

RESEARCH NOTE

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Prevalence, types and outcome of injuries among abattoir workers in Ghana

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Abstract

Background In many places in the world, workers in the meat processing industry report high incidence of injuries. Details of such injuries are not well known for Ghana or much of Africa.

Methods A cross-sectional survey involving 300 workers from three major meat processing facilities in the Kumasi metropolis of Ghana was carried out using a structured questionnaire from April to June 2023. The prevalence, types and outcome of injuries among workers were assessed. Test of association was established by Chi square analysis.

Results Over the prior 6 months, the prevalence of injury was 83.0%. Among the various injury types, lacerations had the highest prevalence (46.0%) followed by musculoskeletal pain (16.7%) bone fractures (14.0%), swelling (13.0%), burns and scalds (7.3%), and dislocations/sprains/strains (6.7%). More than half (58.9%) of injuries sustained were moderately severe (2–7 days of lost work) and nearly half (42.0%) required immediate medical attention. Gender, employment status, wages, availability and use of safety equipment were significantly associated with injuries among abattoir workers.

Conclusions The incidence of injuries among abattoir workers in Kumasi, Ghana demonstrates a large public health burden requiring attention and improved enforcement through occupational safety interventions.

Keywords Occupational injuries, Hazards, Abattoir, Lacerations, Ghana

Introduction

Activities in the meat processing industry predispose worker to various form of injuries, such as deep lacerations, falls, fractures and bites from animals [1–5]. Non-fatal injuries such as sprains and strains are common often requiring time off work or job modifications based on severity [6, 7]. Most studies on injuries in the meat processing industry come from high-income countries. But the few studies that have addressed injuries in the meat processing industry in Africa have shown a high prevalence of injuries among workers, often associated with factors such as dirty slippery floors, kicks and stamps from irate animals and sharp machinery [8–10].

Globally and in Ghana, abattoirs are obligated to have occupational safety policies that will mitigate the

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occurrence of injury. Regrettably these policies are inadequate, poorly coordinated or non-existent in most abattoirs [11–14].

In Ghana, there has been attention to other occupational safety issues, such as those in construction and mining, food safety and infectious disease risk from abattoirs [15–19]. However, there has been almost no attention paid to injury and safety risks for abattoir workers in Ghana. To support the development of occupational injury control strategies, it is imperative to obtain detailed information on injury characteristics. This study addressed the gap by assessing injury prevalence, types, and outcomes in abattoir workers in Ghana.

Methods

Study design and setting

The study employed a quantitative research approach using descriptive cross-sectional design to solicit for information from abattoir workers in the Greater Kumasi Metropolis of Ghana. The city has a heterogeneous population and enhanced economic activities. It is the second largest city in Ghana with a population of 3,490,000 and a land size of 299km² [20]. Meat processing industries in Kumasi receive their supply of animals from different regions in the country, and neighboring countries like Mali and Niger [21].

Study population

The city has 3 major meat processing facilities and 17 smaller facilities with less than 20 workers each. This study was carried out in the three main meat processing facilities. This includes Kumasi Abattoir, the Subtui Musah Slaughterhouse and the Akwatia Line slaughter slab with worker population of 200, 560 and 290 respectively. These three facilities cut across the different grades of meat processing facilities in the country. Workers include those who move animals and work in lairage as well as butchers and slaughterers engaged in killing, singeing and processing of the meat. There are also retailers, administrators and general workers who dispense, inspect the site and keep the facility operating.

Data collection

A structured questionnaire adapted from previous injury literature was employed for the data collection [15, 17]. It was divided into demographic characteristics, types and frequencies of injuries, and outcomes of the injuries occurring in the abattoir. A three-day training was done for the research assistants. The training focused on building understanding on the questionnaire and the objective of the study, conducting interviews and maintaining confidentiality. The questionnaire was in

English but most of the respondents had low levels of education. Hence research assistants were trained on how to translate the questions into a language directly understood by the participants, mostly Twi and Hausa. The questionnaire asked about injuries over the prior six months. If a respondent had more than one injury event during that time, they were asked to report on whichever injury they chose.

The tool was pretested at a separate facility (Sofoline Slaughterhouse) not involved in the remainder of the study to assess the questions and the interview skills of the research assistants. Four questions were modified to assess the specific department in which the worker is engaged. Content validity assessment was done by seven experts, who have published extensively on injury related studies and necessary modifications were made before the actual data collection.

An estimated sample size of 300 was calculated using the Yamane formula [22]. Purposive sampling was used. After obtaining ethical clearance and administrative approval from authorities, the principal investigator and research assistants visited the three worksites for a total of eight days. During this time, they approached for interviews workers who were at the worksite that day. The principal investigator sought written informed consent from workers, explaining the objectives of the study. Workers who consented were interviewed. The principal investigator and research assistants interviewed as many workers as possible during the time allotted each day, up until the goal of 300 was achieved. All 300 workers approached agreed to be part of the study. Interviews were anonymous and no names or other identifying information about the respondents were collected. Data collection ran from April to June 2023.

Data analysis

Quantitative tools were employed in data analysis. Data were first cleaned and checked for completeness then exported to IBM SPSS Version 25.0, USA for analysis using descriptive statistics. Continuous variables were expressed as mean \pm standard deviation ($M \pm SD$) and the results were presented in tables, frequencies and percentages. Test of association was established by Chi square analysis.

Results

Respondents' demographic characteristics

A total sample of 300 respondents participated in the study. Table 1 summarizes their demographic characteristics. The largest single group of participants were between 40–49 years, representing 28.3% of the respondents. The industry is predominantly male (96.7%), and are married (78.0%). Similar proportions

Table 1 Demographic characteristics of respondents

Variable	Frequency (n = 300)	Percentage (%)
<i>Age (years)</i>		
Mean ± SD	38.6 ± 11.9	
< 20	9	3.0
20–29	75	25.0
30–39	72	24.0
40–49	85	28.3
50–59	47	15.7
60+	12	4.0
<i>Gender</i>		
Male	290	96.7
Female	10	3.3
<i>Marital status</i>		
Married	234	78.0
Single	66	22.0
<i>Educational level</i>		
No formal education	54	18.0
Primary	72	24.0
Junior high /middle school	64	21.3
Senior high school	76	25.3
Technical/NVTI	7	2.3
Tertiary	27	9.0
<i>Employment status</i>		
Casual worker	139	46.3
Permanent worker	109	36.3
Temporal contract worker	52	17.3
<i>Years of working experience</i>		
Less than 2 years	45	15.0
2 to 5 years	61	20.3
6 to 10 years	50	16.7
Over 10 years	144	48.0
<i>Wages</i>		
Paid by daily wages	180	60.0
Fixed monthly salary	93	31.0
I am paid based on my daily targets (commission)	27	9.0

of the respondents have primary (24.0%), junior high (21.0%) and secondary education (25.0%) with only 9.0% having tertiary education. Nearly fifty percent of respondents have over 10 years of working experience in the abattoir. Majority (60.0%) are casual workers (46.3%) hired and paid daily wages.

Prevalence, types and outcome of injuries

In the 6 months prior to the study, 249 workers reported at least one injury for a prevalence of injury of 83.0% (Table 2). Laceration was the most frequent injury sustained by respondents, representing 46.0%, followed

Table 2 Prevalence, types and outcome of injuries in the meat processing industry

Variable	Frequency (n = 300)	Percentage (%)
<i>Injury experience in last 6 months</i>		
Yes	249	83.0
No	51	17.0
<i>Type of injury*</i>		
Lacerations	138	46.0
Musculoskeletal pain	50	16.7
Bone fracture	42	14.0
Swelling of the body	39	13.0
Burns, scalds	22	7.3
Dislocation, sprain or strain	20	6.7
Concussion or internal injury	13	4.3
Deformity	12	4.0
Eye injury	8	2.7
Bites	3	1.0
Traumatic amputation	2	0.7
Other specific injury	22	7.3
<i>Severity of injury</i>		
Not severe (1 or less day of lost work)	36	14.2
Moderately severe (2–7 days of lost work)	149	58.9
Severe (more than a week of lost work)	68	26.9
<i>How was injury managed</i>		
Sent to a nearby hospital	126	42.0
First aid administered	110	36.7
Nothing was done, continued working	58	19.3
Was given the day off from work	6	2.0

* Multiple responses were allowed

by musculoskeletal pain (16.7%) and bone fractures (14.0%). Other leading injuries included swelling of various body parts (13.0%), burns and scalds (7.3%), and dislocation, sprains, or strains (6.7%). Close to half (42.0%) of these injuries sustained required immediate medical attention (42.0%) at health facilities. Another large group (36.7%) were treated first aid by co-workers at the worksite. In terms of long-term outcome, more than half (58.9%) of injuries were moderately severe, leading to 2–7 days of lost work.

Association between socio-demographic characteristics, safety measures and injuries among workers in the abattoir

Table 3 shows a significant association between gender, employment status, wages and injuries among abattoir workers ($p < 0.05$). There was low availability of fire extinguisher (33.7%), first aid kits (16.8%), smoke detector (1.4%), emergency exit (12.1%), safety boots (63.2%) and injury incidence record book (4.1%). Only

Table 3 Association between socio-demographic characteristics, safety measure and occupational injuries among workers in the abattoir in Kumasi, Ghana

Variable	Injury prevalence		χ^2	p-value
	No n = 51 (%)	Yes n = 249 (%)		
<i>Age (years)</i>				
< 20	1 (2.0)	8 (3.2)		
20–29	13 (25.5)	62 (24.9)		
30–39	7 (13.7)	65 (26.1)		
40–49	17 (33.3)	68 (27.3)		
50–59	11 (21.6)	36 (14.5)		
60+	2 (3.9)	10 (4.0)	4.84	0.436
<i>Gender</i>				
Male	46 (90.2)	244 (98.0)		
Female	5 (9.8)	5 (2.0)	7.98	0.005
<i>Marital status</i>				
Married	42 (82.3)	192 (77.1)		
Single	9 (17.7)	57 (22.9)	0.68	0.410
<i>Educational level</i>				
No formal education	10 (19.6)	44 (17.7)		
Primary	12 (23.6)	60 (24.1)		
Junior high /middle school	7 (13.7)	57 (22.9)		
Senior high school	12 (23.5)	64 (25.7)		
Technical/NVTI	1 (2.0)	6 (2.4)		
Tertiary	9 (17.6)	18 (7.2)	6.98	0.222
<i>Employment status</i>				
Casual worker	16 (31.4)	123 (49.4)		
Temporal contract worker	8 (15.7)	44 (17.7)		
Permanent worker	27 (52.9)	82 (32.9)	7.73	0.021
<i>Years of working experience</i>				
Less than 2 years	9 (17.6)	36 (14.4)		
2 to 5 years	7 (13.7)	54 (21.7)		
6 to 10 years	8 (15.7)	42 (16.9)		
Over 10 years	27 (53.0)	117 (47.0)	1.95	0.582
<i>Wages</i>				
Paid by daily wages	4 (7.8)	23 (9.2)		
Fixed monthly salary	28 (54.9)	65 (26.1)		
I am paid based on my daily targets (commission)	19 (37.3)	161 (64.7)	16.71	0.001
<i>Use of PPE at work</i>				
No	27 (56.2)	180 (72.6)		
Yes	21 (43.8)	68 (27.4)	5.10	0.024
<i>Availability of fire extinguisher</i>				
No	26 (53.1)	171 (68.9)		
Yes	23 (46.9)	77 (31.1)	4.62	0.031
<i>Availability of first aid kits</i>				
No	33 (67.3)	214 (86.3)		
Yes	16 (32.6)	34 (13.7)	10.49	0.001
<i>Availability of smoke detector</i>				
No	46 (93.9)	247 (99.6)		
Yes	3 (6.1)	1 (0.4)	10.07	0.002
<i>Availability of emergency exit</i>				

Table 3 (continued)

Variable	Injury prevalence		χ^2	p-value
	No n = 51 (%)	Yes n = 249 (%)		
No	45 (91.8)	216 (87.1)	0.86	0.353
Yes	4 (8.2)	32 (12.9)		
<i>Availability of safety boots</i>				
No	22 (44.9)	87 (35.2)	1.64	0.200
Yes	27 (55.1)	160 (64.8)		
<i>Availability of incident report book with records of injury sustained at work</i>				
No	43 (91.5)	240 (96.8)	2.83	0.093
Yes	4 (8.5)	8 (3.2)		

30.1% of the respondents used PPEs at work. Use of PPEs, availability of fire extinguisher, first aid kits, and smoke detector respectively were significantly associated with injuries ($p < 0.05$).

Discussion

This study reports the injury burden in the meat processing industry in Kumasi, an industry that has seen little attention in terms of research. The study assessed the prevalence, types and outcome of injuries sustained by workers. This study suggests that the prevalence of injury is high with the types being predominantly lacerations, followed by musculoskeletal pain. A significant number of workers sustained moderately severe injuries, losing 2–7 days of work time, as well as requiring medical attention, both of which represent financial losses for the workers. Gender, employment status, wages and availability and use of safety equipment were significantly associated with injuries.

Our findings need to be put into the context of other studies. In high-income countries, injury rates are generally much lower. For instance, injury incidence rates of 15.2 to 22.8 per 100 full-time employees and an annual total injury rates per 100 workers of 6.4% (poultry) and 13.2% (pork) have been reported in abattoir facilities in the United States [7, 23, 24]. All of these reports show far fewer injuries than the current study's finding of 83.0% of workers sustaining at least one injury during the past 6 months (approximately equivalent to 166 injuries per 100 workers per year).

The high burden of injury in Ghana is similar to what has been reported from other African countries. In a study of slaughterhouses in Kenya, Cook et al. found that 25% of workers reported an injury at least once per month, with 8% of workers still having a wound at the time of the interview [25]. In a different study, Makori et al. found that 85% of slaughterhouse workers in the

Nairobi area had been injured in the past year [26]. Among 203 workers in five slaughter houses in Ilorin, Nigeria, 88% of workers reported having had at least one injury ever [27].

We examined the types of injuries sustained by workers and our data highlighted lacerations as the most dominate type of injury. It is unsurprising as workers in this sector are usually exposed to numerous hazards such as sharp cutting tools and bones. This finding agrees with studies, both in Africa and in countries elsewhere [9, 23, 25, 28–30]. Musculoskeletal pain was the next common type of injury reported by this study possibly due to the repetitive movement and heavy lifting associated with abattoir operations [9, 28]. However, in another study conducted in the United States, bovine related injuries dominated [31].

This study highlights an association between employment status, wages and injuries. Most of the workers in the current study were casual employees who are paid based on their daily wages irrespective of their decade working experience in the industry. Taking a day off is considered as absenteeism and no commission is earned by the worker [32]. It is possible that employees usually work shifts and overtime to make ends meet. Worker tiredness affects attention and reaction times and raises the risk of accidents. Studies have linked shift work and weariness to the probability of accidents [27, 28]. This may possibly be a factor to the high prevalence of injury reported by this study.

Majority of injuries were moderately severe requiring between 2 and 7 days for treatment and recovery, with most respondents needing immediate medical attention. It can be anticipated that the lost wages and cost of treatment will have considerable negative economic consequences to these workers and their families. Most workers received daily pay and would not be paid while out of work. Also, the cost for treatment of even

work-related injuries is usually borne by the worker and their families.

Gender of the worker was significantly associated with injuries in this study. It is evident from this and other studies that the industry is male dominated [1, 7, 25] and possibly puts this gender at risk for injuries. This mirrors findings from other studies where gender of the worker has been anticipated to be a major influencer on work place injury [33]. Although other studies suggest that the risk of injury is equivalent for both male and female [8].

The study highlights low PPE usage and the absence of safety equipment in the facilities, similar to findings of other studies in the industry [9, 10, 14, 24, 25]. Meanwhile there is a significant association between these factors and injuries. This finding agrees with other studies that using PPE properly, dramatically lowers the risk of injuries in the industry [27, 34].

Conclusion

The types of injuries noted in the meat processing industry are mostly lacerations, musculoskeletal pain and bone fractures and the frequency of these injuries is high. Most of these injuries are moderately severe necessitating immediate medical treatment. This study highlights a high burden of injuries in the meat processing industries. This reinforces calls for enforcement of existing occupational health policies in this industry.

Strengths and limitations of the study

The study depended on self-report of injuries and there was no way of verifying answers about the types, frequencies and outcome of injuries sustained. A six-month recall period was used which could have led to recall bias for earlier injuries. Despite these limitations, the present study has several strengths. The sample size was large and also the study was conducted in three geographical locations in separate slaughterhouse facilities in the metropolis thereby increasing generalizability.

Acknowledgements

We want to express appreciation to all the workers and management of the various abattoirs in Kumasi who were respondents of this study and to Mr. Joel Adusei-Gyamfi for the ideas and support.

Author contributions

Conceptualization and design of the study was by AAT, VD, PAB, EKN, screened the tool for data collection. VD, EKN, CM, BB, provided methodological insights. VD, PD, AAT, AG, AKA, coordinated data collection. BNA, AKA, AAT, VD, BB, CM carried out the initial analysis and drafted the initial manuscript. All authors discussed the results and critically reviewed its intellectual contents. VD, BB, EKN, PD and CM critically reviewed and revised the manuscript which as then approved by all other authors for submission.

Funding

This study was supported by grant D43 TW007267 from the Fogarty International Center at the US National Institutes of Health. The content is

solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Availability of data and materials

Datasets used and analyzed in this study are safely kept with the corresponding author and will be available on reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the ethics committee of Kwame Nkrumah University of Science and Technology (CHRPE AP/203/23) with approval from the administrative wing of each of the facilities visited. Written and verbal consent was obtained from respondents after an explanation of every aspect of the research in their preferred language.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 27 May 2024 Accepted: 4 September 2024

Published online: 14 September 2024

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