



Occupational health and safety factors influencing absenteeism among construction workers in Johannesburg, South Africa

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Absenteeism among construction workers is a cause for concern in this industry. Unearthing occupational factors linked to non-attendance in this labour-intensive industry was prioritised, hence determining the relationship between occupational health and safety (OH&S) factors and absenteeism among these workers was imperative.

The study assessed if there was a statistically significant association between absenteeism and reported workplace exposures and health ailments among construction workers, to influence the effective implementation of OH&S management systems among small and medium construction firms.

A cross-sectional design was used to assess the prevalence of exposure and health outcomes for comparative analysis. A simple random sampling technique was used to select research participants. The sample size of 500 participants was determined using Epi Info™ 7.2 statistical software for epidemiology. Data was analysed using the IBM SPSS™ Statistics version 26. Data visualisation tools, frequency distributions, cross tabulations, and logistic regressions were used to present and analyse data.

Research results reflected an association between absenteeism and OH&S factors. There was a probability of a small contractor employee being absent from work with an AOR of 0.34 (0.20, 0.58) and 4.04 (1.40, 11.66) for age. A correlation existed between absenteeism and workplace exposures [cement exposure 0.53 (0.30, 0.92), heat AOR of 2.60 (1.55, 4.35), and dust 1.79 (1.11, 2.90)]. An AOR of 3.49 (2.36, 5.16), 1.77 (1.05, 2.97), and 1.96 (1.12, 3.45) for workplace injuries, chronic flu, and pneumonia-related pains indicate the existence of an association between the dependent and the independent variables.

The findings of this study showed that there was a statistically significant association between absenteeism and OH&S factors. The probable association between the dependent variable and independent variables implied correlation, not causation. Further research with a focus on causative factors was recommended.

Keywords: Absenteeism, Construction worker, Health ailments, Workplace exposures

Introduction

Absenteeism among construction workers is a challenge and a cause for apprehension in the industry. Unearthing and exploring OH&S factors linked to absenteeism in small and medium contractors was the focus of this study. While much research had been conducted with respect to this issue, most studies focused on OH&S factors and employee productivity, and less on the association between OH&S factors and absenteeism. It was from this backdrop that this study sought to determine the relationship between absenteeism and OH&S factors among construction workers. The findings could influence the adoption and effective implementation of OH&S management systems among small and medium construction firms for reduced occupational injuries and disease in the workplace.

Studies pertaining to occupational health (OH) in South African construction examined H&S practices tailored towards workplace incidents in construction small and medium enterprises (SMEs) (Agumba



and Haupt, 2018). None of those studies segmented OH&S factors among small and medium entrepreneurs according to size, neither did they link them to absenteeism. In spite of those studies, the H&S in South African construction did not improve commensurately in construction SMEs (Construction Industry Development Board (cidb), 2009). It was also noted with concern that in South Africa, no study had been conducted, focused on comparing OH&S factors accounting for absenteeism by trade and contractor size. This status quo existed despite failure to report for scheduled work being perceived as a major workplace challenge in most contractors.

A study conducted by Mwanaumo and Thwala (2012) determined that exposure to health risks while working on construction projects accounted for a significant proportion of disease burden (Mwanaumo and Thwala, 2012). Unique and dynamic operations in the construction industry involving numerous uncertainties, multiple intricacies, and divergent environments, exposed employees to various risk factors (Jarkas and Haupt, 2015), a situation which could be linked to absenteeism. In addition, the above status quo indicated that H&S was still not a priority for reduced injuries and diseases on some construction sites (Vitharana, 2015). A reflection on the OH status quo among construction SMEs was beneficial to the construction SMEs, cidb, and other stakeholders, for policy-making and improved employees' wellbeing. Hence, a study of this nature was a necessity to promote the creation of a healthy and safe work environment and H&S consciousness among workers employed by construction SMEs (Vitharana, 2015; Jarkas and Haupt, 2015).

The International Labour Organization (ILO) emphasises the promotion of equality, H&S, and dignity of workers worldwide (Gonzalez-Delgado, Gómez-Dantés, Fernández-Niño, Robles, Borja, Aguilar, 2015), which included prevention from falls from rooftops, machinery failure, being struck by objects, electrocutions, exposure to silica dust, cement, asbestos, lead, welding emissions, structural collapses, and engine exhaust fumes and noise (Khashaba, El-Helaly, El-Gilany, Motawei, Foda, 2018). Kumar and Maheswari (2017) established that hazards associated with construction projects include worker tools, equipment, materials, and the workplace environment (Kumar and Maheswari 2017). The low awareness of OH issues made construction workers vulnerable to OH&S exposures in construction, amplified the importance of a study to establish the level of their awareness of occupational injuries and disease (Mwanaumo and Thwala, 2012). This called for the implementation of health risk management approaches centred on regulations, education and training, risk assessment, risk prevention, and accident analysis to achieve optimum health and wellbeing for all employees (Suárez Sánchez, Carvajal Peláez, Catalá Alís, 2017).

Methodology

This study sought to determine if there was an association between absenteeism and OH&S factors among construction workers on projects in the Johannesburg metropolitan area, South Africa.

The target population comprised of skilled, semi-skilled, and general construction workers employed by construction SMEs registered with the cidb. A self-administered questionnaire was used to collect data, and the research participants provided written informed consent before completing the questionnaires. Privacy and confidentiality were guaranteed and practiced. The purpose of the study and the instrument were explained to respondents prior to administering the research tool. In cases where a research participant did not understand a question or part of it, an investigator or data collector provided clarity without leading the respondent. After completing the questionnaire, the research participant returned the instrument to the researcher or data collector onsite.

Reliability was determined through a pilot study, which was key in reviewing the questionnaire and determining the feasibility of the research. Appropriate inferences were made based on collected evidence, to give a logical comparison between the measure in question and the outcome. Respondents included builders, painters, plasterers, electricians, carpenters, carpet installers, dry-wall



installers, plumbers, tilers, machine operators, and general workers at various construction sites. Administrators, management, and employees who were office bound on site and employees who had been employed for less than one month were excluded to confine the scope of the study to a defined population sample.

The sample size was calculated using Epi Info™ 7.2. The confidence interval was set at 95%, and the power set at 80% with the cluster sample size of 400. Considering a 25% contingency for multiple comparisons and missing data, the final sample size was 500 from an estimated population of 2 030 construction workers, populated on the Epi Info™ 7.2 statistical software. A cross-sectional study design used, estimated, and described the prevalence of absenteeism and its association with OH&S factors. Cross-tabulations were used to analyse the relationship between multiple variables (between absenteeism and non-absenteeism) among construction workers. Adjusted odds ratios were used to measure the association between workplace H&S practices and absenteeism.

Ethical clearance was sought from the Higher Degrees and Ethics Committees at the University of Johannesburg who reviewed and approved this research before data collection commenced. Letters requesting permission to interview construction workers were submitted to construction SMEs to gain access to collect data. The purpose of the study and the research participants' rights were explained. Research participants were requested to sign consent forms, specifying their voluntary participation and the right to withdraw their consent before data was submitted. Research participants were not exposed to any form of harm by participating in the study. Participants were treated equally without any form of discrimination. Completed questionnaires were assigned codes that could not be linked to any of the research participants. An environment conducive for participants to freely respond to the questionnaire was created to maintain their privacy, anonymity, and confidentiality.

Results

The study sought to quantify the frequency of absenteeism among construction SMEs' workers. Table 1 shows the socio-demographic data and incidence of workplace absenteeism and non-absenteeism among the study participants.

Table 19: Incidence of absenteeism among workers in terms of socio-demographic characteristics

Characteristic	Total		Absenteeism incidence		Non-absenteeism incidence	
	No.	%	No.	%	No.	%
Gender						
Female	52	10.4	32	61.5	20	38.5
Male	448	89.6	328	73.2	120	26.8
Age						
20 - 30 years	216	43.2	160	74.1	56	25.9
31 - 40 years	173	34.6	119	68.8	54	31.2
41 - 50 years	77	15.4	56	72.7	21	27.3
51 - 60 years	34	6.8	25	73.5	9	26.5
Country of birth						
Lesotho	17	3.4	11	64.7	6	35.3
Malawi	14	2.8	11	78.6	3	21.4
Mozambique	60	12	36	60	24	40
South Africa	244	48.8	163	66.8	81	66.8
Zimbabwe	17	3.4	11	64.7	6	35.3
Education						
College	85	17.0	57	67.1	28	32.9



Secondary school	341	68.2	252	73.9	89	26.1
Primary school	61	12.2	46	75.4	15	24.6
No formal schooling	13	2.6	5	38.5	8	61.5
Total	500	100.0	360	72.0	140	28.8

89.6% of workers were male, and 10.4% were female. 73.2% of male workers reported having been absent, compared to 61.5% of female workers. 68.2% of workers had secondary school education, 17.0% college-level education, and 12.2% had primary school education.

The researchers investigated whether there was an association between absenteeism and workplace exposures among the workers. Table 2 below presents cross-tabulations to model the relationship between workplace exposures and absenteeism based on the time spent in the presence under each condition per day.

Table 20: Incidence of absenteeism among construction workers in terms of workplace exposure

Workplace exposure	No/Yes	Total		Absenteeism incidence		Non-absenteeism incidence	
		No.	%	No.	%	No.	%
Exposure to dust	No	122	24.4	88	72.1	34	27.9
	Yes	378	75.6	272	72.0	106	28.0
Exposure to noise	No	61	12.2	41	67.2	20	32.8
	Yes	439	87.8	319	72.7	120	27.3
Exposure to heat	No	219	43.8	159	72.6	60	27.4
	Yes	281	56.2	201	71.5	80	28.5
Exposure to rain	No	279	55.8	181	64.9	98	35.1
	Yes	221	44.2	179	81.0	42	19.0
Exposure to chemicals	No	316	63.2	213	67.4	103	32.6
	Yes	184	36.8	147	79.9	37	20.1
Exposure cement	No	151	30.2	98	64.9	53	35.1
	Yes	349	69.8	262	75.1	87	24.9
Exposure sewage and dirty water	No	315	63.0	213	67.6	102	32.4
	Yes	185	37.0	147	79.5	38	20.5
Exposure to limited lighting	No	353	70.6	234	66.3	119	33.7
	Yes	147	29.4	126	85.7	21	14.3
Total		500	100	360	72	140	28

Three hundred and seventy-eight (378), four hundred and thirty-nine (439), and three hundred and forty-nine (349) construction workers who had either been present or absent from work reported being exposed to dust, noise, and cement, respectively. Of the employees who were exposed to dust, noise, and cement, 72.0%, 72.7%, and 75.1% recorded absenteeism, respectively.

Logistic regression models in Table 3 were used to present the effect of workplace exposures and hazards on absenteeism.

Table 21: Crude and adjusted odds ratios for construction workers in terms of workplace exposures

Workplace exposure	Crude Odds Ratio	95% Confidence interval	Adjusted Odds Ratio	95% Confidence interval
Exposure to dust	0.97	(0.71, 1.31)	1.79	(1.11, 2.90)
Exposure to noise	0.95	(0.68, 1.31)	0.9	(0.44, 1.87)



Exposure to heat	0.95	(0.68, 1.31)	2.60	(1.55, 4.35)
Exposure to rain	1.60	(1.08, 2.38)	0.81	(0.50, 1.30)
Exposure to chemicals	1.49	(0.98, 2.27)	1.45	(0.92, 2.30)
Exposure cement	1.13	(0.82, 1.56)	0.53	(0.30, 0.92)
Exposure sewage and dirty water	1.46	(0.96, 2.20)	1.72	(1.04, 2.84)
Exposures to limited lighting	2.26	(1.36, 3.75)	0.76	(0.40, 1.46)

Table 3 shows the probable effect of workplace exposures on absenteeism among construction SMEs' workers. The AOR indicated that there was a correlation between absenteeism and exposure to dust, heat, cement, and sewage, and dirty water. A positive correlation of 1.79 (1.11, 2.90) existed between absenteeism and dust, a positive correlation of 2.60 (1.55, 4.35) with heat, another positive correlation of 1.72 (1.04, 2.84) with sewage and dirty water, and a negative association of 0.53 (0.30, 0.92) with cement.

Manual work which characterises the construction industry exposes construction workers to several health ailments. Table 4 presents data that reflects the incidence of absenteeism and non-absenteeism that have a probable association with physical and respiratory health ailments among this populace.

Table 22: Incidence of absenteeism among construction workers in terms of health ailments

Ailment	No/Yes	Total		Absenteeism incidence		Non-absenteeism incidence	
		N	%	N	%	N	%
Workplace injury incidents	No	415	83.0	281	67.7	134	32.3
	Yes	85	17.0	79	92.9	6	7.1
Pain induced by bending	No	286	57.2	166	58.0	120	42.0
	Yes	214	42.8	194	90.7	20	9.3
Pain induced by pushing	No	301	60.2	191	63.5	110	36.5
	Yes	199	39.8	169	84.9	30	15.1
Pain induced by pulling	No	307	61.4	190	61.9	117	38.1
	Yes	193	38.6	170	88.1	23	11.9
Pain induced by lifting	No	235	47.0	137	58.3	98	41.7
	Yes	265	53.0	223	84.2	42	15.8
Pain induced by working in one position too long	No	238	47.6	145	60.9	93	39.1
	Yes	262	52.4	215	82.1	47	17.9
Respiratory ailments							
Difficulty breathing	No	244	48.8	158	64.8	86	35.2
	Yes	256	51.2	202	78.9	54	21.1
Chronic coughing	No	306	61.2	206	67.3	100	32.7
	Yes	194	38.8	154	79.4	40	20.6
Coughing blood	No	362	72.4	240	66.3	122	33.7
	Yes	138	27.6	120	87.0	18	13.0
Breathing noisily	No	316	63.2	214	67.7	102	32.3
	Yes	184	36.8	146	79.3	38	20.7
Chest pain	No	92	18.4	75	81.5	17	18.5
	Yes	408	81.6	285	69.9	123	30.1
Chronic mucus	No	278	55.6	190	68.3	88	31.7
	Yes	222	44.4	170	76.6	52	23.4
Chronic flue	No	105	21.0	83	79.0	22	21.0



	Yes	395	79.0	277	70.1	118	29.9
Pneumonia related pains	No	383	76.6	256	66.8	127	33.2
	Yes	117	23.4	104	88.9	13	11.1
Total		500	100.0	360	72.0	140	28.0

Most employees experienced absenteeism due to pain induced during various workplace activities. Two hundred and sixty-five (265) employees experienced pain while lifting equipment and material in the workplace, while two hundred and sixty-two (262) experienced some pain induced by working in one position for too long. Many construction workers reported experiencing respiratory-related ailments in the workplace. 78.9% of those that experienced difficulty breathing, 69.9% of those that reported having had chest pains, and 70.1% that had experienced chronic flue connected to their working environment, had been absent.

The association between absenteeism and health ailments among construction workers was also examined. Table 5 below presents odds ratios that seek to model the effect of workplace health ailments and on workplace absenteeism.

Table 23: Crude and adjusted odds ratios for construction workers in terms of health ailments

Characteristic	Crude Odds Ratio	95% Confidence interval	Adjusted Odds Ratio	95% Confidence interval
Physical health ailments				
Workplace injury incidents	2.88	(1.18, 7.00)	3.49	(2.36, 5.16)
Pain induced by bending	2.12	(1.21, 3.71)	0.94	(0.12, 7.35)
Pain induced by pushing	1.23	(0.75, 2.03)	0.54	(0.33, 0.89)
Pain induced by pulling	1.62	(0.94, 2.77)	1.17	(0.78, 1.76)
Pain induced by lifting	1.16	(1.74, 1.83)	0.95	(0.64, 1.43)
Pain induced by working in one position for too long	1.41	(0.75, 1.37)	0.75	(0.51, 1.10)
Respiratory related ailments				
Difficulty breathing	1.61	(1.11, 2.33)	0.52	(0.32, 0.82)
Chronic coughing	1.66	(1.11, 2.50)	8.50	(4.04, 17.88)
Coughing blood	2.88	(1.68, 4.93)	11.93	(6.06, 23.45)
Breathing noisily	1.66	(1.10, 2.51)	0.58	(0.22, 1.48)
Chest pain	1.41	(0.75, 1.37)	0.75	(0.51, 1.10)
Chronic mucus	1.41	(0.97, 2.05)	1.76	(0.95, 3.26)
Chronic flue	1.01	(0.75, 6.38)	1.77	(1.05, 2.97)
Pneumonia related pains	3.45	(1.87, 6.38)	1.96	(1.12, 3.45)

The Odds ratios in Table 5 defined the association between reported health ailments and the incidence of absenteeism among construction SMEs' workers. There is a statistically significant positive correlation between absenteeism and workplace injury incidents reflected by an AOR of 3.49 and a confidence interval (CI) of (2.36, 5.16). Furthermore, the likelihood of a construction employee being absent due to pain induced by pushing was 0.54 times with a precision of (0.33, 0.89), reflection a negative correlation. A statistically significant positive association exists between absenteeism and respiratory ailments, with an AOR of 8.50 and a CI of (4.04, 17.88) for chronic coughing, an AOR of 11.93 and a CI of (6.06, 23.45) for coughing blood, an AOR of 1.77 and a CI of (1.05, 2.97) for chronic flue and an AOR of 1.96 and a CI of (1.12, 3.45) for pneumonia-related pains. A statistically significant negative correlation also exists between absenteeism and difficulty breathing with an AOR of 0.52 and a lower value of CI of 0.32 and an upper value of 0.82.



Discussion

The researchers examined the association between OHS factors and absenteeism among construction workers in Johannesburg, South Africa. The study sampled and collected data from five hundred (500) construction workers, using a self-administered questionnaire. The quantified frequency of absenteeism among employees in construction SMEs was assessed through the association between absenteeism and demographic factors (sex, age, education, and country of birth) among these workers. Additionally, the study examined the correlation between the dependent variable (absenteeism) and OHS factors among construction workers. The findings indicate that there were more men than women working for construction SMEs, and slightly more absenteeism among the male workers.

Absenteeism was more prevalent among the 20 – 30 years category. The main reasons for workplace non-attendance were linked to both non-occupational and OH&S factors which include illness, workplace injury, stress, and fatigue. Wee et al. (2019) observed that the younger generation recorded more incidents of absenteeism due to a combination of socio-economic, physical, and mental health factors for construction workers (Wee, Yeap, Chan, Wong, Jamil, Nantha, and Siau, 2019). Most young employees in the construction industry are new entrants in the job market, with a lack of experience, commitment, responsibility, and patience, which exposed them to workplace injuries associated with absenteeism. Furthermore, unhealthy lifestyles of young employees may be a result of alcohol abuse after pay day contributed to absence incidences (Ntili, Emuze, and Monyane, 2015).

Construction workers from seven SADC countries participated in the study. South Africans had the highest number of absenteeism followed by Zimbabweans and Mozambicans, respectively. Workplace injuries, illness, and personal responsibilities were cited as the reasons for absence from work. Notable, there was a statistically significant negative correlation between absenteeism and nationality of respondents (Mozambique and South Africa). It is possible that factors that led to employees absconding from work, (in the case of South Africans) were an indication of discontentment, with disgruntled employees communicating their dissatisfaction with management by absenting themselves (Badubi, 2017). There was a statistically significant association between absenteeism and employees with college, secondary and primary education, with higher precision for employees with a higher level of education. This observation was compatible with the perception that low educational level had an impact on H&S awareness linked to absenteeism in the construction industry. In a study for enhanced competitiveness among construction employees in Indonesia, research participants with a higher level of education had a high level of H&S awareness and H&S compliance compared to their counterparts with low levels of education (Dardiri, Sutrisno, Kuncoro, Ichwanto, and Suparji, 2017). A higher level of education corresponds to a lower rate of absence, though crude data do not provide a clear *ceteris paribus* relationship between absenteeism and educational level (Hatletveit, 2010).

The study further assessed the association between absenteeism and reported health factors among construction workers. The study found statistically significant positive correlations between absenteeism and physical and respiratory-related health ailments, respectively. A statistically significant positive correlation between absenteeism and workplace injuries was observed among SMES' construction workers. These findings reflected that construction employees were three times more likely to be absent from work due to injuries. The 118th International Conference of Labour Statisticians, of the International Labor Organization (ILO) revealed that annual occupational accidents and diseases, caused employee absenteeism for at least four working days (ILO, 2008). A statistically significant positive correlation between absenteeism and pain induced by pushing with a high level of accuracy of the AOR is consistent with the assertion by OSH WIKI (2020), which states that lifting operations performed manually inherent in the construction industry put workers at risk of injury or health symptoms causing sick leave or disability (Deroiste, Van den Broek, and Douwes, 2020). Statistics courtesy of OSH WIKI indicate that 75% of health problems reported by construction



workers were related to musculoskeletal disorders (MSDs), which led to reduced ability to perform tasks and influenced absenteeism (Hengel, and Drupsteen, 2017).

A statistically significant association exists between absenteeism and difficulty breathing, chronic coughing, coughing blood, chronic flu, and pneumonia-related pains. These findings are consistent with the results courtesy of Tavakol et al. (2017), who determined that almost all workers in the construction industry had higher exposure to crystalline silica than the threshold limit value (TLV) required by the Iranian Ministry of Health and ACGIH (0.025 mg/m³) (Tavakol, Azari, Zendeheel, Salehpour, Khodakrim, Nikoo, and Saranjam, 2017). Similarly, in a systematic review conducted by Borup et al. (2017), the researchers found that in twelve (seven cohorts, two case-controls, and three cross-sectionals) studies, between 15 and 20% of prevalent cases of chronic obstructive pulmonary disease (COPD) had been attributed to occupational exposures to vapours, gases, dust and fumes and dust at construction sites was a major challenge (Borup, Kirkeskov, Hanskov, and Brauer, 2017).

Employees from both small and medium entrepreneurs reported exposure to dust, noise, cement, rain, dirty water, and limited lighting, linked to incidents of absence from work. These findings concur with the results of Bhosale and Biswas (2015), who found that unhealthy and intolerable working conditions which existed on construction sites, affected workers' health causing them to be absent from work (Bhosale, and Biswas, 2015). There is a statistically significant positive association between absenteeism and exposure to dust, and a statistically significant negative correlation between absenteeism and cement exposure. The 95% confidence level indicates a low precision for exposure to dust and a high precision for exposure to cement. In a study on personal exposure to inhalable cement dust among construction workers, Peters et al. (2009) found that inhalable dust concentrations at the construction site ranged from 0.05 to 34 mg/m³, with a mean of 1.0 mg/m³, an average concentration for inhalable cement dust of 0.3 mg/m³ (GM; range 0.02–17 mg/m³), and levels in the ready-mix and pre-cast concrete plants were on average 0.5 mg/m³ (GM) for inhalable dust, and 0.2 mg/m³ (GM) for inhalable cement dust (Peters, Thomassen, Fechter-Rinkc, and Kromhouta, 2009).

Further, Dutta et al. (2015) observed a statistically significant association between absenteeism and exposure to heat. In a study relative to perceived heat stress in India, researchers found that 59% of labourers reported heat-related symptoms, mild to severe. (Dutta, Rajiva, Andhare, Azhar, Tiwari, Sheffield, and Ahmedabad, 2015). No ailment from exposure to sewage and dirty water showed a probability that construction employees would be absent from work due to exposure to dirt and sewage water exposure. Conversely, a study by Tiwari (2008) found that exposure to sewage was independently associated with positivity for hepatitis B virus (HBV) infection ($P < 0.001$) (Tiwari, 2008).

Conclusions

The findings of this study indicate that there is a statistically significant association between absenteeism and OH&S factors. A statistically significant correlation exists between absenteeism and socio-demographic factors, and health ailments workplace exposures. These findings require one to note that the probable association between and the dependent variable and independent variables, implied correlation, not causation. Consequently, no causality could be claimed or denied between absenteeism and OH&S factors.

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Conflict of interest

The authors declare that they have no conflict of interest

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