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RESEARCH ARTICLE

FACTORS ASSOCIATED WITH THE INJURIES INFLICTED TO WORKERS IN SLAUGHTERHOUSES AND MEAT PROCESSING PLANTS IN NAIROBI, KENYA

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ABSTRACT

Background: Slaughterhouse facilities and meat processing plants are known to pose significant threats to worker's safety and health due to the hazardous conditions involving animals, tools and dangerous machines used in the meat industry.
Objective: To investigate the types of injuries and associated factors experienced by workers in slaughterhouses and meat processing plants in the study area since the extent of this has an impact on the safety of the employees.
Methodology: A total of 347 respondents were included in this study out of an estimated population of 2206 workers in slaughterhouses and meat processing plants in the study area. Information was obtained using structured questionnaires, Key informant Interviews and focused group discussions.
Result: The types of injuries inflicted to these workers included wounds/superficial injuries (57.3%), bone fracture(7.5%), concussion, internal injury, burn, scald or frost bite(4.0%), poisoning, infection and suffocation (4.0%) and other types (8. 0%). Demographic factors had a significant influence on injury rates and so was the category of a slaughterhouse and processing plant. The level of implementation of Occupational Health and Safety Act (OSHA, 2007) determined the injury rates in these facilities. Overall, workers in Nairobi experienced very high injury rates (21.9 per 100 full-time workers).
Conclusion: Demographic factors had an influence on incidence of injuries and the category of slaughterhouses and processing plants which again was closely linked with the level of compliance to OSHA, 2007.

Key words: Injuries, slaughterhouses, workers.

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INTRODUCTION

Globally, a total of 2.3 million deaths were reported in the year 2012 and out of these, 318,000 were attributed to occupational injuries and 2,022,000 to work-related diseases (Hamalainen et al., 2006). In the USA, the illness and injury rate of workers was higher in slaughterhouses than in any other industry for "much of the last quarter of the twentieth century" (Broadway et al., 2005). The single largest factor contributing to worker injuries is the speed at which the animals are killed and processed (ILO, 1996-2015). These workers use sharp and dangerous tools and the incidence of accidents in this industry is one of the highest in the foods and drinks industry (Ilo, 2011). In the year 2010, an employee in the slaughtering sector in Britain was three times more likely to be injured than the average person at work (BMPA et al., 2014). This study has investigated the types of injuries inflicted and the associated factors to workers in slaughterhouses and meat processes plants in Nairobi, Kenya.

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MATERIALS AND METHODS

A descriptive cross sectional study was carried out in 3 export slaughterhouses, 3 local categories A, 21 local category C slaughterhouses and 4 meat processing plants in Nairobi City County, Kenya (Latitude of 1 17 0 S and the longitude of 36 49 0 E) with a total size of 696 Km^2 and a population of 3.1million (KNBS, 2013). Clearance to conduct the study was obtained from Kenyatta University graduate school, National Commission for Science, Technology and Innovation (NACOSTI), Director of Veterinary Services (DVS) both at the National and County levels. Quantitative data was collected from export slaughterhouses 190 (54.76%), local slaughterhouses category A 24 (6.91%), category C 90 (25.93%) and processing plants 43 (12.4%) using structured questionnaires and this was representative of the target population. Further qualitative information was collected by conducting focused group discussions and key informant interviews. Key informants included Meat Inspectors, Veterinary Officers and Hides and skins Inspectors while focused group discussion (FGDs) members further included some workers. The data collected was cleaned, coded and entered into Statistical Packages for Social Scientists (SPSS)

Version 18 for multivariate analysis (Bohrnsted *et al.,* 1994). Chi-square statistic test was used to analyse the quantitative data with a significance result of p-value less than 0.05 being considered significant.

RESULTS

Of the 347 respondents interviewed, 279 (80.4%) were males and their age range was between 16 and 60 years with a mean age at 35.56 years. The socio-demographic profile of the study population is as shown in Table 1. Among the study participants, 74% were married, 23% were single while 3% were divorcees. Socio-demographic factors were very significant in the injury rates experienced. The age factor was statistically significant where younger workers reported more injuries than the older employees ($\chi2=25.59$, $p<0.05$). The injury rates were higher in males than females and the result being statistically significant ($\chi2=27.72$, $p<0.05$). The educational level of the workers was statistically significant ($\chi2=21.39$, $p<0.05$) with those of primary education (87.9%) getting more injuries than those of secondary education (2.5%) and Diploma levels (1.9%). The duration the workers had worked was also examined in relation to injuries sustained where those who had worked for more than 15 years got minimal injuries as compared to workers who had worked less than 5 years (50.0%). Hence, work experience was found to be significant in terms of injuries sustained ($\chi2=22.12$, $p<0.05$). Overall, 295 (85%) workers got injured and this rate of injury was found to be very high (21.9 per 100 full-time workers). The types of injuries experienced by these workers included wounds (57.3%), bone fracture (7.5%), concussion, internal injury, burn, scald or frost bite (4.0%),poisoning, infection, suffocation(4.0%), other types (8. 0%). The parts of the body that were affected included fingers, arms and wrist 265(76.9%), back and shoulder 13 (3.7%), neck 14 (4.0%), 52(15%) not injured. The study observed that most of the respondents 119 (34.3%) were injured by an object which struck them and 81 (23.3%) were injured by slips and falls and while the same number by handling and lifting. Only 13 (3.7%) were injured by animals. From the FGDs and KII, it emerged that knives, pangas, spreaders, machines, falls/slips, animals, pieces of bones, falling carcasses/objects, violence, vehicles, hot water/frost bite, electrocution, suffocation, captive bolt stunner and working in confined places in that order were the most common cause of injuries.

Table1. Socio-demographic profile of the study population

Variable		N	%
Gender	Male	279	80.4%
	Female	68	19.6%
Age	16-18 Years	13	3.7%
	19-30 Years	93	26.8%
	30-40 Years	132	38%
	40-50 Years	82	23.6%
	Over 50 Years	27	7.9%
Marital Status	Single	80	23%
	Married	257	74%
	Divorced	10	3%
Religion	Christianity	281	81%
	Islam	66	19%
Duration worked	< 5 Years	105	30.3%
	5-10 Years	94	27.1%
	10-15 Years	52	15%
	15-20 Years	42	12.1%
	20-25 Years	54	15.5%
Educational Level	Primary Education	121	34.9%
	Secondary Education	198	57.3%
	Diploma Education	28	7.8%

The highest rates of injuries were recorded in Category C (97.2%), followed by Category A (96.4%) and processing plants (71.1%). The lowest rates of injuries were recorded in Export slaughterhouses which experienced a rate of (79.1%). With a $\chi2 =23.554$ and $p<0.05$ (Exact p value of 0.00225), this result is statistically significant and hence, the category of a facility has an impact on the rates of injuries experienced. The study established that injury rates in the meat industry in Nairobi City County is very high an indication that the safety of the workers is not assured. The injury rate of 21.9 per 100 full-time workers in the Nairobi City County in the year 2015 compares very well with the one of USA in the year 2001 which declined to 8.7 per 100 full time workers in the year 2012 (AMI, 2014). In total, 295 (85.01%) workers were injured in these facilities in Nairobi out of 347 respondents in the year 2015. The highest injury rates were recorded in local slaughterhouses as compared to export and processing plants which recorded lower injury rates. The existence for instance of occupational health and safety committee in an enterprise obviously must have an impact in the injury rates. These committees were absent in local slaughterhouses which had higher injury rates than export and processing facilities.

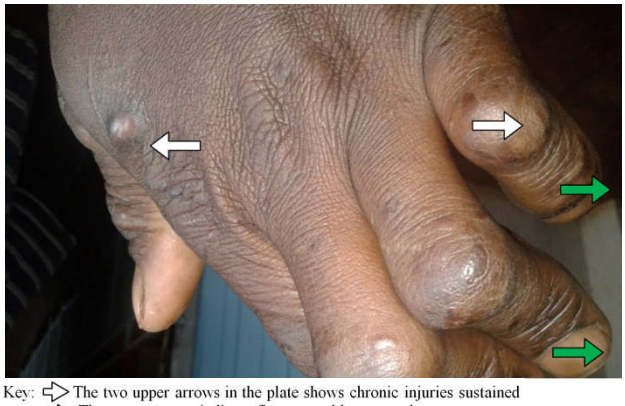
Table 2. Distribution of Injuries in categories of slaughterhouses and meat processing plants

Facility	Yes	No	Totals
Export	150 (79.1%)	40 (20.9%)	190
Processing Plants	31 (71.1%)	12 (28.9%)	43
Category A	23 (96.4%)	1 (3.6%)	24
Category C	88 (97.2%)	2 (2.8%)	90
Totals	292	55	347

$\chi2 =23.554$; $p<0.05$ (Exact p value of 0.00225)

Table 3. Number of off days given to workers in these facilities as a result of injury

	Frequency	Percent
4-6 days	81	23.3
7-13 days	79	22.8
14-20 days	27	7.8
21- 30 days	52	15.0
1 month-3 months	55	15.9
3 months- 6months	13	3.7
6 months and over	40	11.5
Total	347	100.0



Key: ⇨ The two upper arrows in the plate shows chronic injuries sustained
→ The green arrows indicate fingers unable to stretch

Plate 1. Showing chronic injuries sustained in the arms and fingers of the respondents and fingers unable to stretch (clear case of Carpal Tunnel Syndrome (CTS))

As presented in Table 3, the study found out that 23.3% respondents had been off duty as a result of injury for between 4-6 days, 22.8% for between 7-13 days, 7.8% for between 14-

20 days and 15.9% and 15% had been off duty as a result of the injury for between 21-30 days and 15.9% between one month and three months respectively. Further, 11.5% and 3.7% had been off duty as a result of the injury for between three and six months and above six months, respectively as a result of the injury. This translates to a total loss of approximately 15,340 working days the equivalent of 122,720 hours resulting from injuries sustained by workers in the meat industry in Nairobi, Kenya in one year. During one of the FGDs, it was noted that two workers were in hospital as a result of injuries sustained in the course of their duty.

DISCUSSION

The study established that fingers, arms and wrist injuries were the highest parts of the body affected accounting for 76.9% of the body parts affected and the shoulders and neck received 4% of the injuries while 15.3% of the workers either were affected in other body parts not mentioned in the study or were not injured at all. From Plate 1, which was taken in one of the local slaughterhouses, it was obvious that most complaints of injuries were limited to fingers, arms and wrists. These injuries were mostly inflicted by knives and from Plate 1, open chronic wounds would be noticed and some fingers would not stretch because of fibrotic tissue and nerve interference resulting from repetitive motion. These findings are consistent with a study carried out in Nebraska where fingers, hands wrists and forearms were the majority of body parts affected in the meatpacking industry in the USA (Autumn, 2014). This means that management should provide specialized protective devices to reduce injuries to these body parts. Except for export and processing plants, the study found out that category A and C slaughterhouses never provided any Personal Protective Equipment (PPEs) to their workers and these explains the high injuries rates experienced in these facilities as compared to export and processing facilities.

The study found out that the majority of the workers were suffering from wound or superficial injury, borne fracture, dislocation, sprain or strain, concussion and internal injuries. These compares well with a report in the USA where common injuries were cuts, strains, and cumulative trauma injuries sustained from falls (AMI, 2013). The incidence rate of injury stood at 21.9 for 100 workers full-time in the study area in the year 2015. According to a report done by the American Meat Institute (AMI) in 2013, the combined rate of injury and illness cases per 100 full-time workers in the USA in 2012 was at 8.7 while in 2001 it was at 20.4 per 100 full-time and this compares very well with Kenya in 2015 which stood at 21.9. This decline in injury rates was attributed to the strict implementation of the Occupational Health and Safety Act in that country (AMI, 2013).This compares very well with the lowered injury rates in export and processing plants which have fairly implemented the Occupational Health and Safety Act (OSHA, 2007) as compared with local slaughterhouses which experienced very high injury rates. Hence, injury rates are determined by implementation of occupational health and safety legislations as noted in the USA (AMI, 2013). These were not simple injuries because most of the workers were off as a result of the injuries sustained. In fact, 46.1% of the workers were off between 4-13 days and 40 workers were off for over 6 months because of injuries inflicted at workplace. The wounds and superficial injuries have been reported to expose workers to zoonotic infections resulting from the close contact with animals and animal fluids (Mahendra *et al.,* 2013). It is possible that the workers who were found sick in this study were suffering from work-related sicknesses (54% of the workers) and these were likely to be zoonotic infections.

Conclusion

The types of injuries noted in the meat industry in Nairobi City County are mainly wound or superficial injuries, borne fracture, dislocation, sprain or strain, concussion or internal injuries and were mainly limited to fingers, arms, hands, shoulders, neck and back and all were related to similar common hazards in this industry. Consequently, these findings can be used to institute control measures in these facilities so as to enhance worker safety in this industry. The incidence of injury rate in the meat industry in Nairobi City County is very high (21.9 per 100 full-time workers in 2015) and would even be higher with the underreporting noted and this rate compares very well with the USA in 2001 which at that time stood at 20.4 per 100 full-time workers. This rate in Nairobi is very much supported by the high number of workers injured and treated in medical facilities in the course of the year of study (2015) and a total loss of 15,261 working days the equivalent of 122,088 man-hours lost resulting from off days given due to injuries. Those 40 workers who received off days of more than 6 months must have had major injuries. In conclusion, strict implementation and enforcement of the Occupational Health and Safety legislation in the meat industry will lead to the reduction of these occupational injuries noted in this industry and ultimately enhance worker safety.

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REFERENCES

American Meat Institute (AMI at (202) 587-4200 or visit www.meatmicom.2013), Accessed on 17th of July, 2014.

Autumn (2014).University of Nebraska-Lincoln. Hand, Wrist, Forearm and finger occupational injuries in pork processing, comparison by worksite and source of injury: USA *Occup Environ Med.,* 67 (10): 686-92. Doi: 10.1136/oem.2009.048611. PubMed.

BMPA, HSE, MTC, FSA and AHDS, 2014. Health and Safety Guidelines in the Meat Industry in Britain.

Bohrnsted G.W. and Knoke, D. 1994**.**Statistics for Social Data Analysis.3rd Edition.

Broadway, Michael and Donald D. Stull 2005. "Meat processing and Garden City, KS: Boom and bust*." Journal of Rural Studies.*

Hamalainen, P., Takala, J. and Saarela, K. L. 2006." Global estimates of occupational accidents".1 *http://onlinelibrary. wiley.com/doi/10.1002/ajim.20411/full*37-*American Journal of Industrial Medicine, 50* (1): 28-41. accessed 24.05.17

Ilo, (1996-2015).Safety and Health of Meat, Poultry and Fish ProcessingWorkers-Sectoral Working papers, 104 (Food and beverage industries, Occupational Safety and Health).

ILO, 2011. Meatpacking/processing.Encyclopedia of Occupational Health and Safety.ILO (2011).

Kenya National Bureau of Statistics (KNBS, 2013). Kenya – 2009**,** Kenya Population and Housing Census (10 Per Cent sample, every 10th household), Population and Housing Census.

Mahendra Pal, SihinTestaye and Pratibha, 2013.Zoonoses occupationally acquired by abattoir workers. *Environ occup Scie*., 2(3):155-162. ISSN: 2146-2180

Marcin, J.P., Leigh J.P. and Miller, T.R. 2004. An estimate of the U.S. Government's undercount of nonfatal occupational injuries. *Occup Environ Med*., 46(1):10-8

OSHA, 2007.Occupational Safety and Health Act, 2007 Government Printer, Nairobi, Kenya Gazette. Supplement No 111(Acts No.15) Acts, 2007, Nairobi, 26th October, 2007.Page 100.

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