

Prevalence of Respiratory Symptoms among Sawmill Workers in Benin City, Nigeria

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Abstract: Studies elsewhere have shown that exposure to sawdust increases susceptibility to development of pulmonary symptoms but there is paucity of information on this in Benin City, Nigeria where, there are many sawmill factories. The objective of this study, was to determine the prevalence of respiratory symptoms in sawmill workers in Benin City, Nigeria. This was a cross-sectional study, in which the British Medical Research Council Questionnaire was used to obtain information on respiratory symptoms in a standardized manner in sawmill workers, who met the inclusion criteria for the study and age-matched controls. Two hundred and twenty eight sawmill workers and 371 controls with mean ages of 33.1 ± 7.3 and 32.9 ± 7.2 years, respectively were studied. Symptoms like cough, sputum production, breathlessness and wheeze were more common in sawmill workers compared to controls ($p < 0.05$). Respiratory symptoms are more prevalent in sawmill workers compared to controls. Use of appropriate protective devices is advocated in order to reduce this preventable morbidity.

Key words: Prevalence, respiratory symptoms, sawmill workers, Benin City, Nigeria

INTRODUCTION

The respiratory tract is vulnerable to occupational hazards (Harrington and Gill, 1987), which include exposure to organic and inorganic dusts generated from various industries. Sawdust is a by product of wood processing and an occupational hazard of sawmills, which abound in Benin City, Edo state because of her geographical location in the rain forest belt of Nigeria. All the sawmills are privately owned, of small scale, with substandard working and environmental conditions (Asogwa, 1981) which promote increased morbidity.

Although, the respiratory status of this subset of workers has been determined elsewhere (Fatusi and Erhabor, 1996; Ige and Onadeko, 2000; Shamssain, 1992; Rastogi *et al.*, 1989; Lin *et al.*, 1996; Vedal *et al.*, 1986; Hessel *et al.*, 1996; Noertjojo *et al.*, 1996; Brooks *et al.*, 1981; Carasso *et al.*, 1987; Douwes *et al.*, 2001), there is paucity of data regarding sawmill workers in Benin City. The aim of this study, was therefore, to determine the prevalence of pulmonary symptoms among sawmill workers in Benin City and to compare the results with similar studies elsewhere in this country and beyond. The findings would serve as a baseline for future research as

well as serve as a basis for proffering solutions to the occupational hazards being faced by sawmill workers in Nigeria.

MATERIALS AND METHODS

This was a cross-sectional study, in which sawmill workers were selected by a 2-stage stratified random sampling technique using a table of random numbers from among the registered sawmill factories in Benin City. The first stage involved the random selection of 22 registered sawmill factories while, the second stage involved the random selection of workers from the selected sawmills after an informed consent. The subjects were sawmill workers aged between 18 and 50 years, who had been in continuous employment in the sawmill factories for at least 1 year and with no history of smoking while, those with history of chronic respiratory disease and current or past smokers were excluded. The control subjects were healthy individuals who were not in employment in any sawmill or dusty occupation, whose places of residence were not within sawmill factory premises and were non-smokers. They were age-matched and had similar socioeconomic background as the sawmill workers. They were all interviewed with the modified British Medical

Research Council Questionnaire on respiratory symptoms (Anonymous, 1960), which has been validated and used for similar studies in this country.

Statistics: Statistical analysis was done with Epi info® for windows (2002). Continuous variables were expressed as means and standard deviations. Comparison of arithmetic means was carried out using the z-test. Discrete variables were expressed as percentages and analysis of differences between proportions was done by the use of Chi-square (χ^2) test. Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

Two hundred and twenty eight sawmill workers and 371 controls were studied with mean ages of 33.1 ± 7.3 and 32.9 ± 7.2 years, respectively. The 2 groups were generally comparable in their socio-demographic characteristics. This is shown in Table 1.

The prevalence of respiratory symptoms among the sawmill workers and the control group is shown in Table 2. The sawmill workers had a significantly higher prevalence of pulmonary symptoms compared to the control group viz: Cough (35.1 vs 8.6%), sputum production (51.8 vs 1.6%), breathlessness (8.3 vs 0%), wheeze (3.1 vs 0%). Among the sawmill workers, 179 (78.5%) reported at least one respiratory symptom compared to 45 (12.1%) of the controls ($p < 0.05$).

The results of this study, show that sawmill workers in Benin City had a higher prevalence of respiratory symptoms compared with controls. This is in agreement with earlier works on the same subject (Fatusi and Erhabor, 1996; Ige and Onadeko, 2000; Vedla *et al.*, 1986; Douwes *et al.*, 2001). However, the prevalence figures for respiratory symptoms reported in this study are somewhat different from those reported elsewhere in this country (Fatusi and Erhabor, 1996; Ige and Onadeko, 2000). While, the prevalence of cough among the sawmill workers in this study is comparable to the 34.4% reported by Ige and Onadeko (2000), it is lower than the 45.8% reported by Fatusi and Erhabor (1996). Also, sputum production prevalence rate of 51.8% among the sawmill workers in this study is comparable to the 50.8% reported in the study by Fatusi and Erhabor (1996) but $< 34.4\%$ reported by Ige and Onadeko (2000). Similarly, while the prevalence rate of breathlessness among the sawmill workers in this study was found to be 8.3 and 4.1% was reported by Ige and Onadeko (2000) while, Fatusi and Erhabor (1996) reported 25.4%.

As there were no material differences in the structural design of the sawmills used in this study and those of these other workers on the same subject, these

Table 1: Socio-demographic characteristics of the subjects

Variable	Sawmill workers, n = 228	Controls, n = 371	p-value
Age (years)	33.1 \pm 7.30	32.9 \pm 7.20	ns
Height (cm)	168.6 \pm 5.50	168.7 \pm 5.50	ns
Weight (kg)	69.8 \pm 5.90	70.0 \pm 6.10	ns
Employment duration (years)	6.8 \pm 2.90	6.9 \pm 3.50	ns
Systolic BP	122.7 \pm 11.1	122.4 \pm 11.0	ns
Diastolic BP	71.9 \pm 10.0	71.4 \pm 9.90	ns

Values are Means \pm SD, BP = Blood Pressure, ns = Not statistically significant

Table 2: Prevalence of pulmonary symptoms among sawmill workers and controls

Symptom	Sawmill workers, n (%)	Controls, n (%)	p-value
Cough	80 (35.1)	32 (8.6)	< 0.05
Sputum production	118 (51.8)	6 (1.6)	< 0.05
Breathlessness	19 (8.3)	0 (0.0)	< 0.05
Wheeze	7 (3.1)	0 (0.0)	< 0.05
Chest tightness	2 (0.9)	0 (0.0)	ns
Haemoptysis	0 (0.0)	0 (0.0)	-
At least one respiratory symptom	179 (78.5)	45 (12.1)	< 0.05

NS = Not Statistically significant

differences are likely to relate, not only to the quantity of sawdust in the research environment, but also sawdust control measures put in place and utilized at the different sawmills. Over 95% of the workers wore no protective devices such as face masks in the sawmills used for the study. Another important possible reason for the findings is the type of wood that is processed in the factories. Most of the tree species were the highly allergenic type such as *Mansonia*, *Iroko* and *Walnut* sp. (ILO Encyclopedia of Occupational Health and Safety, 1972). Such species may contain high levels of irritant chemicals such as monoterpenes, which have been shown to increase work-related symptoms (Rosenburg *et al.*, 2002). Exposure to molds in the sawdust, which has also, been reported to cause several respiratory symptoms and mucous membrane irritation among wood workers (Dutkiewicz *et al.*, 2001) may be another reason for the high prevalence of respiratory symptoms among the sawmill workers.

It is important to note that the 25.4% prevalence rate of dyspnoea reported by Fatusi and Erhabor (1996) compared to the 8.3% reported in this study may relate to the sample size as they studied only 59 subjects compared to 228 in this study. The small sample size in their study could have increased the possibility of type 2 error in the analysis. It is also, noteworthy that while, the prevalence rates of cough and sputum production were quite high, those of the more disabling symptoms such as breathlessness and wheeze were low while, haemoptysis was not even reported at all. This is not a surprising finding as subjects in this study, like in most cross sectional studies, represent a survival population. Subjects who develop the more disabling symptoms might have changed jobs.

CONCLUSION

This study has shown clearly that sawmill workers have a higher prevalence of pulmonary symptoms compared to the normal population. Legislations and enforcement regarding factory designs and other measures to ensure workers' safety and health in the workplace e.g., use of protective face masks could bring about improvement in these rather high prevalence rates of respiratory symptoms among sawmill workers in Benin City and indeed the whole country.

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