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ASSESSMENT OF OCCUPATIONAL HAZARDS IN SMALL SCALE SAWMILLS IN THREE SELECTED LOCAL GOVERNMENT AREAS OF BENUE STATE, NIGERIA

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Abstract:
This study examined occupational hazards in small-scale sawmills in three Local Government Areas (Makurdi, Gwer west and Gwer east) in Benue state, Nigeria. A total of ten sawmills were sampled and visited. Ten copies of well-structured questionnaire were distributed in each sawmills to elicit information on the hazards supported by workers due to sawmill activities. Results on hazards in sawmills revealed that Destiny, Ire Akari, and Segun sawmills had 100% accident victims, followed by Igbor (87.5%) Hafilla (83.3%) Adekola (77.8%) Apir and Mase (71.4%), and 60% in Ogo Oluwa and El-matandi respectively. High rate of accident was recorded in Gwer East (93.7%) followed by Gwer West (78.9%) and Makurdi (71.4%). The most injuries registered were Laceration, sprain and strain, 41.65% in Gwer East, 30.13% in Gwer West and 28.6% in Makurdi. Fracture was more frequent in Gwer East (22.9%) and Gwer West (9.53%). Bruises were common in Makurdi (42.9%), Gwer West (40.21%) and Gwer East (29.15%) respectively. Most of workers are male and they are performed a lot of manual activities without any protection means which led to injuries in different parts of the body. Generally back and hand pains dominated in all studied sawmills. It was therefore concluded that efforts should be made by owners of sawmills towards drastically practical measures (training, protective materials and specific devices), that had to reduce hazards among their employees to the minimum level.

Key words: *hazard; injuries; protective material; sawmill; small-scale; worker.*

INTRODUCTION

The major wood processing industries in Nigeria are typically large capacity facilities industry such as large sawmills, plywood mill, pulp and paper plants and quite large numbers of small scale wood products manufacturing companies such as furniture industries, cabinet makers and carpentry (Segun and Yahaya 2010). Nigeria Sawmill Industries are essentially distributed between small, medium and large scale in the proportion of 81%: 13%: 6% respectively (RMRDC 2003).

Sawmilling is one of the oldest wood processing industries in Nigeria (Abel 2008). The most important wood products, produced, consumed and traded in Nigeria are sawn-wood, plywood, particle board news-print, printing and writing paper and other paper boards that are derived from sawmills (Bello and Mijinyawa 2010). A sawmill worker performs any combination of the following activities: unloads logs from trucks or lorries, rolls logs onto sawmill deck, examines logs for defects (embedded pieces of iron or stone), marks the defects for removal, rolls logs from deck onto carriage, leads the log carriage to the head saw and adjusts position of log on the carriage to cut the planks of required thickness, sorts and guides planks resulted planks to the roller tables or conveyors for trimming edges, straightens lumber on moving conveyors, straightens edges of rough lumber using a saw, sharpens and adjusts teeth of woodworking saws (Career Test and Career Counseling 2011).

Work activities and machine-tools have constituted a great source of occupational hazards to human beings. Sawmilling operations involves lots of manual handling which makes workers to be exposed to higher levels of risks (Adeoye *et al.* 2015). The nature of work done by workers in their occupations and the types of equipment and materials they handle present many on-the-job hazards (Segun and Yahaya 2010). These hazards resulting from such incidence include: striking by the machinery falling from a height, heavy lifting or repetitive movements, twisting and breathing in

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noxious or toxic chemicals. Besides the hazards inherent in this profession, the unfavourable weather conditions and noise pollution are other factors that endanger the human health (Judd *et al*. 2004).

Mitchual *et al.* (2015) reported that keeping workplace safe should be the concern of all stakeholders whose productivity and competitiveness play a major role on safe working environment. The International Labour Organisation (ILO) considers issues relating to occupational health and safety (OHS) to be of much importance to that extent that it has devoted about 80% of its standards and instruments to it (Alli 2008).

According to the World Health Organisation (WHO) as cited in Amponsah-Tawiah and Dartey-Baah (2011), poor occupational health and reduced working capacity of workers may cause economic loss up to 10% - 20% of the Gross National Product of many countries for which Nigeria is not an exception. Amponsah-Tawiah and Dartey-Baah (2011) reported that the operations performed in the timber industry, have been found to be associated with high levels of occupational hazards which result in illness and injuries.

Hence, a lot of practical steps need to be put in place to reduce occupational hazards thus to create a safe working environment and also to improve the well-being of the workers in the wood processing industry. Sawmill employees must follow well-known safety procedures and practice safety to ensure their own safety and good health as well as those of their co-workers. However, it is not known about the extent to which workers in the timber industry in Benue state consciously practice safety rules.

OBJECTIVES

The objective of this study was to assess the hazards in the small scale sawmill industries in the geographical area of Benue State, zone B, Nigeria.

METHOD AND MATERIALS

Study Area

This study was carried out in three Local Government Areas in Benue State, Nigeria. The State is divided into three (3) senatorial zones; A, B and C zone. This study was carried in zone B which includes Makurdi, Gwer West and Gwer East Local Government. Benue State lies between latitudes 60° 25" and 80° 08" N, and on longitudes 70° 47" and 100° 00" E in the central part of Nigeria called 'Middle belt' (Nyagba 1995). Map of the study area is shown in Fig. 1.

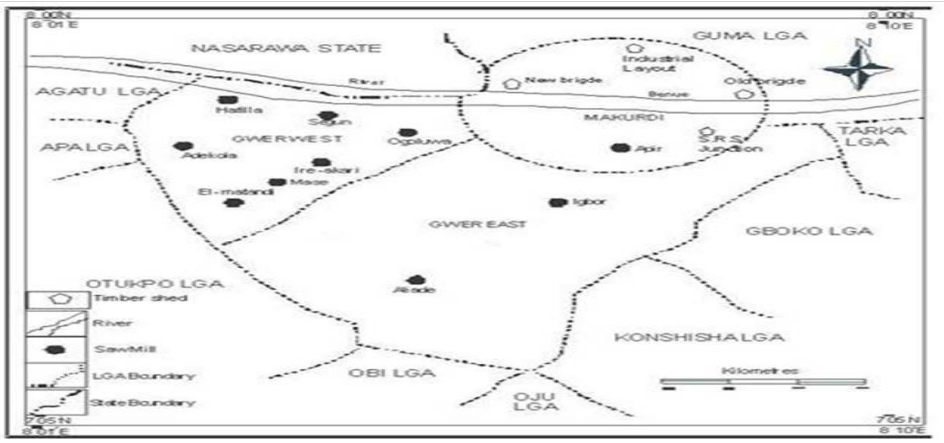

Fig. 1.
Map showing the study sites.

Experimental Design

The study was carried out in three Local Government Areas namely: Makurdi, Gwer East, Gwer West. These LGAs were deliberately selected based on accessibility and number of functional sawmills. Total of 10 sawmills were selected and visited. The selected sawmills were: two sawmills (Igbor, Destiny) in Gwer East L.G, seven sawmills (Ire Akari, Mase, Ogo Oluwa, Segun, Hafilla, El-matandi, Adekola and Ajayi) in Gwer West L.G.A., and Apir sawmill in Makurdi L.G.A. The sampled sawmills were visited and ten copies of well-structured questionnaire were left in each sawmill to obtain information on hazards that workers are subjected due to the sawmill activities.

Data Analysis

Data collected were analyzed with the aid of descriptive statistics such as tables, chart. Frequency of injuries, illness was presented in percentages based on the procedure done by to Segun and Yahaya 2010.

RESULTS AND DISCUSSIONS

Demographic data of the respondents in the sampled sawmills is represented in Table 1. In Gwer East LGA, 93.75% were males while 6.25% were females. In Gwer West LGA, 97.14% were males and 2.86% were females and in Makurdi LGA, 100% were male. Age of respondents in the sawmills indicated that in Gwer East, majority of the respondents (79.4%) aged between 30-45 years, 14.6% were between 46-55 years and 6.25% are included in the age class of 56-65 years. In Gwer West, the majority of the respondents (87.38%) were in the age class of 30-45 years, and fewest (12.61%) in the age class of 46-55 years. In Makurde L.G.A, 85.7% of respondents were between 30-45 years, while 14.3% were in age between 46-55 years.

Assessment of occupational hazards in the small-scale sawmills in Gwer West and Gwer East, Makurdi Local Government Areas of Benue State, Nigeria was carried out by examination and a lot of observations have been made. It was observed that both male and female were involved in all sawmill activities. The males number was higher than those of female in all sampled sawmills, because of the hard work performed in a sawmill. Nonetheless, women could only participate in easy works like saw dust disposal which does not require much energy. This confirms with literature (Segun and Yahaya 2010, Adeoye *et al.* 2015) were it is mentioned that more males were engaged in sawmill activities. However, Aruofor (2000) reported that female tendency is more towards rural farming and trading activities than timber related businesses.

Furthermore, most respondents did not have formal education. This seems to influence the way they use sawmill equipment and tools and also their attitude toward the use of protective materials. They were not willing to adopt new ideas and technology. This is in line with Ochire *et al.* (2014) who reported that lack of formal education adversely affected the efficiency of workers as most of them cannot read health and safety notices, posters and signals to avert dangers at the workplace.

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Table 1

A demographic characteristic of respondents in the sampled sawmills Zone B, Benue State

S/No.	Personal Data of Respondents	Frequency in Gwer East L.G.A., %			Frequency in Gwer West L.G.A., %								Frequency in Makurdi, %
		SM 1	SM 2	Total	SM 3	SM 4	SM 5	SM 6	SM 7	SM 8	SM 9	Total	SM 10
	Gender Ratio												
i	Male	7(87.5)	6(100)	13(93.75)	3(100)	7(100)	10(100)	4(100)	6(100)	4(80.0)	9(100)	43(97.14)	7(100)
ii	Female	1(12.5)	0	1(6.25)	0	0	0	0	0	1(20.0)	0	1(2.86)	0
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)
	Age												
i	30-45	6(75.5)	5(83.3)	11(79.4)	3(100)	7(100)	9(90.0)	3(75.0)	6(100)	4(80.0)	6(66.7)	38(87.39)	6(85.7)
ii	46-55	1(12.5)	1(16.7)	2(14.6)	0	0	1(10.0)	1(25.0)	0	1(20.0)	3(33.3)	6(12.61)	1(14.3)
iii	56-65	1(12.5)	0	1(6.25)	0	0		0	0	0	0	0	0
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)
	Education Level												
i	None	2(25.0)	2(33.3)	4(29.15)	2(66.7)	3(42.9)	2(20.0)	1(25.0)	3(50.0)	1(20.0)	4(44.4)	16(38.43)	4(57.1)
ii	Primary	4(50.0)	4(66.7)	8(58.35	1(33.3)	3(42.9)	3(30.0)	3(75.0)	3(50.0)	2(40.0)	4(44.4)	19(45.09)	1(14.3)
iii	Secondary	2(25.0)	0	2(12.5)	0	1(14.3)	5(50.0)	0	0	2(40.0)	1(11.1)	9(16.49)	2(28.6)
iv	Tertiary	0	0	0	0	0	0	0	0	0	0	0	0
v	Adult Education	0	0	0	0	0	0	0	0	0	0	0	0
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)
	Qualification												
i	First Living Certificate	4(50.0)	4(66.7)	8(58.35)	1(33.3?)	3(42.9)	3(30.0)	3(75.0)	3(50.0)	2(40.0)	4(44.4)	19(45.09)	1(14.3)
ii	SSCF Certificate	2(25.0)	0	2(12.5)	0	1(14.3)	5(50.0)	0	0	2(40.0)	1(11.1)	9(16.49)	2(28.6)
iii	NCE Certificate	0	0	0	0	0	0	0	0	0	0	0	0
iv	B.SC Certificate	0	0	0	0	0	0	0	0	0	0	0	0
v	None	2(25.0)	2(33.3)	4(29.15)	2(66.7)	3(42.9)	2(20.0)	1(25.0)	3(50.0)	1(20.0)	4(44.4)	16(38.43)	4(57.1)
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)

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Table 1 continues

S/No.	Personal Data of Respondents	Frequency in Gwer East L.G.A., %			Frequency in Gwer West L.G.A., %								Frequency in Makurdi, %
		SM 1	SM 2	Total	SM 3	SM 4	SM 5	SM 6	SM 7	SM 8	SM 9	Total	SM 10
	Marital Status												
i	Single	3(37.5)	2(33.3)	5(35.4)	0	2(28.6)	4(40.0)	1(25.0)	1(16.7)	1(20.0)	1(11.1)	10(20.2)	1(14.3)
ii	Married	5(62.5)	4(66.7)	9(64.6)	3(100)	5(71.4)	6(60.0)	3(75.0)	5(83.3)	4(80.0)	8(88.9)	34(79.8)	6(85.7)
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)
	Religion												
i	Christians	8(100)	6(100)	14(100)	3(100)	7(100)	9(90.0)	2(50.0)	5(83.3)	5(100)	8(88.9)	39(87.46)	6(85.7)
ii	Muslim	0	0	0	0	0	1(10.0)	2(50.0)	1(16.7)	0	1(11.1)	5(12.54)	1(14.3)
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)

Sources: Fieldwork, 2015.

Key: Sawmills (SM), **SM 1**- Igbor Sawmill, Gwer East LGA, **SM 2-** Destiny Sawmill (Aliede), Gwer East LGA, **SM 3**- Ire Akari Sawmill, Gwer West LGA, **SM 4-** Mase Sawmill, Gwer West LGA, **SM 5**- Ogo Oluwa Sawmill, Gwer West LGA, **SM 6**- Segun Sawmill, Gwer West LGA, **SM 7**- Hafilla Sawmill, Gwer West LGA, **SM 8-** El-matandi Sawmill, Gwer West LGA, **SM 9**- Adekola Ajayi Sawmill, Gwer West LGA,**SM 10**- Apir Sawmill, Makurdi LGA

The years of experience of the respondents in the study areas are presented in Table 2. In all studied areas (excepting the Makurdi LGA), the highest percentage was represented by workers with less experience (under 5 years). A small percentage (4-6%) was found related to workers with experience greater than 2 years.

The highest age class of the respondents was between 30 and 45 years. At this age, the men are very active and their duty is mainly to support their family members. Also, people in this age group found well-paid jobs in sawmill and timber business. This result agrees with Forestry Statistics (2003) that the age group between 25-45 years is the highest percentage (51.57%) involved in the active work in a sawmill, implying that these participants are those in active age that have the power to fulfill the requirements demanded for the job. Majority of the respondents had had less experience which indicate that most workers in the sawmills had little or inadequate skills concerning the sawmill activities, so being exposed to hazard. Most of workers in the studied high rate of injuries this finding is consistent with previous reports that show that workers in the sawmill industries environment, have high risk exposure to occupational hazards (Osagbemi *et al.* 2010, Umwangho *e.al.* 2010*,* Aliyu and Saidu 2011, Faremi *et al.* 2014). Inexperience, lack of technical knowhow of workers on-use of appropriate safety gadgets and protective devices, partly due to poor education and lack of regular training, led them to avoidable injuries.

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Table 2

The years of experience of respondents

S/No.	Years of experience (years)	Frequency in Gwer East L.G.A, %			Frequency in Gwer West L.G.A., %								Frequency in Makurdi L.G.A., %
		SM 1	SM 2	Total	SM 3	SM 4	SM 5	SM 6	SM 7	SM 8	SM 9	Total	SM 10
i	1_5 years	4(50.0)	2(33.3)	6(41.65)	2(66.7)	2(28.6)	4(40.0)	3(75.0)	3(50.0)	1(20.0)	2(22.2)	17(43.21)	1(14.3)
ii	6_10 years	2(25.0)	0	2(12.5	1(33.3)	2(28.6)	1(10.0)	0	1(16.7)	2(40.0)	1(11.1)	8(19.96	3(42.9)
iii	11_15 years	1(12.5)	3(50.0)	4(31.25)	0	3(42.9)	3(30.0)	1(25.0)	0	2(40.0)	2(22.2)	11(22.87)	1(14.3)
iv	16_20 years	0	1(16.7)	1(8.35	0	0	2(20.0)	0	0	0	1(11.1)	3(4.44)	1(14.3)
v	21_25 years	1(12.5)	0	1(6.25)	0	0	0	0	1(16.7	0	2(22.2)	3(5.56)	1(14.3)
vi	26_30 years	0	0	0	0	0	0	0	1(16.7)	0	1(11.1)	2(3.97)	0
vii	31_35 years	0	0	0	0	0	0	0	0	0	0	0	0
viii	>36_40 years	0	0	0	0	0	0	0	0	0	0	0	0
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)

Sources: Fieldwork, 2015.

Key:

Sawmills (SM), **SM 1**- Igbor Sawmill, Gwer East LGA, **SM 2-** Destiny Sawmill (Aliede), Gwer East LGA, **SM 3**- Ire Akari Sawmill, Gwer West LGA, **SM 4-** Mase Sawmill, Gwer West LGA, **SM 5**- Ogo Oluwa Sawmill, Gwer West LGA, **SM 6**- Segun Sawmill, Gwer West LGA, **SM 7**- Hafilla Sawmill, Gwer West LGA, **SM 8-** El-matandi Sawmill, Gwer West LGA, **SM 9**- Adekola Ajayi Sawmill, Gwer West LGA,**SM 10**- Apir Sawmill, Makurdi LGA

The training attended by respondents on sawmills activities is presented in Fig. 2. In Gwer East and also in West L.G.A., only 29.15% of respondents and 37.56% respectively, performed training while higher number (70.85% and 62.44% respectively) were not formally or did not attend any form of training.

Data analysis has shown that the majority of respondents had no training on occupational hazards. Only few of respondents went through an intermittent apprenticeship which was not enough to prevent or avoid hazards they are exposed in sawmills. This finding consistent with Ochire *et al.* (2014), where 95% of sawmill employees have no training on occupational health and safety whilst the remaining 5% received some form of training while in school. This situation could lead most of workers to some untold levels of hazards exposure.

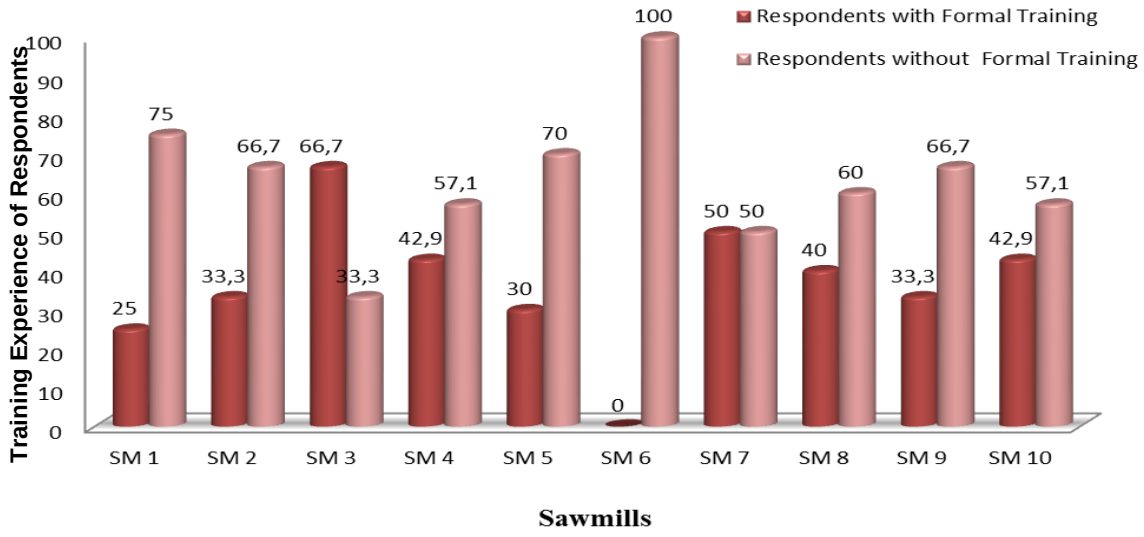

Fig. 2.
Training Experience of Respondents in the observed Area.

Key:
Sawmills (SM), **SM 1**- Igbor Sawmill, Gwer East LGA, **SM 2-** Destiny Sawmill (Aliede), Gwer East LGA, **SM 3**- Ire Akari Sawmill, Gwer West LGA, **SM 4-** Mase Sawmill, Gwer West LGA, **SM 5**- Ogo Oluwa Sawmill, Gwer West LGA, **SM 6**- Segun Sawmill, Gwer West LGA, **SM 7**- Hafilla Sawmill, Gwer West LGA, **SM 8-** El-matandi Sawmill, Gwer West LGA, **SM 9**- Adekola Ajayi Sawmill, Gwer West LGA,**SM 10**- Apir Sawmill, Makurdi LGA.

Results on cases of accidents, location of accidents, activities that have led to accidents (including uses of saws) in the observed areas are presented in Table 3. The percentage of accidents is higher, 93.75% in Gwer East LGA, 78.93% in Gwer West LGA and 71.4% in Makurdi L.G.A. Results on location accidents show that in Gwer East, 16.65% of respondents had accidents within sawmill yard, 77.1% in sawmill workshop and production areas. In Gwer West LGA, 12.97% of respondents had accidents within sawmill yard, 62.4% in sawmill workshop and production areas and 3.57% on public road. In Makurdi L.G.A, 28.6% had accidents within sawmill yard, 42.9% in sawmill workshop and production areas. The most accidents occurred in the production area of sawmill as presented above.

The activities that led to accidents were different. During maintenance exercise the rate of accidents was 14.6% in Gwer East LGA, 8.0% in Gwer West LGA and 28.6% in Makurdi L.G.A. More accidents were observed in stacking of timber, thus 35.4% in Gwer East LG, 16.27% in Gwer West LGA and 14.3% in Makurdi L.G.AOther accidents were occurred in Gwer East LGA, in Gwer West LGA and Makurdi L.G.A during use of circular saw (18.75%, 22.2% and 14.3% respectively) and band saw (8.35% and 1.59% respectively). No band saw was used in Makurdy sawmill. Trunks movement caused also a considerable number of accidents 24.4% in Gwer East LGA and 14.3% in Makurdi L.G.A.

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Table 3

Accidents recorded in the observed sawmills

S/No.	Variables	Frequency in Gwer East L.G.A, %			Frequency in Gwer West L.G.A. %								Frequency in Makurdi L.G.A %
		SM 1	SM 2	Total	SM 3	SM 4	SM 5	SM 6	SM 7	SM 8	SM 9	Total	SM 10
	Accident Cases												
i	Accidents victim	7(87.5)	6(100)	13(93.75)	3(100)	5(71.4)	6(60.0)	4(100)	5(83.3)	3(60.0)	7(77.8)	33(78.93)	5(71.4)
ii	No accident	1(12.5)	0	1(6.25)	0	2(28.6)	4(40.0)	0	1(16.7)	2(40.0)	2(22.2)	11(21.07)	2(28.6)
	TOTAL	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)
	Locations of accident												
i	Sawmill yard	0	2(33.3)	2(16.65)	0	2(28.6)	0	0	0	2(40.0)	2(22.2)	6(12.97)	2(28.6)
ii	Sawmill workshop and production areas	7(87.5)	4(66.7)	11(77.1)	3(100)	3(42.9)	6(60.0)	3(75.0)	5(83.3)	1(20.0)	5(55.6)	26(62.4)	3(42.9)
iii	Public roadway	0	0	0	0	0	0	1(25.0)	0	0	0	1(3.57)	0
iv	None	1(12.5)	0	1(6.25)	0	2(28.6)	4(40.0)	0	1(16.7)	2(40.0)	2(22.2)	11(21.07)	2(28.6)
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)
	Activities that lead to accident												
i	Movement of log to mill	0	`0	0	0	2(28.6)	2(20.0)	2(50.0)	3(50.0)	0	2(22.2)	11(24.4)	1(14.3)
ii	Maintenance exercise	1(12.5)	1(16.7)	2(14.6)	0	1(14.3)	0	1(25.0)	1(16.7)	0	0	3(8.0)	2(28.6)
iii	Log Transportation	0	2(33.3)	2(16.65)	0	1(14.3)	0	0	0	0	0	1(2.04)	0
iv	staking of timber	3(37.5)	2(33.3)	5(35.4)	0	0	3(30.0)	1(25.0)	1(16.7)	1(20.0)	2(22.2)	8(16.27)	1(14.3)
	Use of Saws												
i	Circular saw	3(37.5)	0	3(18.75)	3(100)	1(14.3)	1(10.0)	0	0	1(20.0)	1(11.1)	7(22.2)	1(14.3)
ii	Band saw	0	1(16.7)	1(8.35)	0	0	0	0	0		1(11.1)	1(1.59)	0
iii	Power saw	0	0	0	0	0	0	0	0	1(20.0)	1(11.1)	2(4.44)	0
iv	None	1(12.5)	0	1(6.25)	0	2(28.6)	4(40.0)	0	1(16.7)	2(40.0)	2(22.2)	11(21.07	2(28.6
	TOTAL	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)

Sources: Fieldwork, 2015.

Key: Sawmills (SM), **SM 1**- Igbor Sawmill, Gwer East LGA, **SM 2-** Destiny Sawmill (Aliede), Gwer East LGA, **SM 3**- Ire Akari Sawmill, Gwer West LGA, **SM 4-** Mase Sawmill, Gwer West LGA, **SM 5**- Ogo Oluwa Sawmill, Gwer West LGA, **SM 6**- Segun Sawmill, Gwer West LGA, **SM 7**- Hafilla Sawmill, Gwer West LGA, **SM 8-** El-matandi Sawmill, Gwer West LGA, **SM 9**- Adekola Ajayi Sawmill, Gwer West LGA,**SM 10**- Apir Sawmill, Makurdi LGA.

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Table 4

Injuries recorded on body area due to sawmill tasks/operations

S/No.	Variables	Frequency in Gwer East L.G.A., %			Frequency in Gwer West L.G.A., %								Frequency in Makurdi L.G.A., %
		SM 1	SM 2	Total	SM 3	SM 4	SM 5	SM 6	SM 7	SM 8	SM 9	Total	SM 10
	Nature of Injuries												
i	Fracture	1(12.5)	2(33.3)	3(22.9)	0	0	3(30.0)	0	1(16.7)	1(20.0)	0	5(9.53)	0
ii	Bruises	2(25.0)	2(33.3)	4(29.15)	0	4(57.1)	1(10.0)	4(100)	3(50.0)	1(20.0)	4(44.4)	17(40.21)	3(42.9)
iii	Laceration, Sprain and Strain	4(50.0)	2(33.3)	6(41.65)	3(100)	1(14.3)	1(10.0)	0	2(33.3)	1(20.0)	3(33.3)	11(30.13)	2(28.6)
iv	Heart Attack	0	0	0	0	0	1(10.0)	0	0	0	0	1(1.43)	0
v	Burning	0	0	0	0		0	0	0	0	0	0	0
vi	None	1(12.5)	0	1(6.25)	0	2(28.6)	4(40.0)	0	0	2(40.0)	2(22.2)	10(18.69)	2(28.6)
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)
	Body Areas Affected												
i	Back	1(12.5)	3(50.0)	4(31.25)	0	3(42.9)	2(20.0)	0	3(50.0)	1(20.0)	1(11.1)	10(20.57)	2(28.60
ii	Body/Multiple	2(25.0)	0	2(12.5)	0	0	2(20.0)	2(50.0)	0	0	4(44.4)	8(16.34)	1(14.3)
iii	Chest	0	1(16.7)	1(8.35	0	0	1(10.0)	0	0	0	0	1(1.43)	0
iv	Eye	0	0	0	0	0	1(10.0)	0	0	0	0	1(1.43)	0
v	Foot	0	0	0	0	1(14.3)	0	1(25.0)	1(16.7)	0	0	3(8.0)	0
vi	Hand	2(25.0)	1(16.7)	3(20.85)	3(100)	1(14.3)	0	1(25.0)	1(16.7)	1(20.0)	2(22.2)	9(28.31)	2(28.6)
vii	Leg	1(12.5)	0	1(6.25)	0	0	0	0	1(16.7)	1(20.0)	0	2(5.24)	0
viii	Shoulder	0	1(16.7)	1(8.35)	0	0	0	0	0	0	0	0	0
ix	Back and hand	1(12.5)	0	1(6.25)	0	0	0	0	0	0	0	0	0
x	None	1(12.5)	0	1(6.25)	0	2(28.6)	4(40.0)	0	0	2(40.0)	2(22.2)	10(18.69	2(28.6
	Total	8(100)	6(100)	14(100)	3(100)	7(100)	10(100)	4(100)	6(100)	5(100)	9(100)	44(100)	7(100)

Key: Sawmills (SM), **SM 1**- Igbor Sawmill, Gwer East LGA, **SM 2-** Destiny Sawmill (Aliede), Gwer East LGA, **SM 3**- Ire Akari Sawmill, Gwer West LGA, **SM 4-** Mase Sawmill, Gwer West LGA, **SM 5**- Ogo Oluwa Sawmill, Gwer West LGA, **SM 6**- Segun Sawmill, Gwer West LGA, **SM 7**- Hafilla Sawmill, Gwer West LGA, **SM 8-** El-matandi Sawmill, Gwer West LGA, **SM 9**- Adekola Ajayi Sawmill, Gwer West LGA,**SM 10**- Apir Sawmill, Makurdi LGA.

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Results on nature of injury and area of human body affected by accidents in the sawmill activities in the study areas are presented in Table 4. The most frequent injury was bruises followed by Laceration, Sprains and Strain. Bruises and lacerations were in a higher rate in Gwer East and Gwer West.

The frequent body areas affected by accidents were: back ache and hands. Injuries to the back are the result of repetitive jacking, pulling, rolling and lifting of heavy logs. This finding confirms with Tappin *et al.* 2003, Segun and Yahaya 2010. They affirmed that the high percentage of body injuries recorded in a sawmill was back or low back ache due to manual hauling of heavy log by a number of workers rather than using the conventional conveyors or lift crane. Such occurrences were also attributable to movement of sawn products such as lumber transport, loading and offloading, lumber stacking and transport to the lumber market and tools maintenance including restoration, repair and routine maintenance were also sources of hazards in the studied area. However, Adeoye *et al.* (2015) reported in their study in Osun state on awareness of occupational hazards and health problems among sawmill workers that abruises and wounds being dominant among workers.

a.

b.

c.

d.

e.

f.

g.

Fig. 3.
Show various sources or causes of injuries in the studied sawmills
a - Finger injury of a respondent from Ogo Oluwa Sawmill, Naka; b - Manual moving of logs in Ogo Oluwa sawmill, Naka; c - Manual feeding with logs of band saw in Ogo Oluwa sawmill, Naka; d - Inhaling of saw dust during waste disposal in Destiny sawmill, Aliede; e - Sharpening the circular saw without the use of hand gloves, and any labor protection rules in Ogo Oluwa sawmill, Naka; f - Manual lifting and stacking of heavy sawn lumber, in Hafilla Sawmill, Agagbe road in Naka; g - Non-use of protective wears during maintenance exercise in Hafilla Sawmill, Agagbe road in Naka.

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Table 5

Protective measures provided by owners of Sawmills

VARIABLE	Frequency in Gwer West L.G.A.%	Frequency in Gwer East L.G.A. %	Frequency in Makurdi L.G.A. %	Total
Specific safety equipment/facilities provided in the sawmill industries				
Hand glove only	4(9.09%)	2(14.29%)	1(14.29%)	7(12.56%)
Only machine guid	2(4.55%)	1(7.14%)	0	3(5.85%)
Log rolling stick	3(6.82%)	2(14.29%)	1(14.29%)	6(11.8%)
Hand glove and Eye protector	1(2.27%)	0	0	1(2.27%)
Pressing carp, Hand glove, Sharping machine,	2(4.55%)	1(7.14%)	0	3(5.85%)
secting table, joining saw and table hammer.				
Hand glove and Noise protector	1(2.27%)	0	0	1(2.27%)
None	31(70.45%)	8(57.14%)	5(71.43%)	44(66.34%)
TOTAL	44(100%)	14(100%)	7(100%)	65(100%)
other facilities that are not available in most of the saw milling industries				
Hand glove, Overall cloth, Nose protector,	32(72.73%)	12(85.71%)	6(85.71%)	53(81.38%)
Eye protector,Helment, Boot				
Overall cloth, Nose protector, Eye protector, Boot	3(6.82%)	2(14.29%)	1(14.29%)	6(11.8%)
Nose protector,Helment, Eye protector, Boot	9(20.45%)	0	0	9(20.45%)
TOTAL	44(100%)	14(100%)	7(100%)	65(100%)
Suggestion to eliminate these restrictions				
Employer should make safety materials available to	13(29.55%)	4(28.57%)	1(14.29%)	18(24.14%)
the employee and ensure its usage.				
Laxity attitude should be discourage in sawmill industry	8(18.18%)	2(14.29%)	1(14.29%)	11(15.59%)
Regular maintenance should always be carryout on the sawmill machine	7(15.91%)	1(7.14%)	1(14.29%)	9(12.45%)
Training and retraining should always be encourage and enforce	10(22.73%)	6(42.86%)	3(42.86%)	19(36.15%)
There is need for model equipment should be acclaimatize	6(13.64%)	1(7.14%)	1(14.29%)	8(11.69%)
TOTAL	44(100%)	14(100%)	7(100%)	65(100%)

Percentage (%) of protective measures provided by owners of sawmills is presented in Table 5. High percentage of respondents (around 70%), have any protective means. Few workers (9-15%) had gloves. It seems that in Gwer West all protective facilities are used even a small percentage and in Makurdi some protection means are not used (machine guide, gloves and protective eyes etc).

In rare cases where few facilities were provided, many workers hardly make use of them because of negligence and lack of knowledge concerning the importance of safety equipment in sawmills and timber yard. Lots of manual handling were observed in all sawmills visited despites the protective materials provided. This was also pointed out by Aruofor 2000 and Adeoye *et al.* 2015. Back pains, fracture, sprain, body pains, and chest pain were all reported as consequences of manually carrying heavy objects, an observation comparable with previous studies that report about ergonomic hazards (Bello and Mijinyawa 2010, Adeoye *et al.* 2015).

CONCLUSIONS

Safety of workers in any work place is very essential for high turnover and production efficiency. Many workers in the observed area were involved in various accidents because there was lack of essential protective safety materials, less f technical knowhow, inadequate training and retraining of employees, lack of modern facilities and laxity, indifference among workers. Efforts should therefore be directed towards practical measures that will reduce hazards in sawmills to the minimum bare level.

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