Original Article

Occupational Health and Safety and Organizational Commitment: Evidence from the Ghanaian Mining Industry

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A B S T R A C T

Background: This study seeks to examine the relationship and impact of occupational health and safety on employees' organizational commitment in Ghana's mining industry. The study explores occupational health and safety and the different dimensions of organizational commitment.
Methods: A cross-sectional survey design was used for this study. The respondents were selected based on simple random sampling. Out of 400 questionnaires administered, 370 were returned (77.3% male and 22.7% female) and used for the study. Correlation and multiple regression analysis were used to determine the relationship and impact between the variables.
Results: The findings of this study revealed positive and significant relationship between occupational health and safety management, and affective, normative, and continuance commitment. Additionally, the results revealed the significant impact of occupational health and safety on affective, normative, and continuance commitment.
Conclusion: Management within the mining sector of Ghana must recognize the fact that workers who feel healthy and safe in the performance of their duties, develop emotional attachment and have a sense of obligation to their organization and are most likely committed to the organization. Employees do not just become committed to the organization; rather, they expect management to first think about their health and safety needs by instituting good and sound policy measures. Thus, management should invest in the protection of employees' health and safety in organizations.

1. Introduction

The mining sector is one of the world's most hazardous sectors (International Labour Organization, ILO) [1], and it is also considered by mine workers as dangerous and hazardous [2]. People working in the mines are exposed to various physical, chemical, mechanical, biological, and psychosocial risk factors [3]. According to Owiredu [4], Ghana is one of the West African countries that has become a preferred destination for mineral investment, with the legal mining industry accounting for more than 49% of the country's gross foreign exchange earnings. Mining activities, however, present not only economic opportunities for the country but also major challenges, particularly in the area of occupational safety and health (OSH) for employees in this sector [3]. The importance of healthy workplaces is increasingly being recognized as a broad concept influencing quality of life at the individual level to substantial impacts on public health at the societal level [5].

OSH is a multidisciplinary concept that concentrates on the promotion of safety, health, and welfare of people engaged in work or employment [6]. According to Amponsah-Tawiah and Dartey-Baah [7], occupational health and safety encapsulates the mental, emotional, and physical well-being of the worker in relation to the conduct of his work and, as a result, marks an essential subject of interest impacting positively on the achievement of organizational goals. Available data reveal startling and tremendously high rates of work-related deaths and injuries in both developed and developing nations [2,8]. According to the ILO, 2.3 million people die each year owing to work-related accidents or illness, and 350,000 of these deaths are attributable to occupational accidents. Additionally, the ILO estimates that there are 264 million nonfatal accidents each

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year that result in work-related illnesses, leading to approximately 3 days of absence from work [9]. According to Seo et al [10], industries—especially those in developing countries—are suffering enormous economic and personnel costs as a result of injuries and diseases related to work. In a recent publication, the ILO revealed that the everyday occurrence of 860,000 occupational accidents with either a direct or indirect cost for occupational illnesses and accidents is estimated at $2.8 trillion worldwide [9].

However, despite these startling global figures on occupational health and safety, only a small number of empirical research studies on occupational health and safety have been conducted in sub-Saharan Africa—specifically, Ghana, where majority of the citizens are engaged in jobs classified hazardous such as mining, quarrying, lumbering, farming, and fishing. Arguably, few studies have examined the relationship between occupational health and safety management and employee commitment, particularly in the mining industry. In the light of the provocative issues on the extraction of ore from the earth in recent times, this study sets out to investigate occupational health and safety management from the employees' perceptions and its implication on employees' attitude, specifically their commitment to the organization.

The subject of occupational health and safety management in the mining sector is on the rise because of the increasing demand for minerals and the high-risk factors associated with it. The case for employees and organizations is that, according to Demba et al [11], in developing nations, the rates of industrial and occupational injury-related deaths and disabilities are on the rise. As a result, the mining sectors of these mineral-endowed developing countries are highly prone to these occupational injury-related deaths and disabilities. This affects employees' attitudes and intentions toward their organization. Occupational health programs are thus primarily concerned with the prevention of ill health arising from workplace conditions, whereas safety programs deal with the prevention of accidents and with minimizing the resulting loss and damage to lives and properties [12]. Boyle [13] posits that the process of managing occupational health and safety is the same as other management activities, but the distinction lies in the complex nature of occupational health and safety. However, according to Cooper [14], the management of OSH is in many respect exactly the same as managing productivity or other functional areas of operations. This shows that the management of safety at the workplace is not just about prevention of repetitions of accidents that have already occurred but rather must be integrated into the general management system that relates to quality management and protection of the working person and the environment.

Hayes et al [15] proposed five constructs of assessing workplace safety. These authors are of the view that management commitment to safety, supervisors' safety practices, coworker safety practices, job safety, and safety programs are some of the critical issues that could be looked at in terms of safety at the workplace. Steenkamp and Van Schoor [16] rightfully mention that occupational health and safety is a complex international problem for management and society, and that it must always be a top management priority. Management commitment plays an important role in all aspects of safety intervention [16]. Management commitment to safety indicates the extent to which the organization's top management demonstrates positive and supportive safety attitudes toward their employees' safety [17]. Yule et al [18] noted that employees' perception of dedicated management's action to safety resulted in accident reduction. Ali et al [19] also argued that management safety practices as well as commitment to safety play an effective role in reducing workplace injuries. Geldart et al [20], in a study on Canadian manufacturing firms, also found that administrative policies, practices, and attitudes have a direct positive impact on safety in the workplace.

Additionally, supervisors are normally seen as one of the key element in health and safety management at the workplace in ensuring safety compliance and safety participation. In their study, Yule et al [18] noted that employees conformed to safety rules and procedures when they perceived that the action of their supervisor is fair and congruent with organization policy on safety. Supervisors' safety practices describe the extent to which a supervisor keeps track of unsafe practices as well as acknowledges the workers who adopt safe work behaviors. Another interesting element in health and safety management that could be used to increase safety performance at the workplace is coworker safety practices. Coworker safety concerns the extent to which workers perceive their colleagues as valuing safety. According to Ford and Tetrick [21], employee behaviors at work and personality variables contribute, directly or indirectly, to accidents. Safety behavior encompasses all activities undertaken by individuals in their workplace to ensure their personal safety, the safety of their coworkers, and the safety of their organization at large. Ford and Tetrick [21] asserted that workers' safety-oriented behavior can be scaled by the extent to which they engage in actions that promote safety and avoid those that decrease safety.

Job safety shows the extent to which job duties do not pose threats or unhealthy consequence(s) on the health and safety of employees. According to the Occupational Safety and Health Administration [22], job safety analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment. Gyekye [2] explains job safety as a measure of the degree of safety inherent in a job assignment. Job safety looks at how employees are well informed on hazards and risk associated with job description and measures implemented to curtail or eradicate those hazards and risk. Health and safety programs consist of clearly defined actions to implement the health and safety training and policies. Safety training and safety policies are essential determinants of safety performance. Safety training is defined as the knowledge of safety given to employees in order for them to work safely and with no danger to their well-being [23]. Likewise, Lin and Mills [24] found that clear policy statements and safety training played an important role in reducing accident rates. Earlier studies indicated a link between safety training and increased safety performance [25]. Consequently, effective training assists workers to have a sense of belonging and thus, be more accountable for safety in their workplace. In addition, Vassie and Lucas [26] indicated that safety programs are crucial to all workers and an important aspect of effective health and safety management.

Commitment is one of the job-related attitudes that has received extensive attention from researchers around the globe. Organizational commitment is an individual's attitude and attachment toward his or her organization [27]. Miller (reference [28], p. 73) defines organizational commitment as the "state in which an employee identifies with a particular organization and its goals, and wishes to maintain membership in the organization." Organizational commitment is therefore the degree to which an employee is willing to maintain membership because of interest and association with the organization's goals and values. To Cohen (reference [29], p. xi), "commitment is a force that binds an individual to a course of action of relevance to one or more targets." Arnold [30] extended Cohen's [29] definition of commitment to the organization, and suggested that organizational commitment is the relative strength of an individual's identification with and involvement in an organization.

Organizational commitment has traditionally been measured as a unidimensional construct [31,32]. However, Meyer and Allen [33] identified three forms of organizational commitment. According to

Meyer and Allen [33], the three-component model captures the affective commitment, continuance commitment, and normative commitment. They explain affective commitment as an employee's emotional attachment to, identification with, and involvement with the organization as well as enjoyment of being a member of the organization. Continuance commitment is described an individual's need to continue working for the organization based on the perceived costs associated with leaving, and normative commitment is the feeling of obligation to remain with an organization [33,34]. To them, these components of commitment can be experienced simultaneously to varying degrees.

Gbadamosi [35] contends that the more favorable an individual's attitudes toward the organization, the greater the individual's acceptance of the goals of the organization, as well as their willingness to exert more effort on behalf of the organization. Chen [36] confirmed organizational commitment to have negative impact on turnover intentions. Organizational commitment has been related to valuable outcomes for both employees and employers that could result in enhanced feelings of belonging, security, efficacy, greater career advancement, increased compensation, and increased intrinsic rewards for the individual [37].

Cole [38] posits that employees who are healthy and feel safe at work are those who can fully invest their capabilities and exploit the best of their potentials to work. Similarly, Sinclair et al [39] are of the view that when organizations fail to address poor working conditions such as health and safety issues, workers are more likely to judge the costs of staying with the firm as exceeding the costs of leaving. Grawitch et al [40] explored the relationship between employee satisfaction with different workplace practices (i.e., employee involvement, growth and development, work−life balance, recognition, health and safety) and employee outcomes (i.e., organizational commitment, emotional exhaustion, mental well-being, and turnover intentions). Overall, regression results indicated that satisfaction with healthy workplace practices was predictive of employee outcomes. In China, Siu [41] found a positive relationship between affective commitment and physical well-being of employees. To have committed employees, management must show concern for the safety, health, and welfare of people engaged at work.

2. Materials and methods

2.1. Research design and sample

The study adopted the cross-sectional survey design. Thus, the researchers collected data from participants from three selected large-scale mining companies operating in Ghana at a time. The study was conducted in three gold-mining companies that were conveniently sampled in Ghana. The mining companies were AngloGold Ashanti, Goldfields Ghana Ltd, and Golden Star Resources Ltd. In compliance with research ethics, permission was first sought from these organizations to solicit data from their employees, specifically, technical staff (employees with technical skills or expertise in mining). With a total population of 6,000, Krejcie and Morgan's [42] formula table for selecting sample size from a population was used to obtain a sample size of 370. Furthermore, in order to obtain the exact number of sample as proposed by Krejcie and Morgan's [42] formula, 400 questionnaires were distributed among the three mining companies, and 370 duly completed forms were retrieved. Respondents for this study were conveniently sampled because of their busy work schedule. Thus, the questionnaires were administered to technical employees who were available and willing to participate in the study at the time of visit. The convenient sampling technique was adopted because of the busy and rotational schedule of the technical staff. Data was gathered within a period of 1 month. The demographic details of the respondents are displayed in Table 1.

2.2. Instrumentation and reliability analysis

Employees' perception of OSH management was measured using the 50-item Workplace Safety Scale (WSS), which was developed by Hayes et al [15]. The WSS generally assesses employees' perceptions of OSH management at the workplace. The WSS specifically measures five distinct constructs, each with 10 items: (1) work safety (sample items include "Safety programmes are effective"); (2) coworkers safety (sample items include "Pay attention to safety rules"); (3) supervisor safety (sample items include "Enforces safety rules"); (4) management's commitment to safety (sample items include "Responds to safety concern"); and (5) satisfaction with safety program (sample items include "Effective in reducing injuries"). The distinct constructs of the WSS have Cronbach α reliabilities of 0.96, 0.80, 0.97, 0.94, and 0.86, respectively. The overall Cronbach α reliability of the WSS is 0.86. Each statement (e.g., "my job could hurt easily") is answered on a five-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree").

Employees' commitment was measured using the Organizational Commitment Questionnaire (OCQ), developed by Meyer and Allen [43]. The OCQ measures the three dimensions of organizational commitment: Affective commitment, normative commitment, and continuance commitment. The OCQ has a total of 18 items, and it is answered on a seven-point Likert scale ranging from 1 ("Strongly disagree") to 7 ("Strongly agree"). Sample items on the OCQ include "I would be very happy to spend the rest of my career with this organization" (affective commitment), "It would be very hard for me to leave my organization right now, even if I wanted to" (continuance commitment), and "This organization deserves my loyalty" (normative commitment). Meyer and Allen [43] reported Cronbach α reliabilities of 0.74 for the affective commitment dimension, 0.74 for the normative commitment dimension, and 0.84 for the continuance commitment dimension.

Table 1
Distribution of respondents' demographic characteristics

Variable	Characteristics	Frequency	Percent
Sex	Male	286	77.3
	Female	84	22.7
Age (y)	Below 20	0	0.0
	20−30	137	37.0
	31−40	121	32.7
	41−50	77	20.8
	51−60	33	8.9
	Over 60	2	0.5
Marital status	Single	144	38.9
	Divorced	12	3.2
	Married	214	57.8
Tenure (y)	Less than 1	67	18.1
	1−5	154	41.6
	6−10	60	16.2
	11−15	42	11.4
	16−20	28	7.6
	Over 21	19	5.1
Education	Basic certification	46	12.4
	SSCE	99	26.8
	Diploma	74	20.0
	First degree	106	28.6
	Professional	32	8.6
	Postgraduate degree	13	3.5

SCCE, Senior Secondary Certificate Exams.

2.3. Procedure

A pilot study was first conducted to check the reliability of the scales. The sample for the pilot study consisted of 40 employees from the University of Ghana Business School. The Cronbach α for the reliability of the various dimensions of the WSS were 0.79 for job safety, 0.74 for coworker safety, 0.90 for supervisors' safety, 0.80 for management safety practices, and 0.84 for satisfaction with safety programs. The overall coefficient α of the WSS was 0.90. A Cronbach α of 0.81 was observed for the OCQ; the affective, normative, and continuance dimensions of the OCQ had Cronbach α of 0.76, 0.72, and 0.81, respectively. To avoid bias, all items on the questionnaire were neutrally structured as well as pretested prior to actual data collection.

3. Results

The relationship between occupational health and safety management and affective, normative, and continuance commitment was analyzed using the Pearson product–moment correlation coefficient. A preliminary investigation was conducted to ensure that no violation of basic assumptions—such as normality, linearity, multicollinearity, and homoscedasticity—occurred. In Table 2, the results indicate a moderate positive relationship between occupational health and safety management and affective commitment ($r = 0.257$, $p < 0.01$), normative commitment ($r = 0.370$, $p < 0.1$), and continuance commitment ($r = 0.309$, $p < 0.01$).

In assessing the unique contribution of occupational health and safety management on affective, normative, and continuance commitment, the standard multiple regression was used. Results for these analyses, as presented in Table 3, indicate that all of the three study models were statistically significant ($F_A = 26.106$, $F_N = 58.230$, $F_C = 38.792$; $p < 0.001$). The R^2 value indicated that occupational health and safety management accounted for 6.6% ($R^2 = 0.066$) of the variation in affective commitment, 13.7% ($R^2 = 0.137$) in normative commitment, and 9.5% ($R^2 = 0.095$) in continuance commitment.

4. Discussion

This study explored the relationship between occupational health and safety management and organizational commitment. The correlation analysis of the study confirmed that there is a

Table 2
Correlation results

Variables	AC	NOC	COC
Affective commitment	1		
Normative commitment	0.331*	1	
Continuance commitment	0.248*	0.526*	1
Occupational health and safety management	0.257*	0.370*	0.309*

*$p < 0.01$.
AC, affective commitment; COC, continuance commitment; NOC, normative commitment.

Table 3
Standard multiple regression for occupational health and safety management on affective, continuance, and normative commitment

	β	R^2	F	t
OSH and affective commitment	0.257	0.066	26.106*	5.109*
OSH and normative commitment	0.370	0.137	58.230*	7.631*
OSH and continuance commitment	0.309	0.095	38.792*	6.228*

*$p < 0.001$.
OSH, occupational safety and health.

moderate positive relationship between occupational health and safety management and affective commitment. Likewise, the regression analysis showed that occupational health and safety management had a significant impact on affective commitment. Thus, as employees have positive impression/perception of the management of health and safety on the job, their emotional attachment and identification with the organization becomes stronger. This finding is consistent with an earlier study conducted by Siu [41], who also found a positive relationship between the physical well-being of employees and affective commitment. According to Zeidan [44], employees with high affective commitment demonstrate emotional attachment/identification with, and involvement in the organization, and such employees are less likely to engage in withdrawal behaviors such as absenteeism, low performance, and turnover [45,46].

The findings also show that there is a moderate positive relationship and significant impact of the perception of occupational health and safety management on the normative commitment of employees. This also affirms the assertion of Cooper [14] that, in order for management to develop loyalty among employees, especially those working in highly hazardous organizations, the health and safety of these employees must be a top management priority. According to Meyer and Allen [33], normative commitment may be developed when an organization incurs significant costs in providing employment such as investing in health and safety training for employees. Acknowledgment of such an investment on the part of employees could create an imbalanced relationship and cause employees to feel obliged to reciprocate by devoting themselves to the organization until the cost has been paid [47,48]. Normative commitment has been found to be a significant predictor of employees' intention to quit [49]. Hence, the more employees feel safe on the job, the more they will feel obliged and loyal to their organization and reduce turnover.

The results of this study further indicated that there is also a moderate positive and significant association between occupational health and safety management and continuance commitment. Thus, employees' perception of the management of health and safety in the organization influences their decision to stay in the organization and to contribute favorably to the organization. Where employees perceive the management of health and safety in the organization to be appropriate and adequate, they are more likely to have a continuing relationship with the organization knowing that their health and safety are secured in the organization. By contrast, where they perceive that their health and safety is under threat through their evaluation of the management of health and safety in the organization, they tend to exhibit withdrawal behaviors such as absenteeism and high turnover. This finding is consistent with that of Sinclair et al [39], who found that, when organizations failed to address poor working conditions such as excessive noise, abusive supervision, poor visibility and dusty conditions, there was a decrease in employees' continuance commitment to the organization. Thus, employees judge the cost of staying with their organization to exceed the cost of leaving. In other words, to get devoted employees to work within highly hazardous organizations such as the mines, there is a need to provide effective safety and health systems that safeguard employees' health and safety.

Theoretically, findings from the study give credence to the various theories on reciprocity, particularly the social exchange theory, which proposes that social behavior is the result of an exchange process the purpose of which is to maximize benefits and minimize costs. According to the theory, people weigh the potential benefits and risks of social relationships. When the risks outweigh the rewards, people will terminate or abandon that relationship. The primary assumption of the theory is that individuals interact

for profit or the expectation of it. Out of a very basic desire to secure their health and safety at work, employees will evaluate their relationship with their organizations and make an informed decision as to whether to have an emotional, continuous, or normative relationship with their organizations. According to Falk and Fischbacher [50], a reciprocal action is modeled as behavioral response to an action that is perceived as either kind or unkind. The more an action is considered kind or unkind, the more it will be rewarded or punished, respectively. So, when employees perceive that their organization does not care for their health and safety, they will reciprocate by exhibiting work behaviors such as absenteeism, intent to leave the organization, and poor commitment.

4.1. Limitations of the study and recommendations for future studies

The researchers gathered data during a time of uncertainty in the mining industry, and it is believed that this uncertainty would have affected the responses of respondents, hence limiting the impact of the results of this study. During the period of data collection, all mining companies that participated in the study were laying off workers, which caused most employees to feel insecure about their jobs. This, as a result, could have an effect in providing accurate information, because it is likely for them to assume that management would assess their commitment to the organization through the information that was given. Future research can therefore explore the same variables in mining organizations that are relatively stable (mining organizations that have no intentions of downsizing). Also, future studies should explore safety leadership and safety performance mediating the role of coworker safety in the mining sector.

The study investigated the relationship between occupational health and safety management and organizational commitment in the mining industry of Ghana. Analysis of the data indicated that occupational health and safety management is positively associated with the three dimensions of organizational commitment. Thus, effective occupational health and safety management provides the impetus for employees to be committed affectively, normatively, and continually. It is therefore imperative that organizations within the mining sector of Ghana recognize the fact that workers who feel healthy and safe in the performance of their duties develop emotional attachment and have a sense of obligation to their organization and are most likely to stay with the organization. In conclusion, organizations can enhance the commitment of their employees by effectively managing the health and safety of employees.

Conflicts of interest

All authors have no conflicts of interest to declare.

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