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H&S factors linked to absenteeism in small and medium-sized contractors

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ABSTRACT

Purpose of the study: The construction industry is characterised by high rates of accidents linked to workplace absenteeism. Absenteeism disrupts project timelines, leads to breaches of contractual agreements, increased labour costs, and hinders overall productivity. While absenteeism among construction workers is a well-documented concern, there is a need for a more nuanced understanding of specific health and safety (H&S) factors that contribute to absenteeism among small and medium-sized contractors. Hence, this research seeks to assess the relationship between H&S factors and absenteeism among small and medium-sized contractors in the Johannesburg metropolitan area. The research aims to influence the adoption of management practices that can assist contractors in mitigating absenteeism through enhanced H&S performance in the construction industry.

Design/methodology/approach: This study used a cross-sectional design to determine a correlation between H&S factors and absenteeism among construction workers employed by small and medium contractors. A simple random sampling technique was used to select research participants, to give each construction worker an equal opportunity to participate in this study, and to minimise biased representation. Epi Info™ 7.2 statistical software for epidemiology was used to determine the sample size. The data was collected using a self-administered questionnaire over a period of three months. The questionnaire and the informed consent forms were translated orally to research participants with a low level of literacy. The data was analysed using the IBM SPSS™ Statistics version 26. The data was presented and analysed using data frequency distributions, contingency tables, and t-tests of Independence.

Findings: The research findings indicate varying degrees of intercorrelation between various independent variables and absenteeism, a dependent variable measured by Cramér's V. However, such relationships were found to be generally weak to moderate in strength. A medium practical significance was observed between workplace stress causes and absenteeism, implying that increased workplace stress led to a noticeable but not overwhelming increase in absenteeism.

Recommendations/value: Understanding H&S factors linked to absenteeism among contractors should influence the adoption of strategies to manage absenteeism through enhanced H&S performance in the construction industry.

Managerial implications: Research findings can be used to assess the impact of absenteeism on productivity, quality of work, and contractor reputation. Furthermore, they can be used to enhance H&S consciousness among construction workers, contractors, and other relevant stakeholders. H&S consciousness is vital in creating a healthy and safe workplace and improving construction workers' wellbeing, linked to decreased absenteeism among contractors.

Keywords

Absenteeism; construction; construction workers; exposure; health and safety

JEL Classification: J28

1. INTRODUCTION

The construction industry is known as the most hazardous and risky industry and has always been plagued with high accident rates and health problems (Abas *et al*., 2020; Ammad *et al*., 2021). Unsafe working conditions, non-compliance with H&S regulations, a lack of workplace H&S programmes, and practices that enhance prioritisation of construction workers' H&S, welfare, and well-being can adduce absenteeism associated with workplace accidents, injuries, and illnesses among construction workers (Adebiyi *et al*., 2020; Malomane *et al*., 2022). Workplace absenteeism has a negative impact on productivity, work schedules, workflow, task accomplishment, and profitability (Mashwama *et al*., 2018; Omari *et al*., 2019). Workplace exposures, accidents and injuries, workplace stress, and other H&S factors contribute to absenteeism, presenteeism, and low productivity in the construction industry (Zaccheus *et al*., 2022). According to the authors' knowledge, no study has been conducted in South Africa, linking H&S factors and absenteeism. Therefore, it is vital to assess the correlation between absenteeism and H&S factors among small and medium-sized contractors to influence the adoption of management practices that can assist such contractors to manage and control absenteeism.

2. LITERATURE REVIEW

The literature review contextualised the meaning of absenteeism among contractors, after which the types, causes and effects of absenteeism were explored. Managing absenteeism among contractors was then deliberated from this background.

3.1 Contextual definition of absenteeism among contractors

Absenteeism is a planned or unplanned, justifiable, or unjustifiable lack of physical presence of a worker in the workplace for two or more hours in a day or working < 35 hours during the reference week (Groenewold *et al.*, 2019). In the South African context, there is no statutory definition of 'a reasonable time' that defines workplace absenteeism. Generally, a lack of physical presence at work, arriving late, leaving early, extended tea or lunch breaks, attending to private business during working hours, not attending to duties in terms of the employment contract, extended toilet breaks, and feigned illness can be regarded as being absent from work (Claassen, 2023).

3.2 Types of absenteeism

Absenteeism can be classified as authorised, unauthorised, habitual, and circumstantial absenteeism. Authorised absenteeism is a lack of physical presence at the workplace, where prior notice is given to the contractor who allows the absence based on the circumstances and the reason a construction worker provides (Kaiser, 2018; Saruan *et al*., 2020). Unauthorised absenteeism entails illegitimate absence from work (Chiloane & Mpanza, 2021). This type of absenteeism is not applied for or approved by the employer. Habitual absenteeism is usually a regular and predictive pattern of absence from work without good reason, or it is an implicit breach of contract by a worker through wilful nonattendance (Zaccheus *et al*., 2022). Absenteeism can also be regarded as circumstantial if a worker is absent from work due to situations beyond their control. Circumstantial absence can be legitimate or illegitimate and can be caused by illness, injury, and personal or family responsibility (Parsley *et al*., 2022).

3.3 Causes of absenteeism

Identifying H&S factors influencing absenteeism is key in terms of improving the management of absenteeism by managing H&S factors (Boakye *et al*., 2022). Understanding the causes and reasons for worker absence can help management effectively handle worker absenteeism (Nath *et al*., 2022). Worker absenteeism in the construction industry can be linked to workplace exposures, workplace stress, workplace accidents and injuries and other H&S factors. Researchers have categorised absenteeism as individual and organisational factors, where individual factors include personal issues, illness and disease, personal attitude, lifestyle, family responsibilities, and transport problems (Qi, 2018). Organisational factors include work stress, work fatigue, job dissatisfaction, poor or unsafe working conditions, lack of adequate resources, poor workplace interpersonal relationships, few opportunities for promotion, unattractive salaries, low morale, inadequate leadership and poor supervision and work-related injuries (Qi, 2018; Attridge, 2022).

3.4 Effects of absenteeism on contractors

Absenteeism has been identified as a major contributor to contractor non-performance and productivity losses (Nath *et al*., 2022; Zaccheus *et al*., 2022). Due to absenteeism, contractors are faced with impeded productivity, inefficient service delivery, and reduced performance, thereby negatively affecting sustainability (Singh *et al*., 2016). Research has shown that productivity losses caused by absenteeism cost contractors billions of dollars each year (Nath *et al*., 2022). Reduced productivity, quality of service delivery, and promptness in satisfying the customers' needs due to absenteeism's impact on contractor profitability and sustainability (Nath *et al*., 2022). Furthermore, worker absenteeism casts doubt on a contractor's commitment and capacity to achieve their contractual and mandatory obligations relative to a project (Dhlewayo *et al*., 2021).

Contractors incur direct and indirect costs due to unscheduled absences from work. Direct costs to the contractor include lost working days, sick pay, lost productivity, and reduced service provision (Moletsane, 2018; Arum *et al*., 2019; Dinizulu, 2020; Aboagye-Nimo *et al*., 2021). Indirect costs comprise disruptions of work schedules, administrative costs to monitor and administer leave policy, loss of expertise and experience, training costs for construction workers' replacements, resentment and lower workplace morale, reduced productivity, staff turnover, termination of contracts, and loss of income (Moletsane, 2018; Dinizulu, 2020; Umar & Umeokafor, 2021). Productive time is also lost when management spends time securing replacement workers, reassigning remaining workers and maintaining administrative systems for dealing with control measures for absenteeism (Moletsane, 2018; Dinizulu, 2020; Dhlewayo *et al*., 2021; Nath *et al*., 2022).

3.5 Managing absenteeism among contractors

The construction industry is dynamic. Its complex project-based nature and its reliance on migrant, casual, and transient workforce makes the task of implementing human resource management (HRM) functions difficult (Srour *et al*., 2017). Despite the intricate nature of the construction industry, there is a need to adopt and employ strategies to reduce absenteeism and promote work attendance among contractors (Dhlewayo *et al*., 2021). Effective management of the labour force for reduced absenteeism can lead to improved productivity, contractor organisational effectiveness, efficient and effective service delivery, profitability, and overall organisation H&S performance (Moletsane, 2018; Dinizulu, 2020; James, 2020; Dhlewayo *et al*., 2021). Furthermore, the development of a robust means of motivating workers improves worker morale. The implementation of health risk management approaches centred on compliance with regulations, risk assessment, risk prevention, and accident

analysis to achieve optimum health and well-being of workers for reduced absenteeism (Dhlewayo *et al*., 2021; Moyo *et al*., 2021).

Given the impact of absenteeism on construction productivity, a sound understanding of the underlying causes of absenteeism is critical in terms of identifying possible mitigating strategies for this challenge (Srour *et al*., 2017). Furthermore, an understanding of patterns of absenteeism can assist managers in designing and or revising policies to eliminate or moderate financial losses and the probability of economic insolvency through the control of workplace absenteeism (Nath *et al*., 2022). Contractor commitment to H&S is vital in terms of circumventing absenteeism caused by injuries in the workplace (Ugwu *et al*., 2021). Management commitment to H&S ensures that H&S standards are considered as a component of project performance (Mohammadi *et al*., 2018; Abas *et al*., 2020).

H&S compliance should be considered a driver for productivity, profitability, and client satisfaction to militate against lowered project performance due to H&S risks linked to absenteeism (Mohammadi *et al*., 2018; Abas *et al*., 2020; Moradi *et al*., 2022). Contractors should adopt policy-driven H&S measures to minimise construction accidents and worker non-attendance as a strategy for managing absenteeism. Such measures may include managing and preventing H&S incidents through the hierarchy of elimination of hazards, substitution, engineering controls, administrative controls, and the provision of personal protective equipment (PPE).

PPE is used to protect construction workers from experiencing exposure or injury if properly used (Ammad *et al*., 2021; Puthillath *et al*., 2021). Provision and proper wearing of PPE can mitigate and prevent work-related injuries, leading to reduced rates of workplace absenteeism among contractors (Arum *et al*., 2019). The provision of PPE such as safety goggles, high visibility vests, safety boots, gloves, hard hats, and safety harnesses to construction workers is essential as PPE can protect construction workers from hazards and risks, provided construction workers are trained in terms of their use (Ammad *et al*., 2021).

Research informs that construction workers who have received training relative to the use of PPE are about three times more likely to use PPE than those who are not trained (Alemu *et al*., 2020). In cases where construction workers are reluctant to wear PPE or remove their PPE, strict enforcement of H&S management controls should be implemented to encourage their continued use at construction sites (Eteifa, 2018). Appropriate positioning of risk assessment in the lifecycle of a construction project is critical in terms of H&S management controls, which includes PPE misuse, an often-neglected hazardous behaviour linked to workplace injuries and accidents on construction sites (Ammad *et al*., 2021).

Furthermore, the presence of qualified and experienced H&S specialists on construction sites is key in terms of managing drivers of absenteeism in the construction industry (Okonkwo & Wium, 2020). During research conducted in South Africa, it was determined that there is a scarcity of suitably qualified H&S personnel registered with the South Africa Council for the Project and Construction Management Professions (SACPCMP) (Okonkwo, 2019). The SACPCMP is the statutory body mandated to register appropriately qualified and experienced construction H&S personnel in South Africa. Qualified and experienced construction H&S personnel are essential for the successful implementation of H&S programmes on construction sites because of their ability to be role models in imparting and reinforcing behaviours that optimise H&S (Okonkwo, 2019). During other studies, researchers determined that insufficient qualified H&S personnel, inadequate H&S knowledge and awareness, inadequate H&S management techniques, inadequate H&S training, inadequate safe operating procedures (SOPs), safe working procedures (SWPs), and poor client H&S leadership were the primary causes of H&S non-compliance, injuries, and fatalities on various construction sites (Liu *et al*., 2020; Mafuya & Smallwood, 2020). Therefore, concerted efforts should be made by the relevant stakeholders to promote and facilitate training and registration of H&S personnel who meet the needs of the construction industry (Okonkwo, 2019).

3. RESEARCH METHOD

Construction workers from small and medium contractors undertaking projects in the Johannesburg metropolitan area were sampled for this cross-sectional design study. The sample size was calculated using Epi Info™ 7.2. The confidence interval was set at 95%, with a cluster sample size of 400. A 25% contingency for multiple comparisons and missing data was considered, and the final sample size of 500 from an estimated population of 2 030 construction workers was decided. Contractors were identified and selected through convenience sampling. Respondents (bricklayer, carpenter, carpet installer, drywall installer, electrician, painter, plasterer, plumber, tiler, and general worker) were selected using simple random sampling to minimise bias and give each respondent an equal opportunity to participate in the study.

Data was collected from contractors registered with the Construction Industry Development Board (cidb) using a self-administered questionnaire over a period of 3 months. The data collection instrument (the questionnaire) was pretested for validity and reliability through a pilot study conducted among construction workers who were not part of the main study but having similar characteristics to the study participants of the main study. A list of cidb registered contractors was formerly requested from the board. The questionnaire and the informed consent were translated to vernacular languages orally to accommodate illiterate construction

workers. A pilot study was conducted before the collection of data for the main study to test if the research instrument measured what it purported to measure (Moyo & Smallwood, 2022).

Ethical considerations are central to this study, 'H&S factors linked to absenteeism in small and medium-sized contractors', to ensure that the research is conducted with integrity, respect for participants, and a commitment to improving the workforce and the construction industry. Hence, ethical clearance was sought from the Higher Degrees and Ethics Committees at the University of Johannesburg. The committees reviewed and approved the research before data collection commenced. Letters requesting permission and gaining access for data collection at construction sites were submitted to contractors. The purpose of the study and the research participants' rights were explained to respondents before data collection commenced. Research participants were requested to sign consent forms specifying the nature of their participation in the study. Information regarding the right and freedom to withdraw from the study was communicated and elucidated on the consent form.

4. RESULTS

The IBM SPSS was used to analyse the collected data. The results indicated significant variations between the independent variables and absenteeism, the dependent variable.

6.1 Relationships between absenteeism and demographics

Table 1 indicates that 65.3% and 77.5% of construction workers from small and medium contractors, respectively, had been absent from work once or more. A small intercorrelation exists between contractor size and absenteeism with Cramér's V=0.13.

Table 1: Contractor size versus absenteeism

Contractor size	None		Once or more		Total	
	No.	%	No.	%	No.	%
Small	78	34.7	147	65.3	225	100.0
Medium	62	22.6	213	77.5	275	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 9.02; p = .003; V = 0.13 Small

Construction workers from subcontractors recorded 79.8% absenteeism, while construction workers for contractors at independent construction sites recorded 65.7% absenteeism. A small intercorrelation exists between the type of contract and absenteeism with Cramér's V=0.16.

Table 2: Type of contract versus absenteeism

Type of Contract	None		Once or more		Total	
	No.	%	No.	%	No.	%
Contractors at independent sites	95	34.3	182	65.7	277	100.0
Subcontractors	45	20.2	178	79.8	223	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 12.21; p < .0005; V = 0.16 Small

Males dominate the respondents - 448 of the 500 participants were male. Men recorded 73.2% absenteeism, while women recorded 61.5%, with a p-value of .076.

Table 3: Gender versus absenteeism

Gender	None		Once or more		Total	
	No.	%	No.	%	No.	%
Female	20	38.5	32	61.5	52	100.0
Male	120	26.8	328	73.2	448	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 3.15; p = .076

The 20-30 years age group and the 51-60 years recorded the highest absenteeism, namely 74.1%, while the 31-40 years age group registered the lowest absenteeism, namely 68.8%, with a p-value of p = .704, which is greater than 0.05.

Table 4: Age group versus absenteeism

Age Group	None		Once or more		Total	
	No.	%	No.	%	No.	%
20-30 years	56	25.9	160	74.1	216	100.0
31-40 years	54	31.2	119	68.8	173	100.0
41-50 years	21	27.3	56	72.7	77	100.0
51-60 years	9	26.5	25	73.5	34	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 3, n = 500) = 1.41; p = .704

Absenteeism among Zimbabweans was 84.2% while 78.6% Malawians reported being absent once or more. Mozambicans recorded the lowest absenteeism, namely, 60.0%. A small practical significance exists between the country of birth and absenteeism with Cramér's V = 0.20.

Table 5: Country of birth versus absenteeism

Country of Birth	None		Once or more		Total	
	No.	%	No.	%	No.	%
South Africa	81	33.2	163	66.8	244	100.0
Lesotho	6	35.3	11	64.7	17	100.0
Malawi	3	21.4	11	78.6	14	100.0
Mozambique	24	40.0	36	60.0	60	100.0
Zimbabwe	26	15.8	139	84.2	165	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 4, n = 500) = 20.57; p < .0005; V = 0.20 Small

Absenteeism recorded for non-South Africans was 77.0%, while South Africans recorded 66.8% absenteeism. A small practical significance exists between South Africans and non-South Africans with Cramér's V = 0.11.

Table 6: Absenteeism between South African and Non-South African construction workers

Country of birth	None		Once or more		Total	
	No.	%	No.	%	No.	%
South Africa	81	33.2	163	66.8	244	100.0
Not South Africa	59	23.0	197	77.0	256	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 6.38; p = .012; V = 0.11 Small

Carpenters (88.9%) recorded the highest level of 'once or more' absenteeism, followed by carpet installers (84.6%) and plasterers (85.4%). Drywall installers recorded the lowest level of 'once or more' absenteeism, namely 57.1%. A small practical significance exists between construction workers' trades and absenteeism with Cramér's V = 0.21.

Table 7: Trade and absenteeism

Trade	None		Once or more		Total	
	No.	%	No.	%	No.	%
Bricklayer	21	35.6	38	64.4	59	100.0
Carpenter	4	11.1	32	88.9	36	100.0
Carpet installer	6	15.4	33	84.6	39	100.0
Drywall installer	9	42.9	12	57.1	21	100.0
Electrician	8	20.0	32	80.0	40	100.0
Painter	15	39.5	23	60.5	38	100.0
Plasterer	6	14.6	35	85.4	41	100.0

Plumber	22	26.8	60	73.2	82	100.0
Tiler	10	35.7	18	64.3	28	100.0
General worker	39	33.6	77	66.4	116	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 9, n = 500) = 22.24; p = .008; V = 0.21 Small

Absenteeism for construction workers on a short-term contract was 76.7%, while construction workers on a long-term contract recorded 63.6% absenteeism. A small practical significance exists between the nature of contract and absenteeism with Cramér's V = 0.12.

Table 8: Nature of contract and absenteeism

Nature of contract	None		One or more		Total	
	No.	%	No.	%	No.	%
Permanent	36	27.1	97	72.9	133	100.0
Long-term contract	51	36.4	89	63.6	140	100.0
Short-term contract	53	23.3	174	76.7	227	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 2, n = 500) = 7.43; p = .024; V = 0.12 Small

Semi-skilled construction workers reported 73.1% absenteeism. Similarly, 73.1% of general construction workers were absent once or more, while 65.2% of skilled construction workers were absent.

Table 9: Job level and absenteeism

Job level	None		Once or more		Total	
	No.	%	No.	%	No.	%
Skilled worker	24	34.8	45	65.2	69	100.0
Semi-skilled worker	71	26.9	193	73.1	264	100.0
General worker	45	26.9	122	73.1	167	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 2, n = 500) = 1.83; p = .401

Construction workers with primary and secondary education had the highest incidence of absenteeism at 75.4% and 73.9%, respectively. Construction workers with no formal education had the lowest incidence of absenteeism at 38.5%. A small practical significance exists between the highest educational levels of construction workers and absenteeism with Cramér's V = 0.14.

Table 10: Highest education and absenteeism

Highest education	None	Once or more	Total

	No.	%	No.	%	No.	%
College	28	32.9	57	67.1	85	100.0
Secondary school	89	26.1	252	73.9	341	100.0
Primary school	15	24.6	46	75.4	61	100.0
No formal schooling	8	61.5	5	38.5	13	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 3, n = 500) = 9.25; p = .026; V = 0.14 Small

Construction workers who had been employed for 21-30 years recorded the highest percentage of absenteeism, namely 93.3%, followed by 11-20 years (83.3%). Those with 0-10 years of tenure recorded the lowest percentage of absenteeism, namely, 65.7%. A small intercorrelation exists between the number of years worked for a contractor and absenteeism with Cramér's V = 0.23.

Table 11: Number of years in contractor and absenteeism

Years	None		Once or more		Total	
	No.	%	No.	%	No.	%
0-10 years	122	34.3	234	65.7	356	100.0
11-20 years	14	16.7	70	83.3	84	100.0
21-30 years	4	6.7	56	93.3	60	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 2, n = 500) = 25.84; p < .0005; V = 0.23 Small

Construction workers with an employment tenure of 21-30 years recorded the highest percentage of absenteeism, namely 82.9%, followed by 11-20 years (81.7%), while construction workers with a tenure of 0-10 years recorded 67.7%. A small practical significance exists between the number of years in a position and absenteeism with Cramér's V = 0.15.

Table 12: Number of years in position and absenteeism

Years	None		Once or more		Total	
	No.	%	No.	%	No.	%
0-10 years	113	32.3	237	67.7	350	100.0
11-20 years	20	18.3	89	81.7	109	100.0
21-30 years	7	17.1	34	82.9	41	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 2, n = 500) = 10.65; p = .005; V = 0.15 Small

6.2 Relationships between work-related factors and absenteeism

Construction workers who experienced workplace injuries (92.9%) had been absent from work once or more, while 67.7% of those who had not had also been absent from work once or more. A small practical significance exists between the experience of workplace injury and absenteeism with Cramér's V = 0.21.

Table 13: Absenteeism related to experiences of workplace injury

Workplace injury	None		Once or more		Total	
	No.	%	No.	%	No.	%
No	134	32.3	281	67.7	415	100.0
Yes	6	7.1	79	92.9	85	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 22.28; p < .0005; V = 0.21 Small

There were 79.2% of construction workers who reported being absent due to pain induced in the workplace, while 20.8% who had been absent did not report absenteeism due to such pain. A small intercorrelation exists between workplace-induced pain and absenteeism with Cramér's V = 0.36.

Table 14: Absenteeism related to workplace-induced pain

Workplace induced pain	None		Once or more		Total	
	No.	%	No.	%	No.	%
No	53	64.6	29	35.4	82	100.0
Yes	87	20.8	331	79.2	418	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 65.30; p < .0005; V = 0.36 Medium

Construction workers who experienced stress in the workplace recorded 83.9% absenteeism, while 46.2% of those who did not experience stress were also absent from work more than once. A medium intercorrelation exists between causes of workplace stress and absenteeism with Cramér's V=0.39.

Table 15: Absenteeism related to experience of workplace stress

Experience workplace stress	None		Once or more		Total	
	No.	%	No.	%	No.	%
No	85	53.8	73	46.2	158	100.0
Yes	55	16.1	287	83.9	342	100.0
Total	140	28.0	360	72.0	500	100.0

Chi²(d.f. = 1, n = 500) = 76.25; p < .0005; V = 0.39 Medium

Construction workers who experienced workplace fatigue recorded 81.7% being absent from work once or more, while 46.8% who had not experienced workplace fatigue also reported absenteeism.

Table 16: Absenteeism related to experience of workplace fatigue

Experience of workplace fatigue	None		One or more		Total	
	No.	%	No.	%	No.	%
No	74	53.2	65	46.8	139	100
Yes	66	18.3	295	81.7	361	100
Total	140	28.0	360	72.0	500	100

Chi² (d.f. = 1, n = 500) = 60.82; p < .0005; V = 0.35 Medium

Construction workers who did not report adverse workplace exposures (76.9%) reported being absent from work, compared to 71.9% of those who t reported adverse exposures.

Table 17: Absenteeism related to adverse workplace exposures

Adverse workplace exposures	None		Once or more		Total	
	No.	%	No.	%	No.	%
No	3	23.1	10	76.9	13	100.0
Yes	137	28.1	350	71.9	487	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 0.16; p = .689

Construction workers exposed to workplace health hazards (81.2%) recorded absenteeism from work once or more. In comparison, 52.5% of those not exposed to workplace health hazards also reported being absent once or more. A small intercorrelation exists between workplace health hazards and absenteeism with Cramér's V=0.30.

Table 18: Absenteeism related to exposure to workplace health hazards

Exposure to workplace health hazards	None		Once or more		Total	
	No.	%	No.	%	No.	%
No	76	47.5	84	52.5	160	100.0
Yes	64	18.8	276	81.2	340	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 44.38; p < .0005; V = 0.30 Medium

Construction workers with respiratory-related illnesses (71.5%) reported being absent once or more. All 9 (100.0%) construction workers who did not report respiratory illnesses also reported being absent from work.

Table 19: Absenteeism due to respiratory-related illnesses

Respiratory related illnesses	None		Once or more		Total	
	No.	%	No.	%	No.	%
No	0	0.0	9	100.0	9	100.0
Yes	140	28.5	351	71.5	491	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 3.56; p = .059

6.3 Management practices adopted to harness H&S linked to absenteeism

Construction workers issued with PPE (72.3%) reported being absent from work once or more. However, 55.6% who were not issued with PPE also reported absenteeism.

Table 20: PPE issued versus absenteeism

PPE issued	None		Once or more		Total	
	No.	%	No.	%	No.	%
No	4	44.4	5	55.6	9	100.0
Yes	136	27.7	355	72.3	491	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 1.23; p = .268

Construction workers who received PPE induction (72.6%) reported absenteeism from work once or more, while 27.4% did not. 21 (63.6%) who were not inducted reported being absent once or more, while 12 (36.4%) had not.

Table 21: PPE induction versus absenteeism

PPE induction	None		Once or more		Total	
	No.	%	No.	%	No.	%
No	12	36.4	21	63.6	33	100.0
Yes	128	27.4	339	72.6	467	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 1.23; p = .268

Construction workers (72.7%) from contractors who had conducted H&S activities (H&S induction and toolbox talks) reported being absent from work, compared to 60.7% of those whose employers did not conduct such H&S activities.

Table 22: H&S induction, safety and toolbox talks versus absenteeism

H&S activities	None		Once or more		Total	
	No.	%	No.	%	No.	%

No	11	39.3	17	60.7	28	100.0
Yes	129	27.3	343	72.7	472	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 1.87; p = .171

Construction workers (73.8%) whose employers employed H&S personnel reported absenteeism once or more, while 50.0% of those who did not employ H&S personnel also reported being absent from work. A small intercorrelation exists between the employment of H&S personnel and absenteeism with Cramér's V=014.

Table 23: H&S personnel employment and absenteeism

H&S personnel employment	None		Once or more		Total	
	No.	%	No.	%	No.	%
No	19	50.0	19	50.0	38	100.0
Yes	121	26.2	341	73.8	462	100.0
Total	140	28.0	360	72.0	500	100.0

Chi² (d.f. = 1, n = 500) = 9.87; p = .002; V = 0.14 Small

There is a large effect on the dependent variable absenteeism by the independent variables with a Cohen's d 1.18 for workplace-induced pain and causes of workplace stress 1.24. A medium effect of the independent variable on the dependent variable exists with Cohen's d 0.69 for causes of workplace fatigue, 0.68 for exposure to adverse workplace conditions, and 0.72 for exposure to workplace health hazards. In contrast, a small effect of the independent variable on the dependent variable exists with Cohen's d 0.4 for workplace conditions exposed to 0.41 for respiratory-related illnesses, 0.33 for PPE induction, and 0.28 for H&S activities. The difference of means for PPE induction and H&S personnel are 3.33 and 2.80 respectively, with $|t| > 1.96$.

Table 24: Incidents of factors (number of) by absenteeism

Variable	Absenteeism	N	Mean	S.D.	Difference	T	p (d.f.=498)	Cohen's d
Workplace induced pain	None	140	1.16	1.17	-1.54	-11.86	<.0005	1.18 Large
	Once or more	360	2.70	1.35				
Causes of workplace stress	None	140	0.68	0.98	-2.10	-12.48	<.0005	1.24 Large
	Once or more	360	2.78	1.90				
Causes of workplace fatigue	None	140	0.74	0.89	-0.59	-6.98	<.0005	0.69 Medium
	Once or more	360	1.34	0.84				
Workplace conditions exposed to	None	140	3.04	1.63	-0.80	-3.98	<.0005	0.40 Small
	Once or more	360	3.84	2.15				
Exposure to adverse workplace	None	140	1.49	1.12	-0.96	-6.85	<.0005	0.68 Medium
	Once or more	360	2.44	1.50				
Exposure to workplace health hazards	None	140	1.41	2.59	-2.40	-7.22	<.0005	0.72 Medium
	Once or more	360	3.80	3.58				
Experience of respiratory related	None	140	3.26	1.65	-0.79	-4.11	<.0005	0.41 Small
	Once or more	360	4.05	2.04				
Issued with PPE	None	140	6.39	2.83	0.23	0.90	.369	n/a
	Once or more	360	6.15	2.51				
PPE induction	None	140	3.22	1.33	0.42	3.33	.001	0.33 Small
	Once or more	360	2.80	1.25				
H&S activities	None	140	6.18	2.67	0.66	2.80	.005	0.28 Small
	Once or more	360	5.52	2.24				
H&S personnel	None	140	2.85	1.62	-0.03	-0.19	.851	n/a
	Once or more	360	2.88	1.43				

5. DISCUSSION

The study sought to assess if there is an association between H&S factors and absenteeism in small and medium sized contractors. The findings show that a small intercorrelation exists between contractor size and absenteeism. This implies that the size of a contractor has a practical significance of influence on the prevalence of absenteeism among small and medium sized contractors. Several reasons may be associated with this status quo. Poor management decisions, or an organisational culture where H&S goals are considered subordinate to production goals may be the trigger of such results (Haupt, 2021). Furthermore, construction workers employed by small contractors are exposed to higher H&S risks than construction workers in large contractors leading to a high prevalence of absenteeism among them (Moyo, 2021). A high level of exposure might be associated with the fact that small and medium sized contractors have not demonstrated good H&S performance as their larger counterparts because of the unavailability of resources to develop and implement H&S management systems or the fact that H&S is not a priority to them (Mashwama *et al*., 2018). For most small and medium sized contractors, principal or subcontractors, the availability of a H&S file onsite and inadequate PPEs are considered 'sufficient' as a standard of H&S compliance (Moyo, 2021).

The practical significance that exists between the type of contract and absenteeism (V=0.16) indicates that the type of contract that a worker enters has an impact on absenteeism. Permanent construction workers have more job security and are less driven to be always at work, and are more difficult to dismiss for absenteeism, while non-permanent construction workers are insecure and would like to be present every day to receive a positive assessment and perhaps an extension of their contract (Moletsane, 2018). Administrative factors that can influence high rates of absenteeism among permanent construction workers may include but are not limited to poor organisational structure, improper work climate, poor leadership and communication processes, the absence of sensible employment policies, poor supervision, and managers' passiveness (James, 2020).

Sickness-related absenteeism research suggests that lower non-permanent worker absenteeism rates are attributable to the insecurity of not being reemployed or lack of benefits, which leads them to report for work (Moletsane, 2018). On the contrary, research has also shown that temporary construction workers tend to abuse or misuse alcohol leading to habitual tardiness and workplace injuries that can be linked to absenteeism (Badubi, 2017). The researchers for this study postulate that construction workers employed temporarily for specific construction tasks, which are paid for hours worked, have limited loyalty to the contractor, leading to absenteeism. In such cases, legislative changes aimed at reducing the

incidence of temporary employment are used to minimise absenteeism through permanent employment (Garcia Mainar *et al*., 2017).

There is a small practical significance between nature of contract, number of years in a contractor, number of years in a position, and absenteeism. These results concur with the findings of research which found that construction workers with longer tenure normally have a higher degree of organisational commitment to the contractor and have a higher need for job stability (Moletsane, 2018). While it might seem having construction workers contracted for longer periods of time in other industries, it seems that it is counterproductive among small and medium contractors in this study. It is therefore vital for contractors to understand the underlying tenure-related absenteeism factors to develop and strategies for addressing factors that contribute to absenteeism among long-term construction workers.

A small practical significance exists between country of birth and absenteeism and an intercorrelation which exists between South Africans and non-South Africans and absenteeism, which may indicate instability in work attendance among migrant construction workers. During a study conducted in Lebanon, researchers determined that being a migrant, casual, and transient workforce can lead to unpredictable rates of absenteeism (Srour *et al*., 2017). During a separate study conducted in the United States of America (USA), researchers determined that migrant construction workers believed they had to ’work harder’ and ‘faster’ than their American counterparts to demonstrate their value, though their ‘working hard’ and ’fast’ impeded H&S performance, leading to increased workplace injuries that are associated with absenteeism (Grzywacz *et al*., 2021; Montgomery *et al*., 2021). Other studies revealed that migrant construction workers are reluctant to adopt H&S procedures as they think undergoing H&S training has limited value to them, while on the other hand, the unwillingness of employers to enforce H&S regulations and discrimination against migrant construction workers due to their legal status exacerbates the situation (Montgomery *et al*., 2021).

Absenteeism among construction workers in small and medium sized contractors is influenced by construction workers’ trades. A small practical significance exists between construction workers’ trades and absenteeism. The trades in this study included bricklayer, carpenter, carpet installer, dry wall installer, electrician, painter, plasterer, plumber, tiler, and general worker. A study conducted in the USA determined that construction workers in the roofing and framing trades were typically not paid by the hour; therefore, in their minds, the quicker they completed one job and moved on to another, the more they could earn, leading to accidents which could be linked to workplace absenteeism (Grzywacz *et al*., 2021). In 2019, researchers compared absenteeism among construction workers by nature of assignments, workload, and working conditions and determined that factors associated with the nature of work, working

conditions and trade predicted absenteeism and presenteeism in the workplace (Omari *et al*., 2019).

A small practical significance exists between highest educational level of construction workers and absenteeism. This association reflects a high level of H&S awareness among those with a high level of education in the workplace. These results are congruent with the expectation that the higher the level of education a worker attains, the less absent this person will be. Educational attainment elevates construction workers' professionalism and consequently enhance their level of responsibility and commitment to attendance (Dardiri *et al*., 2017; Moletsane, 2018). This observation is compatible with the perception held by the researchers for this study that low educational level has an impact on H&S awareness linked to absenteeism among contractors. During a study focused on enhancing competitiveness among construction workers in Indonesia, research participants with a higher level of education had a high level of H&S awareness and H&S practice compliance as compared to their counterparts with low levels of education (Dardiri *et al*., 2017).

The findings of this research reflect a small practical significance between workplace injuries and absenteeism. The results amplify the need for a comprehensive understanding of the causes of workplace accidents and the fact that accident prevention begins with a thorough understanding of factors that contribute to causation (Moyo *et al*., 2021; Manzoor *et al*., 2022). These factors may include organisational and individual factors. Organisational factors may include but are not limited to a lack of H&S management systems, resources, and management commitment. Individual factors may entail construction workers' behaviour like hegemonic masculinity, associated with lowered perceived susceptibility, and decreased perceived severity of hazards. Through hegemonic masculinity predispositions, construction workers tend to minimise workplace hazards and minor injuries that are a cause of major accidents, linked to worker absenteeism. Construction accidents can be mitigated by adhering to H&S standards and elimination of unsafe working practices attributable to fatal accidents (Manzoor *et al*., 2022; Rafindadi *et al*., 2022b). Small and medium sized contractors should thrive to create an H&S culture by adopting appropriate H&S prevention practices suited for their context.

Most construction workers in small and medium sized contractors experienced absenteeism due to pain induced during various workplace activities (Moyo *et al*., 2021). This confirms an existence of a small intercorrelation between workplace induced pain and absenteeism and a large effect on the dependent variable by the independent variables for workplace induced pain. The results also reflect an existence of a causative relationship between induced workplace pain and absenteeism among construction workers. Studies conducted in the USA

and Australia, determined that the incidence of bodily pain experienced by construction workers increased with age (Lingard *et al*., 2021). The physically demanding nature of construction work and the incidence of physical injuries which cause bodily pain, also impact on construction workers' mental health which could be associated with workplace absenteeism (Turner & Lingard, 2020).

A small intercorrelation exists between workplace health hazards exposed to and absenteeism. In addition, a medium effect of exposure to workplace conditions and workplace health hazards indicates an association between workplace exposure and absenteeism. Exposure to adverse work conditions has significant (short and long term) effects on construction workers' health and wellbeing and is likely to trigger absenteeism (Lingard *et al*., 2021). Health hazards confronting construction workers may be caused by known high levels of exposures in the construction industry, low awareness of H&S regulations and poor attitudes towards the use of PPE (Arum *et al*., 2019). In Ghana, researchers determined that construction workers had little control over harsh workplace temperatures, dust, unpleasant smells, exposure to hazardous chemicals, excessive noise, and other on-site work stressors (Aboagye-Nimo *et al*., 2021). These stressors could be some of the triggers of workplace absenteeism among small and medium contractors.

A small intercorrelation exists between the employment of H&S personnel and absenteeism. This reflects the importance of employing construction H&S personnel controlling and or managing H&S factors linked to absenteeism on construction sites. Construction H&S officers monitor compliance with H&S regulations on site which seeks to mitigate accidents that are linked to workplace absenteeism (Raliile *et al*., 2021). According to the knowledge of the researchers, no study has been conducted in South Africa to assess how the employment of H&S personnel influenced absenteeism. This means that these findings should be noted and actioned by the relevant stakeholders in the construction industry.

A medium intercorrelation exists between the experience of workplace stress and absenteeism, with a large effect of the independent variable (causes of workplace stress) on absenteeism. Similarly, a medium effect of the independent variable (causes of workplace fatigue) on the dependent variable. This could be a sign of prolonged work-related stress among construction workers resulting from work overload or prolonged working hours without rest, low financial and non-financial incentives (Nath *et al*., 2022). Both younger and older construction workers are affected by psychosocial job demands, which include working under pressure, a lack of employment security, and concerns of occasional and unfavourable changes in their working conditions (Lingard *et al*., 2021). These results are also compatible with findings of a study conducted in China, where researchers determined that construction

managers experience a great deal of stress which negatively affects health conditions and increases absenteeism (Yang *et al*., 2017).

A small effect of respiratory related illnesses on absenteeism was reflected in this study. These findings are consistent with the results of research conducted in Iran, which determined that almost all construction workers in the construction industry had higher exposure to crystalline silica than the threshold limit value (TLV) (Tavakol *et al*., 2017). Similarly, based upon twelve studies in Denmark, researchers determined that between 15 and 20 percent of prevalent cases of chronic obstructive pulmonary disease (COPD) had been attributed to occupational exposures to vapours, gases, dust and fumes and dust on construction sites, which constitutes a major challenge to construction workers (Borup *et al*., 2017).

A small effect exists between both PPE induction and H&S activities on absenteeism. Based on these results, PPE induction has an impact on workplace incidents linked to absenteeism. Construction workers that wrongly perceive hazardous situations often lack training relative to the appropriate use of PPE (Rafindadi *et al*., 2022a). It should also be noted that accident experience, attitude towards using PPE, habituation, risk perception, H&S consciousness, H&S knowledge, outcome expectations, perceived ease of use, perceived usefulness, social influence, H&S management system, time pressure and workplace conditions, also influence the use and non-use of PPE (Wong *et al*., 2020).

6. CONCLUSION

This study examined the link between H&S factors and absenteeism among construction workers in small and medium sized contractors. The research findings indicate that there is a statistically significant association between absenteeism and H&S factors in both small and medium sized contractors. The study shed light on the existence H&S factors and their relationship with absenteeism among small and medium sized contractors. The existence of such an association might have a negative impact on contractors' profitability, incurrence of direct and indirect costs by construction workers, their co-workers, and families. The implications of this study extend beyond the realms of workplace absenteeism in the construction industry. A healthier and safer work environment not only reduces absenteeism rates but also enhances overall workforce well-being, productivity, and job satisfaction. It is therefore vital for small and medium sized contractors to adopt a comprehensive proactive approach to mitigate H&S induced absenteeism among construction workers.

7. RECOMMENDATIONS

A comprehensive understanding of the link between H&S factors and absenteeism among small and medium sized contractors is vital for identifying and adopting strategies to control

and or manage absenteeism through enhanced H&S performance in the construction industry. In this context, the researchers recommend that contractors incorporate H&S management systems into their operational management systems to promote H&S performance efficacy for reduced absenteeism in the industry. This can be achieved through designing, adopting, and implementing H&S policies and programmes that promote leadership commitment to H&S. This should entail development and execution of comprehensive H&S task specific training programmes to create H&S awareness and foster a strong H&S culture. The H&S policy should also emphasise the need for the allocation of resources to H&S, worker participation and consultation, establishment of functional H&S committees, conducting of hazard identification and risk assessments, developing and communication emergency response plans and rewarding H&S behaviour among construction workers.

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REFERENCES

Abas, N.H., Yusuf, N., Suhaini, N.A, Kariya, N., Mohammad, H. & Hasmori, M.F. 2020. Factors affecting safety performance of construction projects: A literature review. *IOP Conference Series: Materials Science and Engineering*, 713(1):012036-(1-10). [https://doi.org/10.1088/1757-899X/713/1/012036].

Aboagye-Nimo, E., Nai, F., Osei-Nimo, S. & Mamphey, S. 2021. Occupational stress and site workers' wellbeing: A case study of Ghana. In Hare, B., Sherratt, F. & Emuze, F. (eds). Glasgow: CIB. (Proceedings of the Joint CIB W099 & W123 Annual International Conference 2021: Good health, changes & innovations for improved wellbeing in construction; 9-10 September 2021).

Adebiyi, R.T., Babalola, O., Amuda-yusuf, G., Rasheed,S.A. & Olowa, T.O. 2020. Effect of knowledge and compliance of health and safety information on construction sites workers' safety in Nigeria. *International Journal of Safety and Security Engineering*, 10(2):269-277. [https://doi.org/10.18280/ijsse.100215].

Alemu, A.A., Yitayew, M., Azazeh, A. & Kebede, S. 2020. Utilization of personal protective equipment and associated factors among building construction workers in Addis Ababa, Ethiopia, 2019. *BMC Public Health*, 20:794. [https://doi.org/10.1186/s12889-020-08889-x].

Ammad, S., Alaloul, W.S., Saad, S. & Qureshi, A.H. 2021. Personal protective equipment (PPE) usage in construction projects: A scientometric approach. *Journal of Building Engineering*, 35 (4): 3495-3507. [https://doi.org/10.1016/j.jobe.2020.102086].

Arum, C.I, Osunsanmi, T.O. & Aigbavboa, C.O. 2019. Appraisal of the challenges to ensuring occupational health and safety compliance within the Nigerian construction industry. *2019 Modular and Offsite Construction Summit Proceedings*, 488-495. [https://doi.org/10.29173/mocs130].

Attridge, M. 2022. The effectiveness of employee assistance program counseling on depression, alcohol misuse, work absenteeism and work productivity outcomes: Four single-group longitudinal studies of archival data in the United States 2017-2021. *JMIR Preprints*. [https://doi.org/10.2196/preprints.37294].

Badubi, R. 2017. A critical risk analysis of absenteeism in the workplace. *Journal of International Business Research and Marketing*, 2(6):32-36. [https://doi.org/10.18775/jibrm.1849-8558.2015.26.3004].

Boakye, M.K., Adanu, S.K., Adzivor, E.K., Coffie, G.H. & Ayimah, J.C. 2022. Factors influencing health and safety performance at construction sites in Ghana: the perspective of building artisans. *International Journal of Occupational Safety and Ergonomics*, 29(3):1121-1127. [https://doi.org/10.1080/10803548.2022.2112444].

Borup, H., Kirkeskov, L., Hanskov, D.J.A. & Brauer, C. 2017. Systematic review: chronic obstructive pulmonary disease and construction workers. *Occupational Medicine*, 67(3):199–204. [https://doi.org/10.1093/occmed/kqx007].

Chiloane, N.M. & Mpanza, M. 2021. The assessment of absenteeism: A case study of a platinum mine. Johannesburg: University of Johannesburg.

Claassen, A. 2023. Absenteeism. [Internet: https://labourguide.co.za/general/absenteesm-107/; downloaded on 31 July 2023].

Dardiri, A., Sutrisno, F.T., Kuncoro, T., Ichwanto, M.A. & Suparji, P. 2017. Enhancing the competitiveness of skilled construction workers through collaborative education and training. *AIP Conference Proceedings*, 1887: 020005. [https://doi.org/10.1063/1.5003488].

Dhlewayo, N.P., Bello, P.O. & Mofokeng, J.T. 2021. Missing in action: Perspectives on employee absenteeism in the South African Police Service. *Cogent Social Sciences*, 7(1):1-17 [https://doi.org/10.1080/23311886.2021.1964200].

Dinizulu, N.F. 2020. Investigating the self-reported reasons for absenteeism of nurses working in a facility for intellectually disabled persons in the Western Cape. Cape Town: University of the Western Cape.

Eteifa, S.O. 2018. Modeling root causes of construction site fatalities using social network analysis. Knoxville: " University of Tennessee. (Master's Thesis), [Internet: https://trace.tennessee.edu/cgi/viewcontent.cgi?article=5933&context=utk_gradthes; Downloaded: 19 April 2021).

García Mainar, I., Green, C.P. & Navarro Paniagua, M. 2017. The effect of permanent employment on absenteeism: evidence from labor reform in Spain. *ILR Review*, 71(2):525-549. [https://doi.org/10.1177/0019793917717226].

Groenewold, M.R., Burrer, S.L., Ahmed, F., Uzicanin, A. & Luckhaupt, S.E. 2019. Health-related workplace absenteeism among full-time workers — United States, 2017–Influenza season. *Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report*, 68(26):577-582. [https://doi.org/10.15585/mmwr.mm6826a1].

Grzywacz, J.G., Montgomery, S.C., Marín, A.J., Nuñez-Reyes, E., Mills, T. & Merten, M.J. 2021. Elevated injury among Latino workers in small-scale residential construction: contractor and worker perspectives. *In* Hare, B., Sherratt, F. & Emuze, F. (eds). (Proceedings of the Joint CIB W099 & W123 Annual International Conference 2021: Good health, changes & innovations for improved wellbeing in construction; 9-10 September 2021).

Haupt, T.C. 2021. Management of safety, health and environment in South Africa. Newcastle: Cambridge Scholars Publishing.

James, S. 2020. A study on the factors influencing employee absenteeism. *JETIR Journal of Emerging Technologies and Innovative Research*, 7(3):1-8.

Kaiser, C.P. 2018. Absenteeism, presenteeism, and workplace climate: A taxonomy of employee attendance behaviors. *Economics & Business Journal: Inquiries & Perspectives*, 9(1):68-86.

Lingard, H., Pirzadeh, P., Zhang, R. & Turner, M. 2021. Job quality and construction workers' mental health: A life span developmental perspective. In Hare, B., Sherratt, F. & Emuze, F. (eds). Glasgow: CIB. (Proceedings of the Joint CIB W099 & W123 Annual International Conference 2021: Good health, changes & innovations for improved wellbeing in construction; 9-10 September 2021).

Liu, S., Nkrumah, E.N.K., Akoto, L.S., Gyabeng, E. & Nkrumah, E. 2020. The state of occupational health and safety management frameworks (OHSMF) and occupational injuries and accidents in the Ghanaian oil and

gas industry: Assessing the mediating role of safety knowledge. *BioMed Research International*, 2020(1):1-14. [https://doi.org/10.1155/2020/6354895].

Mafuya, N. & Smallwood, J. 2020. Health and safety challenges on South African regional public sector projects. *Proceedings of the Creative Construction e-Conference,* 2020(059):85-93. (Creative Construction e-Conference 2020; June 28 - July 1, 2020).

Malomane, R., Musonda, I. & Okoro, C.S. 2022. The opportunities and challenges associated with the implementation of fourth industrial revolution technologies to manage health and safety. *International Journal of Environmental Research and Public Health*, 19(2):1-22. [https://doi.org/10.3390/ijerph19020846].

Manzoor, B., Othman, I. & Waheed, A. 2022. Accidental safety factors and prevention techniques for high-rise building projects – A review. *Ain Shams Engineering Journal*, 13(5):101723. [https://doi.org/10.1016/j.asej.2022.101723].

Mashwama, N.X., Kale, H. & Aigbavboa, C.O. 2018. Investigating the hindrances of implementation of occupational health and safety among small medium enterprise's in the Gauteng Province of South Africa. Ljubljana, Slovenia: Budapest University of Technology and Economics. (Proceedings of the Creative Construction Conference; 30 June to 3 July 2018).

Mohammadi, A., Tavakolan, M. & Khosravi, Y. 2018. Factors influencing safety performance on construction projects: A review. *Safety Science*, 109:382-397. [https://doi.org/10.1016/j.ssci.2018.06.017].

Moletsane, M.I. 2018. Evaluating human resource policy in managing absenteeism: A case of The City of Tshwane. Pretoria: University of South Africa.(MBA Thesis) [Internet: https://uir.unisa.ac.za/bitstream/handle/10500/25056/dissertation_moletsane_mi.pdf?sequence=1&isAllowed=y; Downloaded 08 April 2022]

Montgomery, S., Marin, A., Reyes, E.N., Mills, T., Merten, M., Nolasco, H. & Grzywacz, J. 2021. Work ethic and cognitive models of work: Contractors and workers perspectives on elevated injury and fatality among Latino workers in small-scale residential construction. In Hare, B., Sherratt, F. & Emuze, F. (eds). Glasgow: CIB. (Proceedings of the Joint CIB W099 & W123 Annual International Conference 2021: Good health, changes & innovations for improved wellbeing in construction; 9-10 September 2021).

Moradi, S., Ansari, R. & Taherkhani, R. 2022. A systematic analysis of construction performance management: Key performance indicators from 2000 to 2020. *Iranian Journal of Science and Technology, Transactions of Civil Engineering*, 46:15-31. [https://doi.org/10.1007/s40996-021-00626-7].

Moyo, L. 2021. Occupational health and safety factors influencing absenteeism among construction workers in Johannesburg, South Africa. Johannesburg: University of Johannesburg (MPH Thesis) [Internet: https://ujcontent.uj.ac.za/esploro/outputs/graduate/Occupational-health-and-safety-factors-influencing/9912478107691#file-0; Downloaded: 4 April 2023].

Moyo, L., Feresu, S., Chadyiwa, M. & Smallwood, J. 2021. Occupational health and safety factors influencing absenteeism among construction workers in Johannesburg, South Africa. In Hare, B., Sherratt, F. & Emuze, F. (eds). Glasgow: CIB. (Proceedings of the Joint CIB W099 & W123 Annual International Conference 2021: Good health, changes & innovations for improved wellbeing in construction; 9-10 September 2021).

Moyo, L. & Smallwood, J. 2022. Prevalence of absenteeism among construction workers in small and medium contractors in the Johannesburg Metropolitan Area. *Journal of Construction*, 15(2):1-15.

Nath, G., Wang, Y., Coursey, A., Saha, K.K., Prabhu, S. & Sengupta, S. 2022. Incorporating a machine learning model into a web-based administrative decision support tool for predicting workplace absenteeism. *Information*, 13(7):320.

Okonkwo, P.N. 2019. Health and safety management and performance among construction contractors in South Africa. Cape Town: Stellenbosch University.[https://doi.org/10.3390/info13070320]. (Doctorate Thesis). [Internet: https://scholar.sun.ac.za/server/api/core/bitstreams/e67c3554-5465-42dd-8eee-581927672244/content; Downloaded: 04 April 2023].

Okonkwo, P.N. & Wium, J. 2020. Health and safety management systems within construction contractor organizations: Case study of South Africa. *Journal of Construction Engineering and Management*, 146(5):05020003. [https://doi.org/10.1061/(ASCE)CO.1943-7862.000183].

Omari, G.C., Manyele, S.V. & Mwaluko, G. 2019. Analysis of measured employees' absenteeism in the forensic science laboratory. *Engineering*, 11(03:137-166. [https://doi.org/10.4236/eng.2019.113012].

Parsley, I.C., Dale, A.M., Fisher, S.L., Mintz, C.M., Hartz, S.M., Evanoff, B.A. & Bierut, L.J. 2022. Association between workplace absenteeism and alcohol use disorder from the National Survey on Drug Use and Health, 2015-2019. *JAMA Network Open*, 5(3):e222954. [https://doi.org/10.1001/jamanetworkopen.2022.2954].

Puthillath, B., Marath, B. & Ayappan, B.C. 2021. Analyzing the cause of human electrical accidents using Swiss Cheese model. *Vilakshan – XIMB Journal of Management*, 20(1):193-208. [https://doi.org/10.1108/XJM-01-2021-0004].

Qi, S. 2018. Worker absenteeism in construction site. Skudai Johor: Universiti Teknologi Malaysia.

Rafindadi, A.D., Napiah, M., Othman, I., Alarifia, H., Musa, U. & Muhammad, M. 2022a. Significant factors that influence the use and non-use of personal protective equipment (PPE) on construction sites—Supervisors' perspective. *Ain Shams Engineering Journal*, 13(3):101619. https://doi.org/10.1016/j.asej.2021.10.014].

Rafindadi, A.D., Napiah, M., Othman, I., Mikić, M., Haruna, A., Alarifi, H. & Al-Ashmori, Y.Y. 2022b. Analysis of the causes and preventive measures of fatal fall-related accidents in the construction industry. *Ain Shams Engineering Journal*, 13(4):1-14. [https://doi.org/10.1016/j.asej.2022.101712].

Raliile, M.T., Haupt, T.C. & Akinlolu, M. 2021. Rethinking construction health and safety legislation compliance: Lessons learnt from COVID-19 – Pilot study. In Hare, B., Sherratt, F. & Emuze, F. (eds). Glasgow: CIB. (Proceedings of the Joint CIB W099 & W123 Annual International Conference 2021: Good health, changes & innovations for improved wellbeing in construction; 9-10 September 2021).

Saruan, N.A.M., Yuso, H.M., Fauzi, M.F.M., Puteh, S.E. & Robat, R.M. 2020. Unplanned absenteeism: The role of workplace and non-workplace stressors. *International Journal of Environmental Research and Public Health*, 17(17):6132. [https://doi.org/10.3390/ijerph17176132].

Singh, T., Chetty, N. & Karodia, A.M. 2016. An investigation into the impact of absenteeism on the organisational performance of a private security company in Durban, Kwazulu-Natal. *Singaporean Journal of Business Economics, and Management Studies*, 4(11):105-159.

Srour, F.J., Srour, M.I. & Lattouf, G. 2017. A survey of absenteeism on construction sites. *International Journal of Manpower*, 38(4):533-547. [https://doi.org/10.1108/IJM-08-2015-0135].

Tavakol, E., Azari, M., Zendehdel, R., Salehpour, S., Khodakrim, S., Nikoo, S. & Saranjam, B. 2017. Risk evaluation of construction workers' exposure to silica dust and the possible lung function impairments. *Tanaffos*, 16(4):295-303.

Turner, M. & Lingard, H. 2020. Examining the interaction between bodily pain and mental health of construction workers. *Construction Management and Economics*, 38(11):1009-1023. [https://doi.org/10.1080/01446193.2020.1791920].

Ugwu, T.P., Nwaichi, E.O. & Patricks-E, C. 2021. Evaluation of safety performance of Nigerian construction industry - A case study of the Niger Delta region. *Journal of Scientific Research & Reports*, 27(2):94-103. [https://doi.org/10.9734/jsrr/2021/v27i230362].

Umar, T. & Umeokafor, N. 2021. A review of the costs of accident in GCC construction. In Hare, B., Sherratt, F. & Emuze, F. (eds). Glasgow: CIB. (Proceedings of the Joint CIB W099 & W123 Annual International Conference 2021: Good health, changes & innovations for improved wellbeing in construction; 9-10 September 2021).

Wong, T.K.M., Man, S.S. & Chan, A.H.S. 2020. Critical factors for the use or non-use of personal protective equipment amongst construction workers. *Safety Science*, 126:104663. [https://doi.org/10.1016/j.ssci.2020.104663].

Yang, F., Li, X., Zhu, Y., Li, Y. & Wu, C. 2017. Job burnout of construction project managers in China: A cross-sectional analysis. *International Journal of Project Management*, 35(7):1272-1287. [https://doi.org/10.1016/j.ijproman.2017.06.005].

Zaccheus, O.O., AbdulLateef, O., Cheen, K.S. & Folasade, A.B. 2022. Evaluation of construction workers mental health during COVID-19 pandemic in Nigeria. Sri Lanka: University of Moratuwa. *(*Proceedings of the 10th World Construction Symposium; 24-26 June 2022).