

To Assess the Prevalence of Occupational Health Related Risks and Use of Safety Measures among Employees in Bralirwa Processing Industries in Rwanda

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Abstract

Background: Worldwide, occupational health related injuries have become potential public health issue leading to disability and death causing abandonment of work. Rwanda is one developing country which is at risk of having work related injuries due to the fact that its industrial economy is growing at a very fast rate which has attracted many investors in industrial sector.

Objective:

- To assess the prevalence of occupational health related risks and
- To assess use of safety measures among employees in Bralirwa processing industries in Kigali Rwanda and
- To specifically identify the types of occupational health related risks faced by the brewery employees,
- To establish the occupational safety measures used by the brewery employees.

Methods: This was a descriptive cross-sectional study design carried out in Bralirwa processing industries in Kigali Rwanda from August to October 2012. This study employed mainly quantitative methods of data collection. A sample of 220 respondents was selected. Quantitative data were collected using semi-structured questionnaires and observational check list. Data was analyzed using SPSS version 17 and Stata software computer packages. The study findings were summarized using proportions, percentages, frequencies and presented tabular format and figures.

Results: Majority 72.7% (160/220) of the respondents were male. Half 50% (110/220) of the respondents were in the age range of 31-45 years. The findings indicated that 86.4% (190/220) of the respondents reported having suffered from occupational health related injuries.

Conclusion: More than three quarters of the respondents reported having suffered from occupational health related injuries and these were physical injuries like falls, cuts and electrocutions and ergonomic related risks like fractures and dislocations.

Recommendations: The industry management should organize training and sensitization programs for the employees, hold regular meetings with employees to discuss on a number of health and safety issues.

Keywords: Occupational health; Safety; Brewery

Background to the Study

The main aim of the study was to assess the prevalence occupational health related injuries and use of safety measures among employees in brewery factory in Gisenyi district, Rwanda. The research was done for two months, August to October 2012, data was collected and analyzed and later the findings were presented in this report.

Occupational health and safety at work is an important aspect of public health that requires workers and employers to adhere to safety standards and guidelines important in protecting and enhancing safety of the work environment. Globally, studies have shown that occupational health related injuries and deaths are rising. According to Concha-Barrientos et al. [1], he estimated that annually approximately 312,000 fatal unintentional occupational injuries occur and [2] estimated that annually about 2 million fatal work-related diseases and occupational accidents occur (345,000 fatal occupational accidents and 1.6 million work-related diseases). They also estimated that annually 263 million occupational accidents occur that cause at least four days of absence from work.

Recent estimates by WHO (2012) show that about 2.9 billion workers globally are exposed to hazards at their work environment

(data on selected occupation risk factors).

Whereas occupational health and safety is taken care of as major area of concern to address occupational health related issues at work place, the reverse may be true for developing countries. Hollnagel (2007) in his study on Resilience engineering – why, what, and how? noted that the knowledge and skills understanding of occupational health and safety in developing countries is still lacking. The flow of industrial production to developing countries has increased and continues to increase.

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Received June 18, 2015; **Accepted** September 28, 2015; **Published** October 05, 2015

Citation: Mbonigaba E (2015) To Assess the Prevalence of Occupational Health Related Risks and Use of Safety Measures among Employees in Bralirwa Processing Industries in Rwanda. *Occup Med Health Aff* 3: 215. doi:[10.4172/2329-6879.1000215](https://doi.org/10.4172/2329-6879.1000215)

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According to Glodstein et al. (2001) and Manuaba (2001) it was reported that if the process of globalization is not carried out wisely, there will be an increase in the number of occupational health and safety problems, as well as of ergonomic problems, both in developing and developed countries [3,4]. By and large the safety of workers at their work places is still wanting in developing countries. Many studies have noted that many workers in the developing countries have continued to be exposed to work related risks at their works places [5-9].

According to the Bull et al. [10] report, it's noted that brewery employees are mainly exposed to physical related risks which are typically attributed to heavy manual lifting and carrying crates of bottles and other raw materials; due to recurring work as well as packing and cleaning, and poor work postures caused by inadequate workstation and process activity design.

In Kenya it's noted that manufacturing, construction and transport industries account for 41% of accidents, the machine operators and assemblers account for 28% of the risks while others occupants share 31% of work place accidents. This is an indication that these occupations are injury prone while matters of safety are treated causally by both employee and employers [11].

In Rwanda, like many other African developing countries following the civil wars of 1994 and 2009, her economy was dually affected. However, in the recent past following political stability the economy registered a notable growth and due to Rwanda's favorable investment policy, there has been setting up of many industrial establishment and increased employment (PSF report 2009 Rwanda).

In developing countries like Rwanda, the experience in the practice of occupational health is limited. Records of work related injuries and diseases are lacking. Workers in industries are at a great risk of work related injuries, stress, unfamiliarity to work process and inadequate training.

. It is therefore important to assess the prevalence of occupational health related risks and use of safety measures among employees in Bralirwa brewery so as to identify better interventions for prevention and control of occupational health related risks.

Methodology

Introduction

This chapter presents the study area, the study subjects, the dependent and independent variables, the sample size, the sampling procedure employed, the data sources and the study tools that were used for data capture, data management and analysis. This section also captures the ethical issues and the anticipated study limitation.

Study area

The study was conducted in Bralirwa industry which is the largest brewery and soft beverage company in the Republic of Rwanda. The Bralirwa brewery is located in Gisenyi approximately 117 kilometers (73 mi), by road, west of Kigali, Rwanda's capital city.

Study design

This was a descriptive cross sectional study employing both quantitative methods of data collection and analysis.

Sources of data

Quantitative data was collected on aspects of the awareness among the brewery employees on occupational health risks, occupational

safety measures used by the brewery employees, factors influencing use of occupational safety measures and types of occupational health related risks faced by the brewery employees using the semi structured questionnaire.

Observational check list was used to capture information on the hazards with the brewery environment like presence of excessive heat, dust, noise, warning signs or safety rules, use of the necessary personal protective equipment, presence of poorly installed electric wires or unguarded machinery or equipment and availability of copies of the most important safety and occupational health regulations

Study population

The study populations were brewery employees of Bralirwa processing industries in Gisenyi Rwanda. The respondents for the study were employees' directly involved beer production.

Inclusion criteria: All employees directly engaged in production process in Bralirwa processing industries in Gisenyi Rwanda.

Exclusion criteria: All Employees not engaged in the production process were excluded in the study because of less risk they are exposed to.

Sample size estimation

Yamane formula for sample size was used to calculate the sample size:

$$n = \frac{N}{1 + N(e)^2}$$

Where n: The total number of respondents required for this study

N: The population size of the workers from Bralirwa industry which is equal to 500.

e: The level of precision given as 5%=0.05

From computation above the sample size is given by: 222 respondents. However, the researcher was only able to access 220 respondents. This number constituted the employees who worked at production section of whom formed the respondents of interest in this study.

Sampling procedure

1. A list of 220 employees working in the processing was obtained from the human resource. All the 220 employees in the production section were considered because the employees in this department/section were finite.

Data collection tools

Quantitative data collection methods were employed. A semi-structured interviewer administered questionnaire and observational check lists were used to collect data. The questionnaire was designed in English and translated into local dialect-Kinyarwanda (the most commonly used local language in Rwanda). Interviews were conducted in either English or Kinyarwanda

Quality control

Preparations for data collection: The researcher made preliminary visits to Bralirwa brewery to introduce the study, explain the study objectives and get acquainted with the ethical procedures of conducting

research at the factory.

Training of research assistants: Four research assistants underwent a three days training in data collection. The morning session of the first day, focused on the problem statement, objectives and methods. In the afternoon the training focused on the consent process and the questionnaire. There were role plays on how to use the questionnaire to enable research assistants understand the tool in more detail. On the second day the questionnaire was pre-tested at soda beverage factory in Kigali. Each research assistant pre-tested the questionnaire with five participants. There was a debriefing session in the afternoon with emphasis on what should possibly be changed and other challenges met during the pre-test. The questionnaire was adjusted in the morning session of the third day and a question and answer session held in the afternoon after which logistical issues were addressed and the team was well prepared and ready for data collection.

Pre-testing: The Data collection tool was pre-tested by the principal investigator and research assistants at soda beverage factory. The soda beverage factory was used because it was considered to have characteristics that similar to the beer brewery factory. The data collection tools were revised after the pre-test and the final data collection tool formulated.

Field editing of data: Each questionnaire was checked for completeness by the research assistant at the end of each interview. The researcher cross checked the questionnaires after data collection and made observations for corrections. The questionnaire completion rate was 100%.

Quantitative data management: Quantitative data was checked for completeness, cleaned and entered in SPSS Version 17 Software. Data was validated for errors that could have occurred during data entry, coded (Outcome variable was coded as 1 when present and as 0 when absent) and exported to Stata 10.0 for analysis.

Quality assurance: Quality assurance was done using the following criteria;

- The research assistants were trained on the study objectives, effective use of the data collection tools and good communication skills.
- The data collection tools were pretested to ensure clarity and accuracy in collecting the intended data.
- The questionnaire was translated to Kinyarwanda to ensure accuracy of data collected in local dialect.
- The research assistants were well supervised during data collection and ensured that correct procedures were followed.
- Observational checklists were prepared by the researcher.

Plan for data analysis

1. **Quantitative data analysis:** Data was analyzed using Stata 10.0 statistical package. The general characteristics of the study population are described using proportions for categorical variables. To estimate the proportion of employees using occupational safety measure and the numbers of employees who reported to have ever got occupational health related risks were established and expressed as percentages.

To assess factors associated use of safety equipment at work, the observational check lists were used. Also a semi structured tool was used to capture information on factors mentioned by the employees that they thought influenced use of safety equipment. Frequencies

and percentages were generated and presented in tabular format and where possible the findings were also presented in form of graphs and figures.

Ethical considerations: Approval to carry on the study was sought from IHSU in collaboration with brewery industries in Rwanda. Ethical aspects also taken into account to the respondents to whom explanation of the purpose of the study and possible benefits of the study are explained; the respondents were assured of the confidentiality of their identity and information they gave during this study.

1. **Limitations of the study:** The following are the anticipated limitations of the study

2. The study was limited by lack of willingness to give information regarding the work related injuries in brewery factory and also limited time available for respondents to be interviewed

1. **Plan for dissemination:** The study reports will be submitted to the International Health Sciences University School of Post-graduate Studies, as one of the requirements for the award of the Master of Science in Public Health degree. A copy will be given to the management of Bralirwa brewery.

Study Results

Introduction

This chapter presents the results from the assessment of the prevalence of occupational health risks and safety measures in brewery factory in Rwanda study. The study findings are presented according to the specific objectives.

The socio demographic characteristics of the respondents

Majority, 72.7% (160/220) of the respondents were male. Half 50% (110/220) of the respondents were in the age range of 31-45 years. In terms of religious affiliations, the findings showed that a more than three quarters, 86.4% (190/220) of the respondents were Catholics. The findings equally showed most of the respondents 79.5% (175/220) had attained tertiary level of education.

Almost half, 47.7% of the respondents were married, and with respect to professional qualification and employment status, less than half 43.2% of respondents were casual laborers and 47.7% of the respondents were permanently employed. The distribution of the socio demographic characteristics of the respondents is presented in Table 1 below.

Types of occupational health related injuries suffered by the brewery employees in the past 12 months

3. The findings indicated that 86.4% (190/220) of the respondents reported having suffered from work. The work related injuries faced by the brewery employees were a result of physical, ergonomic and psychosocial hazards as shown in Figure 1.

The physical injuries and ergonomic hazards

4. Of the 86.4% (190/220) respondents who mentioned having ever suffered from physical injuries in the last 12 months, 25.5% (56/190) of them reported falls, 21.8% (48/190) reported cuts, 17.7% (39/190) reported electrocution, only 8.6% (19/190) and 4.5% (10/190) reported fractures and dislocations as presented in Figure 1 below.

5. From observations carried out at the factory at the time of this study there was no excessive heat in the workplace and no workers

Variable	Details	Frequencies (N=220)	Percentage (%)
Gender	Male	160	72.7
	Female	60	27.3
Age	15-30	50	22.7
	31-45	110	50.0
	46-60	60	27.3
Religion	Catholic	190	86.4
	Protestant	15	6.8
	Muslim	05	2.3
	Others	10	4.5
Education level	None	0	0
	Primary school	05	2.3
	Secondary school	40	18.2
	Tertiary	175	79.5
Marital Status	Married	105	47.7
	Single	90	40.9
	Divorced	05	2.3
	Widowed	20	9.1
Profession	Engineers	30	13.6
	Machine operators	90	40.9
	Casual laborers	95	43.2
	Security officers	05	2.3
Employment Status	Permanent	105	47.7
	Temporally	20	9.1
	Casual laborer	95	43.2

Table 1: Socio-demographic characteristics of respondents.

were found sweating or without clothing. Similarly the researcher did not feel sudden heat on entering the industry.

Also there was no excessive dust at the work place. The researcher observed the workers eye brows, hair nostrils and clothes were not covered with dust particles.

Chemical and biological occupational health injuries

These were not reported in this research. This could be attributed to probable low awareness of chemical and biological related injuries by the respondents.

Causes of occupational health related injuries

The causes of occupational health related injuries as reported by the respondents are presented in Table 2 below.

Occupational safety measures used by the brewery employees at the work place

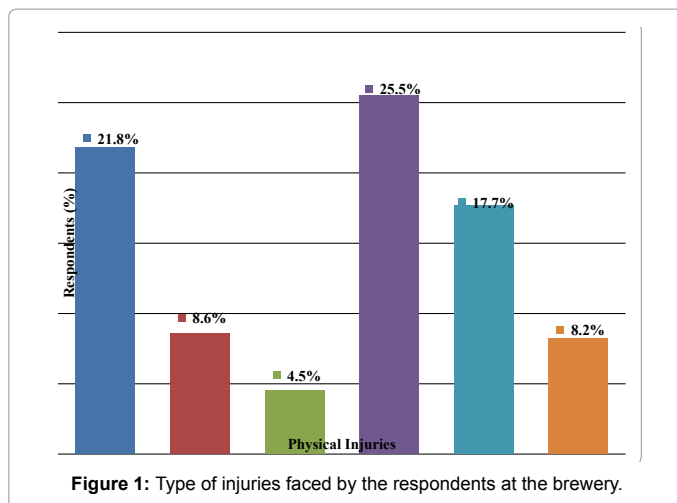


Figure 1: Type of injuries faced by the respondents at the brewery.

Causes	Frequency	Percent	Cumulative Percent
Lack of protective gears	84	38.2	38.2
Lack of safety and health education	10	4.5	42.7
Discomfort in use of PPE	40	18.2	60.9
Decrease work performance	47	21.4	82.3
Other causes	39	17.7	100.0
Total	220	100.0	

Table 2: Causes of occupational health related injuries.

Personal protective wear: A significant proportion 90.9 % (200/220) of the respondents mentioned that they used personal protective wear. The most widespread safety protective wear used were overalls 95.5% (210/220), 90% (200/220) of the respondents reported using gloves, 86.4% (190/220) of the respondents mentioned helmets. Table 3 provides a summary of the safety protective equipment used by the respondents.

Multiple responses: From the observation checks, it was noted that the employees used the necessary personal protective equipment. Many of the workers were seen putting on safety devices at the time the researcher inspected the premises.

Discussion

The socio demographic characteristics of the respondents

Majority of the respondents were male and many of them were in the age category of 31-45 years. The males world over form a majority of the employees especially in industries. This is due to the fact that most of the industrial operations require people who are young and energetic enough to execute activities therein. This finding in study is in line with the Employment to population ratio of Rwanda which reported that males of 15 years plus formed 84.50% as of 2010. Similar findings on employment in the formal sector showed that 55% of salaried workers were in the private sector and 82% were men (Imbonezamuryango, 1992).

Majority of the respondents had attained tertiary level of education. This was an indicator that the literacy level of the respondents was high. This finding is agreement with the findings in the Rwanda Demographic Survey Report, 2010 which shows that only 21 percent of men have attended post-primary/vocational, secondary, or tertiary education and

Type	Use protective wear	
	Yes, n (%)	No, n (%)
Gloves	200 (90.0)	20 (9.1)
Ear plugs	160 (72.7)	60 (27.3)
Respirators	80 (36.4)	140 (63.6)
Helmets	190 (86.4)	30 (13.6)
Overalls	210 (95.5)	10 (4.5)
Face shields	100 (45.5)	120 (54.5)
Boots	200 (90.9)	20 (9.1)
Others	30 (13.6)	190 (86.4)

Table 3: Type of protective wear used.

about 16 percent of women have done so.

Almost half, 47.7% of the respondents were married, this finding slightly higher than the marital status reported in the Rwanda Demographic Survey Report, 2010. The Demographic survey findings reported that 35.1% and 34.1% of the females and males were married respectively.

Types of occupational health related injuries reported by the brewery employees in the past 12 months

The findings indicate that at least more than three quarters of respondents had ever suffered from occupational health related injuries. The most common injuries were mainly physical injuries and ergonomic hazards. The most prevalent physical injuries were the falls and cuts, fractures and dislocations.

Occupational safety measures used by the brewery employees at the work place

Based on the study findings, more than three quarters of the respondents used protective wear. The main occupational health safety wear used by the respondents were gloves, ear plus, helmets, overalls and boots.

Other safety measures included availability of emergency facilities. The first aid kits, fire extinguishers, trained first aiders and occupational health safety guidelines were other safety measures found to be available at the brewery. This was an indicator that in case of an accident at the work place the first aid kits can be of importance and fact that there

were trained first aiders, means that they can respond quickly to offer first aid to affected employees.

Conclusion

More than three quarters of the respondents reported having suffered from occupational health related injuries and these were physical injuries like falls, cuts and electrocutions and ergonomic related risks like fractures and dislocations.

Recommendations

The industry management should organize training and sensitization programs for the employees, hold regular meetings with employees to discuss on a number of health and safety issues.

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Citation: Mbonigaba E (2015) To Assess the Prevalence of Occupational Health Related Risks and Use of Safety Measures among Employees in Bralirwa Processing Industries in Rwanda. *Occup Med Health Aff* 3: 215. doi:10.4172/2329-6879.1000215