

Occupational slips, trips and falls amongst workers in the meat sector in Gauteng Province of South Africa

Maud Maseko¹, Lindiwe Zungu² and Sanyi Gabe³

Abstract

Slips, Trips and Falls (STFs) injuries are the second most common cause of lost workday injuries in most industries with workers in the meat sector being at high risk of exposure to STFs owing to poor housekeeping practices. Research has, however, shown that variables such as age, gender and the type of occupation are common risk factors for STFs. It is within this background that the aim of this study was to determine the incident of occupational STFs among the meat sector workers located in the Gauteng Province of South Africa. The data collection process involved the environmental inspection of the study sites, record reviews of accident registers and interviews of employees at the study sites. Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 21, while the Pearson's Chi-square test was used to determine the strength of relationship between age, gender, number of years spent on the job and the type of occupation as well as the frequency of STF injuries. The study found out that a majority (73.2%) of males were significantly affected by STFs unlike their female counterparts; with the age of victims ranging from 21 to 62 years and the mean age at 35.87; while STFs were most common among general workers, meat packers and slaughter men; and the most affected body parts being the body, arms and hand/fingers. A prevalence of 25.6% of STFs was found among workers at the study sites. Several factors appear to have contributed to this including poor upkeep of the work environment, design issues and the apparent lack of appropriate safety practices such as signage.

Keywords: Occupational health, slips, trips and falls injuries, meat industry, employees, South Africa.

¹ School of Social Sciences, Department of Health Studies, University of South Africa, South Africa, email: maudma@mweb.co.za

² School of Social Sciences, Department of Health Studies, University of South Africa, South Africa, email: zunguli@unisa.ac.za;

³ School of Social Sciences, Department of Health Studies, University of South Africa, South Africa, email: sanyigabe536@gmail.com

Background

Work-related incidents of slips, trips and falls (STFs) are preventable. A consideration of both general statistics released in a few countries throughout the world reveals that work-related slips, trips and falls (STFs) are the second most common cause of lost-workday injuries in the general industry and can cause back and head injuries, fractures, paralysis and even fatalities (U.S. Bureau of Labour Statistics (BLS), 2010; NIOSH, 2010). Employees in wholesale, retail and meat industries are mostly at risk of STF injuries, with a 75% greater than average industry rate for all other private industries combined (28.3 vs. 16.1 per 10,000 employees) (BLS, 2009).

The prevalence of STFs on the globe is also reflected in the statistics and observations on injuries witnessed in the global north and south. A study by Bell, Collins, Wolf, Grönqvist, Chiou, Chang, Soroc, Courtney, Lombardi and Evanoff (2008) found that 21% of the 2,263 injury claims filed in the United States of America (USA), were caused by STFs, with the injury rates from STFs estimated at 38.2 per 100 000 population (Bell, Collins, Dalsey and Sublet, 2010). In Great Britain, STFs have a combined estimated number of working days lost standing at 1.5 million, with slips and trips at an estimated 986 000 working days lost, and falls estimated at 567 000 working days lost (United Kingdom National Statistics, 2014).

There are several factors that are associated with STFs. A study by Mogale, Malangu and Huma (2014) reported that increasing age, female gender and the type of occupation were associated with STFs. Elsewhere, it has been reported that work-related STFs are also a leading cause of injuries in the food industry workers in Canada (WorkSafe BC, 2013). In 2014, Worker's Compensation claims data show that slips, trips and falls were the most frequent causes of injuries among meat and poultry workers in the USA (GAO-16-337, 2016). In addition, a study on African countries such as Sudan (Eltayeb-Yassin and Elsadig, 2013), revealed that the common injuries in the food industry, which includes the meat industry resulted from slips, trips and falls; while Mannyele, Ngonyani and Eliakimu's (2008) study in Tanzania, found that falls from slippery floors are common injuries in the workplace.

Within the context of the area studied for this article, the South African Department of Labour revealed that the food industry, including the meat sector, has been identified as one of the high risk industry for work-related injuries (Pearson, 2009 and Department of Labour, 2011). In South Africa, falls account for 10% of all deaths and the 20th leading cause of mortality in the general population (Seedart, 2009). A breakdown of deaths due to other external causes from accidental injuries points account for 123 reported cases of fall-related deaths out of 29 786 reported deaths in South Africa (Statistics South Africa, 2013).

Employees in the meat industry are faced with different kinds of injuries in the workplace. A survey conducted outside South Africa revealed that the work environment in the meat and poultry plants tends to be risky and results in injuries due to current procedures used in the industry, where for example the final production processing involves a number of packaging machines and conveyors that can present a wide range of safety risks to workers (GAO-05-96, 2005). The types and extent of injuries arising from exposure to such risks range from minor to severe and even fatalities. Injuries such as work-related STFs in the meat industry can be serious injuries and impact negatively on the employees, resulting in pain, lost days of work, and can also have detrimental effects on the organisation that end up disrupting productivity and leading to irreversible serious physical or psychological harm to the individual workers (Bell et al, 2010;

Miller, 2013). The slips and falls injuries sustained by meat sector employees are mainly due to wet or greasy floors (GAO-05-96, 2005; Eltayeb-Yassin et al, 2013). Similarly, the meat and fish processing industry workers, as observed in South Africa, are at a high risk of slips, trips and falls due to the wet slippery floors around the workstations and the freezer areas (Department of Labour, 2014). However, it is commonly agreed that, workplace accidents resulting from slips and falls in the meat industry are associated with poor housekeeping. This poor housekeeping is characterised by slippery, wet and greasy floors as a result of animal fat, or the existence of cluttered obstacles and other tripping obstacles and hazards (British Meat Processors Association, 2014; Lehtola, Brown and Becker, 2009). For instance, a study conducted in the USA by Spellman and Bieber (2008) and a report documented by WorkSafe BC (2013) posit that bad housekeeping and poor drainage in the meat industry make floors and other walking surfaces to be wet and slippery and may cause workers to fall and sustain injuries and/or cause damage to equipment or property. In addition, a survey conducted among British meat processing workers showed that STFs are caused by broken uneven floors, wet slippery floors, unsuitable footwear, smooth floors, slippery stairs, obstructions, poor stairs conditions, bad lighting, an absence of handrails and the existence of uncovered drainage channels (British Meat Processors Association, 2014).

The injuries suffered can further be explained in relation to other potential risk factors. These other risk factors include age, gender, occupation and the number of years in the workplace. The mean age of meat and poultry workers in the meat and poultry industry in the USA was 37 years with 43% of all workers observed as under age of 35 (GAO-05-96, 2005). The characteristics of meat and poultry workers and the conditions in which they work revealed that the largest proportion of workers comprised young males (GAO-05-96, 2005; Allen and Sachs, 2007). On the contrary, a report by the European Agency for Safety and Health at Work (2016) revealed that female workers in the meat sector were more exposed to slips, trips and falls than male employees. Generally, women workers face the same health and safety risks but may suffer different effects and face additional health and safety challenges at work in comparison to their male counterparts. Hence, the International Labour Organisation (ILO) has classified female employees as vulnerable workers (ILO, 2012).

The nature one's job and work experience has a relationship with the incident of injuries. Meat packers, General workers in the stunning section of the abattoirs and Slaughter men, are at a risk of slips, trips and falls injuries due to slippery floors (GAO-05-96, 2005). In addition, the clean-up crew are at a risk of slips and falls from slippery floors because they have to spray machinery, floors and equipment with very hot water, which causes steam that can impair vision from fogged safety goggles (GAO-05-96, 2005). A local study by (Nkomo, 2016) found that employees with less experience at work encountered more injuries than employees with more years of experience at work. Other studies indicate that younger workers sustain occupational injuries at a higher rate than older workers due to lack of experience, lack of knowledge and underdeveloped skills. Similarly, the Government of Western Australia (2010) suggests that older employees' skills and experience gained from many years of employment can assist with safety and health management because of their substantial knowledge and experience. It has also been shown that older employees bring many benefits to the workplace and are viewed as a more productive and resourceful population (Tishman, Van Looy and Bruyere, 2012).

It is acknowledged that slips, trips and falls impact the meat packing industry workers in different ways. They can result in pain and suffering and lead to injuries that affect body parts such as the trunk, upper extremities and the knees (GAO-05-96, 2005). Lower extremities accounted for 45% of all injured body parts after an STF event, followed by upper extremities (Bell et al, 2008). Lower extremities such as knees, ankles and feet are the most cited injured body parts after an STF event (Andersen et al., 2012). In addition, the injuries that are commonly sustained by employees due to slips and trips include musculoskeletal injuries, cuts, bruises, fractures and dislocations (Compa, 2005; GAO-05-96, 2005; Safe Work Australia, 2012).

South Africa has, since the dawn of democracy, put in place legislative tools aimed at ensuring the primacy of occupational health and safety across several industries. Some of these legislations include the Occupational Health and Safety Act (Act 85 of 1993) and Compensation of Injury and Disease Act, Act no. 130 of 1993 (COIDA). In spite of these legislative instruments, there still exist work-related injuries such as slips, trip and falls (STFs). However, it should be stated that, although slips, trips and falls are the second most frequent cause of lost-workday injuries, research on risks and prevention is scarce. In addition, there is paucity of slips, trips and fall data within the meat sector in South Africa. Thus, this study sought to determine the incident of occupational STFs among workers in the meat sector located in Gauteng Province of South Africa. The paucity of studies on STFs among meat sector employees, probably due to under reporting, compelled us to carry this study. In addition, an efficient reporting on injuries could assist in the determination of the trends and the extent of slips, trips and falls injuries among employees in the meat sector that will lead to the establishment of informed decisions seeking to address the problem. The study, therefore, sought to highlight the need to design preventative measures that can mitigate the vulnerability of specific categories of employees in the meat industry.

Methods

Study design and sample

The study adopted a quantitative descriptive cross-sectional design based on a retrospective review of records and interviewer-led questionnaire among two meat sectors in Gauteng province of South Africa. The study sample consisted of two hundred and two (202) employees randomly selected from two meat industries located in Gauteng province.

Data collection methods and statistical analysis

Data was obtained from the records on occupational injuries from the injury registers available from the study sites. This was supplemented with data from investigation reports on work-related accidents reported to the Department of Labour for compensation purposes. Data was collected using a checklist developed for this study at the two meat sector plants, while an interviewer-led questionnaire was used to collect data from the 202 meat sector employees and verify data from the records. The questionnaire and checklist were pre-tested and modified where required to ensure reliability of the instruments. The data that were extracted from the records included age, gender, type of occupation, number of years on the job, anatomical body parts affected and severity of the STF injuries. In addition to the two data collection tools, photographs depicting hazardous conditions in the study sites were considered during the observation exercise in an effort to validate employee responses, the workplace health and safety conditions and exposures,

as well as to enrich the findings of this study through an evaluation of visual images. The checklist was also used to conduct inspections and/or observations of environmental facilities at the study sites.

The Statistical Package for the Social Sciences (SPSS) version 21 and Microsoft Excel were used to perform statistical analyses. Descriptive data were summarised and presented in pictorial, tabular and graphical format. A Pearson's Chi-square test was carried out to test the strength of relationships between categorical variables, participants' age, gender, type of occupation and number of years at the job and these were cross-tabulated with the frequency of injuries. The statistical significance level of testing (p-value) was set at ($p < 0.05$).

Ethics approval

Ethical clearance was obtained from the Research Ethics Committee of the Department of Health Studies at the University of South Africa and the two study sites granted permission to conduct the study. Permission was requested and obtained from the two meat enterprises, prior to the execution of the study. Finally, informed consent was obtained from all participants prior to conducting the interviews.

Results

Prevalence of STF injuries and participants' socio-demographic profile

Records reviewed showed that of 160 workers in the study sites, whose occupational injuries were reported to the Department of Labour for compensation purposes, 41 cases were related to STFs and this amounted to a prevalence of 25.6%. The major victims of STFs were men who constituted 73.2% of the participants while the females made up the remaining minor portion of victims. The age of the victims ranged from 21 to 62 years with the mean age being 35.87 years, and standard deviation stating at 11.38. Employees between the ages of 21 to 30 years (44.0%) were more likely to be affected by STFs than the older ones with a significance of $p < 0.001$. They were followed by those between 31 to 30 years (26.8%). General workers reported the highest number of STFs (24.3%), followed by Slaughter men (22.0%), Meat loaders (19.5%), Meat packers, Deboners (7.3%), and Receivers, Block men, Cleaners and Scale clerks (4.9%). Most employees (44.7%) who sustained STFs were at their job for less than 1 year, followed by those who were at their jobs for a period between 1 year and 5 years (34.2%). A few (9.2%) of those who had been on the job for 6-10 years sustained STFs, while 6.6% of those who had been on the job longer than 16 years had STFs, 5.3% of those who had been at the job for only 11-15 years were affected by STFs. As shown in table 1, the results indicated that the type of participants' occupation and number of years spent on the job were statistically significant to the occurrence of STF injuries ($p < 0.05$).

Table 1: Demographics of participants with STF injuries (n=41)

Gender	Sustained STF's injuries		P value
	Response category	n (%)	
Male	30 (73.2)	No 8(19.5%)	p>0.05
		Yes 22(53.7%)	
Female	11(26.8)	No 8(19.5%)	
		Yes 3(7.3%)	
		Total	41(100.0)
Age in years	Frequency	Percent	
21-30	18	44.0	
31-40	11	26.8	
41-50	6	14.6	
50 and above	6	14.6	
Total	41	(100.0)	
Type of occupation	Frequency	Percent	
General workers	10	24.3	
Slaughter men	9	22.0	
Meat loaders	8	19.5	
Meat Packers	3	7.3	
/Receivers	2	4.9	
Block men	2	4.9	
Cleaners	2	4.9	
Deboners	3	7.3	
Scale clerks	2	4.9	
Total	41	(100.0)	
Number of years spent on the job	Frequency	Percent	
< 1 year	18	44.7	
1-5 years	14	34.2	
6-10 years	4	9.2	
11-15 years	2	5.3	
> 16 years	3	6.6	
Total	41	(100.0)	

Physical work environment at the study sites

The results from the environmental inspection of one of the two study sites showed that it did not have skid-free floor conditions and failed to provide appropriate handrails and barriers on platforms along production lines that could protect workers from falling. These results are presented in the Table 2 below.

Table 2: Physical work environment of study sites (n=2)

	Item	Response category	Frequency (n)	Percentage (%)
1	Are floors in good condition, skid free, free of obstacles and other tripping hazards?	Yes	1	50.0
		No	1	50.0
2	Are appropriate handrails and barriers in place?	No	1	50.0
		Yes	1	50.0
3	Are sufficient signs displayed for safe management of workplace transport, fire, safety, welfare and first aid managements?	No	2	100.0
		Yes	0	0.0

Furthermore, figure 1 below depicts the state of inadequate space on the platform. The inadequacy undermines safe movement and exposes workers to the risk of falling from a height. In addition, the nearby gas cylinder is not placed in a secured place, thus allowing a possible explosion should the worker accidentally falls onto the cylinder with the open gas flame that he is holding in his right hand. He can also sustain serious injuries to his body if he falls onto the cylinder.



Figure 1: A picture depicting worker standing on assembly with inadequate space for movement

Environmental conditions of the facilities in the study sites

Slippery floors

These unsafe conditions that existed in the study sites are depicted in figure 2. Floors were generally wet and contaminated with animal fat. The figure also displays an uneven and dilapidated floor surface that is cluttered with obstacles and exposing workers to risks of STFs. Finally, a further risk is noted from the operators’ failure to always put on protective gloves, which exposed them to blood and the risk of contracting infectious diseases.



Figure 2: A picture depicting wet contaminated and cluttered floor surface

Injured anatomical body parts resulting from slips, trips and falls

Of the 41 participants who were identified as having sustained injuries due to slips, trips and falls, just under half of them sustained on the body; a little under a quarter (17.1%) sustained on the arm and 14.6% were sustained on the hands and fingers. Other parts of the body that sustained injuries as a result from slips, trips and falls were the foot (12.2%), leg (4.9%) and head (2.4%). Injuries sustained on the body, foot, hand/fingers, the leg and the head were common among just over half of participants who worked as general workers; while over two-thirds of participants who worked as meat packers sustained injuries on the arms, the body and the leg. A few injuries were sustained by men performing slaughtering, on the body and hand/fingers. These results are presented in Figure 3 below.

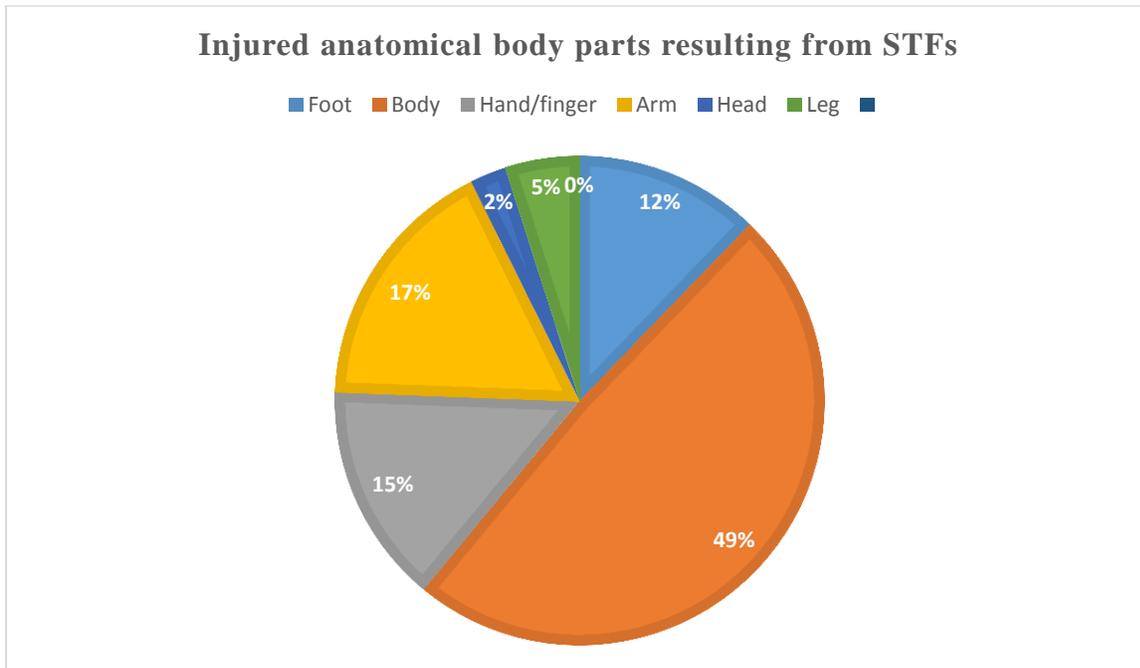


Figure 3: Injured anatomical body parts from STF's (n=41)

Severity of STF injuries as reported by participants

The results from a determination of the severity of injuries reported by the participants, as indicated in Figure 4, show that although 60% suffered from minor injuries; the remaining suffered from moderate to severe injuries that prevented them from continuing with their current duties (23.6%), or required them to temporarily change their jobs or to work for less hours (14.1%), or even forced them to be restricted from performing certain tasks (1.9%).

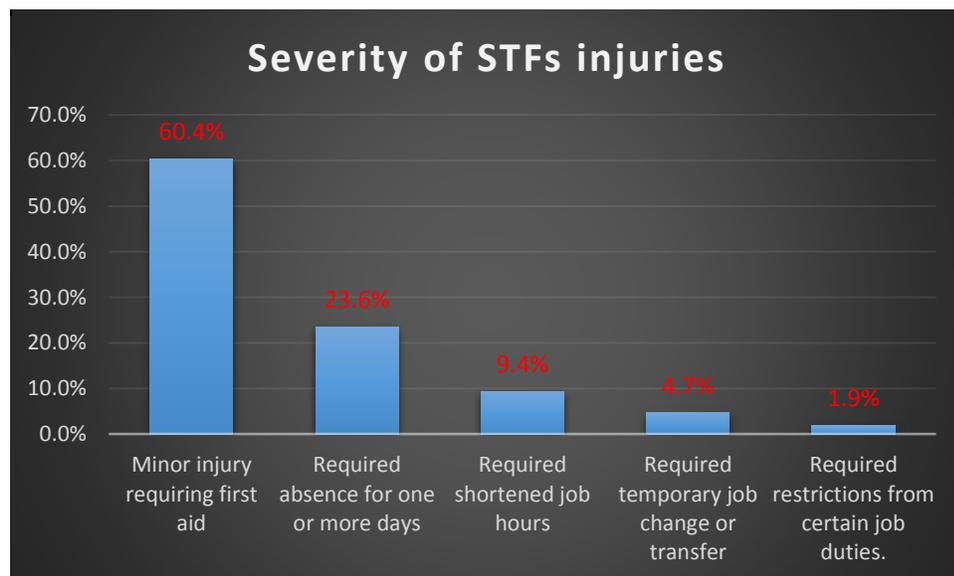


Figure 4: Severity of STFs injuries (n=41)

Discussion

The study found a 25.6% prevalence of STFs-related injuries among employees from both meat companies included in this study. A study by Bell et al, (2008) reported similar findings where about 21% of the filed 2,263 injury claims were noted as resulting from STFs. However, falls accounted for 10% of all deaths in the South African industries in general and stood as the 20th leading cause of mortality (Seedat, 2009). The findings of the current study show that the majority of these injuries (73.2%) occurred significantly in males owing to their greater number in this industry (GAO-05-96) 2005; Allen & Sachs, 2007). This finding suggests that, in line with section 12(1)(a) of the OHS Act (No. 85 of 1993) as amended, a risk assessment followed by a risk mitigation plan should be put in place by the managers in the meat industry (OHS Act No. 85 of 1993). Comparatively, the findings of this study contrast with a 2016 report by the European Agency for Safety and Health at Work (EASW) which revealed that female workers in the meat sector had exposed to slips, trips and falls more than male employees (European Agency for Safety and Health at Work, 2016).

Our study’ findings showed that the age of participants with STF injuries ranged from 21 to 62 years with the mean age of 35.87 (\pm 11.38) years. This finding is similar to report from elsewhere. For instance, the mean age of meat and poultry workers in the meat and poultry industry in the USA was 37 years and about 43% of all workers were under age of 35 (GAO-05-

96, 2005). This study also showed that employees between the ages of 21 to 30 years (44.0%) were more likely and significantly to be affected by STFs than the older ones ($p < 0.001$). This finding suggests that young workers, due to their limited experience, should be supported with regular supervision, information, instruction and training to promote safe work practices and reduce injury and occupational diseases as required by section 8(2)(e) of the amended OHS Act No. 85 of 1993. This legislation states that employers are required to train employees in order to enhance their control procedures regarding compliance with health and safety legislation OHS Act (No. 85 of 1993). According to PAHO (2006:26), training is an important component of the health and safety management program because it enables the workers to assume their duties competently. Furthermore, training strengthens the culture of prevention of occupational health and safety hazards.

In this study, STFs are most common among general workers, meat packers and slaughter men. This finding concurs with the report by GAO (05-96, 2005) that meat packers, general workers in the stunning section of the abattoirs and slaughter men are at a risk of slips, trips and falls. Additionally, our findings showed that study sites had poor housekeeping practices with floors being slippery, wet and covered with animal blood; this situation increased the workers' risk to injuries from falls. Furthermore, the floors were cluttered with obstacles, which could cause the workers to trip. All these findings are in contravention of the section 6(2)(c) of the Environmental Regulations for Workplaces of 1987 which requires an employer to ensure that every indoor workplace is clean, orderly and free of materials and tools which are not necessary for the work done at a given workplace. In addition, the study findings documented by Lehtola et al (2009) and Van DeCruze et al (2008) suggest that poor housekeeping practices, such as keeping floors slippery from spilt water; uneven or broken, and littered with obstacles and other tripping hazards, often results in serious workplace accidents. In Canada, it has been reported that bad housekeeping and poor drainage that makes floors and other walking surfaces to be wet and slippery have the potential to cause worker injuries and/or cause damage to equipment or property (WorkSafe BC, 2013). In addition to the need for order, cleanliness and hygiene, the above observations stress the need for personal protective equipment, specifically appropriate shoes, clothes and goggles.

Another observation that the facilities had inadequate space for safe movement on the platform, which exposed the workers to the risk of falling from a height, is also a mandatory contravention of section 6(2)(f) of the Environmental Regulations for Workplaces of 1987 which requires employers to board over or enclose with rails or guards or take other measures which may be necessary for the access of persons or the movement of material.

With regard to the consequences of the STFs sustained, this study's findings showed that just under half of the reported injuries were sustained on the body. These body injuries, mainly sustained by general workers, packers and slaughter men, were the result of falling from multilevel workstations and slipping on wet slippery floors after being struck by carcasses and moving objects. The present findings are in line with a survey conducted in the USA, which documented that employees in the meat and poultry industry in the USA sustained injuries and bruises on the trunk from being struck by carcasses, moving objects and kicks of live animals, as well as falling from multilevel walkways and slipping on wet or greasy floors (GAO-05-96, 2005). It was further revealed in the current study that a few participants reported that they sustained injuries and bruises on the arms from fractures resulting from slips, trips and falls.

Similarly, a survey conducted among the meat and poultry industry in the USA by indicated that employees sustained injuries and bruises on the arm from fractures (GAO-05-96, 2005). This common pattern of injuries suggests that this now a well-established fact for which effective preventive measures should be implemented.

A minority of the participants sustained STFs injuries on the feet, legs and the head from falling after being struck by falling objects, moving carcasses and moving equipment. These were sustained by general workers and meat packers. Similar outcomes were documented in a survey conducted in the USA, which found that the meat and poultry industry employees sustained injuries on their feet and legs from falling as a result of being hit by falling objects, while others sustained injuries on their heads as a result of being struck by moving carcasses and moving equipment (GAO-05-96, 2005). A further few slaughter men and general workers sustained soft tissue injuries and contusions to their hands and fingers after slipping on slippery greasy floors whilst involved in forceful repetitive stooping and twisting of the waist when grabbing a 150 kg carcass at a time with one hand and degutting it with the other hand was in motion. The findings are in line with a report documented by the South African Department of Labour (2013) which indicates that other occupational hazards threatening the safety of workers include the risk of being hit by moving machinery and unsecured equipment.

Less than two-thirds of this study's participants who experienced STFs injuries had minor injuries that required first aid. The findings concur with a report by the Southern Poverty Law Centre (2010) which states that an injured poultry processing plant employee who sustained injury to her fingers only needed to receive first aid treatment and no further action was taken by the employer. The findings also indicate that just under a quarter said that their STFs injuries required them to work for one or more days from work. In contrast, the findings documented in a survey conducted by the British Meat Processors Association (2011) among the meat processing employees indicated that employees who sustained less serious injuries only required absence from work for 3 or more days. Furthermore, a minority of participants said that their injuries required them to temporarily change their jobs, while another few reported that their injuries required them to be restricted from certain job duties. Thus, this study produced results that contrasted with those from a study conducted by Ruser and Wiatrowskim (2013) among the United States meat and poultry processing sector which reported that a higher proportion (64%) of the participants were temporarily restricted from certain job duties as a result work-related injuries.

It appears that, judging from the above information on the magnitude of risks that employees faced and the economic impacts on employers in the meat sector in Gauteng, there is an absence of implementation of important elements of health and safety management program such as risk assessment, communication, provision of information and training, and the monitoring and evaluation thereof. It is clearly cost-effective to put in place preventive measures to improve the safety of workers and thus, reduce the amounts of money paid annually to victims of work-related injuries.

The above finding should be considered noting that the study was cross-sectional, depicting a situation at the time of the study; thus, the findings do not in any way portray a permanent

feature. In addition, only two workplaces were involved; therefore, the findings cannot be generalized to the whole meat industry in Gauteng or South Africa.

Conclusions and recommendations

A prevalence of 25.6% of STFs was found among workers at the study sites. Several factors appear to have contributed to this including poor upkeep of the work environment, design issues and the apparent lack of appropriate safety practices such as signage. Three interventions are required namely legal, managerial and educational. Where contraventions are found these should be punished as required by law; the management should take responsibility for ensuring safe working condition and workers must be trained and provided with protective equipment. Furthermore, employees should be encouraged to wipe spills immediately. Finally, more signage should be conspicuously displayed to direct employees appropriately.

References

Allen, P and Sachs, C. Women and food chains: the gendered politics of food. *International Journal of Sociology of food and Agriculture*, 2007:15(1):1-23.

Andersen LL, Clausen T, Burr H and Holtermann A. Threshold of Musculoskeletal Pain Intensity for Increased Risk of Long-Term Sickness Absence among Female Healthcare Workers in Eldercare PLoS ONE 7(7): e41287, 2012.

Bell, JL, Collins, JW, Wolf, L, Grönqvist, R., Chiou, S., Chang, W, Soroc, GS., Courtney, TK., Lombardi, DA. & Evanoff, B. Evaluation of a comprehensive slip, trip and fall prevention programme for hospital employees. *Ergonomics*, 2008:51(12):1906-1925.

Bell, JL, Collins, JW, Dalsey, E., & Sublet, V. Slip, trip and fall prevention for healthcare workers. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. 2010: Publication no.2011-123.

Bureau of Labour Statistics (BLS). Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by industry and selected events or exposures leading to injury or illness. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics. 2009 From: <http://www.bls.gov/iif/oshcdnew.htm>. (accessed 13 March 2015)

Bureau of Labour Statistics (BLS). Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by industry and selected events or exposures leading to injury or illness, private industry. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics. 2010. From: <http://www.bls.gov/iif/oshcdnew.htm>. (accessed 8 March 2015)

British Meat Processors Association. Health and safety guidance notes for the meat industry, 2011. Revision 1.

British Meat Processors Association. Health and safety guidance notes for the meat industry 2014. London: BMPA Publishers.

Compa, L. Blood, Sweat and Fear: Workers' Rights in US Meat and Poultry Plants. Human Rights Watch, New York, 2005. From: <https://books.google.co.za/books?id=PA6rCwAAQBAJ&pg=PA273&lpg=PA273&dq=Compa,+L.+Blood,+Sweat+and+Fear:+Worker+Human+Rights+Watch,+New+York,+2005.+pdf+document&source=bl&ots=i0Sc9BVnXb&sig=k1H38BV-HMYDzft45bh7-013LCc&hl=en&sa=X&ved=0ahUKEwjpgfPJw9POAhWJI8AKHfubBXcQ6AEIKDAC#v=onepage&q=Compa%20L.%20Blood%20Sweat%20and%20Fear%3A%20Worker%20Human%20Rights%20Watch%20New%20York%202005.%20pdf%20document&f=false> (accessed 3 August 2015).

Department of Labour. Performance evaluation on strategic objectives 3 & 4, IES Analysis: 2004–2011, 17 May 2011 Presentation. Pretoria: Government Printer. From: http://www.labour.gov.za/DOL/downloads/documents/useful-documents/occupational-health-and-safety/iesanalysis_mampuru.pdf (accessed on 5 June 2015).

Department of Labour. 2014. A guide to health and safety in the wholesale and retail industry. Pretoria: Government Printer. From: <http://www.labour.gov.za/DOL/downloads/documents/useful-documents/occupational-health-and-safety/A%20guide%20to%20health%20and%20safety%20in%20the%20retail%20sector.pdf> (accessed 15 November 2015).

Department of Labour. 2013. Health and safety in the food and beverage industry. Pretoria: Government Printer. From: <http://www.labour.gov.za/DOL/downloads/documents/useful-documents/occupational-health-and-safety/Useful%20Document%20-%20OHS%20-20Occupational%20Health%20and%20Safety%20in%20the%20food%20and%20beverage%20industry.pdf> (accessed 17 October 2015).

Department of Labour. Occupational Health and Safety, 1993 (Act No. 85 of 1993), as amended. Republic of South Africa. Pretoria: Government Printers. From: <https://www.acts.co.za/occupational-health-and-safety-act-1993> (accessed 23 January 2015).

Department of Labour. Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993). Republic of South Africa. Pretoria: Government Printers. From: www.labour.gov.za/.../compensation-for-occupational-injuries-and-diseases-act (accessed 23 January 2015).

Eltayeb-Yassin, K & Elsadig, N. Industrial hygiene and occupational safety assessment in Khartoum North: a case study of food and beverage industry. University of Khartoum Engineering Journal 2013:3(1):26-30.

European Agency for Safety and Health at Work. New risks and trends in the safety and health of women at work. European Risk Observatory. A summary of an agency report, 2016. From: <https://osha.europa.eu/en/tools-and-publications/publications/reports/summary-new-risks-trends-osh-women> (accessed on 28 July 2016.)

Government of Western Australia. 2010. Understanding the safety and needs of your workplace. Older workers and safety. A guide for employers, workers, safety and health representatives and committees. From: https://www.commerce.wa.gov.au/sites/default/files/atoms/files/older_workers_guide_.pdf (accessed 4 February 2015).

International Labor Organization. Women workers and gender issues on occupational safety and health. SafeWork, International Programme on Safety Health and the Environment, 2012. Geneva: ILO Publications.

Lehtola, CJ, Brown, CM & Becker, WJ. Preventing injuries from slips, trips and falls. The Institute of Food and Agricultural Sciences. University of Florida Circular, 2009. Gainesville: Florida.

Mannyele, SV, Ngonyani, H A M and Eliakimu, E, 2008. The status of occupational safety among health service providers in hospitals in Tanzania. Tanzania Journal of Health Research. 2008:10(3):159-165.

Miller, K. Risk factors and impacts of occupational injury in healthcare workers: A critical review. Musculoskeletal Medicine, 1(1), 1-6. 2013

Mogale NM, Malangu N and Huma M. Occurrence of occupational slips, trips and falls amongst health workers in Limpopo Province of South Africa, 2014: PULA: Botswana Journal of African Studies, 2014: 28(1):72-80.

Nkomo, H. Effectiveness of health and safety training in reducing occupational injuries among harvesting forestry contractors in KZN. Master's thesis. Durban: Durban University of Technology. 2016.

Pan American Health Organisation (PAHO). 2006. Health and safety of workers in the health sector. A manual for managers and administrators. Washington: DC.

Pearson, K. The causes of incidence of occupational accidents and ill-health across the globe, 2009. British Safety Council. From: https://www.britsafe.org/sites/default/files/editor/The_Causes_and_Incidence_of_Occupational_Accidents_and_Ill-Health_Across_the_Globe.sflb.pdf (accessed on 7 March 2014).

Ruser, JW and Wiatrowski, WJ. Restricted work due to workplace injuries: a historical perspective. Monthly Labor Review, 2013: 136(3): 31-43.

SafeWork Australia .Slips and trips at the workplace. Fact Sheet, 2012. From: <http://www.safeworkaustralia.gov.au/sites/swa/about/publications/Documents/659/Slips%20and%20Trips%20Fact%20Sheet.pdf> (accessed 28 July 2015).

Seedat, M., Van Niekerk, A., Jewkes, R., Suffla, S., & Ratele, K. Violence and injuries in South Africa: prioritising an agenda for prevention. *The Lancet*, 374, 20091011-1022.

Statistics South Africa. Mortality and causes of death in South Africa, 2010: Findings from death notification. Statistical release P0309.3, 2013.

United States Government Accountability Office (GAO-16-337). Workplace safety and health. Additional data needed to address continued hazards in the meat and poultry industry. 2016. Washington, DC.

Southern Poverty Law Centre. Injustice on our plates. Immigrant women in the US food industry, 2010. From: https://www.splcenter.org/sites/default/files/d6_legacy_files/downloads/publication/InjusticeonOurPlates.pdf (accessed on 12 December 2014).

Spellman, FR & Bieber, RM. Occupational safety and health simplified for the food manufacturing industry, 2008. Maryland: The Scarecrow Press.

Tishman, FM, Van Looy, S & Bruyere, SM. 2012. Employer strategies for responding to an aging workforce. The NTAR Leadership Center. Rutgers: The State University of New Jersey.

United Kingdom National Statistics. Slips & trips and falls from heights in Great Britain. Health and Safety Executive, 2014. From: <http://www.hse.gov.uk/statistics/causinj/slips-trips-and-falls.pdf> (accessed on 28 July 2015).

United States Government Accountability Office (GAO-05-96). Safety in the meat and poultry industry, while improving could be further strengthened. Workplace safety and health. 2005. Washington, DC.

WorkSafe, BC. Watch your step. An employer's guide to preventing slips, trips and falls in the food and beverage industry, 2013. Accessed on 29 December 2013. From: https://www.go2hr.ca/sites/default/files/legacy/ohs/F&B_STF_Watch-Your-Step.pdf (accessed on 12 June 2015).