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Lived Experience of Occupational Health Risks, Safety Behaviour, and Compliance with Safety Protocols Among Welders in Rural and Urban Ogun State, Nigeria

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Abstract

Background

Some jobs are considered high risk due to exposure to hazards, and welders are among such occupations. It is estimated that over 100 fatal welding accidents happen yearly, and about 1 in 250 construction workers may die from welding-related injuries. Even though there is more focus on workplace safety, there is still limited evidence on differences in safety behaviour and compliance between rural and urban welders in Nigeria. Therefore, this study explored lived experiences of occupational health risks, safety behaviour, and compliance between rural and urban welders.

Methods

The study adopted a phenomenological approach to explore participants' lived experiences. A total of 22 participants were purposively selected, including 12 welders from the rural area (Aiyepe) and 10 from the urban area (Abeokuta). Data were collected through observation and interviews, transcribed verbatim, coded, themed, and analyzed thematically.

Results

Findings showed that both rural and urban welders were aware of occupational hazards associated with welding such as burns, cuts, fumes, electric shocks, and noise. However, their understanding differed based on training background and work experience. Despite this awareness, many welders still did not regularly use protective equipment, showing a gap between knowledge and practice.

Conclusion

The study illustrates the influence of the master-apprenticeship system and workplace conditions on occupational safety behaviour among welders. Strengthening structured training, regulatory enforcement, and a strong safety culture remains essential for improving compliance with safety practices.

Background

Welding is widely recognized as a high-risk occupation due to exposure to hazards like burns, eye injuries, electric shocks, toxic fumes, and musculoskeletal disorders [7]. This profession plays an important role in construction and manufacturing, especially in LMIC such as Nigeria [5]. However, exposure to occupational hazards remains a major concern.

Recent studies reports high prevalence of work-related injuries and respiratory conditions among welders [1, 3]. Although awareness of risks is increasing, compliance with safety protocols remains low, suggesting that knowledge alone does not guarantee safe practice. [6]. Occupational safety behaviour is shaped not only by individual awareness but also by structural and social learning systems.The PRECEDE framework identifies predisposing factors such as knowledge, beliefs, attitudes, and prior experiences as key determinants of behaviour [4]. In welding communities, the master-apprentice system plays a central role in shaping these factors as apprentices learn through observation and imitation of their masters, reinforcing both safe and unsafe practices [2].

Despite existing research, limited attention has been paid to how training systems and workplace conditions jointly shape safety behaviour in welding practice. Understanding this relationship is important for strengthening occupational safety interventions in comparable settings in low- and middle-income countries.

Methods

Reasearh Design

The study adopted a phenomenological approach to explore welders' lived experiences.

Study Area

The study was carried out in Ogun State, Nigeria, with Abeokuta representing the urban context and Aiyepe representing the rural context.

Inclusion and Exclusion Criteria

The participants for the study involved welders working in Abeokuta (urban context) and Aiyepe (rural context) in Ogun State. Included were welders aged 18 years and above who had been actively working for at least one year and were willing to participate. Those who were not willing to be part and those who were ill during the period of data collection were excluded in the study.

Study Population and Sampling

A total of twenty-two (22) participants were selected purposively, with twelve (12) from the rural context and ten (10) from the urban context. This helped to show different experiences and made it easier to compare both contexts. More participants were selected from the rural area because rural welders have less access to social amenities and infrastructural facilities, so it was important to hear more about their experiences. The sociodemographic characteristics of the participants are presented in Table 1.

Data Collection and Analysis

Data were collected through in-depth interviews and observation to understand how workshop conditions and daily activities affect safety behaviour.

All interviews were recorded, transcribed verbatim to ensure accuracy and preserve participants' original responses, coded, and organised into themes and sub-themes based on the study objectives and analysed using thematic analysis with ATLAS.ti

An interview guide was developed by the researchers based on the objectives of the study and relevant literature on occupational health risks, safety behaviour, and compliance with safety protocols among welders. The English version of the interview guide has been provided as a supplementary file.

Results

Table 1
Sociodemographic Characteristics of Welders (N = 22)

Variable	Category	Rural n (%)	Urban n (%)	Total n (%)
Religion	*Islam*	*8 (66.7)*	*4 (40.0)*	*12 (54.5)*
	Christianity	*4 (33.3)*	*6 (60.0)*	*10 (45.5)*
Years of Experience	*1–5*	*2 (16.7)*	*3 (30.0)*	*5 (22.7)*
	6–10	*5 (41.7)*	*3 (30.0)*	*8 (36.4)*
	11–20	*3 (25.0)*	*2 (20.0)*	*5 (22.7)*
	Above 20	*2 (16.6)*	*2 (20.0)*	*4 (18.2)*
Work Setting	*Private shop only*	*12 (100.0)*	*6 (60.0)*	*18 (81.8)*
	Shop+ Construction	*0 (0.0)*	*4 (40.0)*	*4 (18.2)*
Employment Status	*Self-employed*	*12 (100.0)*	*10 (100.0)*	*22 (100.0)*

All the participants were self-employed in both rural and urban areas (100%). 36.4% had 6–10 years of experience (36.4%), while 22.7% had 1–5 years, 22.7% had 11–20 years, and 18.2% had above 20 years. 81.8% of rural welders worked in private shops only, while 18.2% of urban welders worked in both shops and construction sites. The thematic breakdown of predisposing factors is illustrated in Fig. 1 (Fig. 1)

Lived Experiences of Occupational Health Risks

Findings showed that rural and urban welders were aware of hazards such as burns, cuts, eye injuries, exposure to smoke and fumes, electric shocks, and noise. In spite of their awareness their level of

understanding and how this knowledge was acquired differs based on their training background and work experience(s).

Welders in rural areas developed awareness mainly through their daily work experience and guidance from their masters within the master-apprenticeship system. This resulted in a practical understanding of immediate risks. A participant openly talked about this, saying

"Sparks can burn my hands and face. Sharp rods can cut my hands." **(Participant 1)**,

showing how strongly their own experiences shape their understanding of the hazards. Others highlighted respiratory and fire risks

"Inhaling smoke makes me cough. Sparks can start small fires." **(Participant 2).**

Noise-related harm and electrical hazards were also reported:

"Noise from welding machines hurts my ears" **(Participant 3)**

"Working near electricity can cause shocks **(Participant 4).**

Urban welders demonstrated broader awareness, including long-term health effects such as fatigue and respiratory problems:

"I see that welding can cause burns, cuts on hands, and eye damage." (Participant 1)

"*The work hazards include inhaling fumes, night fatigue, and eye damage*." (Participant 2)

This wider understanding may be because some urban welders receive formal training in technical school while others learn practical experience from their masters, and together this gives them a better understanding of how welding affects their health. Unlike rural welders who view hazards as something natural and unavoidable, urban welders mostly believe that risks can be managed and prevented. They tend to link accidents to things that can be controlled, like rushing or not following safety rules. One urban participant said, "The risks happen because we sometimes ignore safety rules or don't wear all the necessary protective equipment" **(Participant 4)**.

Safety Behaviour Among Welders

Despite awareness of hazards, both rural and urban welders reported inconsistent use of personal protective equipment. Rural welders cited affordability constraints:

"I feel somewhat confident because I wear a nose mask and goggles, but I don't use gloves" **(Participant 1)**.

Urban welders attributed this to work pressure:

"At construction sites, some use protective equipment carefully, but many work quickly or forget safety steps" **(Participant 9)**

Compliance with Safety Protocols

Compliance with safety protocols was strongly influenced by master-apprentice system and customer pressure. In both rural and urban areas, the master sets daily safety standards through a "do-as-I-do" form of learning, with apprentices often adopting the practices demonstrated by their masters.

"*My master is the main influence on my safety practices"* **(Participant 1)**,

while one urban participant opined,

"My master guides me on how to use protective equipment and work safely" **(Participant 1**). Customer deadlines also influenced unsafe practices. Regulatory enforcement was limited, though occasional inspections improved compliance:

"Authorities came to inspect our workshop before hiring us. It clearly showed me what to do" **(Participant 7)**.

Discussion

Findings demonstrate that there are different levels of understanding, which are linked to how they acquired their skills and work experience [7]. In rural areas, understanding is mainly built through hands-on experience and guidance from their masters within the master-apprenticeship system, with a focus on immediate working conditions. Welders in urban areas also learn from their masters, while some receive formal training in technical schools, which contributes to their awareness of both immediate and long-term effects [3]. However, not all urban welders have formal training, as some still rely solely on apprenticeship learning. Even with this awareness, many welders in both rural and urban areas do not consistently use full protective equipment, showing a gap between what they know and what they practice [6]. These findings suggest that awareness of occupational hazards alone is insufficient to ensure safe practice, as everyday working conditions strongly influence behaviour.

Limitation of the Study

Interviews were done during weekly meetings outside the workshop, and the noise sometimes caused interruptions. The limited time also reduced how deeply some responses were explored. Some participants were initially hesitant to share their experiences, but this improved after reassurance of confidentiality.

Conclusion

The study shows that awareness of occupational hazards among welders is shaped by training background and work experience within the master-apprenticeship system. However, awareness alone is insufficient to ensure safe practice due to workplace constraints and limited enforcement. The findings highlight how training systems and work environments interact to shape occupational safety behaviour, offering insights applicable to similar low-resource settings beyond the study context.

Abbreviations

LMIC
Low-and Middle-Income Countries
PRECEDE
Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation

Declarations

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Authors' Contributions

The first author participated in the design of the study, data collection, analysis, and preparation of the manuscript. The second author supervised the study, reviewed the manuscript critically, and approved the final version of the manuscript.

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Availability of Data and Materials

The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

Ethical approval for the study was obtained from the Babcock University Health Research Ethics Committee following a thorough review to ensure the protection of human participants. All study methods were performed in accordance with relevant ethical guidelines and regulations, including compliance with the Declaration of Helsinki. The aim and purpose of the study were explained to all participants before participation, and informed consent was obtained prior to data collection. Participation was voluntary, and confidentiality was strictly maintained throughout the study.

Consent for Publication

Not applicable.

Competing Interests

The authors declares that there are no competing interests.

Clinical Trial Number

Not applicable.

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Figures

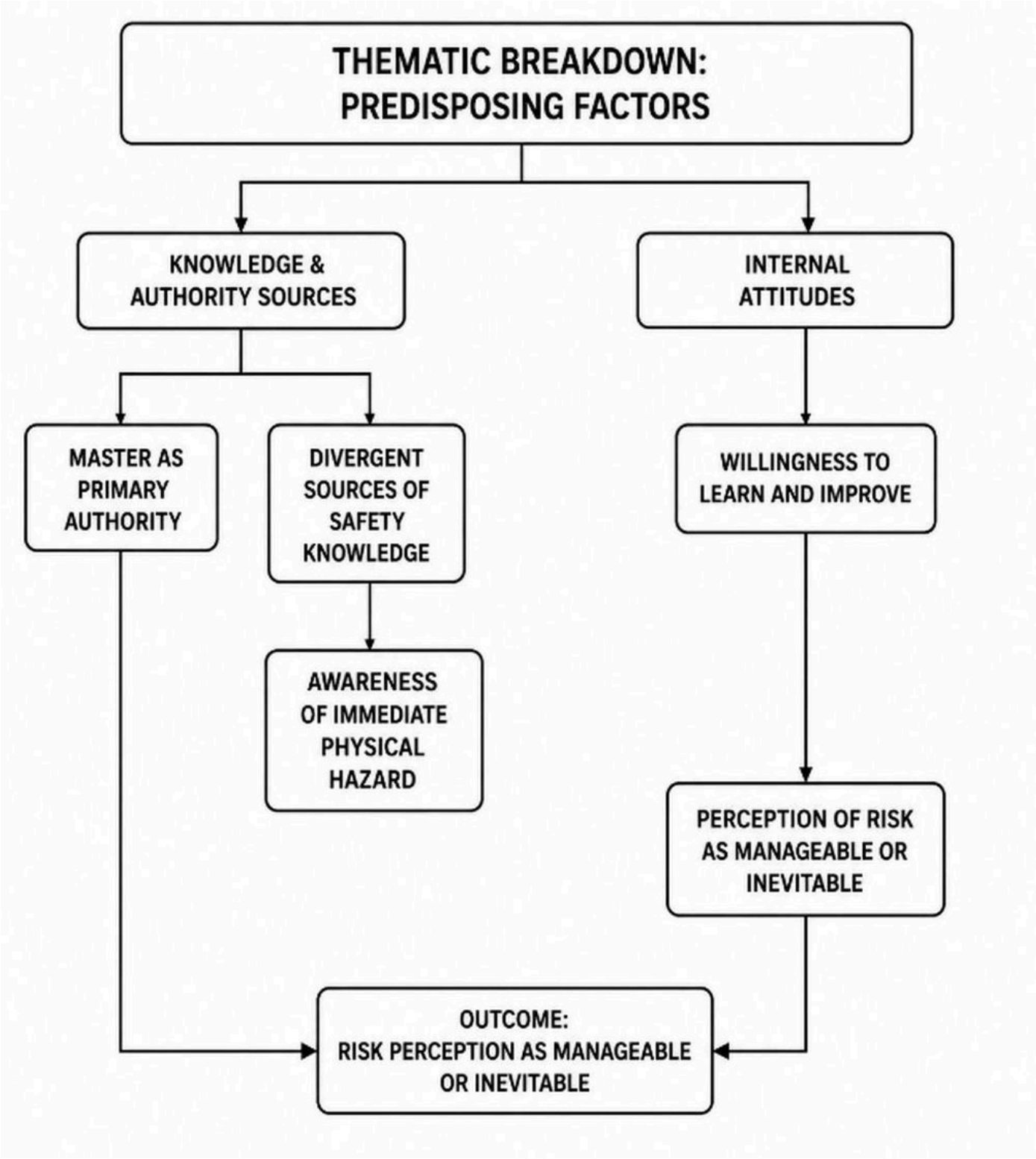


Figure 1

Thematic Breakdown of Predisposing Factors

Supplementary Files

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- SupplementaryFile1InterviewGuide.docx.docx