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Prevalence of Alcohol Consumption and Associated Factors among Workers in a Wood Industrial Processing Zone in Libreville, 2024

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Abstract

Objective: To determine the prevalence and dependence of alcohol consumption within wood industrial processing companies. **Population and Methods:** A cross-sectional, descriptive, and analytical study was conducted from June 3 to July 31, 2024, within a wood processing industrial zone. A stratified sampling method was used to select 530 workers from 14 companies. Data were collected using a structured questionnaire including the AUDIT (Alcohol Use Disorders Identification Test). Statistical analysis was performed using Epi Info 7.2.6.0 software. **Results:** A total of 530 workers were enrolled, consisting of 72.6% men and 27.4% women (M/F sex ratio = 2.6). The mean age was 36 ± 7.3 years (range: 17 to 59 years). The average length of service was 3 ± 2.4 years (range: 1 month to 10 years). Manual workers represented the majority of the surveyed population at 94.3%. The overall prevalence of alcohol consumption was 65.8% (n = 349). According to the AUDIT score, 44.7% of workers were low-risk consumers, 27.7% had harmful use, and 13.4% showed signs of dependence. Beer was the most frequently consumed beverage (60.7%). Male gender (OR = 1.6; p = 0.00) and supervisor status (OR = 9.21; p = 0.00) were significantly associated with alcohol consumption. **Conclusion:** Alcohol consumption in the wood industrial processing sector is high, with a significant proportion of excessive consumers. These findings highlight the urgent need to implement workplace addiction prevention programs to improve occupational health and safety.

Keywords

Alcohol, Prevalence, Workers, Wood Industry, Gabon

1. Introduction

Alcohol consumption constitutes a major global public health challenge. According to the World Health Organization (WHO), alcohol is among the leading risk factors for preventable morbidity and mortality, accounting for 2.6 million deaths worldwide in 2019, including 2 million men and 600,000 women [1]. Alcohol use is closely associated with several non-communicable diseases, such as cardiovascular conditions, liver diseases, various types of cancer, as well as mental health and behavioral issues, including depression, anxiety, and other alcohol-use disorders [1]-[3].

In occupational settings, alcohol consumption represents a critical challenge for health and safety at work, as it can impair alertness, slow reaction times, reduce productivity, and significantly increase the risk of workplace accidents. According to the French National Research and Safety Institute (INRS), 10% to 15% of workplace accidents are attributable to alcohol consumption [4].

In sub-Saharan Africa, several studies have highlighted the prevalence of alcohol consumption in both the general population and professional environments [5]-[7].

In Gabon, while efforts are being made to strengthen occupational health and safety, specific data on workplace alcohol consumption are only available for certain sectors. Kinga and Makosso reported prevalence rates of 65.4% and 56.4% in the oil and mining sectors, respectively [8] [9]. However, data concerning alcohol consumption in Gabon's industrial wood processing sector remains scarce; therefore, we conducted this study to determine the prevalence and dependence of alcohol consumption within industrial wood processing companies.

2. Population and Methods

2.1. Study Type, Period, and Duration

We conducted a cross-sectional, descriptive, and analytical study in an industrial zone over a two-month period, from June 3 to July 31, 2024, within industrial wood processing companies. This Special Economic Zone (SEZ) is located 27 km from the national capital. Its 1390-hectare area is divided into three sectors: industrial, commercial, and residential. Out of the 64 companies established in this zone, 48 operate in the wood processing sector.

2.2. Study Population

The study population consisted of permanent workers involved in various stages of wood processing within the industrial zone.

Sampling: We conducted a two-stage sampling process. First, based on the list of companies provided by the administrative authority of the industrial zone, a simple random sampling without replacement was performed to select the companies to be visited. Among the 48 wood-processing companies operating within the industrial zone, each company was assigned a number. All numbers were placed into a container, and fourteen (14) companies were randomly selected

without replacement.

In the second stage, within each selected company, we carried out an exhaustive recruitment of all workers who met the inclusion criteria.

The minimum required sample size was calculated using Cochran's formula, assuming an expected prevalence of 65% and a margin of error of 5%.

$$n = \left[z^2 \times P(1-P) \right] / m^2$$

n: Sample size.

z: 95% confidence interval ($z = 1.96$).

P: Prevalence of alcohol consumption in the oil sector ($P = 0.65$) [8].

m: Margin of error ($m = 5\backslash\%$).

$$n = \left[1.96^2 \times 0.65(1-0.65) \right] / 0.01^2$$

$$n = 350.$$

The theoretical minimum sample size calculated was 350 participants. The exhaustive recruitment within the 14 selected companies ultimately allowed the inclusion of 530 workers.

2.3. Inclusion Criteria

All workers from the randomly selected wood processing companies who agreed to participate, held permanent positions, worked at least eight (8) hours per day, five (5) days per week for at least one month, and provided verbal informed consent.

2.4. Exclusion Criteria

Companies operating outside the industrial zone, companies within the zone not involved in the wood sector, and workers who were absent or on leave during the study period.

2.5. Data Collecting

Data were collected using a structured, individual questionnaire administered by a trained team comprising an occupational physician, four sixth-year medical students, three state-certified nurses, and one Master's student in Quality, Health, Safety, and Environment (QHSE). Interviews were conducted in designated private areas (offices or infirmary rooms).

The questionnaire collected the following information:

- Sociodemographic characteristics (independent variables): Age, sex, seniority, professional category, and educational level.
- Types of alcohol consumed: Whiskey, beer, and wine.
- Alcohol consumption (dependent variable): Assessed using the World Health Organization (WHO) Alcohol Use Disorders Identification Test (AUDIT).

Alcohol consumption was defined as any alcohol use during the past 12 months, assessed using the Alcohol Use Disorders Identification Test (AUDIT) developed by the World Health Organization (WHO). Each item is scored from 0 to 4 points, with a maximum total score of 40. The interpretation of the AUDIT score is as

follows:

- A score of 0 indicates abstinence.
- Low risk: <6 points (women) or <7 points (men).
- Hazardous or harmful consumption: 6 - 12 points (women) or 7 - 12 points (men).
- Likely alcohol dependence: >12 points for both sexes [10].

2.6. Data Analysis

Data were entered into Excel and analyzed using Epi Info software (version 7.2.6.6). Descriptive analysis was performed for sociodemographic characteristics and alcohol consumption. Qualitative variables were expressed as proportions and compared using Pearson's Chi-square test, while quantitative variables were presented as means ± standard deviation and compared using Student's t-test. Univariate analysis was used to identify risk factors associated with alcohol consumption. The significance threshold was set at 5% ($p < 0.05$).

3. Ethical and Administrative Considerations

Authorization to conduct this study was obtained from the General Directorate of Occupational Health and Safety (DGSST) and the Administrative Authority of the industrial zone. Before the interviews, the study objectives were explained to the workers, and verbal informed consent was obtained. The questionnaires were anonymous. The procedures described involved no experiments on patients or animals, and all principles of the Declaration of Helsinki regarding human subjects in research were strictly followed.

4. Results

4.1. General Population Characteristics

Data were collected from 530 workers across fourteen (14) companies. The sample included 385 (72.6%) men and 145 (27.4%) women, resulting in a male-to-female (M/F) sex ratio of 2.6.

The mean age was 36 years (SD 7.3), ranging from 17 to 59 years. The mean age for women was 37 years (SD 6.9), ranging from 19 to 50 years, while the mean age for men was 35 years (SD 7.4), ranging 17 to 59.

The mean job seniority was 3 years (SD 2.4), ranging from one month to 10 years. Manual workers constituted the vast majority of the surveyed population at 94.3%. Over half of the population (68.6%) had not progressed beyond secondary education, and 4% had no formal schooling, as shown in Table 1.

Table 1. Distribution of the socio-professional characteristics of the workers.

Characteristics	Number (n)	(%)
Sex		
Female	145	27.4
Male	385	72.6

Continued

Age (years)		
<30	236	44.5
[30 - 45[	258	48.7
≥45	36	6.8
Seniority (years)		
<2	318	60.0
[2 - 5[	154	29.1
≥5	58	10.9
Job Position		
Manual workers	510	96.2
Supervisors	20	3.8
Educational Level		
Primary	46	8.6
Secondary	363	68.6
Higher Education	121	22.8

4.2. Prevalence of Alcohol Consumption

Out of the 530 workers, 349 reported consuming alcohol, representing a prevalence of 65.8%. Among these consumers, 84 (24.1%) were women and 265 (75.9%) were men.

Table 2 presents the distribution of workers according to the type of alcohol consumed, frequency of consumption, and consumption levels.

Table 2. Distribution of workers by alcohol consumption.

Variables	Number (n)	(%)
Drinking Frequency (n = 530)		
Never	181	34.2
Monthly or less	113	21.3
2 to 4 times per month	110	20.7
2 to 3 times per week	80	15.1
4 or more times per week	46	8.7
Quantity consumed on a typical day (n = 349)		
3 or 4 drinks	213	61.0
5 or 6 drinks	85	24.4
7 to 9 drinks	37	10.6
10 or more drinks	14	4.0
Risk Level (AUDIT Score) (n = 530)		
Abstinent	181	34.2
Low-risk consumption	237	44.7
Hazardous or harmful consumption	147	27.7
Likely dependence	71	13.4

Continued

Type of alcohol consumed (n = 349)*		
Spirits (Whisky)	56	10.6
Beer	322	60.7
Wine	70	13.1
Multiple beverage types	71	20.3

*The total number of workers consuming alcohol.

4.3. Perception of Alcohol Use and Dependency Indicators

A total of 197 workers reported a perceived need to reduce their alcohol consumption, representing 37.2% of the sample. Additionally, 99 workers (28.4%) reported being criticized or questioned about their drinking by those around them, while 138 (39.54%) felt they were drinking too much. Furthermore, 53 workers (15.18%) expressed a need for alcohol in the morning (eye-opener).

4.4. Factors Associated with Alcohol Consumption

Univariate analysis revealed significant associations between alcohol consumption and several variables: male gender (p = 0.00; OR = 1.6), the professional category of supervisor (p = 0.00; OR = 9.21) as shown in Table 3.

Table 3. Factors associated with alcohol consumption among workers.

Characteristics	Number n (%)	OR [95% CI]	p-value
Sex			
Female	84 (24.1)	-	-
Male	265 (75.9)	1.60 [1.08 - 2.37]	**<0.001**
Age (years)			
<30	150 (43.0)	0.83 [0.58 - 1.19]	0.16
[30 - 45[	177 (50.7)	1.27 [0.88 - 1.82]	0.09
≥45	22 (6.3)	0.80 [0.40 - 1.60]	0.26
Seniority (years)			
<2	201 (57.6)	0.74 [0.51 - 1.07]	0.05
[2 - 5[	109 (31.2)	1.37 [0.91 - 2.06]	0.06
≥5	39 (11.2)	1.07 [0.60 - 1.91]	0.41
Job Position			
Manual workers	331 (98.9)	0.20 [0.04 - 0.98]	<0.001
Supervisors	18 (4.9)	4.86 [1.11 - 21.21]	**<0.001**
Educational Level			
Primary	17 (4.9)	0.26 [0.14 - 0.50]	**<0.001**
Secondary	247 (70.8)	1.35 [0.92 - 1.98]	0.05
Higher Education	85 (24.4)	1.29 [0.83 - 2.01]	0.12

5. Discussion

5.1. Sociodemographic Characteristics

In our study, we observed a male predominance of 72.6%. Male preponderance in the workplace in general, and specifically within the wood processing sector, appears to be a globally recognized trend. For instance, Zatou *et al.* [11] in a study of carpentry workers in Tizi Ouzou (Algeria), Tayou *et al.* [12] in a survey of traditional woodshops in Douala, Ouédraogo *et al.* [7] among carpenters in Ouagadougou, and Agbana *et al.* [13] among sawmill workers, reported male proportions of 100%, 95.2%, 99.35%, and 90.3%, respectively. This male predominance can be attributed to the arduous and hazardous nature of wood processing, which is traditionally regarded as heavy manual labor.

The mean age in our study was 36 ± 7.3 years, a result comparable to the 36.13 ± 10 years reported by Olou *et al.* [14] in their study on occupational risks in Parakou sawmills. Our finding is also similar to those reported by Agbana *et al.* [13] among sawmill workers in Nigeria (37.78 ± 14.69 years) and Balabed *et al.* [15] among workers exposed to wood dust in the Sidi-Bel-Abbès region of Algeria (39.11 ± 1.19 years).

However, the mean age reported in this study is lower than that reported by Zatou *et al.* (41 ± 10 years), but higher than those found by Yéboué-Kouamé *et al.* [16] among carpenters and cabinetmakers in Yopougon, Tanko *et al.* [17] among carpenters in Kaduna (Northwestern Nigeria), and Abateneh *et al.* [18] among woodwork workers in Bahir Dar City, which were 27 ± 10 years, 24.6 ± 0.6 years, and 33 ± 6 years, respectively. Overall, these data suggest that the wood processing sector primarily attracts a young population, likely due to the physical exertion required and the often-temporary nature of the employment.

More than half of the population (68.6%) had a secondary education level. This result is similar to that reported by Agbana *et al.*, where secondary education was found in nearly half of the respondents. However, this contrasts with findings by Ouédraogo *et al.* among carpenters in Ouagadougou, Yedomon in Cotonou [19], and Gounongbé *et al.* [20] in a study on occupational risks associated with artisanal plastic burning in Parakou; in those studies, primary education was the dominant instruction level at 46.08%, 54.8%, and 54%, respectively. These differences may be explained by the mandatory education laws up to age 16 in our context, as well as socioeconomic constraints that force some workers to leave the school system prematurely.

5.2. Prevalence of Alcohol Consumption

In our study, 349 workers reported consuming alcohol, representing a prevalence of 65.8%. This result is consistent with findings previously reported in Gabon by Kinga *et al.* [8] in the oil sector, and by Makosso *et al.* [9] and Ekomy *et al.* [21] in the mining sector, with rates of 65.4%, 56.4%, and 54.17%, respectively.

The alcohol consumption rate reported here is higher than those found by

Ouédraogo *et al.* (29.3%), Yéboué-Kouamé *et al.* (26.4%), Diatte *et al.* [22] in Senegal (3.4%), Foba *et al.* [23] in Mali (8.6%), and Goyal *et al.* [24] among industrial workers in Northern India (36%). These differences may be explained by the fact that in these predominantly Muslim countries, there is often an under-reporting of alcohol consumption due to social stigma, unlike in other countries such as ours.

Conversely, other authors have reported higher prevalence rates in occupational settings. For instance, Gossage *et al.* [25] among agricultural workers in South Africa and Nielsen *et al.* [26] among Norwegian workers reported prevalence rates of 78.8% and 80%, respectively. Beyond methodological differences, socio-cultural disparities between these nations and our own must be considered when interpreting these results.

In our survey, 42% of workers reported a drinking frequency of one to four times per month. This result contrasts with the reality observed on the ground, where alcohol consumption in this sector is nearly daily. Workers often view alcohol as a "reward" after physical exertion, leading them to engage in regular consumption. Nonetheless, our findings are similar to those reported by Ouédraogo *et al.*, Orset *et al.* [27] among university hospital workers, and Piazza-Gardner *et al.* [28] among professional firefighters, who found rates of 50%, 56.27%, and 49%, respectively.

5.3. Frequency and Patterns of Consumption

Regarding the risk levels associated with frequency, consumption was classified as low-risk in the majority of cases (44.7%). This result aligns with several studies across different continents, where proportions vary from 37% to 92% [7] [26] [29] [30]. However, this should not overshadow the fact that the proportion of excessive drinkers (41.1%) is nearly identical to that of low-risk drinkers. This highlights an urgent need for prevention measures targeting addictions in general, and alcohol specifically, to prevent a transition where the majority of consumers become excessive drinkers.

5.4. Risk Factors

In our study, male workers were 1.6 times more likely to consume alcohol than female workers. The predominance of alcohol consumption among men is widely reported in the literature. Nielsen *et al.* found a prevalence of 85% in men versus 76% in women; Ouédraogo *et al.* reported 68.56% versus 54.65%; and Yao *et al.* [31] found 61.2% versus 43%. This trend could be explained by the fact that in many African countries, and Gabon in particular, men tend to have higher levels of social and professional activity than women.

Furthermore, supervisors had a 4.86 times higher risk of consuming alcohol. This may be explained by the higher financial means available to these employees, who are considered the management staff of these companies. A similar observation was made by Ouédraogo *et al.* among carpenters in Ouagadougou [7].

6. Conclusion

Alcohol consumption in the industrial wood-processing sector in Libreville represents a major occupational health issue. In this work environment, characterized by physically demanding tasks and a high risk of occupational accidents, alcohol use constitutes an aggravating factor for safety, productivity, and workers' well-being. Therefore, the implementation of structured addiction prevention programs, including awareness-raising, systematic screening, medico-social support, and workplace alcohol risk management policies, appears essential to improve workers' health and safety in this industrial sector.

Limitations

This study has several limitations that should be considered when interpreting the findings.

- The cross-sectional design does not allow for the establishment of a causal relationship between the identified factors and alcohol consumption;
- Since the data were collected using a self-administered questionnaire, the results may be subject to social desirability bias, particularly in a professional context;
- Only permanent workers present at the time of the survey were included, which may limit the generalizability of the findings to the entire sector;
- Some professional categories had small sample sizes, which may have resulted in wide confidence intervals and reduced precision of the estimates.

Despite these limitations, our study provides original data on a relatively underdocumented industrial sector in Gabon and offers useful insights for the development of targeted prevention strategies.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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