

**Research Paper****Factors Associated with Occupational Hazards in the Integrated Craft Production Centers Kigali, Rwanda**

Authors

MUNYANEZA Abel¹, John Gacohi¹, Daniel Mokaya¹¹School of Public Health, Jomo Kenyatta University of Agriculture and Technology, Kenya**Abstract**

This study determined the prevalence of occupational health hazards and associated factors among Integrated Craft Production Centers in Rwanda. Adopted a cross-sectional design involving both qualitative and quantitative data collection approaches. Where 276 workers selected systematically participated in the study. Data were collected using semi structured questionnaires, a focus group discussion with guide and an observational checklist. Among 276 study participant 97.1% are exposed to occupational hazards mainly Noise 93.8%, Fall of material 89.9% and use of sharp equipment 89,5%. Moreover, factors associated with occurrence of occupational hazards were poor infrastructure (P=0.005), lack of complete Personal Protective Equipment (P=0.000), little knowledge on health and safety measures (P=0.0014), negligence of safety procedure (P=0.003), Distraction with other issues during work (P= 0.004), Lack of skills and experience (P=0.003) and Lack of knowledge of job responsibilities (P= 0.028). By Conclusion, workers are exposed to occupational hazards, thus it is necessary to establish occupational health and safety trainings and awareness campaign.

Keywords: *Factors, Health, Occupational Safety and Health, Occupational Hazards.***Introduction**

Worldwide it is estimated that 2.8 billion employees spend one third of their lifetime at work, this explain why improvement of working environment should be taken as the important human right¹. Even though the increase of occupational accidents and diseases attracted attention in recent years, still work-related diseases and occupational injuries cause over 2.78 million deaths annually all-over the word². They are attributed to poor working conditions and inattention to proper occupational health and safety practices especially in developing countries¹ caused by different political, economic

and social factors³ as well as rapid industrialization and technological development.¹

The control of occupational hazards by making work environment safer is successful when there is collaboration between the government, employers and employees through consideration of medical, engineering and legislative interventions^{1,4}.

Occupational health accidents and work related diseases has impact on the Gross Domestic Product of countries where its cost varies between 1.8 to 6 %⁵. Researches show that 3.2% workers in developed countries reported encountering work accidents⁶. England recorded 1.4 million

work related ill health cases, 147 fatal injuries and 69208 non-fatal injuries in 2019⁷. The situation is worse in developing countries that have more than 80 % of global occupational diseases and injuries¹. Since occupational accidents cause a great number of death and injuries, different countries have started prioritizing health and safety of workers through prevention of accidents and work related diseases.⁸ In addition, increasing awareness of the adverse effects of occupational accidents and diseases on workers has led to the improving the enforcement of preventive measures to combat work risks.⁹

Even though the government of Rwanda has put a lot of effort in the promotion of descent work and assuring safe workplaces for workers through setting laws, standards, guidelines and different programs designed to promote Occupational Safety and Health. It was evident that they was increase of work fatalities since their number in 2012 were seven times greater than their number in the 2007 in the same way the number of injuries in the year 2012 was almost four times greater than their number in 2007.¹⁰ In addition, findings of occupational health and safety studies conducted in Rwanda showed that there is high prevalence of exposure to work hazards in different professions.^{4,11} Thus, the study was conducted to determine the types of occupational hazards, their prevalence as well as determining factors associated with occupational health hazards among workers in Integrated Craft Production Centers in Kigali, Rwanda. These are centers created by the government of Rwanda with the purpose of establishing standardized and modern business to accommodate local craftsmen and artisans.¹²

Methods

Study Design: The study adopted a cross-sectional descriptive study design using both qualitative and quantitative methods of data collection.

Study Area: The study was conducted in three Integrated Craft Production Centers (ICPC)

located in Kigali city, Rwanda that are Nyarugenge ICPC in Nyarugenge District, Gisozi ICPC in Nyarugenge District and Gahanga ICPC in Kicukiro District. In these Integrated Craft Production Centers at the time of study, they were eight hundred ninety one (891) employees, distributed into different activities that are Carpentry, Welding and Craftsmen.

Data Collection: Data collection done by using interviewer-administered questionnaires, observation checklist and focused group discussion with guide.

Questionnaires helped to collect different types of data including social demographic characteristics of respondent, data related to the independent variables as well as data related to dependent variables.

The instrument validity was measured by using Content Validity Index determined by two experts in the field of study who ranked questions by giving marks on suggesting whether the question is appropriate or Inappropriate, the researcher gathered responses of experts and computed content validity index (CVI) $CVI = \frac{79}{90} = 0.87$. Moreover, experts assisted in rephrasing of the questions

The study instrument reliability was obtained by conducting a pilot test of the survey Questionnaires at Gahanga Integrated Craft Production Center located in Kicukiro District, City of Kigali. After piloting, necessary changes were made to the questionnaire to make sure it is well adapted to the study participants and final approval of the instrument. The researcher computed results by using the Cronbach's Alpha by using SPSS version 21 test results of sixty-six (66) items was 0.7

Sample Size Estimation: The study used Yamane formula to calculate the sample size

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

n: Sample size, N: Total population size 891,

(e)The level of precision given as 5% = 0.05

By applying the above formula, the sample size was two hundred seventy six (276) workers, the response rate was 100%.

To work out sample size for each stratum in the Integrated Craft Production Centers, the study used proportionate stratification sampling by weight to calculate specific sample sizes.

By using the formula $nh = (Nh / N) * n$

Where:

nh represent the sample size for stratum h. **Nh** represent the population size for stratum h, **N** represent total population size. **n** represent total sample size.

Data Analysis: The data generated from the study was analysed by using SPSS (version 21). Descriptive statistics was used to determine the profile of the respondents and characterise occupational hazards; they were presented in form of frequency as well as percentage distribution by using tables. While chi-square test was used to determine the association between variables that are statistically significant at P- value <0.05

Ethical Considerations: The researcher obtained authorization to conduct research from the Jomo Kenyatta University of Agriculture and Technology (JKUAT) ethical review board. While the consent to collect data was given by individual participant, after getting the written permission from the Integrated Craft Production Management leaders. The participation in the study was

voluntary and the researcher insured that information given were kept strictly confidential.

Results

Table 1: Socio-demographic characteristics of respondents

Respondent's Characteristics	Frequencies	percentage
Sex		
Male	271	98.2
Female	5	1.8
Age		
[18-30]	124	44.9
[31-40]	125	45.3
[41-50]	27	9.8
Education level		
None	22	8.0
Primary	167	60.5
Secondary	85	30.8
University	2	.7
Work experience		
[1-5]	99	35.9
[11-15]	115	41.7
[16-20]	25	9.1
[6-10]	27	9.8
>20	10	3.6

In this study out of 276 participants 271 (98.2 %) were male, 125 (45.3 %) were in the age cohort category of [31-40], majority of respondent 167 (60.5%) attended primary school and 115 (41.7%) have a working experience that range between 11 to 15 years (Table 1).

Table 2: Distribution of types of occupational Hazards identified in Integrated Craft Production Centers

	Exposed to Hazards			
	Yes	%	No	%
Noise exposure	259	93.8	17	6.2
Fall of material	248	89.9	28	10.1
Sharp machines/ equipment	247	89.5	29	10.5
Confined space	237	85.9	39	14.1
Slippery floor	217	78.6	59	21.4
Manual lifting of heavy load	188	68.1	88	31.9
Unprotected wires	133	48.2	143	51.8
Working at height	87	31.5	189	68.5
Chemical splash	57	20.7	219	79.3
Contagious waste	24	8.7	252	91.3

The study found that out of 276 study participants 268 (97.1%) are exposure to occupational hazards. The most prevalent types of occupational hazards are noise 93.8% (259/276), fall of materials 89.9% (248/276), and use of sharp machines/equipment 89.5% (247/276). Other occupational hazards identified was working in confined space 85.9%

(237/276), Slippery floor 78.6% (217/276), Manual lifting of heavy load 68.1% (188/276). While the occupational hazards with less frequency were chemical splash 20.7% (57/276) and contagious waste 8.7% (24/276). (Table 2)

Table 3: The Chi-square test on relationship between the prevalence of occupational hazards and risk factors

Factors contributing to occurrence of Occupational Health Hazards	Yes	%	No	%	Pearson Chi-square	P-value
Poor Infrastructure	247	89.5	29	10.5	13.665	0.005
Poor safety information communication	213	77.2	63	22.8	1.007	0.388
Equipment maintenance and calibration	200	72.5	76	27.5	0.410	0.688
Poor job supervision	178	64.5	98	35.5	2.621	0.137
Poor knowledge on the use of protective equipment	199	72.1	77	27.9	0.971	0.450
A lot of work	146	52.9	130	47.1	2.574	0.154
Lack of trainings	227	82.2	49	17.8	0.156	1
Lack of complete PPE	247	89.5	29	10.5	23.685	0.000
Little knowledge on Health and safety measures	216	78.3	60	21.7	8.046	0.014
Distraction with other issues during work	207	75.0	69	25.0	10.985	0.004
Negligence of safety procedure	226	81.9	50	18.1	5.646	0.038
Lack of skills and experience	210	76.1	66	23.9	11.818	0.003
Poor knowledge of job responsibilities	176	63.8	100	36.2	5.359	0.028

Tracing the main factors that influence the occurrence of work hazards in the Integrated Craft Production Centers through chi-square test. Factors that have a statistical significant association with occurrence of occupational hazards were; Poor infrastructure (P=0.005), Lack of complete Personal Protective Equipment (P=0.000), Little knowledge on health and safety measures (P= 0.0014), Negligence of safety procedure (P=0.038), Lack of skills and experience (P=0.003), Distraction with other issues during work (P=0.004) Lack of skills and experience (P=0.003) and Lack of knowledge of job responsibilities (P=0.028). (Table 3)

Discussion

Almost all participants in the study were male 98.2%, nearly to a half (45.3%) of participant were in the age category of 31-40, this is similar to the findings of other occupational health studies conducted in different countries like Nepal¹³ and Rwanda.⁴ The majority of respondent (60.5%) attended primary school; this finding differ from finding of other occupational health and safety studies done in different professions in Rwanda which showed that the majority of respondents attended tertiary education.^{4,14}

The study findings revealed that almost all workers (97.1%) are exposed to occupational hazards these finding are in agreement with the study conducted in Ethiopia that found that 86.5% welders were exposed to occupational hazards that might occur during the working process.¹⁵ These findings also are in agreement with studies and documents that classified professions found in Integrated Craft Production Centers mainly carpentry, welding and craft among the categories of hazardous professions.^{13,16}

The study found that the most prevalent occupational hazard identified by participants was exposure to high noise with the highest proportion frequency of 259 (93.8%). This finding are similar to the finding of a study done to assess occupational hazard exposure and general health profile of welders in rural Delhi¹⁷ as well as the findings of the same study conducted in Nepal where noise was identified by 75,5% responded.¹³ Followed by fall of materials 248 (89.9%) which is in line with findings of the study conducted in Nairobi where hit by falling materials was identified as the main hazards that lead to injuries.¹⁸ The use of sharp machine/ equipment had a frequency of 247 (89.5%), which confirm the findings of a study conducted in Nepal where use of sharp equipment was among the main

occupational hazards with the prevalence of 86.7%.¹³

Other important occupational hazards identified in the study were slippery floor identified by 217 (78.6%). Which is in agreement with findings of another study conducted in Rwanda that identified slip and fall among the main occupational hazards in Rwanda.⁴ In addition, this study showed that workers are exposed to hazards related to manual lifting of heavy loads since it has identified by 188 (68.1%).

The main factors which contribute to occurrence of occupational hazards in the study included Poor Infrastructure (P=0.000) and Lack of Personal Protective Equipment (P=0.005). Which is in agreement with studies conducted to determine the prevalence of injuries in Ethiopia.^{19,20}

Moreover, individual factors that have a significant relationship with occurrence of occupational hazards were negligence at work (P=0.038), lack of skills and experience of employees (P=0.001), as well as poor knowledge of job responsibilities (P=0.028). These findings confirm results of a similar study conducted in Rwanda that concluded that individual factors contribute to existence of work hazards.¹¹

Conclusion

According to the study findings, it is clear that workers are exposed to work hazards that can lead to occupational accidents and diseases but they are not effectively reported since there is no formal reporting system in place. Thus, they should be establishment of occupational health and safety trainings and awareness campaign to improve the knowledge of workers with regard to the prevention of occupational hazards. There is a need of enforcing the use of Personal Protective Equipment, improve safety communication and establish a proper reporting system of occupational hazards.

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