

A Prospective Study of Diseases Associated With Workers in the Printing Industry in a City of Ghana

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ABSTRACT

Background: A lack of information on the overall characteristics of work-related diseases in the printing press industry in Ghana holds back the development of effective disease prevention strategies in the industry.

Objective: To identify the commonest disease conditions and factors that influence workers in the printing press industry to visit the hospital.

Study design: A prospective descriptive study.

Setting: Twenty randomly selected printing press houses in the Kumasi metropolis.

Method: Participants were workers of the selected printing houses; they were interviewed in simple and clear English language with pre-tested questionnaires which were administered to them in their respective printing houses. Demographic data, disease conditions and factors for hospital visitation were obtained and recorded from September-December 2010.

Results: In total, 200 participants from twenty selected printing houses in the Kumasi metropolis were interviewed using questionnaires. Females and males were 37.0% and 63.0% respectively, with the age ranges from 18 to 65 years. The three commonest disease conditions recorded were allergic dermatitis (58.5%), asthma (13.0%) and hypertension (13.0%). The most prevalent (51.0%) factor for hospital visitation was sustaining of occupational injuries during work whilst injury caused by the printing machinery: moving parts 63 (31.5%) and sharp edges 33 (16.5%) played major roles in injuries.

Conclusion: The most common disease condition found after the study was allergic dermatitis whilst superficial injuries were a very high factor for workers to seek for health care.

Keywords: Printing industry, allergic dermatitis, occupational injuries, prevention, Kumasi metropolis.

INTRODUCTION

Printing is a large industry composed of many shops that vary in size. About 7 of every 10 printing shops employ 10 or fewer workers (Lynge et al., 2005). There are various organic solvents, filler materials, and inks used in the printing factory. A survey of materials and substances used in the printing industry in 1978 showed that 2000 products were used, in which 300 chemicals were identified. Among the chemicals, 26 are known or suspected carcinogens according to the classifications made by the International Agency for Research on Cancer (Lynge et al., 2005). The industry also consists of establishments that provide related services to printers, such as embossing, binding, finishing,

and pre-press services (Lynge et al., 2005). The average non supervisory worker in the printing and related support activities industry worked 38.4 hours per week in 2004, compared with 40.8 hours per week across all manufacturing industries. Workers in the industry generally put in an 8-hour day, but overtime is often required to meet production deadlines. Larger companies tend to have shift work. There is a fair amount of variability with shift schedules and overtime, which are based largely on seniority (PIA, 2003). Workers enter the printing industry with various educational backgrounds. Helpers generally have a high school or vocational school background, while management trainees usually have a tertiary education background. In general, job applicants must be high school graduates with mathematical, verbal, and written communication skills, and be computer literate (HSE, 1998). The printing occupations have been related to an increased mortality and morbidity from various diseases, including an increased mortality from lung cancer, bladder cancer, renal pelvis cancer, primary liver cancer, gall bladder cancer, and liver cirrhosis (Moss, 1992; Greenberg, 1992; Leon, 2004; Lloyd et al., 1997). Dermatitis is a common condition which is reported to affect 15-20% of the United Kingdom (UK) population (Moss, 1992). During 1996, dermatological problems accounted for 23.4% of all work related health problems reported by UK occupational physicians (English, 1999). Nethercott and Nosal (2006) found that offset lithographic printing operations were related to potential adverse cutaneous effects, with 67% of operators having allergic contact dermatitis, 29% being caused by ultraviolet (UV) cured ink components. Garabrant (2005) assessed the relation between dermatitis and the use of aziridine hardener (TMPTA) used in printing inks, and found the incidence highest in ink mixers. Potential skin irritants within the printing industry include alcohols, alkalis, developers, etching solutions, greases, waxes, and inks, and contact allergens such as potassium dichromate, dyes, formaldehyde, hydroquinone glues, and gums. Work-related injuries and fatalities result from multiple causes, affect different segments of the working population, and occur in a myriad of occupations and industrial settings. Multiple factors and risks contribute to traumatic injuries, such as

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hazardous exposures, workplace and process design, work organization and environment, economics, and other social factors. Preventive 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 (Greene et al., 1999). 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 (Greene et al., 1999). 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 (Paganini-Hill, 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. Having reviewed the available literature the investigators discovered that, there were no documented records on diseases affecting workers in the printing industry in Ghana. As a result the researchers got inclined to take an initiative look into the issue. This paper therefore presents a preliminary data, associated with the prevalence of disease conditions and factors that influence workers in the printing industry in the Kumasi metropolis to seek health care, so as to develop and apply interventions involving many educative and safety measures in the printing units.

MATERIALS AND METHODS

Study Setting

Kumasi is located in the transitional forest zone and is about 270 km north of Accra, the capital city of Ghana. It is between latitude 6.350 - 6.400 and longitude 1.300 - 1.350, an elevation which ranges between 250-300 meters above sea level with an area of about 254 square kilometers. The unique centrality of the city as a traversing point from all parts of the country makes it a special place for many to migrate to. The metropolitan area shares boundaries with Kwabre East District to the north, Atwima District to the west, Ejisu-Juaben Municipal to the east and Bosomtwe to the south. The city is a rapidly growing one with an annual growth rate of 5.47 per cent (Regional Statistical Office, 2010). It encompasses about 90 suburbs, many of which were absorbed into it as a result of the process of growth and physical expansion. The 2010 Population Census kept the population at 1,889,934 (Regional Statistical Office, 2010). The highest proportions of the population are in the age cohorts 0 - 4 years (13.2%) and 5 - 9 years (12.4%). Cumulatively, 39.9 per cent of the population is below 15 years, in contrast to other districts, which range from 40 to 47 per cent. This may be an indication of a slow, incipient decline in fertility. There are more males (51.2%) than females (48.8%) in the metropolis.

The Metropolitan Health Services are organized around five (5) Sub-Metro Health Teams; namely, Bantama, Asokwa, Manhyia North, Manhyia South and Subin. The Metro Health Team is led by its Director of Health Services who has the overall responsibility for planning, monitoring and evaluating the performance of the Health Sector in the metropolis. Educational facilities in the city are provided by the public, private (individual and religious bodies) sectors. The private sector provides the bulk of these institutions at the pre-school, first and second cycle levels, whereas the public sector is the leader at teacher training colleges and tertiary levels. These are evenly distributed in space. Christianity is the dominant religion in the metropolis. The proportions of the population in the metropolis in terms of religion are 78.8%, 16.0%, 0.3% and 0.7% for Christianity, Islam and Traditional and Others respectively. Apart from these four groupings, there is this other group with "No Religion" which constitutes about 4.2% but could vary (Regional Statistical Office, 2010).

Data Collection

Needed information for the study was obtained from September-December 2010 after obtaining ethical clearance from the Committee on Human Research, Publications and Ethics of the School of Medical Sciences and Komfo Anokye Teaching Hospital, Kwame Nkrumah University of Science and Technology, Kumasi.

An interview-based study was designed by using questionnaires to assess the associated disease conditions and factors that influence workers of twenty randomly selected printing houses in the Kumasi metropolis to seeking health care. Informed consent was obtained from the eligible participants before interviewed and participants who agreed to join the study provided the required information for the studies. The pre-tested questionnaire was specially designed to collect the background demographic data and the detailed exposure information. The questionnaire was written in simple English in order to avoid unnecessary semantic misunderstanding. The questionnaire was pilot tested to ensure it was understandable by the participants. Extra space was however, allowed after some questions for the participants' 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 interviewers in drawing up conclusions.

Sampling and Analysis

The sampling technique used was purposive and quota techniques (English, 1999). The interviewers 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 participants in the various sections. Data entry and analysis were made using Statistical Package for Social Scientist (SPSS) 17.0 for Windows (SPSS, Inc., Chicago, IL, USA).

RESULTS

Out of 225 eligible participants, 200 (88.9%) were successfully interviewed from the 20 randomly selected printing houses. The most common reason for refusal to join the study was lack of time for the interview. It was also found that 47.5% (n=95) of the workers had a duration less than 5 years in the industry, while 35.5% (n=71) between 5-10 years and 17.0% (n=34) more than 10 years.

Profile of workers

As shown in Table 1, among the 200 workers, 37.0% were females and 63.0% males, with the age ranging from 18 - 65 years. Junior High School and Tertiary graduates were 5.5% and 26.0% of the sample size respectively.

Table 1: Distribution of workers according to demographic details

Details	Number of Workers	Percent (%)
Age group(Years)		
18-25	56	28.0
26-45	68	34.0
46-60	56	28.0
60+	20	10.0
Gender		
Male	127	63.0
Female	73	37.0
Educational Qualification		
Junior High School	11	5.5
Senior High School	70	35.0
Technical/Vocational	65	32.5
Tertiary Graduate	52	26.0
None	2	1.0

Distribution of workers in the various departments

Forty percent of the workers performed their daily task at the Printing department, while, a relatively low number were at the finishing unit, as Table 2 illustrates below.

Table 2: Table showing the distribution of workers in the various departments

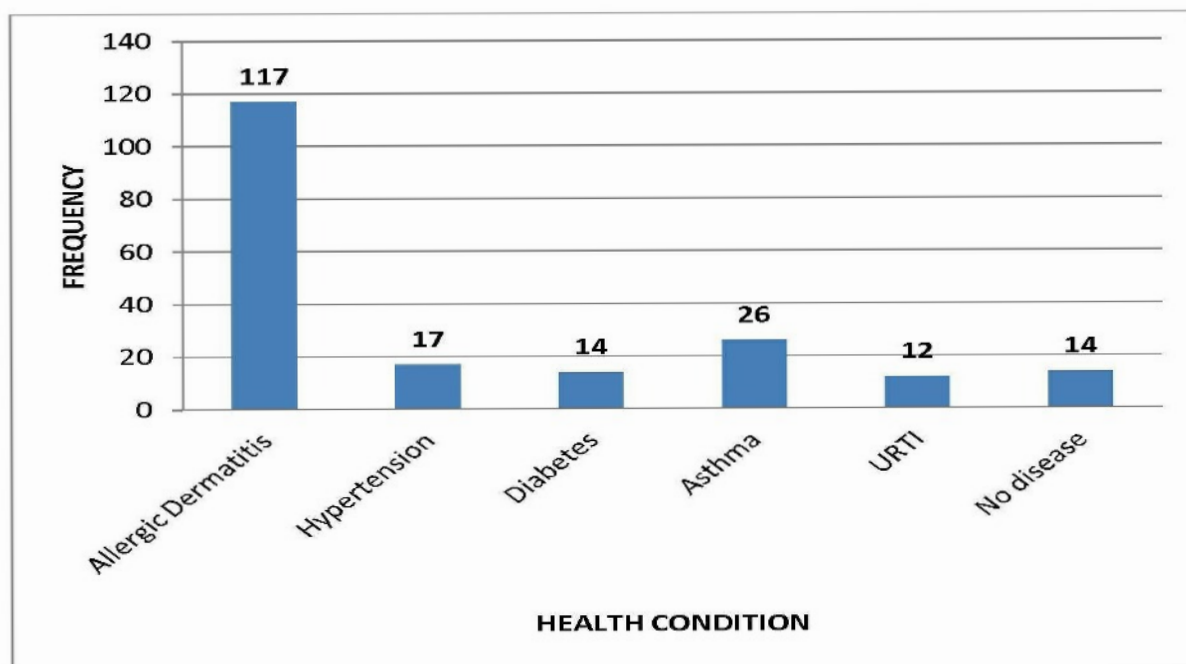
Department	Number of Workers	Percent (%)
Pre-press	62	31.0
Printing	80	40.0
Finishing	58	29.0
Total	200	100.0

Health aspects of workers

A total of 74% (n= 148) workers reported to have gone for medical check-up before starting their normal duties for

employment, whilst 26% (n=52) claimed not to, as they deemed it not necessary. Information regarding the health problems faced by the workers show that workers usually suffered from allergic dermatitis (Figure 1).

Figure 1: Responses given by workers on health conditions

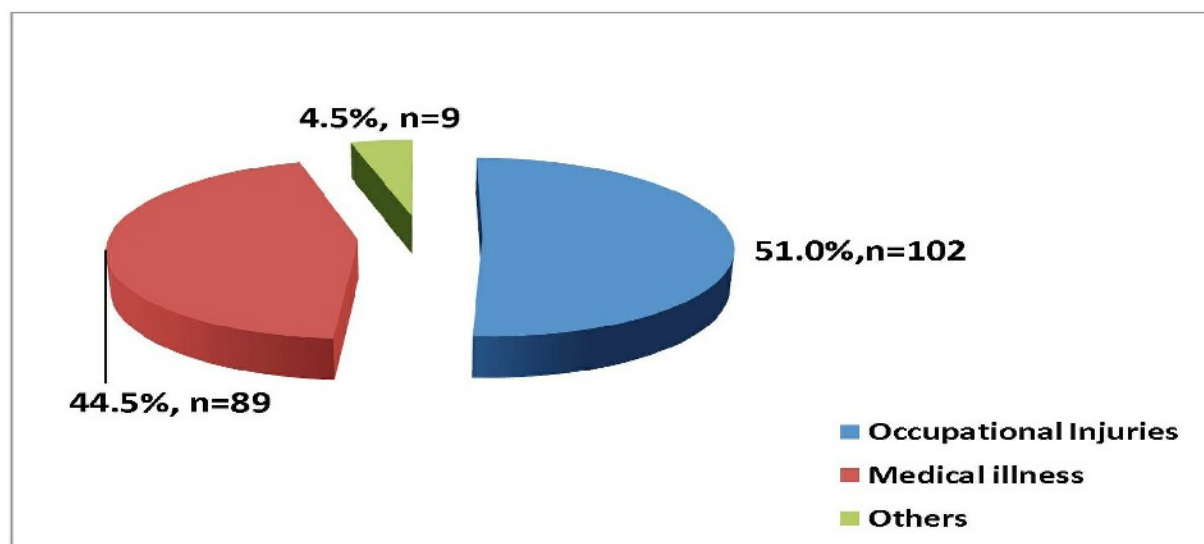


Factors for Seeking Health Care

The information collected reveals that, the major factor that pushed the participants to seek health care was

occupational injuries. Medical illness includes: malaria, gastroenteritis, diabetes etc. Others were for vaccinations (Figure 2).

Figure 2: Factors for printing Press Workers to Seeking Health Care



Causes of Injuries

A careful view of summation of other causes of injury named "others" has the highest value represented by 33.0% (n=66) of the total sample space. These included materials such as plates, hammers, boards, metallic blocks which often were not properly kept; spillage of water, ink, un-dry glue, etc. on

the floor causing the worker to slip off; falling from height of objects such as paper backs, boards, tins, finished products, etc.; little passage in-between the machinery, tables, and chairs; pricks from sewing machine needles. The data distribution however, revealed collectively that injuries associated with printing machinery were prevalently high (Table 3).

Table 3: Representation on causes of injuries occurring in the printing industry

Causes of injury	Number of respondents	% of respondents
Roller in running nip	22	11.0
Contact with moving parts	63	31.5
Entanglement	10	5.0
Sharp edge	33	16.5
Unspecified	6	3.0
Others	66	33.0
Total	200	100.0

DISCUSSION

The results of our study showed that high percentages (40.0%) of workers in the printing industry were in the printing department. The study of Livesley et al, in the UK, had similar trend: pre-press (25%), printing (46%), finishing (42%) processes (Livesley et al., 2002). Also, the printing department is the unit in the industry, where workers come in contact with potential skin irritants including alcohols, alkalis, developers, etching solutions, greases, waxes, and inks; and contact allergens such as potassium dichromate, dyes, formaldehyde, hydroquinone glues, and gums. The highest number of disease conditions found in our study was allergic dermatitis (58.5%), followed by asthma (13%). Comparing statistics with the study of Nethercott and Nosal (2006) illustrated similar pattern. The allergic dermatitis of workers may have a direct link with the skin irritants and allergens they come in contact with during their working activities. Though majority (74.0%) of workers in the industry reported to have gone for medical check-ups before engaging in the work, it does not reflect in the high prevalence of the skin ill conditions and the other related diseases. Safety and protective measures should there be in place in the printing industries, to help alleviate these disease conditions.

Health care for each individual is essential; the study therefore wanted to know the major factor that will influence the printing press workers to opt for medical care. The findings reveal that occupational injury was the major reason; the injuries included: Superficial (i.e. cuts and bruises), Lacerations, Contusions, Fracture/Dislocation, and Amputation. Although comparable to the statistics in a descriptive study in northeastern United States (Sorock et al., 2001; Sorock et al., 2004) and Shanghai, China (Peng et al., 2000) our results showed different patterns of occupational injuries related to machinery industries. Notwithstanding this, our study had some similarities with that of Chow et al (2007) they recorded lacerations and

amputations as the nature of occupational injuries. Report by the Division of Safety Research, National Institute for Occupational Safety and Health (NIOSH), Center for Disease Control (CDC), revealed that amputations, fractures and lacerations are less than 1%, about 7% and 24% of traumatic injuries in a given year respectively (CDC, 1981; 1983). The differences in occupational injuries might have resulted from the differences in the economy and thus the range of industries. Though 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 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 Marek et al (2006) and that by Sorock et al (2001) confirm our finding that mechanical equipment or machinery parts predominates the causes of traumatic injuries in the printing industries. 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 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-glasses, footwear, helmets, etc.); and training of workers in the safe performance of tasks.

CONCLUSION

Findings of the study reveal that allergic dermatitis was the commonest disease among workers of the printing industry in Kumasi metropolis. However, occupational injuries were found to be the reason for seeking health care by the printing industry workers. Occupational related diseases result in considerable human suffering and economic losses at different levels in society. The generalized analysis of these results should be limited to work-based people employed in similar occupations. Further research to confirm the findings could include short clinical examination on all workers in a representative sample of printing houses, preferably in a different region.

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