challenges. Organizational documents, such as safety policies and incident reports, was subjected to document analysis to understand the formalized aspects of Occupational Safety and Health practices. This comprehensive data collection strategy aims to uncover the intricacies of factors influencing safety compliance and challenges in Akamkpa, facilitating a well-rounded analysis of Occupational Safety and Health practices, barriers, and potential enhancements within the study area.

Results

The study assesses the factors influencing safety compliance and challenges among quarry workers in Akamkpa Local Government. The finding highlight that basic safety guidelines are provided but lack consistent implementation, and the adherence to wearing Personal Protective Equipment (PPE) is a concern and emphasize the need for a more robust implementation of

safety measures and enhanced training programs to ensure a safer working environment. See table 1:

Table1: Adherence to wearing personal protective equipment **(PPE)**

Adherence to Wearing PPE	**Frequency**	**Percent**
Always	40	10.0
Most of the time	60	15.0
Occasionally	99	24.8
Rarely	100	25.1
Never	100	25.1
Total	**399**	**100.0**

Source: Researchers fieldwork, 2024.

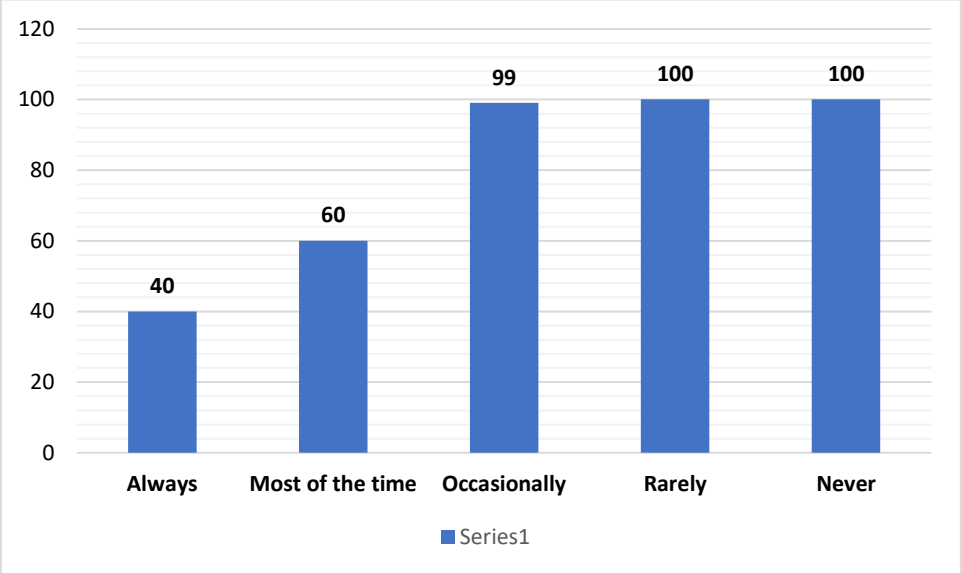

Figure 1: Adherence to Wearing Personal Protective Equipment (PPE)

Table 1 provides insights into the frequency of workers adhering to wearing Personal Protective Equipment (PPE) among quarry workers. A significant portion, standing at 25.1 per cent, reported rarely adhering to PPE guidelines, with an equal percentage indicating never doing so. Furthermore, 15.0 per cent of respondents reported occasional adherence, while 10.0 per cent claimed to always adhere to PPE requirements. This data underscores the importance of addressing challenges related to PPE compliance within the quarry worker community.

Table 2: Peer influence on safety protocols

Peer Influence on Safety Protocols	**Frequency**	**Percent**
Strong influence	40	10.0
Moderate influence	80	20.1
Minimal influence	120	30.1
No influence	99	24.8
I don't know	60	15.0
Total	**399**	**100.0**

Source: Researchers fieldwork, 2024.

Table 2 provide insights into the role of peer influence in adhering to safety protocols among quarry workers. A significant portion, comprising 39.8 per cent, considered peer influence to be unsupportive of safety protocols. Additionally, 30.1 per cent reported minimal influence, while 24.8 per cent indicated moderate influence. This information underscores the need to address peer dynamics to enhance safety compliance within the quarrying industry. The notable percentage indicating unsupportive peer influence suggests potential challenges in creating a collective commitment to safety practices among workers. Recognizing and mitigating these challenges is essential for fostering a workplace culture where peer influence positively reinforces adherence to safety protocols. Formulating targeted interventions and policies aimed at promoting a supportive peer environment will contribute to creating a safer and more secure workplace for quarry workers.

Table 3: Effectiveness of safety training

Effectiveness of Safety Training	**Frequency**	**Percent**
Very effective	10	2.5
Effective	20	5.0
Neutral	60	15.0
Ineffective	99	24.8
Very ineffective	210	52.6
Total	**399**	**100.0**

Source: Researchers fieldwork, 2024

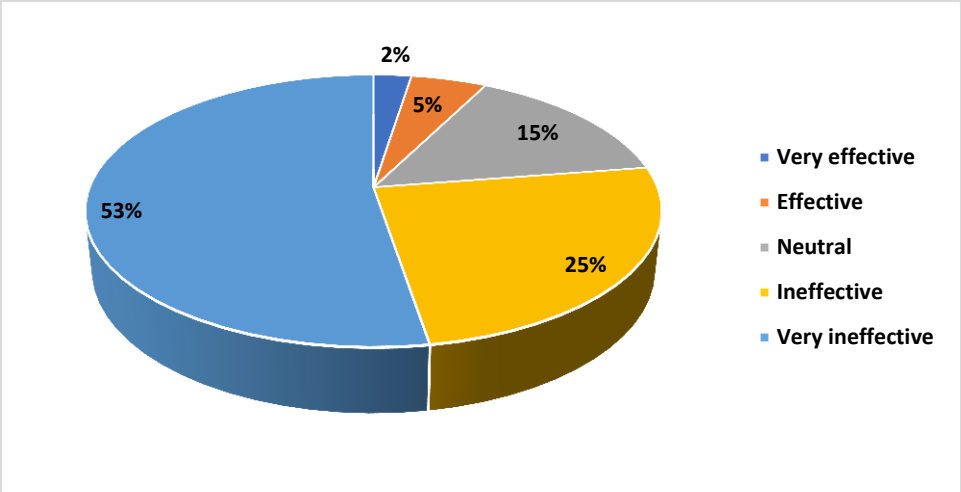

Figure 2: Effectiveness of Safety Training

Table 3 provide insights into the perceived effectiveness of safety training among quarry workers. A significant portion, comprising 52.6 per cent, reported safety training to be very ineffective, while 15.0 per cent perceived it as ineffective. Moreover, 30.1 per cent indicated a need for improvement in safety training. This distribution emphasizes the importance of enhancing the effectiveness of safety training programs for quarry workers. The notable percentage indicating very ineffective or ineffective safety training suggests potential gaps in the content, delivery, or overall impact of the current training programs. Recognizing and addressing these challenges is crucial for formulating targeted interventions and policies aimed at improving the overall quality and effectiveness of safety training within the quarrying industry. Strengthening safety training programs will contribute to enhancing the knowledge and skills of quarry workers, ultimately promoting a safer and more secure working environment.

Table 4: Awareness of health and safety regulations

Awareness of Health and Safety Regulations	Frequency	Percent
Very aware	20	5.0
Somewhat aware	60	15.0
Not very aware	319	79.9
Total	**399**	**100.0**

Source: Researchers fieldwork, 2024

Table 4 outlines the level of awareness of existing health and safety regulations governing the quarrying industry among quarry workers. A significant portion, comprising 79.9 per cent, reported being not very aware of these regulations. This distribution emphasizes potential gaps in knowledge regarding the regulatory framework among quarry workers. The substantial percentage indicating not very aware suggests a need for targeted efforts to enhance awareness and understanding of the existing health and safety regulations within the quarrying industry.

Table 5: Effectiveness of current regulations

Effectiveness of Current Regulations	Frequency	Percent
Very effective	10	2.5
Effective	20	5.0
Somewhat effective	319	79.9
Total	**399**	**100.0**

Source: Researchers fieldwork, 2024

Table 5 provides insights into the perceived effectiveness of current health and safety regulations in the quarrying industry among quarry workers. The majority, comprising 79.9 per cent, considered these regulations to be somewhat effective.

Conclusion

Safety compliance in the quarrying industry within Akamkpa Local Government Area is influenced by a complex interplay of regulatory, economic, and cultural factors. Addressing these challenges requires a comprehensive approach involving government agencies, quarry operators, and the local community. Strengthening safety compliance can significantly reduce occupational hazards, ensuring a regulatory environment that is both well-implemented and effective in protecting quarry workers. A proactive commitment to safety will not only enhance worker well-being but also improve productivity and industry sustainability.

Recommendations

1. Comprehensive Safety Training Programs

Given the socio-demographic diversity of quarry workers, it is essential to develop tailored safety training programs. Regulatory authorities should implement targeted training modules that address specific worker needs and reinforce awareness of existing safety regulations. Regular awareness campaigns and continuous engagement with workers can improve compliance and regulatory effectiveness. Establishing a transparent feedback mechanism will also allow industry stakeholders to refine policies based on evolving safety concerns.

2. Strengthening Regulatory Enforcement

To mitigate the inconsistent implementation of health and safety measures, industry-wide initiatives should be adopted. Collaboration between regulatory bodies and quarry operators can help establish and enforce standardized safety guidelines. Periodic safety audits, strict adherence to personal protective equipment (PPE) requirements, and mandatory safety training sessions can create a more secure working environment.

3. Promoting a Culture of Safety and Compliance

Encouraging a cultural shift toward safety compliance is crucial for long-term improvements in occupational health and safety. Quarry operators should support managerial initiatives that prioritize safety, introduce peer-driven safety programs, and establish open communication channels. Safety committees, incentive-based safety programs, and regular safety drills can further instill a strong safety culture within the industry.

References

Abuduxike, G., Vaizoglu, S. A., Asut, O., & Cali, S. (2021). An assessment of the knowledge, attitude, and practice toward standard precautions among health workers from a hospital in northern cyprus. *Safety and health at work*, *12*(1), 66-73.

Adinma, E. D., Ezeama, C., Adinma, J. I. B., &Asuzu, M. C. (2009). Knowledge and practice of universal precautions against blood borne pathogensamongst house officers and nurses in tertiary health institutions in southeast Nigeria. *Nigerian Journal of Clinical Practice*, *12*(4).

Ajayi, T. (2013). Occupational health hazards among quarry employees in Ebonyi State, Nigeria. *Journal of Environmental Science and Public Health,*5(3), 214-220.

Akinleye, O. T. (2023). Realization of rights of host community under Nigerian mineral and mining act 2007 to foster sustainable community development. *Nnamdi Azikiwe University Journal of International Law and Jurisprudence*, *14*(1), 1-12.

Chan, M. F., Ho, A., & Day, M. C. (2008). Investigating the knowledge, attitudes and practice patterns of operating room staff towards standard and transmission-based precautions: results of a cluster analysis. *Journal of clinical nursing*, *17*(8), 1051-1062.

El-Sallamy, R. M., Kabbash, I. A., El-Fatah, S. A., & El-Feky, A. (2018). Physical hazard safety awareness among healthcare workers in Tanta university hospitals, Egypt. *Environmental Science and Pollution Research*, *25*(31), 30826-30838.

Etienne, A. J., Field, W. E., & Haslett, N. J. (2023). A summary of Lone Agricultural Worker Injuries and fatalities. *Journal of Agricultural Safety and Health*.

Henshaw, J. L., Gaffney, S. H., Madl, A. K., & Paustenbach, D. J. (2007). The employer's responsibility to maintain a safe and healthful work environment: An historical review of societal expectations and industrial practices. *Employee Responsibilities and Rights Journal*, *19*(3), 173-192.

Ilo (2010). *Safety and health at work:* A vision for sustainable prevention. International Labour Organization.

Islam, S., Biswas, P. K., Saha, S., Sayem, A., & Khan, M. M. A. (2023). Occupational injuries and risk assessment among stone crushing industry workers: a cross-sectional study. *International archives of occupational and environmental health*, 1-15.

Kim, Y., Park, J., & Park, M. (2016). Creating a culture of prevention in occupational safety and health practice. *Safety and health at work*, *7*(2), 89-96.

Moilinga, P. T., &Athian, M. R. (2023). Impacts of Stone Quarrying on Local Vegetation in Mount Korok Area, Juba, Central Equatoria State, South Sudan.

Nigeria Population Commission (NPC). (2021). *Population statistics and demographic report*. Abuja, Nigeria: NPC.

Uttah, C., Onuoh, E., Awan, O. E., & Ebok, A. G. (2023). Spatial Distribution of Public Secondary Schools in Biase Local Government Area, Cross River State, Nigeria. *Inter-Disciplinary Journal of Science Education (IJ-SED),* 4(2), 7-16.

Uttah, C.,Awan, O. E., Onuoh, E., & Eneji, E. I. (2023). Environmental Impact of Cameroonian Refugees Activities in Ogoja Local Government Area, Cross River State, Nigeria. *Inter-Disciplinary Journal of Science Education (IJ-SED),* 4(2), 17-27.

Venovcevs, A. (2023). The environmental and health implications of quarrying industries. *Journal of Mining and Environmental Studies*, 45(2), 78-92.

World Bank. (2021). *Global construction outlook: Projections to 2030*. Washington, DC: World Bank Publications.