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Promoting Occupational Health and Safety Through First Aid and Safety Competitions in Ghana's Mining Sector

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ABSTRACT

Introduction: First Aid and Safety Competitions among mining firms in Ghana are annual initiatives organized under the auspices of the Ghana Chamber of Mines to strengthen occupational health and safety within one of the country's most critical economic sectors. This study explored how mining workers experience and interpret these competitions, how participation influences workplace safety practices, and the processes through which competitions contribute to improved occupational health and safety outcomes.

Methodology: Qualitative grounded theory design to explore how first aid and safety competitions promote occupational health and safety within Ghana's mining sector was used. Thirty-one people participated in an in-depth semi-structure interview, allowing them to freely describe their experiences and perceptions. This included safety officers, mine workers, supervisors and managers.

Structure of the Competition: The structure of the competitions comprising both theoretical components such as oral quizzes and practical components such as simulated emergency response demonstrations provide meaningful experiential learning opportunities that enhance skill retention and preparedness.

Findings: The findings further indicate that the competitions contribute to broader safety culture development within organizations through mechanisms such as experiential learning, social modeling, positive reinforcement, and identity formation as safety advocates. Beyond organizational benefits, the competitions also serve a wider social purpose by raising community awareness of health and environmental risks associated with mining, including exposure to hazardous substances and environmental contamination, and by demonstrating corporate commitment to responsible mining practices.

Conclusion: Overall, the study concludes that the First Aid and Safety Competition is a vital catalyst for advancing occupational health and safety in Ghana's mining sector. Its continued implementation and adaptation across other high-risk industries in Ghana are strongly recommended as a practical strategy for strengthening workplace safety and promoting community engagement in safety education.

Introduction

The mining industry in Ghana has played a central role in the country's economic development for over a century. However, mining remains a high-risk occupation, with persistent concerns regarding occupational health and safety. In response to these risks, industry stakeholders have introduced various initiatives aimed at strengthening safety practices and improving emergency preparedness across mining firms. One notable initiative is the Inter-Mines First Aid and Safety Competition, an annual event organized by the Ghana Chamber of Mines. Established in 1985, the competition was instituted to promote safety awareness, enhance first aid competence, and strengthen emergency preparedness among mining companies in Ghana. The event typically comprises two key components: an oral quiz assessing participants' knowledge of safety principles and procedures, and practical demonstrations evaluating first aid skills. Over the years, the

competition has gained significant recognition and credibility, receiving endorsement from the Ministry of Lands and Natural Resources and support from key institutions such as the Minerals Commission of Ghana and St. John's Ambulance (Ghana Chamber of Mines Annual Report [1].

Beyond skills development, the competition represents a broader effort to cultivate a strong safety culture within the mining sector. Existing literature suggests that a positive workplace safety climate is closely associated with improved safety performance and organizational outcomes (Golden Star Report, 2016; [2]). Consequently, competitive safety initiatives such as the Inter-Mines First Aid and Safety Competition are increasingly viewed as strategic platforms for encouraging learning, reinforcing best practices, and motivating firms to prioritize occupational health and safety. By creating opportunities for collaboration, bench marking, and shared learning, such competitions may contribute to the continuous improvement of safety standards and help reduce the adverse health and safety impacts associated with mining operations in Ghana. However, despite the prominence of this initiative, limited research has explored how participants and organizations experience, interpret, and integrate the competition into everyday safety practices. This study therefore seeks to explore how first aid and safety competitions contribute to the promotion of occupational health and safety within Ghana's mining sector.

Objectives

The Research had the Following Objectives

a. To explore experiences of participants in first aid and safety competitions.

b. To examine perceived impacts of the competition on safety practices.

c. To identify processes through which competition participation shapes safety culture.

d. To develop a grounded theory explaining how competitions promote occupational health and safety.

Research Questions

Questions that Guided the Research were as Follows:

a. How do mining workers experience and interpret first aid and safety competitions?

b. How do these competitions influence workplace safety practices?

c. What processes explain how competition participation contributes to improved occupational health and safety?

Problem Statement

The mining industry in Ghana remains one of the most hazardous occupational sectors, characterized by high exposure to physical, environmental, and operational risks. Despite ongoing regulatory efforts and organizational interventions to improve occupational health and safety, workplace accidents, injuries, and unsafe practices continue to pose significant challenges to both workers and management. Developing sustainable approaches that move beyond compliance toward the cultivation of strong safety cultures has therefore become a critical concern for the industry. The Inter-Mines First Aid and Safety Competition has emerged as a prominent industry initiative intended to promote safety awareness, strengthen first aid competence, and motivate mining firms to prioritize occupational health and safety. While the competition has existed for many years and enjoys institutional support, its actual contribution to shaping everyday safety practices, organizational behaviours, and safety culture within mining firms remains poorly understood. Existing reports and discussions largely describe the competition's structure and outcomes but offer limited insight into how participants experience the competition, how meanings are constructed around it, and how knowledge gained is transferred into routine workplace practices.

Moreover, much of the available literature on occupational health and safety interventions in mining tends to focus on compliance, training effectiveness, or accident statistics, with relatively little attention paid to socially constructed processes such as motivation, peer influence, leadership support, and organizational learning. Without a deeper understanding of these processes, it becomes difficult to determine how initiatives such as safety competitions function as mechanisms for promoting sustained behavioural change. This study therefore addresses an important gap by exploring how first aid and safety competitions promote occupational health and safety within Ghana's mining sector. Using a grounded theory approach, the study seeks to generate an empirically grounded explanation of the processes through which participation in such competitions influences safety practices and contributes to the development of a positive safety culture.

Significance of the Study

This Study is Significant in Several Important Ways:

1. Theoretical Contribution: The study contributes to the limited body of qualitative and grounded theory research on occupational health and safety interventions in the mining sector, particularly within the African context. By developing a grounded theory explaining how safety competitions influence workplace practices, the study offers a context-specific conceptual framework that can inform future research and theory development in occupational health and safety promotion.

2. Practical Contribution to Mining Organizations: Findings from the study will provide mining companies with deeper insights into how workers perceive and engage with first aid and safety competitions. Understanding these processes can help organizations strengthen the design, implementation, and integration of such initiatives into broader safety management systems,

thereby enhancing their effectiveness beyond the competition event itself.

3. Policy and Institutional Relevance: The study offers valuable evidence for key stakeholders such as the Ghana Chamber of Mines, the Minerals Commission, the Ministry of Lands and Natural Resources, and other regulatory bodies involved in promoting workplace safety. Insights from the study can inform policy decisions and guide the development of industry-wide strategies that leverage such competitions and similar initiatives as tools for advancing occupational health and safety.

4. Contribution to Worker Well-being: By highlighting the mechanisms through which safety initiatives shape behaviour and culture, the study supports the development of more responsive and meaningful interventions that ultimately contribute to safer working environments, reduced accidents, and improved well-being among mine workers.

5. Academic and Research Significance: The study serves as a useful reference for scholars and students interested in qualitative research, grounded theory methodology, and occupational health and safety in high-risk industries. It demonstrates how socially constructed processes within organizational contexts can be explored to generate theory grounded in empirical data.

Literature Review

Occupational Health and Safety in Mining

Mining is widely recognized as one of the most hazardous industries globally due to workers' exposure to physical, chemical, ergonomic, and psychosocial risks (International Labour Organization [ILO] [3]). Common hazards include rock falls, machinery-related accidents, dust exposure, toxic substances, excessive noise, and fatigue-related incidents (World Health Organization [WHO] [4]). Despite advances in safety management systems, occupational accidents and injuries remain prevalent, particularly in developing contexts where regulatory enforcement and resources may be limited (ILO [3]). In sub-Saharan Africa, mining plays a critical economic role but continues to be associated with persistent occupational health and safety challenges [5]. These conditions have intensified calls for approaches that move beyond regulatory compliance toward interventions that meaningfully influence behaviour, engagement, and organizational culture.

Occupational Health and Safety in the Ghanaian Context

Ghana's mining sector has a long history and remains central to national development, yet safety challenges persist [6]. While regulatory frameworks and institutional oversight exist, gaps remain in consistent implementation of safety procedures and behavioural compliance. Scholars increasingly argue that formal regulations alone are insufficient for sustainable safety improvement. Instead, organizational culture, leadership commitment, and worker participation play a decisive role [7,8]. This shift in emphasis has encouraged the adoption of participatory initiatives such as safety campaigns, peer learning platforms, and structured safety competitions within the industry.

Safety Culture and Safety Climate

Safety culture refers to the shared values, beliefs, and practices that shape how safety is understood and enacted within organizations [8]. Safety climate reflects workers' perceptions of organizational priorities regarding safety at a given time [9]. Empirical studies consistently demonstrate that positive safety culture and climate are associated with improved safety performance, reduced incidents, and stronger engagement in safety behaviours [10]. Leadership commitment, open communication, trust, learning orientation, and employee involvement are commonly identified as key elements of strong safety cultures [7]. Importantly, safety culture is understood not as a static attribute but as a socially constructed and evolving process shaped through everyday interactions. This perspective highlights the relevance of participatory initiatives that actively engage workers in safety-related learning and practice.

Approaches to Promoting Occupational Health and Safety

A wide range of interventions have been employed to promote occupational health and safety, including formal training programmes, behaviour-based safety initiatives, participatory risk assessment, and incentive-based approaches [11]. While such interventions can yield positive outcomes, their long-term effectiveness often depends on how well they are integrated into daily organizational routines and culture (Glendon, Clarke, & McKenna, 2006). Participatory approaches have gained prominence because they involve workers directly in safety-related processes, thereby fostering ownership and intrinsic motivation [12]. Rather than positioning workers as passive recipients of rules, these approaches view them as active contributors to safety knowledge and practice. Safety competitions align with this participatory tradition by creating interactive platforms for learning, collaboration, and recognition.

Competition-Based Approaches and Organizational Learning

Competitions have been widely used in organizational settings as mechanisms for motivation, engagement, and performance improvement [13]. In occupational health and safety contexts, competitions often involve quizzes, emergency simulations, drills, and peer challenges. Such activities can enhance knowledge retention, teamwork, and awareness of safety procedures [14]. Recognition and symbolic rewards associated with competitions may further reinforce organizational commitment to safety values [11]. However, researchers caution that the effectiveness of such initiatives depends on how participants interpret them, the degree of leadership support, and whether

learning from the competition is transferred into everyday practice (Glendon et al., 2006). This suggests that competitions should be understood not merely as events but as social processes embedded within organizational contexts.

Empirical Gaps and Study Positioning

Although occupational health and safety research is extensive, much of the literature particularly within mining remains dominated by quantitative studies focusing on accident rates, compliance indicators, and training outcomes [10]. There is comparatively limited qualitative research exploring how workers and safety professionals experience safety interventions and how meaning is constructed around them. In particular, competition-based safety initiatives have received little scholarly attention, especially within African industrial contexts. Existing reports often describe the structure of such initiatives but offer limited insight into how they shape behaviour, influence organizational culture, or contribute to sustained safety practices. Moreover, there is a lack of empirically grounded theory explaining how these initiatives function as mechanisms for promoting occupational health and safety. This study addresses this gap by adopting a grounded theory approach to explore how first aid and safety competitions promote occupational health and safety within Ghana's mining sector. By focusing on participants' experiences and the social processes surrounding the competition participation, the study generates a contextually grounded explanation that contributes both theoretically and practically to occupational health and safety scholarship.

First Aid and Health and Safety

First aid refers to the immediate care provided to a person experiencing injury or sudden illness prior to the availability of professional medical treatment [15]. Health and safety, in this context, refers to the implementation of appropriate measures and practices designed to prevent, reduce, or control the occurrence of accidents and work-related harm.

The Law of First Aid at the Mines

The Mineral Commission as the regulatory body overseeing the mining industry in Ghana has made sure that first and safety practices is covered by law to ensure enforcement. Rule 534 and 536 of the Legislative Instrument 2182 [16], of the Mineral and Mining (Health, Safety and Technical Regulation), (LI 2082) have specific provision on first aid. This is reproduced as follows:

1) Regulation 534: Certified first aiders

A manager of mine or a holder of a small-scale mining license shall ensure that in each operating section or department in the mine where the work undertaken is likely to cause injury to a person, at least one of the persons working in that operating section or department in the mine, holds a valid first aid certificate granted by a society approved by the Chief Inspector of Mines.

2) Regulation 536: First aid equipment

A manager of an underground mine shall ensure that

a. A stock of fitted first aid boxes, dressings, splints, stretchers, and other materials as the inspector required are kept and maintained at a suitable in the mine.

b. Each first aid equipment is used only for the purpose for which it is provided.

c. Each vehicle and mobile equipment in the mine is equipped with a first aid box; and

d. An electrical substation in the mine has a specific first aid kit for each injury caused by electricity and each electrician in the mine carries this specific first aid kit at each given time.

This regulation makes it mandatory for all mining firms operating in Ghana to have first aiders and first aid equipment available in their area of operations.

Health and Safety Advocacy Groups: Several non-governmental organizations (NGOs) and advocacy groups actively promote health and safety standards within Ghana's mining industry. These organizations contribute through research, training programs, and policy advocacy aimed at improving occupational safety and reducing workplace accidents. Among them, the Ghana Chamber of Mines plays a dual role: advancing the interests of its members while promoting sustainable and safe mining practices [17]. In addition, institutions focused on occupational health, such as the Occupational Safety and Health Administration (OSHA), engage directly with mining firms to strengthen safety protocols and ensure compliance with industry standards [2]. Collectively, these organizations provide crucial support for developing and maintaining a culture of safety in Ghana's mining sector.

The First Aid and Safety Competition: The First Aid and Safety Competition among mining firms in Ghana represents a key initiative for enhancing workplace health and safety standards. By emphasizing first aid training and the practical implementation of safety protocols, the competition promotes a culture of safety and underscores the commitment of mining companies to employee well-being. As Mr. Carl Baker-Duly, CEO of Golden Star Wassa, noted: "Our commitment to safety is the cornerstone of everything we do. This event is not just about sharing knowledge; it's about reinforcing our culture of care and operational excellence. Every individual who steps onto our site should return home safely at the end of each day" [18]. Such statements reflect the broader objectives of the competition, which include fostering collaboration, knowledge sharing, and peer learning among mining firms.

Research indicates that strong safety cultures, coupled with effective safety management practices, can significantly reduce workplace accidents while enhancing operational efficiency [2]. By organizing

this competition, Ghanaian mining companies demonstrate proactive leadership in addressing safety challenges. The emphasis on first aid training is particularly critical, as timely and effective emergency response can save lives and mitigate the severity of workplace injuries. Through these initiatives, the competition not only builds technical competencies among workers but also reinforces organizational commitment to safety, ultimately contributing to safer, more resilient mining operations.

Structure of the Competition

Oral Contest

The oral component of the competition assesses participants' theoretical knowledge of first aid principles and occupational health and safety protocols. This segment is broadcast live on national television, specifically on Ghana Television (GTV), enabling a wider audience to engage with the content and raising public awareness of the importance of safety within the mining sector. Teams representing various mining firms compete by responding to questions that test their understanding of first aid procedures and safety practices [18,19]. The questions and corresponding model answers are developed by St John Ambulance and provided to the competition's moderator.

Practical Contest

The practical component is a hands-on segment in which teams demonstrate their first aid competencies by responding to simulated emergency scenarios. Teams from different mining companies compete to demonstrate their proficiency in emergency response. The practical demonstrations are typically conducted in a lively and engaging atmosphere, reflecting the strong community orientation of the event (Modern Ghana 20,21]). The scenarios used during the practical sessions are designed to replicate real life emergency situations, allowing participants to apply critical life-saving techniques under simulated conditions. This experiential approach reinforces the core objective of the competition, which is to strengthen practical knowledge and competence in first aid and safety practices (Solidaridad Network [22,23]).

Zonal Context

The competition is organised across operational zones corresponding to the geographical locations of participating mining firms. Zonal competitions are typically held quarterly. As part of preparation for these events, mining firms organize refresher training in first aid, facilitated by St John Ambulance. These refresher courses are intended to reinforce essential skills that health and safety officers may not regularly practice, such as cardiopulmonary resuscitation (CPR) and other emergency response techniques. Hosting of the zonal competitions rotates among mining firms. These zonal events serve as preparatory platforms, enabling teams to sharpen their competencies ahead of the national competition.

National Context

The national competition is held annually and brings together health and safety officers and teams from mining firms across the country. Participants converge at a designated host mining site to compete in both oral and practical components. The national event represents the culmination of the zonal competitions and provides a platform for bench marking best practices, recognizing excellence in safety performance, and reinforcing the importance of occupational health and safety across the mining sector.

Content of First Aid Courses Delivered

The first aid training programmes delivered by St John Ambulance cover a wide range of emergency care topics. These include the management of spinal and fracture injuries; control of bleeding; treatment of burns and scalds; management of seizures, choking, and fainting; care for eye injuries; management of soft tissue injuries such as sprains and strains; response to anaphylaxis and shock; recognition and management of angina and heart attack; treatment of bites and stings; management of asthma; cardiopulmonary resuscitation (CPR); positioning of casualties in the recovery position; and the use of automated external defibrillators (AEDs), among others.

Role of St John Ambulance in the Competition

St John Ambulance has been actively involved in the competition since its inception. The organization contributes to the design of competition content by developing questions and model answers for the oral component and by creating realistic scenarios for the practical sessions. It also plays a central role in training health and safety officers across the major mining firms in Ghana, positioning it as a leading provider of first aid education within the sector. In addition, St John Ambulance supports participating teams by familiarizing them with the structure and expectations of the competition at both the zonal and national levels, thereby helping to ensure consistency in standards and preparedness across participating organizations.

Winners of the Inter-Mines First Aid and Safety Competition from 2015 to 2025

1) Golden Star, Wassa - 2015
2) Asante Gold, Chirano - 2016
3) Goldfields, Aboso - 2017
4) Golden Star, Wassa- 2018
5) Newmont, Ahafo - 2019
6) No Competition due to Covid 19 - 2020
7) Adamus Resources Ltd - 2021
8) Goldfieds, Tarkwa - 2022

9) Golden Star, Wassa - 2023

10) Golden Star , Wassa - 2024

11) Golden Star, Wassa - 2025

Source: St John Ambulance, 2025

Methodology (Grounded Theory Design)

Research Design

This study adopted a qualitative grounded theory design to explore how first aid and safety competitions promote occupational health and safety within Ghana's mining sector. Grounded theory is particularly suitable where the aim is to generate theory from data rather than to test existing hypotheses. It allows for an in-depth examination of participants' experiences, interactions, and meanings, thereby facilitating the development of a substantive theory grounded in empirical evidence.

Study Setting

The study was conducted among selected mining firms in Ghana that actively participate in the Inter-Mines First Aid and Safety Competition. The setting provided a relevant context for exploring lived experiences of safety practices, organizational dynamics, and the perceived influence of the competition on occupational health and safety.

Participants and Sampling

A significant number of 31 participants including safety officers, mine workers, supervisors, managers, and competition participants who had direct experience with the first aid and safety competition participated in the research. A purposive sampling strategy was initially employed to identify participants with rich knowledge of the competition and health and safety in general. As analysis progressed, theoretical sampling was used to guide further participant selection based on emerging concepts, consistent with grounded theory principles. Data collection continued until theoretical saturation was achieved, when no new significant categories emerged.

Data Collection

Data were collected primarily through in-depth semi-structure interview, allowing participants to freely describe their experiences, perceptions, and interpretations of the competition and its influence on workplace safety. Where possible, supplementary data such as field notes and relevant organizational documents (e.g., safety manuals, competition materials, internal communications) were also consulted to enhance contextual understanding. Most of the Interviews were conducted face to face when the health and safety officers and managers had a conference in Accra, hosted by St John Ambulance. They gathered at the University of Ghana Medical Center, a Quaternary health facility in Accra for a simulation exercise. Some of the interview were conducted through phone calls as most of the mines are situated in hard to reach rural areas in Ghana.

Data Analysis

Data analysis followed the grounded theory procedures of open coding, axial coding, and selective coding. During open coding, transcripts were examined line-by-line to identify key concepts and actions. In axial coding, related codes were grouped into categories and relationships between categories were explored. In selective coding, a core category was identified, and remaining categories were systematically related to it to construct an emerging theory. The constant comparative method was used throughout analysis, whereby new data were continually compared with existing codes and categories to refine conceptual understanding.

Conceptual Sensitivity and Researchers Positions

Grounded theory requires researchers to maintain conceptual sensitivity, that is, an awareness of existing literature and professional experience while avoiding the imposition of preconceived theories on the data. In this study, the researchers approached the inquiry with an understanding of occupational health and safety practices within organizational settings but consciously adopted an open minded stance throughout the research process. Rather than testing predetermined assumptions about the effectiveness of safety competitions, the study sought to allow meanings, processes, and explanations to emerge inductively from participants' accounts (Figure 1).

Note: Researchers construct 2026.
Figure 1: Conceptual Diagram:
Impact Pathways of the Inter-Mines First Aid and Safety Competition.

Findings

This is the presentation of the findings of the study exploring how mining workers experience, how they interpret first aid and safety competitions, how these competitions influence workplace safety practices, and what processes explain their contribution to improved occupational health and safety. The findings are drawn from participants' accounts and are organized thematically in relation to the three research questions. Pseudonyms are used to protect participants' identities. The analysis revealed that first aid and safety competitions are not perceived merely as formal events, but as meaningful learning, motivational, and cultural mechanisms within the workplace. Four overarching thematic areas emerged across the dataset:

1) Experience and meaning of competitions
2) Influence on everyday safety practices
3) Learning and motivational processes
4) Identity and cultural change

Research Question 1: How do Mining Workers Experience and Interpret First Aid and Safety Competitions?

Competitions as Motivating and Empowering Experiences: Participants commonly described competitions as exciting, challenging, and empowering. Being selected to participate was associated with feelings of pride and personal achievement. Several participants indicated that the competitions allowed them to recognize their own competence.

1. One participant explained: "When you stand there and perform, you realize you actually know more than you thought. It gives you confidence" (Participant 4).

2. Another added: "It's not just a game. You feel proud representing your mining firm and showing what you can do" (Participant 11). For many workers, competitions were therefore interpreted not as additional work pressure but as recognition of their abilities and value within the organization.

Competitions as Practical Learning Opportunities: Participants emphasized that the practical nature of competitions distinguished them from conventional classroom training. Simulated emergency scenarios, timed drills, and hands-on demonstrations helped participants connect theory to real workplace risks. As one participant noted: "Before, first aid was just theory in the classroom. But when you practice CPR in a competition setup, it becomes real" (Participant 2). Another participant highlighted the realism of the scenarios: "They give you situations that are close to what can happen underground. It prepares your mind" (Participant 7). Competitions were therefore interpreted as meaningful spaces for learning rather than symbolic or ceremonial events.

Social Meaning: Belonging and Peer Recognition: A strong social dimension emerged in participants' accounts. Being chosen to represent one's team or mining firm was associated with a sense of belonging, trust, and peer recognition. "When they choose you, you feel like management believes in you" (Participant 9). "People start to see you differently. They come to you with safety questions" (Participant 1). These experiences suggest that competitions contribute not only to skill development but also to social positioning within the workplace.

Research Question 2: How do these Competitions Influence Workplace Safety Practices?

Strengthened Adherence to Safety Procedures: Participants reported that after participating in competitions, they became more conscious of everyday safety practices. This included greater attention to hazard identification, correct use of personal protective equipment, and adherence to procedures.

"Now I don't just wear PPE because it's required, but because I understand why" (Participant 5).

"You start checking hazards automatically. It becomes part of you" (Participant 12).

This indicates that competitions contribute to internalizing safety practices rather than mere rule compliance.

Knowledge Sharing and Peer Influence: Participants described how they often shared knowledge gained during competitions with colleagues upon returning to work. This informal transfer of learning extended the impact of competitions beyond those who directly participated.

"When we came back, the guys wanted to know what we learned. We showed them new ways of handling emergencies" (Participant 3).

"I even corrected my supervisor on first aid steps, and he accepted it" (Participant 8).

This suggests that participants frequently became informal safety resources within their teams.

Increased Confidence to Challenge Unsafe Practices: Another significant influence of participation was the increased confidence to speak up when unsafe practices were observed. Participants described feeling more responsible for the safety of others.

"Before, I would keep quiet. Now I can stop the job and explain the risk" (Participant 6).

"You feel responsible for others because you know what can happen" (Participant 10). This reflects a shift from passive compliance to active engagement in safety behaviours.

Research Question 3: What Processes Explain how Participation Contributes to Improved Occupational Health and Safety?

Experiential Learning and Skill Internalization: The competitive format relies heavily on practical demonstrations, simulations, and problem-solving. Participants indicated that this helped them retain knowledge more effectively than traditional training.

"When you practice under pressure, you don't forget easily. It stays in your mind" (Participant 14).

This suggests that experiential engagement strengthens competence and readiness for real incidents.

Motivation Through Recognition and Reinforcement: Recognition emerged as a key motivational mechanism. Certificates, praise, and public acknowledgment reinforced participants' commitment to safety.

"When they clap for you and give you a certificate, you want to keep that standard" (Participant 13).

This form of positive reinforcement appeared to encourage ongoing attention to safe practices.

Social Modeling and Diffusion of Norms: Participants often became visible examples of good practice within their teams. Their behaviour influenced colleagues' attitudes toward safety.

"If they see you taking safety seriously, they also start taking it seriously" (Participant 1).

This indicates that competitions may influence safety culture by shaping shared norms and expectations.

Identity Shift Toward Safety Advocate: Some participants described a shift in how they perceived themselves over time. Participation encouraged them to see safety as part of their role and identity.

"I don't just see myself as a miner anymore. I see myself as someone responsible for people's lives" (Participant 4).

This identity shift appears to support sustained commitment to occupational health and safety.

Discussion of Findings and Link to Theory

The researchers discussed the findings in relation to existing theoretical perspectives and broader understandings of occupational health and safety. The discussion demonstrates that first aid and safety competitions function not only as training tools but also as mechanisms that influence motivation, learning, identity, and organizational culture. The discussion is structured as follows:

Experiential Learning and Adult Learning Theory

The findings strongly align with principles of experiential learning theory, which emphasizes learning through concrete experience, reflection, and active experimentation. Participants consistently highlighted that simulations and practical demonstrations helped them understand and retain safety knowledge more effectively than classroom-based instruction. The competitive environment created realistic pressure and engagement, which enhanced learning depth and transfer to real world contexts. From an adult learning perspective, the findings suggest that workers value learning approaches that are relevant, practical, and problem-centered. The competitions provided meaningful contexts that mirrored actual workplace risks, making learning immediately applicable.

Social Learning and Role Modeling

The data also reflect key aspects of social learning theory, which proposes that people learn not only through direct experience but also by observing others. Participants became informal role models within their teams, and their behaviors influenced colleagues' safety practices. Through observation and imitation, safe behaviors were gradually normalized within work groups. The finding that participants felt more confident to speak up about unsafe practices further supports the idea that learning is embedded in social interaction rather than existing only at the individual level.

Motivation and Self-Determination

The motivational effects of competitions can be understood through theories of motivation that emphasize autonomy, competence, and recognition. Participants experienced a sense of competence when demonstrating skills successfully. Being selected to participate supported feelings of value and belonging. Recognition through praise and awards reinforced intrinsic motivation to maintain high safety standards. Rather than relying only on external enforcement, competitions appeared to foster internal commitment to safety. This suggests a shift from compliance-based safety toward value-based safety engagement.

Safety Culture and Communities of Practice

The findings again indicate that, the competitions contribute to the development of a stronger safety culture. A safety culture is reflected in shared beliefs, values, and practices regarding safety within an organization. Participants' accounts showed that competitions influenced collective norms, encouraged open discussion about safety, and increased peer accountability. The way participants shared knowledge and supported colleagues resembles the concept of communities of practice, where learning occurs through participation in a social group. Competition participants effectively formed a network of safety champions who influenced practice beyond formal training structures.

Identity Formation and Meaningful Work

The identity shift reported by participants suggests that the competitions influence how workers understand their roles. Seeing oneself as a "safety advocate" rather than only as a miner reflects deeper engagement with occupational health and safety. This aligns with theories of identity and meaningful work, which argue that when individuals connect their work to broader purpose (such as protecting others), commitment and responsibility increase. This identity transformation may explain why the effects of competitions extend beyond the event itself and persist in everyday work practices.

The Impact of the Inter-Mines First Aid and Safety Competition

The Inter-Mines First Aid and Safety Competition play a pivotal role in strengthening occupational health and safety within Ghana's mining sector. By providing structured training in first aid and safety protocols, the competition equips mine workers and health and safety officers with the knowledge and skills necessary to respond effectively to workplace injuries and emergencies [23,24]. This is particularly relevant given evidence that a significant proportion of miners had

limited or no formal safety training in preceding years [25]. Through both theoretical and practical components, the competition fosters a culture of preparedness and reinforces adherence to safety measures, contributing to safer working environments for miners.

Enhancement of Safety Practices

The competition's impact on safety practices extends beyond individual skill acquisition. The hands-on practical exercises allow participants to apply critical life-saving techniques in simulated emergency scenarios, bridging the gap between theoretical knowledge and practical application. This experiential learning is essential for building competence in high-risk environments such as mining, where rapid and effective responses can prevent fatalities and reduce injury severity [22,23]. Moreover, the interactive and competitive nature of the event fosters teamwork, peer learning, and mutual accountability among participants. These social and organizational dynamics support the development of a positive safety culture, encouraging health and safety officers and workers to internalize safety values and integrate them into everyday practices. By combining skill development with recognition and competition, the event motivates mining firms to prioritize health and safety proactively rather than reactively [23].

Community Engagement and Public Awareness

Beyond its influence on mining personnel, the competition serves as an important platform for community engagement and public education. Broadcasting the event live on national television (GTV) expands its reach, raising awareness of occupational health and safety issues among broader audiences and reinforcing the importance of safe practices in mining and beyond (Golden Star Resources [19,21]).

Stakeholder Collaboration

The competition promotes engagement among multiple stakeholders, including mining firms, contractors, educational institutions, health professionals, and community members. This collaborative approach encourages shared ownership of safety practices, ensuring that occupational health and safety is recognized as a collective responsibility. By integrating miners, health and safety officers, and community participants, the competition contributes to embedding safety as a core value within the sector and promotes the dissemination of best practices across organizations.

Reduction of Injury Risks

Empirical evidence suggests that improved training and awareness directly contribute to reductions in workplace injury rates. Limited access to personal protective equipment (PPE) and insufficient safety training are key factors contributing to injuries in Ghanaian mines [25]. By strengthening first aid competence, promoting adherence to safety protocols, and fostering a proactive approach to occupational hazards, the competition mitigates these risks and supports the development of safer mining operations [24].

Challenges and Limitations

Lack of Measurable Impact

A critical limitation is the absence of standardized mechanisms to evaluate the competition's outcomes. Without concrete assessment criteria, it is difficult to quantify improvements in workplace safety practices or determine long-term benefits for community health and safety awareness [26]. This gap constrains the ability to demonstrate tangible results, which may affect participation rates and sponsorship opportunities.

Limited Public Outreach

Although the competition reaches participating mining firms and host communities, its broader public impact remains limited. Stakeholders outside the immediate competition, such as remote mining personnel or neighboring communities, may not benefit from increased awareness of safety practices [27,28]. Expanding outreach and integrating additional educational initiatives could enhance its societal impact.

Safety Management Systems

The competition's effectiveness is influenced by the quality of safety management systems within participating firms. While it provides a platform for demonstrating knowledge of safety protocols, accidents continue to occur, particularly among contractors and small-scale miners. This indicates a need for more robust enforcement of safety standards and systemic improvements that extend beyond the scope of the competition.

Environmental and Social Considerations

The broader environmental and social impacts of mining activities present ongoing challenges. While the competition enhances occupational safety, it does not directly address issues related to environmental stewardship, sustainability, or community livelihoods [17]. Integrating safety initiatives with broader health, social, and environmental strategies is essential to achieve holistic improvements in the sector [29-43].

Conclusion

Overall, the Inter-Mines First Aid and Safety Competition represent a critical intervention for enhancing health and safety in Ghana's mining sector. It strengthens practical and theoretical competencies, promotes a positive safety culture, engages communities, fosters multi-stakeholder collaboration, and contributes to the reduction of workplace risks. However, challenges related to measurable impact, public outreach, stakeholder engagement, and integration with broader safety and sustainability frameworks highlight areas for improvement. Addressing these limitations will be essential for maximizing the competition's long-term effectiveness and ensuring that it continues to serve as a catalyst for safer and more sustainable mining operations.

Recommendations for Practice

Based on the findings, several practical recommendations are proposed to strengthen the impact of First Aid and Safety Competitions within the mining sector and across other industries in Ghana. First, mining companies should institutionalize first aid and safety competitions as part of their formal occupational health and safety (OHS) strategy rather than treating them as occasional events. Regularly scheduled competitions can reinforce continuous learning and sustain workers' motivation toward safe practices. Second, participation in competitions should be broadened beyond a small group of selected employees. Rotational participation systems can ensure that a larger proportion of the workforce benefits directly from experiential learning opportunities. This would strengthen collective competence and enhance the overall safety culture of organizations. Third, management should provide stronger organizational support by linking competition participation to structured post-competition activities. These may include internal workshops, peer training sessions, and mentoring programs led by participants.

Such initiatives can help translate individual learning into organizational-wide impact. Fourth, other industries should emulate the Mineral Commission and the Ghana Chamber of Mines to ensure that, their policymakers and regulatory bodies responsible for occupational health and safety in their industries, should consider promoting inter-organizational safety competitions as part of national safety improvement strategies. Given the positive influence observed in the mining sector, similar approaches could be adopted in construction, manufacturing, transport, healthcare, and other high-risk sectors. Finally, companies and industry stakeholders should strengthen collaboration with community institutions, schools, and local organizations. Since competition participants often transfer safety knowledge into their families and communities, structured community engagement programs could amplify the broader social benefits of safety education.

Recommendations for Future Research

Future studies could adopt quantitative or mixed method approaches to measure the long-term impact of competition participation on accident rates, injury severity, and safety performance indicators. Longitudinal research designs would be particularly valuable in understanding how sustained participation influences behaviour over time. Further research could also explore the perspectives of management, safety officers, and policymakers to gain a more holistic understanding of how safety competitions function within the broader occupational health and safety system. Comparative studies between industries or across different regions of Ghana would also deepen insight into the adaptability of this model.

Limitations of the Study

This study has several limitations that should be considered when interpreting the findings. First, the study relied primarily on participants' self-reported experiences. While these narratives provide rich insight, they may be influenced by social desirability bias, where participants present themselves or their organizations in a more positive light. Second, the qualitative nature of the study means that the findings are context-specific and may not be statistically general to all mining firms in Ghana. However, the depth of the data provides valuable analytical insights that can inform broader understanding and practice. Third, the study focused mainly on workers who had participated in competitions. The perspectives of non-participants, management, and regulatory stakeholders were not explored in detail, which may limit the breadth of interpretation. Finally, time and resource constraints limited the scope of data collection. A larger sample size or inclusion of multiple mining regions could have provided a more comprehensive picture of the phenomenon. Despite these limitations, the study offers meaningful contributions to understanding how experiential initiatives such as safety competitions can strengthen occupational health and safety practices in high-risk industries. Baffoe Kofi Gyan and Emmanuel Odame Ankrah, analyzed the data.

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