

# Knowledge, Attitudes and Practices of Metal Workshop Workers Regarding Occupational Risks (Case of the Yambi Yaya Quarter, Mbunya Commune in the City of Bunia, Ituri Province in the Northeast of the Democratic Republic of Congo)

Undehoso Okameli Isse Mundeke Elisée<sup>1</sup>, Duabo Kisukulu Emmanuel<sup>2</sup>,  
Mapenzi Angundra Wivine<sup>3</sup>

<sup>1,2</sup>Nursing Sciences, Higher Institute of Medical Technology ISTM Nyankunde in Bunia, Ituri Province in the Northeast of the Democratic Republic of Congo

<sup>3</sup>Community Health, the Higher Institute of Medical Technology ISTM Nyankunde in Bunia, Ituri Province in the Northeast of the Democratic Republic of Congo

## Abstract

**Introduction:** The main objective was to assess the level of knowledge of these workers, their attitudes towards prevention and their practices in matters of occupational safety, in order to identify the factors influencing their behavior and the obstacles to the implementation of preventive measures.

**Methods:** The survey method and the semi-structured interview technique were used to collect data from 72 workers and content analysis expressed as percentages in tabular form.

**Results:** Insufficient knowledge about occupational hazards negatively impacts the attitudes and practices of metalworkers. A lack of personal protective equipment (PPE) and the absence of enforced regulations exacerbate risky behaviors. To improve the situation, it is essential to strengthen training, implement clear regulatory measures, and ensure the availability of protective equipment.

**Keywords:** Knowledge, Attitudes, Practices, Occupational hazards, Metal workshops

## Introduction

The knowledge, attitudes and practices of metal shop workers in relation to occupational risks constitute a first level of preventive and safety measures.

According to the WHO (2019), metalworkers are often exposed to heavy machinery, sharp tools, and equipment that frequently cause serious injuries. Therefore, the WHO emphasizes the importance of machine safety and adequate training to minimize these risks.

In industrialized countries such as the United States, Japan, and Germany, approximately 70% of workers are aware of the risks, with strict workplace safety regulations in place. Workers are often better informed

about the risks associated with their jobs thanks to regular training programs and awareness campaigns. However, despite this awareness, accidents continue to occur during work, often due to risky behavior or a lack of attention (EU-OSHA, 2020).

In non-industrialized countries like Bangladesh, where less than 30% of workers are aware of occupational hazards, the situation is often more concerning. Workers lack access to adequate training on occupational hazards, increasing their vulnerability to accidents. Regulations are often less stringent, and risk awareness is low (ILO, 2018).

A lack of awareness of risks and the absence of a safety culture contribute to a nonchalant attitude among many workers. In contrast, in non-industrialized countries, such as those in Africa or Asia, the situation is often more concerning. Workers lack adequate training and protective equipment, which negatively influences their attitude towards risks ( Kouadio, 2020).

In Africa, the lack of infrastructure and access to adequate workplace safety training contributes to low awareness of occupational risks. Workers adopt a resigned attitude towards dangers, often due to a lack of economic options ( Mokgothu et al, 2018).

Inequality and a lack of implementation of workplace safety regulations are observed across different regions of Africa. For example, in North Africa, although some countries like Morocco and Tunisia have implemented workplace safety regulations, their application remains uneven. In Algeria, for instance, approximately 45% of manufacturing workers are unaware of the risks associated with their work. Knowledge of occupational hazards is often insufficient, particularly among informal workers ( Boughanmi et al., 2020).

In the Democratic Republic of Congo (DRC), only 20% of workers in metal workshops are aware of occupational hazards. The situation is particularly concerning. Metal workshops are often characterized by a lack of adequate infrastructure and an absence of strict safety regulations. Workers, often from disadvantaged backgrounds, do not have access to adequate training on occupational hazards. This leads to a high rate of workplace accidents and occupational illnesses. The culture of workplace safety is still developing, which hinders risk awareness (ILO, 2020).

Bunia , Ituri province , a 2024 assessment following practical work on social security in five metal workshops in the Yambi Yaya neighborhood revealed that 82.2% of workers (51 out of 62) were not wearing personal protective equipment while performing their duties. This study therefore aimed to assess the workers' knowledge, attitudes, and practices. metal workshops in the YAMBI YAYA district relating to occupational risks.

## Materials and methods

This study is being conducted in the metal workshops of the YAMBI YAYA district, MBUNYA commune, in the city of Bunia, Ituri province , in the Northeast of the Democratic Republic of Congo, 45 km from Lake Albert. The study will take place between July 1st<sup>and</sup> August 1st, <sup>2025</sup> .

The population consists of workers from the metal workshops in the Yambi Yaya neighborhood of Bunia. Probability sampling was used to select respondents. The sample size was 72 metal workshop workers, determined using the Lynch formula.

The survey method allowed us to conduct this study, and the questionnaire technique was used for data collection. We defined criteria for assessing knowledge (high, average, and low), attitudes (favorable and unfavorable), and practices (good and bad) related to occupational risks.

Data analysis was performed using SPSS version 20. The data were converted into percentages. The research protocol was submitted to the Ethics Committee of the Higher Institute of Medical Technology in Nyankunde for ethical clearance. Respondents freely consented to answer the questionnaire, and the anonymity and confidentiality of the information collected were guaranteed.

**Results**

**1. Knowledge of metal workshop workers regarding occupational hazards**

**Table I. Information on occupational risks**

		<b>Information received</b>				
		<b>Total</b>	<b>Yes</b>		<b>No</b>	
<b>VARIABLES</b>	<b>TERMS AND CONDITIONS</b>		<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Sex	Male	67	60	89.55	7	10.45
	Female	5	5	100.00	0	0.00
Age group	< 18 years old	1	0	0.00	1	100.00
	18-24 years old	18	15	83.33	3	16.67
	25-31 years old	34	31	91.18	3	8.82
	32-38 years old	14	14	100.00	0	0.00
	39-45 years old	5	5	100.00	0	0.00
Seniority	< 1 year	4	3	75.00	1	25.00
	1-3 years	18	15	83.33	3	16.67
	4-6 years old	16	16	100.00	0	0.00
	5-9 years old	11	8	72.73	3	27.27
	10 years and older	23	23	100.00	0	0.00
Task performed in the workshop	Welding	29	25	86.21	4	13.79
	Metal fabrication	2	2	100.00	0	0.00
	repair	9	9	100.00	0	0.00
	Welding and metal fabrication	23	20	86.96	3	13.04
	Welding, metal fabrication and repair	9	9	100.00	0	0.00
<b>Total</b>		<b>72</b>	<b>65</b>	<b>90.28</b>	<b>7</b>	<b>9.72</b>

This table shows that 90.28% of respondents had heard of occupational risks.

**Table II. Knowledge from surveys on the type of occupational risk**

		<b>Types of risks</b>								
		<b>Physics</b>			<b>Physical and Chemical</b>		<b>physical, chemical, biological and psychosocial</b>		<b>Physical and Psychosocial</b>	
<b>VARIABLES</b>	<b>TERMS AND CONDITIONS</b>	<b>Total</b>	<b>N</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Sex	Male	67	16	23.88	9	13.43	30	44.78	12	17.91
	Female	5	0	0.00	5	100.00	0	0.00	0	0.00

Age group	< 18 years old	1	1	100.00	0	0.00	0	0.00	0	0.00
	18-24 years old	18	6	33.33	3	16.67	6	33.33	3	16.67
	25-31 years old	34	9	26.47	6	17.65	16	47.06	3	8.82
	32-38 years old	14	0	0.00	3	21.43	5	35.71	6	42.86
	39-45 years old	5	0	0.00	2	40.00	3	60.00	0	0.00
Seniority	< 1 year	4	1	25.00	0	0.00	3	75.00	0	0.00
	1-3 years	18	9	50.00	3	16.67	3	16.67	3	16.67
	4-6 years old	16	6	37.50	2	12.50	8	50.00	0	0.00
	5-9 years old	11	0	0.00	5	45.45	3	27.27	3	27.27
	10 years and older	23	0	0.00	4	17.39	13	56.52	6	26.09
Task performed in the workshop	Welding	29	13	44.83	7	24.14	9	31.03	0	0.00
	Metal fabrication	2	0	0.00	2	100.00	0	0.00	0	0.00
	Repair	9	0	0.00	2	22.22	7	77.78	0	0.00
	Welding and metal fabrication	23	3	13.04	3	13.04	8	34.78	9	39.13
	Welding, metal fabrication and repair	9	0	0.00	0	0.00	6	66.67	3	33.33
	<b>Total</b>	<b>72</b>	<b>16</b>	<b>22.22</b>	<b>14</b>	<b>19.44</b>	<b>30</b>	<b>41.67</b>	<b>12</b>	<b>16.67</b>

This table indicates that 41.67% cited physical, chemical, biological and psychosocial risks as a known type of occupational risk

**Table I II. Knowledge of surveys on common risks**

VARIABLES	TERMS AND CONDITIONS	Total	<u>Common risks</u>							
			Cuts / Injuries		Cuts, burns and electric shocks		Cuts, burns, inhalation, excessive noise, and fatigue		Cuts and burns	
			n	%	n	%	n	%	n	%
Sex	Male	67	13	19.40	6	8,955	30	44.78	18	26.87
	Female	5	0	0.00	0	0.000	5	100.00	0	0.00
Age group	< 18 years old	1	1	100.00	0	0.000	0	0.00	0	0.00
	18-24 years old	18	6	33.33	3	16,667	3	16.67	6	33.33
	25-31 years old	34	6	17.65	3	8,824	22	64.71	3	8.82
	32-38 years old	14	0	0.00	0	0.000	5	35.71	9	64.29
	39-45 years old	5	0	0.00	0	0.000	5	100.00	0	0.00
Seniority	< 1 year	4	1	25.00	0	0.000	0	0.00	3	75.00
	1-3 years	18	9	50.00	3	16,667	3	16.67	3	16.67
	4-6 years old	16	3	18.75	0	0.000	10	62.50	3	18.75
	5-9 years old	11	0	0.00	0	0.000	5	45.45	6	54.55

	10 years and older	23	0	0.00	3	13,043	17	73.91	3	13.04
Task performed in the workshop	Welding	29	7	24.14	0	0.000	13	44.83	9	31.03
	Metal fabrication	2	0	0.00	0	0.000	2	100.00	0	0.00
	Repair	9	0	0.00	0	0.000	9	100.00	0	0.00
	Welding and manufacturing	23	6	26.09	6	26,087	5	21.74	6	26.09
	Welding, fabrication and repair	9	0	0.00	0	0.000	6	66.67	3	33.33
	<b>Total</b>	<b>72</b>	<b>13</b>	<b>18.06</b>	<b>6</b>	<b>8,333</b>	<b>35</b>	<b>48.61</b>	<b>18</b>	<b>25.00</b>

This table shows that 48.61% stated that cuts, burns, inhalation, excessive noise and fatigue are the risks most often encountered.

### III.2 Attitude of metal workshop workers towards occupational hazards

**Table IV. Respondents' attitudes towards the use of safety rules or procedure sheets**

		<u>ATTITUDES</u>				
		Total	<u>Favorable</u>		<u>Unfavorable</u>	
<b>VARIABLES</b>	<b>TERMS AND CONDITIONS</b>		N	%	n	%
Sex	Male	67	40	59.70	27	40.30
	Female	5	3	60.00	2	40.00
Age group	< 18 years old	1	0	0.00	1	100.00
	18-24 years old	18	9	50.00	9	50.00
	25-31 years old	34	21	61.76	13	38.24
	32-38 years old	14	8	57.14	6	42.86
	39-45 years old	5	5	100.00	0	0.00
Seniority	< 1 year	4	3	75.00	1	25.00
	1-3 years	18	9	50.00	9	50.00
	4-6 years old	16	8	50.00	8	50.00
	5-9 years old	11	0	0.00	11	100.00
	10 years and older	23	23	100.00	0	0.00
Task performed in the workshop	Welding	29	17	58.62	12	41.38
	Metal fabrication	2	2	100.00	0	0.00
	Repair	9	7	77.78	2	22.22
	Welding and metal fabrication	23	11	47.83	12	52.17
	Welding, metal fabrication and repair	9	6	66.67	3	33.33
	<b>Total</b>	<b>72</b>	<b>43</b>	<b>59.72</b>	<b>29</b>	<b>40.28</b>

This table indicates that 59.72% of respondents have favorable attitudes towards consulting safety regulations or procedures.

**Table V. Workers' willingness to consult safety documents or protocols**

VARIABLES	TERMS AND CONDITIONS	Total	Favorable		Unfavorable	
			n	%	n	%
Sex	Male	67	27	40.30	40	59.70
	Female	5	0	0.00	5	100.0
Age group	< 18 years old	1	1	100.00	0	0.00
	18-24 years old	18	9	50.00	9	50.00
	25-31 years old	34	11	32.35	23	67.65
	32-38 years old	14	6	42.86	8	57.14
	39-45 years old	5	0	0.00	5	100.0
Seniority	< 1 year	4	1	25.00	3	75.00
	1-3 years	18	9	50.00	9	50.00
	4-6 years old	16	6	37.50	10	62.50
	5-9 years old	11	11	100.00	0	0.00
	10 years and older	23	0	0.00	23	100.0
Task performed in the workshop	Welding	29	12	41.38	17	58.62
	Metal fabrication	2	0	0.00	2	100.0
	Repair	9	0	0.00	9	100.0
	Welding and metal fabrication	23	12	52.17	11	47.83
	Welding, metal fabrication and repair	9	3	33.33	6	66.67
	<b>Total</b>	<b>72</b>	<b>27</b>	<b>37.50</b>	<b>45</b>	<b>62.58</b>

This table shows us that 62.58% of respondents have an unfavorable attitude towards consulting security documents or procedures.

**Table VI. Reasons for respondents' unfavorable attitudes towards non-regular use of PPE**

VARIABLES	TERMS AND CONDITIONS	Total	Reasons for unfavorable attitudes																			
			Cost		Cost and negligence		Discomfort of the equipment		Negligence		Not available		Habits		Underestimation		Cost and habit		Cost and inconvenience		Cost and unavailability	
			N	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	N	%
Sex	Male	67	3	4.48	1	1.49	2	2.99	6	8.96	5	7.46	5	7.46	3	4.48	3	4.48	9	13.43	19	28.36

	Female	5	0	0.00	0	0.00	0	0.00	2	40	0	0.00	0	0.00	0	0.00	3	60.00	0	0.00			
Age group	< 18 years old	1	0	0.00	0	0.00	0	0.00	0	10	0	0.00	1	0	0.00	0	0.00	0	0.00	0			
	18-24 years old	18	0	0.00	6	33.00	0	0.00	0	23	0	0.00	0	0.00	3	16.67	0	16.00	6	33.00			
	25-31 years old	34	0	0.00	6	17.65	2	5.82	8	23.53	14	0.00	1	0	0.00	0	0.00	3	8.82	10	29.41		
	32-38 years old	14	0	0.00	0	0.00	0	0.00	0	14	0	0.00	2	29	0	0.00	3	21.43	6	42.86	3	21.43	
	39-45 years old	5	3	60.00	0	0.00	0	0.00	0	0	0	0.00	2	00	0	0.00	0	0.00	0	0.00	0	0.00	
	Seniority	< 1 year	4	0	0.00	0	0.00	0	0.00	0	0	0.00	1	00	0	0.00	0	0.00	0	0.00	3	75.00	
	1-3 years	18	0	0.00	6	33.00	0	0.00	0	16	0	0.00	3	7	0	16.67	0	16.00	3	67.00	3	16.67	
	4-6 years old	16	0	0.00	3	18.75	0	0.00	8	50	0	0.00	0	0	0.00	0	0.00	0	0.00	5	31.25		
	5-9 years old	11	0	0.00	0	0.00	2	18.00	0	0	0.00	0	0	0.00	0	0.00	3	27.00	0	0.00	6	54.00	
	10 years and older	23	3	13.04	3	13.04	0	0.00	0	8	0.00	2	70	4	17.39	0	0.00	0	0.00	9	39.13	2	8.70
Task performed in the workshop	Welding	29	0	0.00	3	10.34	2	6.90	6	20.69	17	0.00	4	15	3	10.34	0	10.00	3	34.00	6	20.69	
	Metal fabrication	2	0	0.00	0	0.00	0	0.00	0	0	0.00	0	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Repair	9	3	33.00	0	0.00	0	0.00	2	22.00	0	0.00	2	22	0	0.00	0	0.00	0	0.00	2	22.00	

Welding and metal fabrication	23	0	0.00	6	26.09	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	13.04	6	26.09	8	34.78
Welding, metal fabrication and repair	9	0	0.00	3	33.33	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	33.33	3	33.33
<b>Total</b>	<b>72</b>	<b>3</b>	<b>4.17</b>	<b>12</b>	<b>16.67</b>	<b>2</b>	<b>2.78</b>	<b>8</b>	<b>11.11</b>	<b>5</b>	<b>6.94</b>	<b>5</b>	<b>6.94</b>	<b>4</b>	<b>5.56</b>	<b>3</b>	<b>4.17</b>	<b>12</b>	<b>16.67</b>	<b>19</b>	<b>26.39</b>

This table shows that 26.39% of respondents state that their negative attitudes towards the regular use of personal protective equipment are influenced by its high cost and unavailability.

### III.3 Practices of metal workshop workers in the face of occupational risks

Table VII. Respondents' practices regarding occupational risk prevention

VARIABLES	TERMS AND CONDITIONS	Total	Preventive Practices							
			Wearing work equipment		Wearing work equipment and following instructions		Wearing the equipment, following instructions, and using the machines correctly		Adherence to instructions and correct use of machines	
			n	%	n	%	n	%	n	%
Sex	Male	67	30	44.78	6	8.96	28	41.79	3	4.48
	Female	5	5	100.00	0	0.00	0	0.00	0	0.00
Age group	< 18 years old	1	1	100.00	0	0.00	0	0.00	0	0.00
	18-24 years old	18	15	83.33	0	0.00	3	16.67	0	0.00
	25-31 years old	34	10	29.41	6	17.65	15	44.12	3	8.82
	32-38 years old	14	9	64.29	0	0.00	5	35.71	0	0.00
	39-45 years old	5	0	0.00	0	0.00	5	100.00	0	0.00
Seniority	< 1 year	4	4	100.00	0	0.00	0	0.00	0	0.00
	1-3 years	18	15	83.33	0	0.00	3	16.67	0	0.00
	4-6 years old	16	7	43.75	0	0.00	6	37.50	3	18.75
	5-9 years old	11	6	54.55	3	27.27	2	18.18	0	0.00
	10 years and older	23	3	13.04	3	13.04	17	73.91	0	0.00
	Welding	29	16	55.17	0	0.00	10	34.48	3	10.34

Task performed in the workshop	Metal fabrication	2	0	0.00	0	0.00	2	100.00	0	0.00
	Repair	9	4	44.44	0	0.00	5	55.56	0	0.00
	Welding and metal fabrication	23	12	52.17	6	26.09	5	21.74	0	0.00
	Welding, metal fabrication and repair	9	3	33.33	0	0.00	6	66.67	0	0.00
<b>Total</b>		<b>72</b>	<b>35</b>	<b>48.61</b>	<b>6</b>	<b>8.33</b>	<b>28</b>	<b>38.89</b>	<b>3</b>	<b>4.17</b>

This table shows that 48.61% of respondents use PPE as means of preventing occupational risks such as: Glove fitted clothing, protective glasses, protective masks, safety shoes and masks.

**Table VIII. First actions or reactions of respondents in case of an accident**

		<u>First actions/reactions</u>				
		Total	Notify/inform and report to the supervisor		Treat the victim	
VARIABLES	TERMS AND CONDITIONS		N	%	n	%
SEX	Male	67	49	73.13	18	26.87
	Female	5	0	0.00	5	100.00
AGE GROUP	< 18 years old	1	1	100.00	0	0.00
	18-24 years old	18	15	83.33	3	16.67
	25-31 years old	34	22	64.71	12	35.29
	32-38 years old	14	9	64.29	5	35.71
	39-45 years old	5	2	40.00	3	60.00
SENIORITY	< 1 year	4	4	100.00	0	0.00
	1-3 years	18	15	83.33	3	16.67
	4-6 years old	16	9	56.25	7	43.75
	5-9 years old	11	11	100.00	0	0.00
	10 years and older	23	10	43.48	13	56.52
Task performed in the workshop	Welding	29	23	79.31	6	20.69
	Metal fabrication	2	2	100.00	0	0.00
	repair	9	0	0.00	9	100.00
	Welding and metal fabrication	23	15	65.22	8	34.78
	Welding, metal fabrication and repair	9	9	100.00	0	0.00
<b>Total</b>		<b>72</b>	<b>49</b>	<b>68.06</b>	<b>23</b>	<b>31.94</b>

This table shows that for 68.06 % of respondents, the first action in case of an accident is to inform the hierarchy.

## Discussion

### 1. Knowledge of occupational risks

#### • Information on occupational risks (Table II)

The results show that 90.28% of respondents had already heard about occupational risks.

This high rate suggests widespread exposure to information (oral, practical, or documentary) about workplace hazards. The value differs from that reported by Seddiki and Sairi (2022) (60%), a difference that can be attributed to sample size and composition, survey methods (questionnaire, interview), or the local context. The International Labour Organization emphasizes that knowledge of hazards is an essential step in prevention.

The majority of workers seem to be aware of the existence of occupational hazards, but simply being exposed to information does not guarantee a thorough understanding or translate that understanding into safe behavior. Targeted training remains necessary.

#### • Knowledge of the types of occupational risks (Table III)

According to the results of our study, it was found that 41.67% of respondents jointly cited physical, chemical, biological and psychosocial risks.

A significant proportion acknowledge the diversity of risks, but more than half do not list them all or clearly differentiate between them. Studies such as that by Soumah et al. (2017) confirm the simultaneous presence of several risk categories in workshops, which may imply tacit awareness even if workers do not specifically name each category. Knowledge of risk categories is incomplete among a large proportion of respondents. There is a need for training that clarifies the nature, causes, and consequences of each type of risk.

#### • Knowledge of common risks (Table IV)

In this study, 48.61% of respondents reported cuts, burns, inhalation, excessive noise and fatigue as the most common risks.

These risks correspond to hazards observed in other contexts ( Soumah et al., 2017; Dia et al.), where musculoskeletal disorders , eye/skin irritation, fume inhalation, and stress are also found . The similarities suggest that the nature of the tasks in metal workshops exposes workers to a common set of hazards.

Respondents correctly identified several recurring risks, but the extent and severity of some (e.g., inhalation of toxic fumes, musculoskeletal disorders ) may be underestimated. A more detailed assessment of exposures and medical consequences is recommended.

### 2. Workers' attitudes towards occupational hazards

#### • Attitude towards the existence and perception of the use of safety regulations/procedures (Table V)

The result of this study demonstrates that 59.72% of respondents had a favorable attitude towards the existence, perception and use of safety rules or procedures.

Although the majority of respondents have a positive attitude towards the use of documents, some studies have shown that availability does not always equate to access or use; only 22% read the FDS in certain contexts. ( Sow , Diallo and Ndiaye, 2022).

The availability of documents is limited; their distribution, readability, and motivation for consultation must be improved.

#### • Attitudes towards accessing and consulting security documents/protocols

The results of this study show that 37.50% actually report having access to these documents. (Other studies report ~70% availability but ~40% readability.)

The gap between existence and access/reading indicates organizational barriers (lack of a central location, busy schedules), linguistic barriers or security culture.

Even when documents exist, effective access and reading remain limited. Practical measures (training, visual summaries, dedicated awareness-raising hours) are necessary.

- **Reasons for the non-regular use of PPE**

According to our results for 26.39% of subjects cited cost and unavailability as obstacles to the regular non-use of PPE.

Other studies point to additional reasons: discomfort, underestimation of risk. Economic and material barriers are central, combined with behavioral factors (habits, risk perception) and organizational factors (lack of obligation/control).

Workers' attitudes are characterized by two aspects: a theoretical recognition of the usefulness of PPE, but practical obstacles preventing its regular use. Supply, comfort, training, and monitoring are required to improve adherence.

### **3. Worker practices in the face of occupational risks**

- **Preventive practices (wearing PPE)**

Our study shows that 48.61% report wearing PPE (gloves, fitted clothing, goggles, masks, shoes). However, actual availability is limited (often only goggles and shoes, sometimes unsuitable).

The use of PPE is incomplete and sometimes insufficiently adapted to the tasks. Comparable studies (Nalugya et al., 2022; Ndour et al., 2023) show that training significantly improves practices and that knowledge does not always translate into correct use.

Practices exist but lack systematicity and suitability. Practical training, the provision of appropriate PPE, and follow-up are essential.

- **Initial reaction in case of an accident**

According to 68.06% of our respondents, the first reaction is to prevent, inform, and report to their superior. A high proportion adopts a structured response, which is positive. However, other studies show that, despite reporting, the implementation of protocols and the management of incidents can be insufficient (e.g., only 28% follow the prescribed protocols).

Most workers know how to report an accident, but the effectiveness of accident management will depend on the responsiveness of those in charge and the existing intervention procedures.

These results demonstrate the urgent need to strengthen training, awareness-raising, and monitoring efforts, while actively involving employers, public authorities, and researchers. Improving working conditions and promoting a safety culture will not only protect workers' health but also increase productivity and the sustainable development of the metalworking sector. This work lays the groundwork for better management of occupational risks and calls for a collective commitment to a safer and healthier work environment.

### **Limitations of the study**

Our study has the following limitations:

- **Sample size:** 72 workers is a limited sample size which restricts the generalization of results to other regions or contexts.
- **Lack of environmental/biological measurements:** the study did not measure exposure levels (noise, fumes, chemical agents) or objective health indicators (e.g., breath tests, clinical examination).

- Workshop heterogeneity: variability in tasks, equipment and workshop sizes which can influence results and make direct comparison difficult.

## Conclusion

This study focused on the knowledge, attitudes, and practices of metalworkers in the Yambi Yaya district regarding occupational hazards. The objective was to assess their knowledge, attitudes, and practices related to these hazards.

The study reveals a relatively high awareness of occupational risks (90.28%), a partial understanding of the types of risks (41.67%), and incomplete preventive practices (48.61% wear PPE, often inadequate). Attitudes show a theoretical recognition of the importance of documentation and PPE, but material, organizational, and behavioral obstacles limit the effective implementation of preventive measures. These results largely agree with the literature: the presence of information alone is insufficient; combined actions (training, equipment, monitoring) are necessary to reduce exposures and accidents.

## REFERENCES

1. Bougherara , D., Bouzid, M., & Benamrane , S. (2020). *Knowledge and attitudes toward workplace safety among metalworkers in industrialized countries* . SafetyScience, 130, 104865. Available at: <https://doi.org/10.1016/j.ssci.2020.104865>
2. EU-OSHA (2020) *European Risk Observatory Report* <https://osha.europa.eu/en/user/login?destination=/en/about-eu-osha/what-we-do/european-risk-observatory> . January 29, 2025
3. European Agency for Safety and Health at Work (EU-OSHA) (2020): *The European Framework for Safety and Health at Work* . Available at: <https://osha.europa.eu/en/node/57219> January 31 , 2025
4. International Labor Organization (ILO) (2018): *Safety and Health in the Use of Machinery* . Available at: <https://www.ilo.org/global/topics/labour-inspection/lang--en/index> . January 29, 2025
5. Kouadio, A et al. (2020). *Occupational risks in developing countries: challenges and perspectives*. Editions Harmattan , pp. 45-50).
6. Mokgothu , M., Matlosa , M., & Rakhudu , M. (2018). *Raising awareness of workplace safety among metalworkers in Africa* . African Journal of Science, Technology, Innovation and Development, 10(2), 177–185. <https://doi.org/10.1080/20421338.2018.1430975>
7. Nalugya A. et al., (2022) *Knowledge, attitude and practices related to the use of personal protective equipment among welders in small-scale metal workshops in Nansana Municipality, Wakiso District, Uganda*. Health Psychology and Behavioral Medicine 10(1):731–747.
8. Ndour , S., Diarra, B and Traoré, F. (2023): *Knowledge on the use of PPE in metal workshops in Bamako* . Bamako: Éditions du Mali, 1st ed.
9. International Labour Organization (ILO) (2020). *Report on occupational safety and health in the DRC*. Geneva: ILO.
10. Organization World Health Organization (WHO) (2019) *Health and Safety in the Workplace: A Global Perspective*. Available at: <https://ppm.imp.lodz.pl/docstore/download/IMP5fd5d5ac735d4206a2decda7071e570a/SakowskiP> January 31, 2025.
11. Seddiki, K. and Sairi , S. (2022): *Occupational risk analysis: what perspective on employee motivation: the case of Electro Industrie D'Azazga* . [\(Thesis in PDF format.\)](#)

12. Sophie and Marie P, (2016): *The Theory of Practices, Sociology* . No. 4, Vol. 4, University of Lorraine. <https://tube-a-idees.univ-avignon.fr/sommaire/pratique/> January 20, 2020 uapv 190150
13. Soumah et al., (2017): *Occupational risk assessment in the artisanal foundry sector in Dakar* . <https://doi.org/10.1016/j.admp.2017.03.009> Volume 78, number 5, October 2017, pages 454-459
14. Sow , B., Diallo, T and Ndiaye, M. (2022): *Assessment of knowledge on occupational risks in metal workshops in Dakar* . Dakar: Presses Universitaires du Sénégal, 2nd ed.