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Attitudes of Workers Toward Safety and Health Compliance in Construction Sites in Nairobi

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Abstract

Kenya's construction industry is characterized by numerous hazards, rendering the safety and health of construction workers essential as well as challenging to maintain. These workers face significant risks of injuries and illnesses, highlighting the urgent need for efforts to eradicate accidents and health-related issues on construction sites. Despite governmental efforts to enhance safety and health protocols, the persistence of accidents, injuries, and fatalities remains a critical concern. This study investigated the attitudes of construction workers in Nairobi City County (NCC) towards on-site conformity to safety and health regulations. The findings demonstrate that a positive attitude toward safety and health is crucial for enhancing outcomes and minimizing accidents and incidents. Employing a rigorous mixed-methods approach that combined structured surveys and observations, the research targeted a population of 896 construction sites across NCC. From this population, a representative sample of 268 construction sites were selected. Ultimately, data was collected from 210 respondents, yielding a response rate of 78.4%. The results revealed that worker attitudes are pivotal in meeting safety and health standards, accounting for a 52% variation in adherence to safety practices. Consequently, the study advocates for a strategic framework that fosters a culture of safety, emphasizing the need for resource investment, leadership by example, targeted training initiatives, and comprehensive sensitization campaigns. These measures are essential for promoting proactive safety behaviour and enhancing safety and health practices within the Kenyan construction industry.

Keywords: Challenges, Construction sites, safety and health practice, regulation, construction workers' attitude, safety culture

INTRODUCTION

Construction workers face a myriad of risks on-site, which are considerably higher than those encountered by workers in other industries (Berhanu et al., 2019). As noted by James (2011), echoing the International Labour Organization (ILO, 2005), every worker possesses the inalienable human right to return home at the end of the workday alive and uninjured, in the same physical condition as when they commenced their duties. These workers engage in various activities, associated with specific risks (Purohit et al., 2018). Hazards on construction sites arise from tasks performed, environmental factors, and indirect risks posed by coworkers and site equipment (Hagelskjaer, 2014). The distinct nature of construction environments and the practices involved add to the complexity of ensuring safety and health in the industry, rendering it incomparable to other sectors (Boadu et al., 2020).

Given these circumstances, there is a distinct need for the Kenyan government to protect its construction workers through the formulation and execution of effective regulations and the implementation of relevant policies to address these persistent dangers. The International International Labour Organization (ILO, 2005) estimates that globally approximately 60,000 terminal accidents occur annually on construction sites, equating to one death every 10 minutes (Lingard, 2013). The National Construction Authority (2022), identified common causes of failures in Kenyan construction sites, as detailed in **Table 1**. These findings, in line with Khorasane et al. (2022), provide critical insights into the frequent construction collapses.

Human factors substantially influence accidents on construction sites, with worker behaviour

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TABLE 1
Prevalent factors contributing to construction failures in Kenya

No	Factors	Description
1	Technical	• Insufficient material testing equipment • Incomplete specification drawings and schedules for architectural and engineering tasks • Inferior quality materials • Absence of quality assurance protocols • Inadequate construction oversight
2	Legal	• Insufficient legal and regulatory frameworks to guide safety and health practices • Lack of awareness among key actors regarding existing laws and regulations
3	Institutional	• Deficient coordination and organization between construction projects and regulatory agencies • Inadequate comprehensive integration of digital services within construction processes • Absence of well-defined scopes of work delineated for various professional levels
4	Ethical	• Involvement of unqualified individuals posing as professionals • Lack of transparency among team members within the construction sector and regulatory bodies • Instances of negligence • Misconduct by professionals and consultants • Corrupt practices
5	Financial	• Most contractors are ill-prepared financially to commence construction • Insufficient budget allocation for safety and health measures • Contractors predominantly prioritize profit over the quality of both processes and products
6	Welfare	• Absence of personal protective equipment • Poor remuneration of workers • Unsafe sites

Source: Compiled by Author (2024) from NCA (2022) and Khorasane et al. (2022)

being a primary contributor (Rafieyan & Chan, 2022). Attitudes toward work safety, encompassing perceptions, emotional responses, and engagement with safety protocols, are critical for predicting safety behaviour and preventing accidents (Rybakowski et al., 2009; Gharibi et al., 2016; Tirimisiyu et al., 2022). Despite regulations, workers often dismiss safety measures as burdensome, addressing concerns only post-incident (Meswani, 2008; Ogetii, 2019).

In Kenya, negative attitudes towards safety and health are exacerbated by social structures and economic pressures, which prioritize immediate financial needs over long-term safety and health practices (Mwendwa, 2000; Kemei, 2019). This underscores the necessity for a regulatory model that addresses worker attitudes and behaviours concerning safety and health. The effectiveness of such a framework depends not only on mandated systems but also on understanding the human factors that influence the enforcement of safety and health protocols (Macht & Davis, 2018).

THEORY

The construction industry encompasses a variety of entities, including consultants, contractors, site supervisors, and construction workers, who collaborate to complete projects for their employers (Leyian, 2022; NCA Regulation, 2014). This industry significantly contributes to a country's social and economic development (Pheng & Hou, 2019) and provides livelihoods for hundreds of thousands of skilled and unskilled workers in Kenya (KNBS, 2022).

Recently, the Government of Kenya (GoK), under its Bottom-Up Economic Transformation Agenda (BETA), particularly within the Housing and Urban Development pillar, has promoted social housing for its citizens (Government Delivery Services, 2023). As a key employer, the GoK has heavily invested in the construction sector by implementing key infrastructural projects, including the construction of roads, ports, dams, power facilities, railways, and housing, all aimed at benefiting the populace (CaK, 2017).

Implementing safety and health practices presents a considerable challenge within the construction industry of numerous third-world nations (Boadu et al., 2020). Kheni et al. (2006) noted that this sector predominantly consists of Micro, Small, and Medium Enterprises (MSME) contractors who often neglect safety and health issues, a tendency corroborated by Weil (2001), resulting in significant accidents and health problems. Comprehensive research conducted by Phoya (2012), Kirombo (2012), Muiruri (2014), Umeokafor et al. (2014), Kibe (2015), Omweri and Ombui (2018), Ogetii (2019), Kemei (2019), and Wanjiru and wa Teresia (2021) on construction safety and health regulations in Kenya and other developing nations has highlighted numerous critical and recurring factors.

Construction Worker's Safety and Health Attitude

Attitudes comprise evaluative statements or judgments about objects, people, or events, encompassing cognitive, affective, and behavioral components. In the context of construction industry safety, these components respectively include beliefs about safe behaviour, emotions associated with safety practices, and intentions towards safe conduct (Jhangiani & Tarry, 2022; Nguyen, 2020).

Studies highlight a significant correlation between non-compliance with safety protocols and unsafe behaviours, attributing many construction accidents to human error (Shao et al., 2019; Zin, 2012). Proactive supervisor-worker engagement is crucial for promoting safe practices, as demonstrated by Nguyen (2020) and Sawacha et al. (1999), who found that such interactions improve on-site safety.

A safety culture, deeply rooted in a collective commitment to safety and the proactive involvement of all stakeholders, is pivotal. This is supported by Arblaster (2018) and the ILO (2022). Smallwood (2002) argues that despite the high-risk nature of the industry, Occupational Safety and Health (OSH) standards are inadequately prioritized. The International Atomic Energy Agency (IAEA, 1986) defines safety culture as "the collective values, attitudes, competencies, and behaviours of an organization that determine its commitment to safety". This culture encompasses beliefs, norms, and socio-technical practices aimed at reducing hazardous conditions (Alrehaili, 2016; Hien et al., 2024).

In South Africa, Windapo (2013) noted that contractors often view compliance with OSH regulations as unnecessary, rarely using it as a performance metric. Baghdadi (2024) identified bribery and a lack of awareness as substantial barriers to OSH compliance in infrastructure projects. Fakherpour et al. (2017) found the cognitive component to be the most significant contributor to safety attitudes among workers in small enterprises in Shiraz, followed by the affective component, with the behavioural component being the least significant as illustrated in **Figure 1.**

The following elements of attitude have been elaborated to understand workers' perspectives on adherence to safety and health regulations:

Emotional / Affective Attitudes on Safety and Health Regulations in Construction Sites

Emotional attitudes encompass an attitude's affective dimension, including reactions to safety regulations and feelings towards related subjects (Netzer et al., 2018; Ndege, 2004). In workplace safety, these attitudes reflect workers' emotional engagement with safety and health regulations, influenced by risk communication and protective measures initiated by contractors (Ndege, 2004). This emotional interaction may facilitate safe expressions of feelings and risk-taking (Basahel, 2021), though negative emotions like stress and nervousness can also emerge. Accurate hazard identification by workers is essential for effective safety management, as higher proficiency in recognizing hazards is associated with a decreased likelihood of engaging in unsafe behaviour (Perlman et al., 2014; Namian et al., 2022).

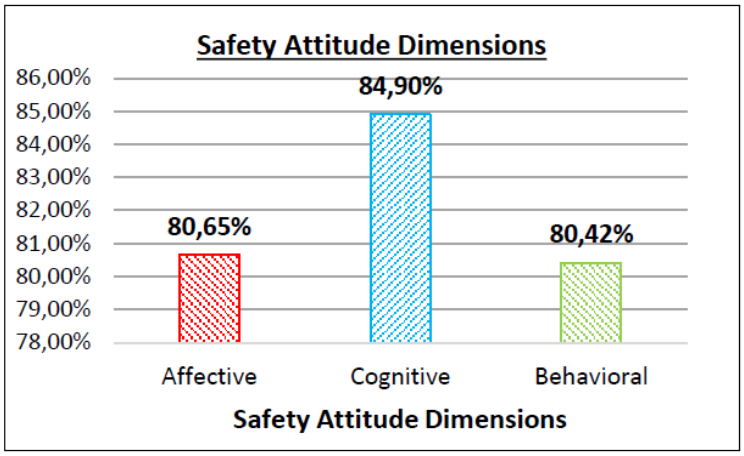

FIGURE 1
Safety Attitude Dimensions
Source: Fakherpour et al. (2017)

Unsafe behaviour among construction workers can be categorized into individual, organizational, and environmental factors (Abdelhamid & Everett, 2000; Zhou et al., 2015). Individual factors involve psychological and physiological aspects, including attitudes towards safety, experience level, physical and mental condition, risk perception, and training. Organizational factors cover policies, safety protocols, equipment availability, enforcement of safety regulations, leadership style, and overall safety culture while environmental factors include equipment state, weather conditions, site layout, and hazardous materials presence (Alizadeh et al., 2015; Namian et al., 2022).

Workers' emotional states and experiences significantly influence safety-related decisions and behaviours on construction sites (Jung & Chi, 2020). Recognizing that emotional decisions may appear irrational and acknowledging that attitudes can vary significantly based on cultural, economic, and societal contexts are essential for comprehensive safety and health management on site.

Behavioural Attitudes Toward Safety and Health Compliance on Construction Sites

Behaviour, as defined by Vijayakumar (2007), encompasses all observable and measurable actions of an individual. It reflects how one responds to specific situations or stimuli (Onochie, 2020). The behavioural component of attitude denotes a person's propensity to act in certain ways, whether in the short term or long term (Jhangiani & Tarry, 2022). This component is critical in settings like construction sites, where behaviour significantly impacts safety and health (Szczygielska, 2011). An ideal safety attitude promotes safe behaviour, reducing accident and illness rates on-site (Wachter, 2014). Good safety behaviour is indicative of compliance with safety standards (Zin & Ismail, 2012); for instance, workers avoid dangerous tasks without adequate knowledge or competence.

Safety behaviour includes practices that support safety and health, such as training (Mehmood et al., 2018), and is crucial in reducing injuries at construction sites (Johnson et al., 2005). Unsafe acts account for approximately 80% of construction site accidents (Wilson, 2007). Changing safety attitudes effectively involves modifying safety behaviours through training (Jhangiani & Tarry, 2022), symbolizing workers' engagement and participation. Behavioural attitudes reveal individual beliefs about safety policies, procedures, and actions, including one's commitment and sense of responsibility towards safety (Jahangiri, 2013).

Construction workers' behaviours, responses, and interactions are influenced by their beliefs, whether conscious or subconscious, significantly affecting their decision-making processes (Orando, 2013). Enhancing safety and health in construction requires not only advanced technological systems but also the upholding of safety behaviours, values, beliefs, and attitudes (Bisbey et al., 2021). Accurate attitudes towards safety and health are

essential in preventing site accidents and injuries (Harper et al., 1996).

Cognitive Attitudes to Safety and Health Regulations in Construction Sites

The cognitive attitude of construction workers toward safety and health includes a comprehensive understanding of construction safety principles, an awareness of work-related risks, and an ability to recognize near misses (Ndege, 2004). This attitude includes beliefs, thoughts, opinions, and attributes related to safety, necessitating that workers identify, assess, and effectively respond to hazards (Abun et al., 2019). This cognitive aspect critically influences workers' abilities to judge and recognize risky behaviours that may compromise safety and health practices (Xiong et al., 2022). Consequently, it plays a pivotal role in safety management, significantly affecting how workers perceive and manage behaviours (Naji, 2021). A thorough understanding of safety cognition is essential for accident analysis, determining causation, and enhancing overall safety in construction environments (Wang & Razavi, 2019).

Various factors drive construction workers' actions and choices on-site, including habit, convenience, necessity, perception, carelessness, or ignorance (Tadesse, 2009). Workers might expose themselves to hazards by relying on past experiences, even if those experiences previously led to flawed outcomes (Bushiri, 2014). Furthermore, they may inadequately recognize or assess risks or fail to fully appraise potential consequences, particularly if previous encounters with similar situations did not result in incidents.

The influence of beliefs on safety at construction sites can be either positive or negative, contingent on the context (Muñoz-La Rivera, 2021). Beliefs regarding personal control over safety are crucial for analyzing accidents and understanding their root causes. A nuanced comprehension of these beliefs facilitates a more realistic analysis of accidents, leading to the development and implementation of effective preventive measures (Titler, 2008).

Safety Culture in Construction Sites

Culture encompasses shared behaviours, norms, values, and tangible artefacts (Duckworth, 2016). Varner and Beamer (2005) describe culture as the profound shared, and often subconscious experiences that characterize a community, forming the backdrop against which all actions are evaluated. Cultural practices exert a substantial influence on how seriously construction workers regard safety and health regulations (Naji et al., 2021). Frequently, cultural norms or pressures may compel workers to prioritize productivity over safety and health. As illustrated in **Table 2**, safety is influenced by various cultural factors, including organizational culture and industry practices, within the relevant legal and institutional frameworks (Guldenmund, 2000).

The evolution of safety and health culture is well-documented and feasible, as illustrated by the historical shift in societal attitudes toward drunk driving since the 1970s (Leif et al., 2023). Thakur et al. (2011) and Al-Bayati et al. (2019) explored the role of cultural factors in shaping safety and health perceptions among construction workers, proposing a theoretical model to analyze these perceptions across different cultural backgrounds in the United States for enhanced fatality analysis.

The safety culture within the construction industry has long been deemed inadequate (Berglund et al., 2023), necessitating a significant shift in attitudes towards safety and health on Kenyan construction sites. The NCA Construction Industry Policy of 2019 emphasizes a zero-tolerance approach to unsafe and unhealthy work practices to cultivate a proactive safety culture.

The term *'safety culture'* was initially introduced following the Chernobyl disaster in 1986, highlighting deficiencies in safety and health management systems and unsafe design and technical processes (Ness et al., 2021). This incident emphasized the significance of organizational and human factors over purely technical failures in causing accidents in high-risk industries (Umugwaneza et al., 2019). Consequently, regulators across various industries, including oil and gas and aviation, have integrated safety culture into their evaluation metrics (Grote & Weichbrodt, 2013; Bernard et al., 2018; ICAO, 2021).

Workplace safety is often compromised by cultural norms such as tool-sharing, social drinking, and a male-dominated environment that promotes toughness, which increases the risk of injuries

TABLE 2
Cultural factors in construction sites towards safety and health compliance

Industry Culture	Organizational Culture
i. Lack of expertise/ professional Safety Personnel for engagement on site ii. Poor safety attitudes of construction workers iii. Poor workers' values & traditions iv. Poor safety & health management on sites v. No consideration of safety and health as the performance indicator vi. Lack of safety and health records on site vii. Lack of safety and health training/ induction viii. Corruption ix. Lack of safety and health enforcement & compliance	i. Poor safety culture. ii. Workers are not encouraged on innovation to safety & health solutions iii. Common firefighting / reactive approach to solving problem iv. 'Blame game'/ Lack Responsibility Center v. Lack of Workers' Involvement in Safety Practice vi. Lack of OSH supervision & safety procedures vii. Disregard for organization safety reputatioviii- Lack of safety /hazard communication viii. Lack of safety /hazard communication ix. Lack of safety training/induction x. Focus on time and output over safety xi. Macho behaviour by male workers xii. Lack safety and health methodology, if available it is 'copy-pasted'

Source: Compiled by Author (2024) from Kheni (2008), and Berglund (2023)

and accidents (Amponsah-Tawiah, 2018; Ness, 2012). The World Health Organization has linked traditional masculinity with riskier behaviours, including refusal to wear seatbelts (WHO, 2002; McKay & Forster, 2005; Asumeng et al., 2015). These practices, while perceived as camaraderie or strength, ultimately result in greater hazards.

Safety and health practices heavily depend on workers' ability to recognize hazards (Afzini & Neyestani, 2011). When workers struggle to acknowledge risks, they become more susceptible to accidents and injuries (Abdalla et al., 2017). Despite existing safety measures, recent research indicates a troubling neglect of human factors in their development, which limits their effectiveness (Gurmu, 2019; Lestari et al., 2020). **Table 3** summarizes safety and health attitudes observed among different stakeholders in the construction industry, as indicated by various researchers.

Workers' attitudes are essential for maintaining safety and health on construction sites (Nguyen, 2020). Key factors include adherence to regulations, proper use of protective equipment, and active participation in safety training. Additionally, workers' perceptions of risk significantly influence their behaviour; underrating risks can lead to the neglect of safety protocols, hindering a strong safety culture. Like other professionals, construction workers may resist new safety and health regulations, especially those disrupting established practices (Muzio et al., 2013).

In the construction industry of Kenya, the prevailing economic challenges and financial pressures often prioritize income generation over adherence to safety and health regulations (Daudigeos, 2013). Construction workers frequently resist implementing safety measures perceived as impediments to their earnings, such as ceasing work under hazardous conditions (Ibid). This resistance poses substantial risks not only to individual workers but also to the overall safety culture of the industry. Despite these prevalent challenges, there is an urgent need to develop and implement a comprehensive safety and health model specifically tailored to the Kenyan construction sector. Such a framework is essential for addressing the economic pressures that currently jeopardize workers' safety and for fostering a culture of compliance that prioritizes safety and health in the construction industry.

RESEARCH METHODS

According to Kothari (2004), the formula for computing the sample size for a large population or population greater than

$$10{,}000 \text{ is } n_1 = \frac{z^2 pq}{E^2}$$

For the finite population or population of fewer

TABLE 3
Common safety & health attitudes in the construction sites

No	Parties in Construction	Prevalent Safety and Health Attitudes in Construction Projects
1	Client	• Giving priority to project timelines/Milestones and not safety compliance • Budget consideration that disregards safety and health cost • Placing significance on the quality of finished works and not safety and health practices on site
2	Consultants	• Prioritizing the satisfaction of client expectations over the effective management of safety and health • Prioritizing project performance metrics, including efficiency and productivity, and giving safety and health the least significance • Inadequate management of safety and health at the construction site due to the absence of regular safety audits • Simply, adhering to Safety & health practices is a legal and contractual obligation • Safety and health costs are often disregarded and instead lumped up as a preliminary item in the bill of quantities. • Adopting a reactive rather than proactive strategy toward the management of safety and health
3	Contractors	• 'Copy-pasting' the risk register from one construction site to another, without properly assessing and addressing site-specific risks. • Adopting a 'bare minimum' approach by merely fulfilling the legal requirements, and treating safety and health practices as a checkbox exercise rather than a genuine commitment. • Failing to engage qualified Safety Supervisors as mandated by the Occupational S&H Act (OSHA, 2007). • Inadequate provision of personal protective equipment (PPE) • Sharing and other unsafe and unhealthy practices • Inadequate welfare facilities provided for workers on construction sites. • Over-reliance on reactive measures rather than proactive safety management. • Absence of a strong organizational culture that prioritizes safety and health practices. • Underinvesting in safety training and equipment, compromising the overall S&H standards on construction sites.
4	Construction Workers	• Practice unsafe & unhealthy behaviours on site • Becoming complacent about safety measures, especially when no incident happens, leading to cutting corners on safety procedures • Wrongful/Misuse of tools and equipment • Casually accepting risks as part of the job, particularly in environments where accidents are frequent and safety measures are not enforced • Resistance to change • Macho behavior (Especially Men) • Poor reporting culture (Non-reporting of incidents) • Poor safety culture
5	Regulator	• Lack of a comprehensive operational framework for S&H management. • Insufficient continuous training and sensitization programs for construction workers and site supervisors. • Inadequate prioritization of enforcement checks and inspections on active construction sites. • Prevalence of corruption, which undermines the effective implementation of safety regulations. • Negligence and failure to conduct adequate oversight, often not following up on reported safety violations. • Predominantly reactive rather than proactive behaviour in addressing S&H concerns.

Source: Compiled by Author (2024) from Lestari et al. (2020), Gurmu (2019), Purohit (2018) & Abdalla et al. (2017)

AFRICA HABITAT REVIEW 19(2) 2024

than 10,000, the computation for the sample size is adjusted to reduce the size of the sample (Yamane, 1967). The formula is therefore computed as follows;

$$n = (n_1)/(\left(1 + \left(\frac{n_1 - 1}{N}\right)\right)$$

Therefore, this study considered all the active registered construction projects within Nairobi County as of December 2022. The sampling frame contained a population size of 896 construction sites which was categorized as a finite population or a population less than 10,000 as shown below:

$$n = (n_1)/\{(1 + \left(\frac{n_1 - 1}{N}\right)\}$$

$$n_1 = \frac{z^2 pq}{E^2}$$

$$n_1 = \frac{1.96^2 0.5x0.5}{0.05^2} = 384$$

Where;
n is the sample of a population less than 10,000
n_1 is the sample size of a population greater than 10,000
N is the size of the total population
z^2 is the square of the z score for a 95% confidence level which is 1.96
p is the population mean (0.5)
q is the value of (1 – p)
E is the margin of error
E^2 is the square of the margin of error

$$n_1 = \frac{1.96^2 0.5x0.5}{0.05^2} = 384$$

$$n = \frac{384}{1 + \frac{383}{896}}$$

$$n = \mathbf{268}$$

The research onion, proposed by Saunders et al. (2012), serves as a symbolic framework delineating the various stages of a research study. This model, illustrated in **Figure 2**, is structured in concentric layers. It begins with the outermost layer, which represents the research philosophy and proceeds inward through layers that include the research approach, strategy, time horizon, data collection methods, and data analysis techniques. The research onion paradigm is instrumental in guiding researchers to methodically consider each element, thereby ensuring that the research design and methodology achieve coherence. It is conducted with the appropriate level of scholarly rigor. Tabulated in **Table 4** is a synthesis that articulates the preferences selected from the research onion pertinent to this study as Saunders et al. (2012) described.

Table 4 summarizes the study's research methodological preference as guided by the research onion.

RESULTS

Questionnaire Response Rate

A total of 268 questionnaires were physically distributed to various construction sites within Nairobi City County. These questionnaires targeted safety officers or site supervisors. Out of the 268 questionnaires distributed, 210 were completed and returned, yielding a response rate of 78.4%, which is substantially high for statistical generalization. According to Saunders et al. (2003), a response rate between 30% - 50% is usually adequate for generalizing sample findings to a broader population. Detailed information on the response rates is provided in **Table 5**.

Reliability Test for Workers' Attitude

Within the context of this research, '*reliability*' pertains to the consistency, stability, and replicability of the study's measurements or procedures (Chiang, 2015). To evaluate the internal consistency of the data regarding workers' attitudes towards safety and health practices on construction sites, Cronbach's alpha was employed. Cronbach's alpha values exceeding 0.7, as detailed in **Table 6**, indicate satisfactory reliability of findings.

This study reported a Cronbach's alpha of 0.74 which is deemed satisfactory. This alpha value indicates reliable consistency in the data collected on workers' attitudes towards safety and health practices, thereby enhancing the credibility and validity of the study's findings. Such a level of reliability confirms that the measurement instruments employed generate stable and replicable results.

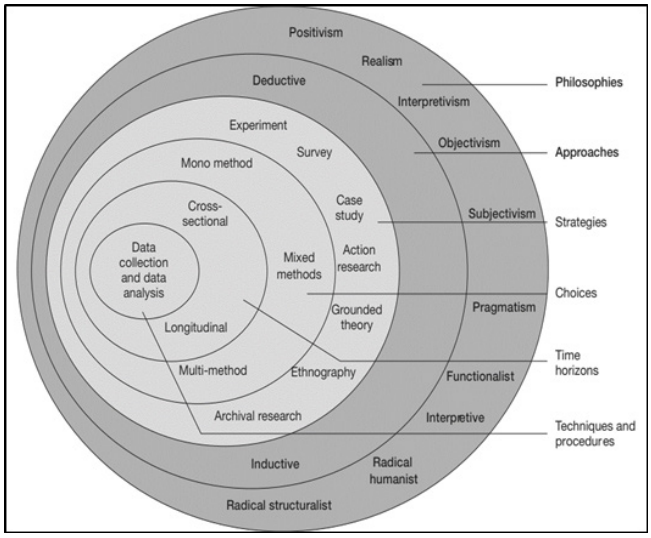

FIGURE 2
Diagrammatic representation of the research onion model
Source: Saunders et al. (2012, 2019)

TABLE 4
Summary of the study's research methods

No	Methodology	Selected Choice	Remarks
1	Philosophy	Pragmatism	Pragmatism was preferred in this study, as it has the potential to generate actionable insights and effective strategies to enhance safety and health outcomes.
2	Approach	Deductive approach	The deductive approach was highly suited for this study due to its structured methodology, emphasis on, objectivity, ability to establish causality, reproducibility, and practical relevance.
3	Strategy	Surveys	The survey method was ideal since it was efficient in collecting large-scale, standardized, and quantitative data.
4	Choice	Mixed method approach	The mixed-methods approach was effective in combining quantitative and qualitative research and ensures comprehensive, valid, and reliable insights
5	Time Horizon	Cross-sectional study	A cross-sectional study was preferred for investigating workers' attitudes toward safety compliance on Nairobi construction sites due to its efficiency, and cost-effectiveness.
6	Data collection method	Questionnaires	Questionnaires were chosen for their efficiency in gathering data from many participants quickly and their ease of distribution
		Observation Checklist	Observation checklists were preferred because they provided a structured framework for systematically recording specific behaviours and events of interest in real-time
7	Sampling Method	Simple Random	Simple random sampling was preferred for this study due to its impartiality, simplicity, and statistical robustness.
		Convenience Sampling	This was preferred due to its practicality, feasibility, and timeliness, particularly suited for observation purposes.

Source: Field survey, 2024

TABLE 5
Questionnaire response rate

Questionnaires	Number	Percentage
Total Issued	268	100
Total Returned	210	78.4
Total Unreturned	58	21.6
Response Rate		**78.4**

Source: Field survey, 2024

TABLE 6
Reliability test

Variable	Cronbach's Alpha	No. of Items	Comment
Workers' attitudes to safety & health practice	.740	33	Accepted

Source: Field survey, 2024

Linear Regression Analysis of Construction Workers' Attitudes and Compliance with Safety and Health Practices

A linear regression analysis was performed to investigate the relationship between the predictor variable, workers' attitudes, and the dependent variable, the level of safety and health practices. The model summary, illustrated in **Table 7**, indicates a robust fit for the linear regression model. The coefficient of determination (R2) was found to be 0.520, signifying that approximately 52.0% of the variance in the level of safety and health practices can be attributed to workers' attitudes. This strong correlation suggests a significant relationship between workers' attitudes and the level of safety and health practices on construction sites.

There exists a substantial and statistically significant relationship between workers' attitudes and the level of safety and health practices, with workers' attitudes accounting for a considerable portion of the variance in these practices as alluded to in **Table 7**. This finding underscores the critical role that worker attitudes play in promoting safety and health practices on construction sites.

ANOVA Analysis of Workers' Attitudes and Their Impact on Safety and Health Practices

Table 8 presents the findings from the analysis of variance (ANOVA) conducted to explore the relationship between the predictor variable, '*Workers' Attitude,*' and the dependent variable, '*Level of Safety and Health Practices*.' The ANOVA table includes key model results: the regression sum of squares, the residual sum of squares, the total sum of squares, degrees of freedom (df), mean squares, the F-value, and the significance level (p-value). The ANOVA results indicate that the regression model is statistically significant ($F(1, 209) = 224.907$, $p < .001$), demonstrating that '*Workers' Attitude'* significantly influences the variance observed in the level of safety and health practices, as illustrated in **Table 8**.

There is a statistically significant relationship between workers' attitudes and the level of safety and health practices as highlighted in **Table 8**. The results demonstrate that workers' attitudes significantly affect safety and health practices, and the provided statistical metrics validate the robustness of the model.

Regression Coefficients Analysis for Safety and Health Practice

The results presented in **Table 9** demonstrate that controlling for other factors, each one-unit increase in workers' attitudes leads to a 2.781-unit rise in the level of safety and health practices at construction sites in Nairobi. This indicates a positive correlation between workers' attitudes and safety and health practices at Kenyan construction sites. The impact of the predictor variable, 'Workers' Attitude,' on the dependent variable, '*Safety and Health Practices*,' is statistically significant. The unstandardized coefficient for 'Workers' Attitude' is 2.781 (B = 2.781, SE = 0.185), signifying that on average, a one-unit increase in '*Workers' Attitude*' results in an approximate 2.781-unit enhancement

TABLE 7
Linear regression for workers' attitude and compliance with safety and health practices

Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721[a]	.520	.517	.89911

a. Predictors: (Constant), Workers Attitude

b. Dependent Variable: Level of safety and health practices

Source: Field survey, 2024

TABLE 8
ANOVA for level of safety and health practices on site

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	181.812	1	181.812	224.907	.000[b]
	Residual	168.145	208	.808		
	Total	349.957	209			

a. Dependent Variable: Level of safety and health practices

b. Predictors: (Constant), Workers Attitude

Source: Field survey, 2024

TABLE 9
Regression coefficients analysis for safety and health practices

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-9.140	.817		-11.189	.000
	Workers Attitude	2.781	.185	.721	14.997	.000

a. Dependent Variable: Level of Safety and Health Practices

Source: Field survey, 2024

in the level of safety and health practices.

Additionally, the standardized coefficient (Beta) for '*Workers*' *Attitude*' was 0.721 which indicates the magnitude of the predictor variable's effect when the variables are expressed in standard deviation units. Essentially, this means that a one-standard-deviation increase in '*Workers*' *Attitude*' is associated with a 0.721 standard deviation increase in the level of safety and health practices.

CONCLUSION

The results of this study illuminate the significant impact of worker attitudes on compliance with safety protocols within the construction sector. It is evident that '*Worker Attitude*' exerts a critical influence on the '*Compliance of Safety and Health Practices*.' Empirical evidence from the study reveals a substantial unstandardized coefficient of 2.781 for '*Worker Attitude*' (β = 2.781, SE = 0.185). This indicates that holding other factors constant, a one-unit increase in '*Worker Attitude*' is associated with an approximate 2.781-unit enhancement in the implementation of safety and health practices at construction sites in Nairobi.

Safety culture begins at the top and cascades downward, shaped by the actions and attitudes of consultants, contractors, and workers alike. It is therefore paramount to foster a culture that prioritizes open communication and adopts a non-punitive approach to safety and health issues. Such a culture empowers construction workers to

report hazards freely and take appropriate actions, including halting operations when confronted with unsafe conditions, without fear of reprisal.

RECOMMENDATIONS

Enhancing safety culture in Kenya's construction industry requires a multifaceted approach addressing organizational, regulatory, and behavioural aspects. This study emphasizes the critical importance of cultivating a safety-centric mindset among workers to improve safety and health on construction sites. Developing a model to foster this mindset is crucial for elevating the industry's safety culture and encouraging all stakeholders to prioritize workforce well-being.

Significant investment in meticulously designed training initiatives and awareness programs is imperative. These programs should establish and reinforce a robust safety culture, encompassing comprehensive information on risk identification, hazard recognition, proper use of safety equipment, and adherence to established best practices. Regular safety training sessions and toolbox talks are essential for emphasizing daily vigilance in construction site safety.

The study recommends mandatory, comprehensive safety and health orientation programs for all new construction workers, delivered by certified training providers or subject matter experts. Training should be expansive, covering new worker orientation, introduction of new tools or technologies, and periodic refresher courses for all site operatives. Ongoing, up-to-date training sessions must accommodate diverse skill levels and responsibilities within the workforce, covering critical topics such as risk awareness, hazard identification, and accident prevention. Programs should be tailored to reflect the specific demands of each project.

This research underscores the critical role of worker attitudes in construction safety and health, suggesting that effective safety measures extend beyond regulatory compliance. Recommendations emphasize worker involvement, relevant training, and addressing cultural norms. Economic incentives and leadership by example are pivotal. The study also advocates for ongoing evaluation and enhancement of safety regulations by a governing body to ensure their efficacy and adaptability.

In conclusion, this study lays the foundation for a strategic approach aimed at instilling a durable safety-centric mindset. This approach is anticipated to yield long-term benefits for the construction industry in terms of both human well-being and operational efficiency. By fostering a culture of safety, construction workers are more likely to comply with regulations and contribute to a secure working environment, ultimately reducing on-site incidents and accidents.

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