

Full Length Research Paper

Traumatic injuries among printing press workers in Kumasi, Ghana

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There are no records on printing press injuries; this phenomenon holds back the development of effective occupational hazard prevention strategies in Ghana. The objective of this study was to identify the prevalence rate, types, causes of traumatic injuries and the level of education on work safety of workers in the printing industry. Respondents were workers of 20 selected printing houses in the Kumasi metropolis; they were interviewed in simple and clear English language with pre-tested questionnaires which were administered to them in their respective printing houses. The prevalent rate of traumatic injuries was 67% (134/200). The most common recorded type of injuries was superficial (62.7%) and lacerations (19.4%). The most common causes of injuries were those involving the printing machinery (48.5%). Majority of the respondents (65.0%) had knowledge on health safety measures. Training and knowledge about the work was high among Kumasi printing house workers. Despite this, traumatic injury prevalent rate was high. Knowledge on preventive health and safety education must be enforced.

Keywords: Printing industry; Traumatic injuries; Prevention, Health education; Kumasi metropolis.

INTRODUCTION

Any injury, whether physically or emotionally inflicted are known as trauma. Multiple factors and risks contribute to traumatic injuries, such as hazardous exposures, workplace and process design, work organization and environment, economics, and other social factors. Prevention strategies are also varied and multiple strategies may be applicable to many settings, including engineering controls, protective equipment and technologies, management commitment to and investment in safety, regulatory controls, and education and training. Research needs are thus broad, and the development and application of interventions involve many disciplines and organizations (Leigh et al., 1997).

Efforts to set research and prevention priorities for traumatic injuries must be driven by data that identify the nature and magnitude of these injuries (Leigh et al., 1997).

In Africa, health and safety arrangements vary between printing industries, with more organized ones tending to have a specific individual responsible for the overall company health and safety (Pope and Mays, 2000). These individuals are the first point of contact when any problem or issue arises and also responsible for the dissemination of health and safety advice (Pope and Mays, 2000). However, in the Kumasi metropolis, the majority of printing companies are small-to-medium sized industries and do not have full-time health and safety managers. In a case of injury, a form of first aid is usually given by a colleague worker if there is any.

The Ghana Labor Act 2003, under section 24, subsection (1) enumerates the general health and safety

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conditions for employees in the country. The Act also states clearly that occupational accidents and diseases at workplaces should be reported immediately by the employer to the appropriate government agency. An employer who, without reasonable excuse, fails to discharge any of the obligations under subsection (1) or (2) commits an offence and is liable on summary conviction to a fine not exceeding 1000 penalty units or to imprisonment for a term not exceeding 3 years or to both.

Printing operations and related processes can present a variety of hazards or potential health injuries to its workers. These could be waist pains, contact dermatitis, traumatic injuries such as cuts, big lacerations, bruises, contusions and even complete loss of body parts (traumatic amputations), (Hung et al., 1999).

Having reviewed the available literature the investigators discovered that, there were inadequate documented records on traumatic injuries among workers in the printing industry in Ghana. As a result researchers got inclined to take an initiative look into the issue. This paper therefore presents data associated with the prevalence, nature and cause of traumatic injuries in the Kumasi metropolis, so as to develop and apply interventions involving many educative and safety measures in the press industry in Ghana.

MATERIALS AND METHODS

Field Survey and Sampling

Kumasi's strategic location has also endowed it with the status of the principal transport terminals and has assured its pivotal role in the vast and profitable distribution of goods in the country and beyond. It is located in the transitional forest zone and is about 270km north of the national capital, Accra. It is between latitude 6.35° – 6.40° and longitude 1.30° – 1.35°. The metropolis shares boundaries with Kwabre District and Kwabre East District to the north, Atwima Nwabiagya District to the west, Ejisu-Juaben Municipal to the east and Bosomtwe Atwima Kwanwoma District to the south. The metropolis is a rapidly growing one with an annual growth rate of 5.47 per cent. The 2000 Population Census kept the population at 1,170,270. It was however projected to 1,889,934 by 2009. A total of 25 printing houses were randomly selected from the metropolis and the management of 20 of them agreed to make avail their staffs for the study. The management of the other 5 printing houses did not give their consent for the study.

Questionnaire Administration

The pilot testing questionnaire was specially designed to collect the background demographic data and the detailed exposure information. The questionnaire was pilot tested among workers of the Kwame Nkrumah University of Science and Technology (KNUST) printing house. After the test, it was improved to recall the injury event and a space added to consider other relevant information. The tested questionnaires were then administered to obtain the accurate information needed for the studies. In order to

avoid unnecessary semantic misunderstanding, the questionnaire was written in simple English. The subjects were asked an open-ended question to describe the circumstances of the accident, restate the injury period before it was recorded in the questionnaire. Extra space was however allowed after some questions for the subjects' comments; and in most cases, these were used as qualifying remarks which aided considerably in giving answers to specific questions and in providing additional information which assisted the interviewer in drawing up own conclusions. The sampling technique used was purposive and quota techniques (Nag and Patel, 1998). The interviewer used the various sections of the printing houses as segments out of which a quota was selected for the interview. This quota was selected mainly due to the proportion of subjects in the various sections.

Data Acquisition and Presentation

From December 1, 2008 to January 31, 2009, an interview-based study was designed to assess the prevalent, types, causes of traumatic injuries and health safety measures education level among workers of 20 selected printing houses in the Kumasi metropolis. Questionnaires were used during the interview at the study subjects' selected printing houses to collect data needed for the study. Informed verbal consent was obtained from the subjects before interviewed and subjects who agreed to join the study provided the required information for the studies. Ethical clearance for the study was obtained from the KNUST School of Medical Sciences Ethical Committee. Data recorded were put in descriptive statistics using SPSS 12.0 window version (SPSS, Inc., Chicago, IL, USA).

RESULTS

A total of 200 subjects were successfully recruited from 225 eligible ones from twenty selected printing houses. The other 25 workers did not give their consent for the study. The most common reason for refusal to join the study was lack of time for the interview. Among the 200 cases, 73(37.0%) were females and 127 (63.0%) males, with the age range from 18 to 65 years. The prevalence of workers who sustained injuries in the course of their work was 67.0% (134/200), majority (n=113 = 84.3%) of which sought for orthodox medical treatment. Forty percent (n=80) of the respondents performed their daily task at the printing department, while, a relatively low number were at the finishing unit (Figure 1). Majority (n=81, 60.5%) of the injured respondents had their wounds dressed when they visited health facilities "Others" type of treatment refers to the respondents who sought treatment at home and those who could not specify the treatment they received (Figure 2).

Segregation of the Printing Houses

From Table 1, the printing houses with the smaller size of workers/ staffs (N= 12) outnumber the medium (N=5) and

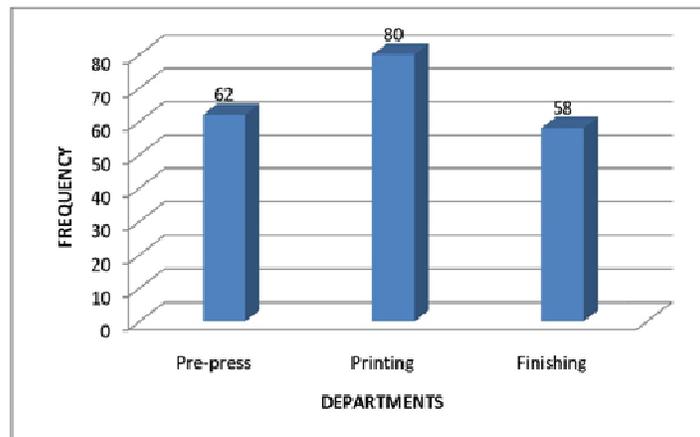


Figure 1. Distribution of Respondents into the Departments in the Printing Houses (N=200)

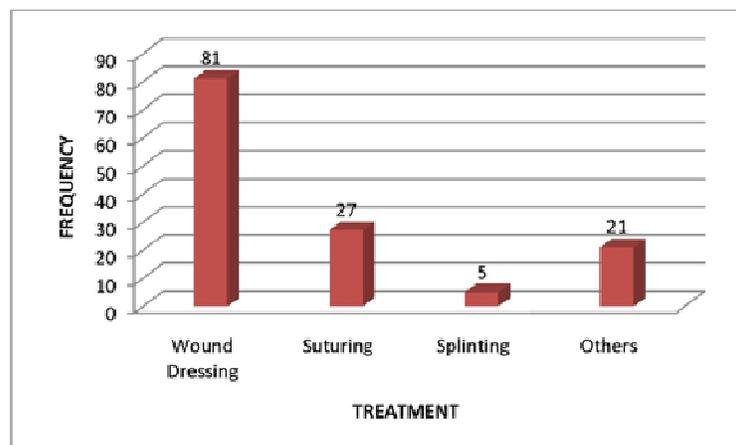


Figure 2. Types of Treatment received by Injured Respondent (N= 134)

Table 1. Characteristics of the 20 selected Printing Houses

Staff size	Average Number of workers	Number of Printing House (%)
Large	11	3(15.0)
Medium	7	5(25.0)
Small	3	12(60.0)

large (N=3) sizes. Though the smaller ones are many, there are few workers there as compared to the larger printing houses, which had a mean of 11 workers.

Respondents Characteristics

The study shows that 99% (n=198) of the respondents had a form of formal education. Senior High School

(SHS) graduates (35.0%, n=70) were the highest; followed by Technical /Vocational school leavers (32.5%, n=65); tertiary (26.0%, n=52) and Junior High School (JHS) graduates (5.5%, n=11) were the least of the workers with formal education.

The responses are shown in the Figure 3, 47.5% workers had length of time less than five years; those who were within five to ten years (35.5%) were the second highest. Also, those who had attained more than

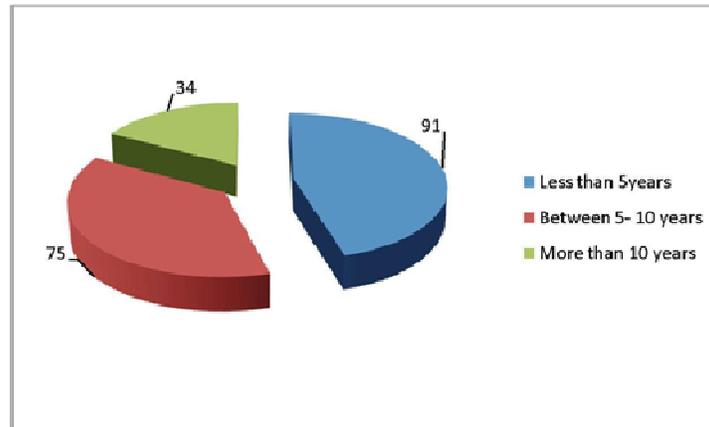


Figure 3. Duration of Stay of Workers in the Printing Press

Table 2. Nature of Injury sustained by Respondents

Nature of Injury	Frequency of Occurrence	% of occurrence
Laceration	26	19.4
Superficial	84	62.7
Fracture/Dislocation	4	3.0
Crushes	3	2.2
Amputation	2	1.5
Multiple	3	2.2
Finger Nail torn-off	4	3.0
Others	8	6.0
Total	134	100.0

ten years were the least and they were 34 representing 17%.

Nature of Injuries

It was realized that many forms of injuries were sustained but focus was laid on those most common ones that cut across board of almost all the firms visited. The details of the undertaking are enlisted in Table 2 above. Superficial type – bruises, abrasions, small cuts (62.7%) was the highest nature of injury of the total subjects interviewed; followed by laceration injuries (19.4%) and then “others” forms of injuries (6.0%), which included soft tissue contusions, pains in body parts, etc. of the sample space of 200 study subjects.

Causes of Injuries

A view of the Figure 4 shows that, injuries reported involving the printing machinery was highest (48.5%); these included *roller-in running nip, contact with moving*

parts and entanglement. summation of other causes of injury named “others” (34.3%) included spillage of water, ink, un-dry glue, etc. on the floor causing the worker to slip off; materials such as plates, hammers, boards, metallic blocks which often were not properly kept; little passage in-between the machinery, tables, and chairs; falling from height of objects such as paper backs, boards, tins, finished products, etc.; pricks from sewing machine needles.. Contact with sharp edges (17.2%) which included blades, knives, printing plates and guillotine cutting machine was also a common cause.

Preventive and Safety Management

The study revealed that, majority (65.0%, n=130) of the respondents confirmed to have educational workshop on work and health safety measures before starting the job. Also, 63.0% (n=126) responded to have prior knowledge about the printing work. Contrary, 76.0% (n=152) of the respondents admitted to have no first aid box or kits at their work place.

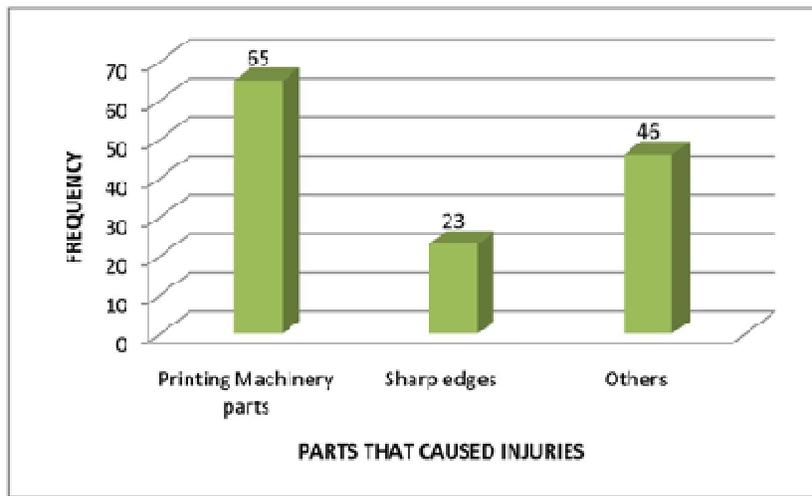


Figure 4. Causes of Injuries Occurring in the Printing Industry (N= 134)

DISCUSSION

Prevalence levels

Traumatic injuries were known to cause significant long-term hand function impairment and required intensive rehabilitation (BLS, 2005). The study found out that the prevalence rate among workers in the printing industry was 67%. Also, comparing statistics of a retrospective-cum-prospective study of Nag and Patel (1998) among similar workers shows 60% and 57% for morning and night shifts respectively. An editorial review of the Center for Disease Control (CDC) dated April 27, 1984, indicated that 52% of workers in the printing industry in the United States of America reported recordable injuries in a given year.

These similarities in the pattern clearly signify that, injuries in the industries especially in the printing sector are high. The small staff size and the printing department had most of the injuries. This may be due to higher number of workers in the numerous small staff size printing houses (60%) in the Kumasi metropolis (Table 1). In addition, workers at the printing department were many (Figure 1) and they were those who came in contact with the machinery parts by nature of their work, which were the major causes of injuries (Figure 4). This may be due to ineffective prevention measures and inadequate safety education training of workers in the safe performance of tasks; and repeated systematic inspection of the workplace for emerging or previously undetected hazards. A visible, serious and persistent commitment to safety by both management and labor appears crucial for preventing and alleviating severe traumatic injuries.

Injuries

After the study, it was found that, the most common nature of injuries in the printing industry were Superficial (i.e. cuts, bruises, abrasions – 62.7%) (Table 2). Although, comparable to the statistics in a descriptive study in Shanghai, China (Peng et al., 2000) our results showed different patterns of occupational injuries related to machinery industries from that revealed in the previous studies in the northeastern United States (Sorock et al., 2001; 2004). Notwithstanding this, our study had some similarities with that of Chow *et al.* (2007); they recorded a relatively low of lacerations and high nature of “others”. A report by Division of Safety Research, National Institute for Occupational Safety and Health (NIOSH), CDC, revealed that in the US, amputations, fractures and lacerations are less than 1%, 7% and 24% of traumatic injuries in a given year respectively (CDC 1981, 1983). The differences might have resulted from the differences in the economy and thus the range of industries. Though the US and other developed countries have relatively greater number of industries as compared to the developing ones, such as Ghana, these developed nations have organizations such as NIOSH, CDC and Bureau of Labor Statistics, which research, educate and regulate safety prevention measures in the various industries. These measures prevent severe occupational traumatic injuries by emphasizing on basic principles of control technology: engineering controls, work practices, personal protective equipment, and monitoring of the workplace for emerging hazards.

The studies of Trybus *et al* (2006), and that by Sorock *et al* (2001), confirm our finding (48.5%) that mechanical

equipment or machinery parts predominate the causes of traumatic injuries in the printing industries (Figure 4). This may be due to the fact that types of machinery parts such as conveyor, binding, cutting, folding, coating, shrink-wrapper, and the printing also come in contact with workers during active working periods in the industry. Also it was found that majority of the workers perform their normal duties around these parts. Traumatic injuries can be prevented by specific measures as physical barriers between the worker and the source of injury (e.g., machine guards, light curtains, worker-independent safety circuits, proximity sensors on robots); changes in the design of tools (e.g., knives and slicers) and tasks to reduce the hazard; use of personal protective equipment (e.g. protective eye - and footwear, helmets, harnesses); and training of workers in the safe performance of tasks.

In addition the labor inspection under the National Labor Commission, empowers the labor inspectors to interview, either alone or in the presence of witnesses, any employer or worker on any matter concerning the application and compliance with the provisions of this Act and Regulations made under it; and enter freely and without notice at any hour of the day or night to inspect any workplace during working hours. However, 76.0% of the respondents confirmed to have no first aid kits in their workplaces and some of the injured respondents admitted they had treatment at home, when injured during work (Figure 2). This coupled with the high prevalence of traumatic injuries, signifies that Act and Regulations of the labor laws are ineffective in the printing industry in Ghana.

Technical skills and training

The study outcome shown indicates that, the preventive and safety management knowledge of respondents in the printing industries indicates that the majority of the workers had training (81.5%) and knowledge (63.0%) about their duties towards work. Again, almost all respondents had some level of formal education (99.0%). Then the question is: *Why then there is a high prevalence of traumatic injuries?*

A relatively high number of workers (72.7%) had up to SHS or Tech/Vocational level of formal education. This forms the greater part of the firms' labor force and that these workers had no skills or formal operational knowledge concerning the industry. Though others may demand about the technical graduates, there is no educational syllabus at that level on the aspect of the industry. Paramus (1998) reported in a related study that, printing workers generally are trained informally on the job and the length of on-the-job training needed to learn skills varies by occupation and department. This clearly

buttresses the fact that the prior knowledge taught them before starting actual task is inadequate. There may be therefore insufficient and lack of seriousness attached to preventive health and safety education, hence this negligence, coupled with the problem of lack of experience, contributes to the high prevalence of traumatic injuries in the printing industry.

Period of service and experience

The study results (Figure 3) show that 47.5% of the total workers were found to have less than 5 years experience in the printing industry. This forms the chunk of the firm's labor force and that there may be that problem of lack of experience. More so, those employees who are within five to ten years are the second highest giving a value of 71 (35.5%). Also, those who have attained more than ten years are the least and they are 34 representing 17%. The reason for the reduction in number of the respondents as the year progresses might be due to better prospects as the person (worker) gains much experience and that would like to be employed elsewhere or establishing his own firm. Paramus (1998) also reported that, through experience and training, workers may advance to more responsible positions. Workers usually begin as helpers, advance to skilled craft jobs, and eventually may be promoted to supervisor.

The reasons to be assigned this pattern of responses of the workers could perhaps be that the rampant accidents and injuries sustained by the various workers are due to lack of experience on the job. This is because experience is best achieved with length of time and that as most of the workers have attained less than 11 years, it is likely that the necessary skills through experience might be inadequate. Lack of experience is attributed to major accidents and injuries in the various printing presses because in attempt to find out whether workers have prior knowledge on the numerous accidents in the printing industry, much of the responses were in the affirmative.

CONCLUSION

Training and knowledge about the printing press work was high among the Kumasi printing house workers. Despite this, traumatic injury prevalent rate was alarming. Our study confirmed that inadequate knowledge on preventive health and safety education injuries involving machinery parts were the factors associated with the high prevalence of traumatic injuries in the printing industry in Kumasi. Also, ineffectiveness of the Ghana labor laws and regulations by the management of the various

printing houses, coupled as a factor. All stakeholders involved in the regulation of safety measures should pay more attention to these industries; they form part of the backbone of any nation.

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