Occurrence of occupational injuries at a railway construction industry in Pretoria, South Africa

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Abstract

Occupational injuries have emerged as a major public health problem because of its effects on the health of employees. To minimize injuries in the construction industry, it is important to document the extent of the problem, and that includes the prevalence of such injuries in the workplace. This was a quantitative descriptive survey aimed to investigate the types and causes of injuries that occurred amongst construction workers at a railway construction industry in Pretoria, South Africa between the years 2011 and 2014. Descriptive statistics were used to summarize data and determine the frequency of events. Logistic regression was used to test the association between contributing factors and occurrence of occupational injuries. A total of 204 workers completed the questionnaire. Most common injuries reported were bruises (31%), lacerations (29%), muscle sprain (11%), burns (10%) and (8%) fractures. Two-thirds of the respondents worked overtime, and more than half (56%) of them worked overtime every day after hours including or excluding holidays. Almost all participants had access to personal protective clothing. Most injuries were caused by moving objects (32%) and stationery machines (28%). Young and middle-aged trainees and contract workers were the most frequent group reporting injuries significantly than the older permanent workers. This study has shown that the major factors contributing to injuries at Railway Construction Industry Pretoria include age, worker experience, working overtime and night shifts. Workable strategies need to be formulated to mitigate further for these injuries.

Key words: Workplace, injuries, construction industry, employees, occupational health

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Introduction

The International Labour Organization (ILO) estimates that about 2.3 million workers die each year from work-related accidents and diseases and that globally this figure is on the increase (Machida, 2009). The global construction industry has a poor health and safety record, and South Africa is no exception (Smallwood et al., 2008). The construction industry in South Africa has not improved much in reducing the high level of fatal and non-fatal accidents over the past ten years (Venter, 2013). The construction industry has an injury and fatality rates second only to the mining industry in South Africa with 171 fatalities, and 755 injuries reported during the period 2007-2010 (DoL, 2012). As a result of this, a total of 872 720 claims were paid out during the last financial year for compensation (DoL, 2012).

Several factors have been identified as contributors to occupational injuries and accidents. These include leadership and responsibility, illiteracy, stress, lack of health and safety training, working long hours (overtime), night shift, poor working conditions (environment), individual factors (age, gender, work experience), violence, substance abuse (drugs, alcohol), and non- communicable diseases (Taswell et al., 2008; Ismail et al, 2012; Smallwood et al, 2013). Most fatalities reported in the South African construction sector are a result of falling from heights, slipping, falling and moving machinery and vehicles (Venter, 2013).

Despite safety measures and programs that are in place to reduce accidents and injuries, the number of injuries and fatalities reported is still increasing, indicating that the occupational health and safety measures may not be effective. A large number of accidents remain unreported and that the Department of Labour does not have efficient systems in place to collate and consolidate the relevant information about worker injuries. Reporting and documenting of injuries and fatalities will assist the employer in formulating strategies that will address the problem. Thus, this study aimed to investigate the types and causes of injuries that occurred amongst workers at a railway construction industry in Pretoria, South Africa.

Methods

This was a quantitative descriptive survey aimed to investigate the types and causes of injuries that occurred amongst construction workers at a railway construction industry in Pretoria, South Africa between the years 2011 and 2014. The construction company employs about 3900 workers in the categories of students, contract, and permanent staff. These employees work with heavy machinery pertaining to the railway industry. The target population (all personnel who sustained occupational injuries), reported to the clinic between the years July 2011 till August 2014. This target population was identified through studying the medical records for the same period.

Before the study commenced, ethical clearance was obtained from the Medunsa Research Ethics Committee (MREC) of the University of Limpopo (Now Sefako Makgatho Health Sciences University), South Africa. Permission to conduct the study was also obtained from the Company CEO and the Risk and Safety Department of the Construction Company. Written informed consent was obtained from the participants and confidentiality was maintained by anonymous completion of the questionnaires. Instead, specified numbers were used to link the respondents to their information from the medical records.

Data were collected using a self-administered structured questionnaire, which was in English as all of the employees were able to read and write. The information collected consisted of demographic data, factors associated with occupational injuries and the frequency and types of injuries. The questionnaire was self-administered by the employees who got injured.

After permission had been granted to collect data, the researcher started to study the injury records in the personal files of employees for their contacts and to verify when the injury occurred. Participants were contacted and asked to visit the clinic during lunch or tea break when they were free from their job to prevent disruption of their work. Participants were given the questionnaire, for those who were able to complete same day and submitted immediately given that chance. If they were not able to complete the questionnaire during the visit they were asked to drop them in a designated box at the clinic. Data were collected for four months (May 2014 to August 2014).

Descriptive summary statistics such as frequency distribution mean percentage calculation was used to summarize and present data. Inferential statistics were performed on desirable variables such as demographic data (Age, sex, period of employment) and the types of injuries. Multivariate logistic regression was performed to test the strength of association between contributing factors (such as overtime, duration of employment, leave, night shifts, use of alcohol) and occurrence of occupational injuries. Statistical significance was deduced at a p-value less than 0.05. The questionnaire was pre-tested using 10 participants whose results were not included in the analysis of the main study. Recall bias was minimized by verifying the questionnaire responses in the personnel records.

Results

Participants' socio-demographic information

A total of 250 participants were contacted, but 204 responded with complete valid questionnaires, a response rate was 82%. The largest group (80, 39%) was in the 30-39-year age group (Figure 1). Their mean age was 37.6±10.3 years and ranged from 21 to 62 years. Most of the employees were males (167, 82%).

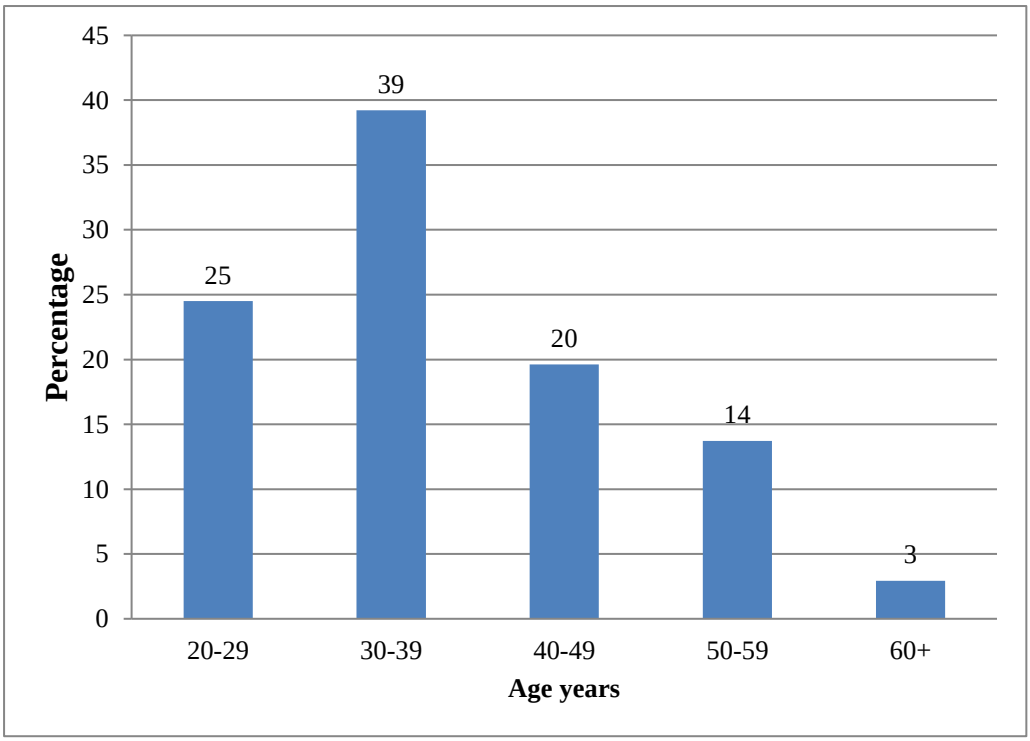

Figure 1: Age distribution of participants (n=204)

Table 1 presents the professional categories of employees who participated in this study. Technical staff (86, 42%), operators (45, 22%) and artisans (37, 18%) formed the largest group in this study. The participants (166, 81%) were permanent employees while the rest were on contractual employment.

Table 1: Professional categories of employees (N= 204)

	Number	**%**
Operators	45	22
Technical staff	86	42
Artisan	37	18
Other	37	18
Total	**204**	**100**

Types of injuries sustained by employees

Respondents were asked if they had sustained injuries in the last three years. The majority (70%) of the participants reported that they had sustained injuries followed by 30% with two of more injuries. Sixty-five (32%) of the employees were struck by moving objects, followed by those cut by a machine (28%). Table 2 illustrates the source of injury by professional category of staff.

Table 2: Source of injury by professional employee category (n =204).

	Operator	**Technical staff**	**Artisan**	**Other**	**Total**
Cut by machine	12 (27)	21 (24)	14 (39)	9(24%)	56 (28)
Falls from height	4 (9)	8 (9)	3 (8)	1 (3%)	16 (8)
Slippery floor	1 (2)	6 (7)	4 (11%)	1 (3)	12 (6)
Struck by moving object	17 (39)	27 (31)	5 (14%)	16 (42)	65 (32)
Other	10 (23)	24 (28)	10 28%)	11 (28)	55 (27)

The types of injuries sustained by the participants are shown in Figure 2. Bruises (31%), lacerations (29%), muscle sprain (11%), burns (10%) and (8%) fractures were the most common injuries reported.

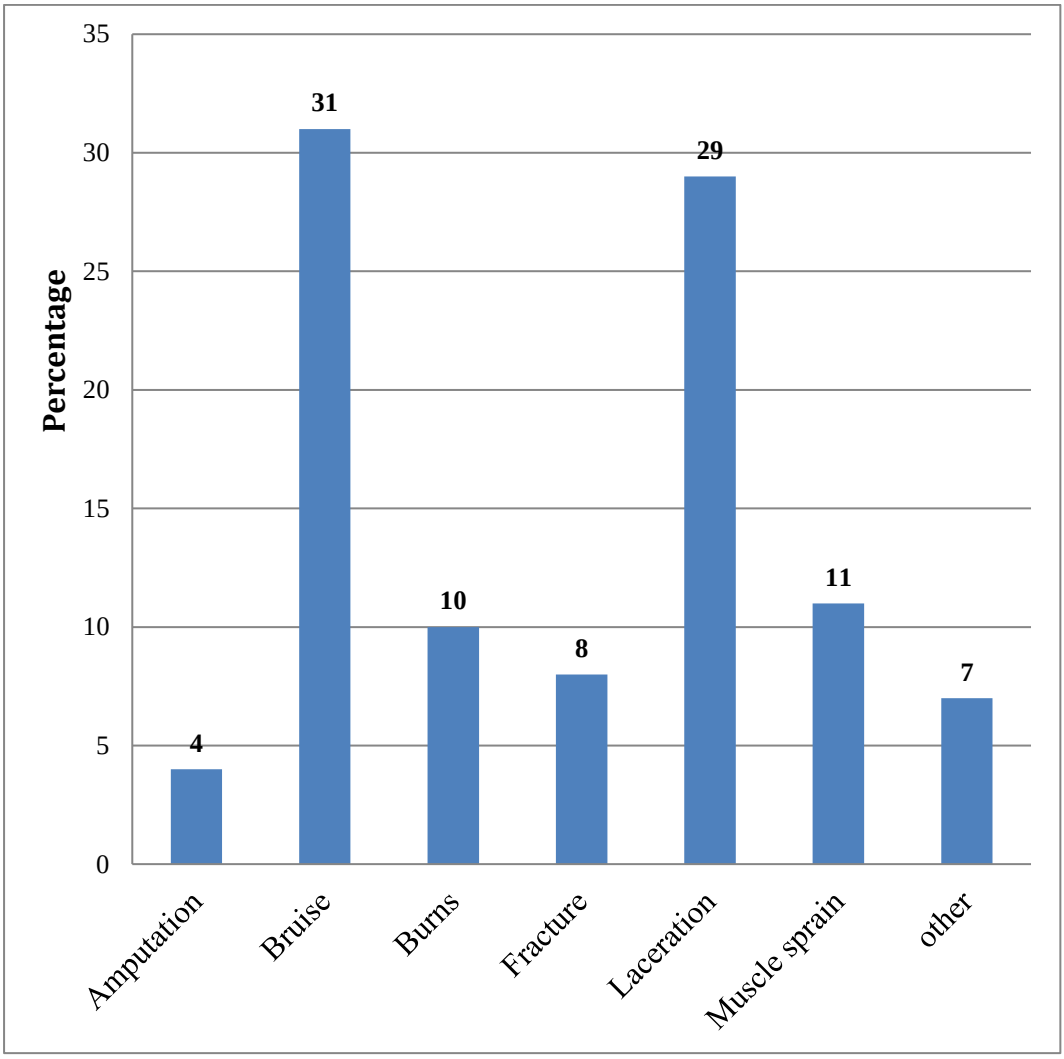

Figure 2: Types of reported injuries (n=204)

Data were analyzed to determine if there was an association between selected demographic information and injury types. No significant difference was observed between male and female with regard to bruises as the most common injury ($p = 0.45$). All categories of staff (i.e. operators, technical staff, artisan and other staff members) experienced similar injuries. However, a significantly high proportion of trainees and contract staff reported bruises compared to permanent staff ($p = 0.01$).

Upon the investigation into the risk factors contributing to injuries in the workplace, two-thirds of the respondents did overtime and more than half (56%) of them did it every day after work including or excluding holidays. Seventy-five percent took leave once in a year, and almost all of them had short breaks during working hours (over 90%). Although the workers were provided with personnel protective equipment (PPE), the helmet was the least worn by 35% of respondents. The details of the responses are shown in Table 3 below.

Table 3: Risk factors associated with bruise as the major occupational injury reported (N= 204)

	Level of adherence			
Variables	**Yes n (%)**	**No n (9%)**	**p>|z|**	**OR (95% CI)**
Have chronic conditions	45(22)	159(78)	0.233	1.64(0.73,3.70)
Employment contract (yes vs no)	38(19)	166(81)	0.012	2.93(1.27, 6.77)
Alcohol use (yes vs no)	79(39)	125(61)	0.122	0.55(0.26, 1.17)
Overtime (everyday vs once a week)	114(56)	90(44)	0.904	0.96(0.48, 1.89)
Work on night shifts	87(43)	117(57)	0.451	1.30(0.65, 2.60)
Annual leave (once vs twice)	152(75)	52(26)	0.829	1.07(0.57, 2.02)
Breaks on working hours	188(92)	16(7.8)	0.116	0.30(0.06, 1.35)
Refresher training annually	176(86)	28(14)	0.380	0.66(0.26, 1.66)
Attended health and safety training	180(88)	24(12)	0.118	2.43(0.82, 7.45)
Always wear safety googles	171(84)	33(16)	0.085	0.48(0.21, 1.11)
Always wear safety helmet	71(35)	133(65)	0.324	0.43(0.07, 2.31)
Doing the work trained for	157(77)	47(23)	0.65	1.03(0.90, 1.18)

When inferential statistics were performed (logistic regression) in order to determine the relationship between bruises, a major injury reported by the workers, no significant association was found except for employment status.

Discussion

This study investigated the factors contributing to occupational injuries at railway construction industry in Pretoria. In this study, the majority of respondents who sustained more injuries were men. This could be because the engineering sector is a predominantly male occupation although currently women are being introduced to the profession. This observation has been reported in another study where males report more injuries than females (Osnaya-Moreno et al., 2014).

Almost a quarter of employees' sustained injuries more than once since they started working in the company. The majority of respondents' sustained injuries due to being struck by the moving objects, which is a consistent finding in other studies (Utterback, 2010; Wilkins et al., 2007). Most construction companies work with heavy moving machinery such as cranes, forklifts, and tractors, which are used to lift heavy materials. Laceration and bruises were the most common type of injuries sustained by employees. These are the most common injuries in construction industries globally (Sorock et al., 2002). It was notable also that hardly any of the employees sustained multiple injuries in any one incident.

In this study, a number of employees have reported to work overtime almost every day, and according to the number of participants, most of them were middle age. Illiteracy, stress, lack of health and safety training, lack of information on health hazards, risks at the workplace, working long hours, overtime, night shift, poor working conditions, age, gender, work experience, violence, substance abuse, and non-communicable diseases have been identified as contributors to occupational injuries and accidents (Taswell et al., 2008).

Younger workers are more likely to be injured at work than older workers (Laberge, 2014) and this appears to be related to inexperience, which is age-related. In the current study, most of the participants were classifiable as young to middle age compared to older people who were much fewer (14%). Our study findings show that experience plays a role in the occurrence of worker injuries as a smaller proportion of the older people reported fewer injuries than the younger group. This finding has been corroborated by another study where younger people reported more injuries than older people (Khanzode, 2012). Essentially, epidemiologic models have shown that young

people frequently hold manual and unskilled jobs and these are strongly associated with high occupational injury rates (Breslin et al., 2010). Furthermore, young people are still on the job training, and this puts them at a higher risk of exposure to occupational injuries than older people due to less experience.

Lack of training also predisposes workers to higher risk of injuries (Adane et al., 2013). Training plays an important part of the work process as it prevents hazards and educates employees on how to follow safety measures. This study results showed that almost half of the employees received induction on health and safety training every year as a preventative measure of occupational injuries. However, education and awareness strategies to prevent injuries among young workers are common, but they are often ineffective as the training approaches emphasize teaching, rather than learning strategies, and appear to contradict recent competency-based developments in education science (Laberge et al., 2014). Beside induction given at the construction company, the rate of occupational injuries still increased. Therefore, there is a need to review the process of training and teaching.

In most construction institutions working overtime is a norm, in the sense that employees want to increase their salary or the employer has to meet the target. This study has shown that employees of the Pretoria construction company work overtime every day after hours, including holidays. The study has also shown that almost half of participants worked on night shifts. Night duties have been identified as contributory factors to occupational injuries (Taswell et al., 2008). Thus, overtime practice observed in this study could have contributed to some of the injuries reported by the workers. It has been reported that technical professions where overtime have been scheduled were associated with an increase of 61% injuries rates compares to technical professions without the overtime (Dembe et al. 2005).

Study limitations

The findings in this study are from one industrial worksite with a small population size. Thus the findings may not adequately be generalized to all national construction industries. Experiences of other sister companies and other unrelated construction companies may not show the same pattern of findings. It is thus recommended that other larger studies need to be conducted in order to understand the problem further.

Conclusion

The study has shown that occupational injuries still occurred amongst construction workers. Some of the major reported factors, which may contribute to injuries in this workplace include young age, worker experience, working overtime and night shifts. Adequate measures should be in place to prevent accidents from happening; risk assessment should be conducted on regular basis to review potential risks.

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