Full Length Research

Effects of Safety Intervention Practices among Selected Sawmill Workers in Sawmills in Delta State, Nigeria

[1]Odibo A.A., [*1]Nwaogazie I.L., [2]Achalu E.I., and [1]Ugbebor J.N.

[1]Centre for Occupation Health, Safety and Environment, Faculty of Engineering, University of Port Harcourt, Nigeria.

[2]Department of Human Kinetics and Health Education, Faculty of Education, University of Port Harcourt, Nigeria.

This study was aimed at evaluating the effects of safety education as safety-intervention programme on Sawmill workers in Delta State. Selected study area was 21 sawmills located within 3 local government areas (Sapele, Warri-south and Udu) in Delta State. Purposive sampling was adopted for selection of the 3 sawmills locations, while systematic and simple random sampling was used to select 21 sawmill sites and respondents (210) respectively. A structured questionnaire was used for data collection. Collected data were subjected to normality test, Kolmogorov-Smirnov Test, Knowledge Attitude, Practice and Skill (KAPS) analyses and regression analysis. The output from the pre-intervention revealed fair knowledge, attitude, practice and skills of respondents when compared to the post-intervention output that revealed1.51, 1.82 and 1.89 out of 2 for Sapele, Warri and Udu, respectively for awareness of occupational hazards; 2.52, 2.88 and 2.94 out of 3 for Sapele, Warri and Udu, respectively on knowledge of physicals; 2.49, 2.96 and 2.98 out of 3 for Sapele, Warri and Udu, respectively for chemical hazards; and 2.41, 2.91 and 2.96 out of 3 for Sapele, Warri and Udu on mechanical hazards. Furthermore, comparing the resultant grand means of the pre and post intervention assessments, it revealed high improvement (2.41, 3.18 and 3.35 out of 4 for Sapele, Warri and Udu) on the attitude of the workers towards occupational hazards. Looking at their safety practices a notable increase was recorded (2.44, 3.12 and 3.31 out of 4 for Sapele, Warri and Udu). Also recorded was an increase in skills as related to occupational safety (2.60, 3.37 and 3.40 out of 4 for Sapele, Warri and Udu. The regression analyses produced a goodness of fits for Sapele, Warri and Udu sawmills of 0.2016 (20.16%), 0.6041 (60.41%), 0.6813 (68.13%), it also, revealed that the intervention had positive contributions on the attitude of the respondents of both Experimental groups, (ie Warri and Udu classes) safety practice unlike the control (Sapele class) where there no intervention.

Key Words: Occupational Hazards, Safety Education, Intervention, Delta State.

INTRODUCTION

Aina (2006) defined sawmilling as the process of converting logs from the forests into lumber by using a variety of machines. Some of the machines include band saws capable of breaking down logs

into desired specifications and re-sawing machines for processing the cants and fitches into specified and marketable dimensions. Ademola (1997) stated that sawmilling involves cutting of logs into planks which is associated with various hazards. Though many sawmill workers in developing countries claim to be undisturbed by workplace noise and its associated health hazards, there are many effects of which they may be unaware. A study by the University of British Columbia of over 27,000 sawmills workers found correlations between working in a noisy environment and heart disease (Vaishali et al., 2011).

Safety of workers in a work place is enhanced through safety practices – putting into action or effect learned/acquired knowledge, skills, attitude or behaviour related to safety to avoid accident, injury and damage to personal life and property (Okpako, 2014). For safety to be practiced, the knowledge, skills and attitude must first be acquired. This acquisition is made possible through education. Safety education according to Charles (2009) is the recognition and avoidance of hazards causing illness, disability or death in the workplace. Safety education is not about isolating young people from all hazards – the bumps, cuts and bruises which are a normal part of growing up, but about equipping them to deal with a wide range of situations. Safety education covers a wide area of knowledge about different aspects of human life. It was based on this notion that Odibo et al, (2005) defined safety education as the act of cultivating those knowledge, attitude, practices and skills that make for safe living. It involves the mastery of safety knowledge and its application in making decisions that enhanced the individual in any situation or environment in which he/she is operating. Safety education helps to reduce the vulnerability of individuals, especially workers, working in hazardous work environment such as sawmills. An analysis of numerous accident reports, where movement and exposure are involved in human endeavour, revealed that sound safety education programmes have proven to be the most effective approach in accident reduction. Safety education provides intervention usually directed at the agent, host or environment. It strives to erase negligence among community members and workers

*Corresponding Author ✉: ifynwaogazie@yahoo.com

respectively (Charles, 2009). Based on these premises this study was aimed at assessing the effects of safety education on the safety practices of sawmill workers in Delta State, Nigeria.

MATERIALS AND METHODS

Study Area

The area of study (Figure 1) was limited to twenty-one selected sawmills from three different locations (Warri-South, Sapele and Udu) within Delta State, Nigeria. Delta State is situated between Longitude 5^0 00' and 6^0 45' East and Latitude 5^0 00' and 6^0 30' North. The State has three National Senatorial Districts (Delta North, Delta Central and Delta South). Most parts of the Delta central and south senatorial districts are coastal area interlocked with rivers and as such, sawmill industries in the State are mainly located there. These coastal areas are central to lumbering and timber processing in Delta State. They are well-known for their age long tradition of woodcraft and furniture making, with the sale of timber contributing significantly to the economy of the State. A typical sawmill in Delta State is characterised by a large building with a roof made of corrugated zinc supported by wooden poles.

Population of Study Area

There are two thousand one hundred and four (2104) sawmill workers in two hundred and ten (210) sawmill industries in Delta State (MAFDDS, 2016). However, the population of this study were workers from 21 selected sawmills in Udu, Warri and Sapele locations where actual sawmilling processes were actively in operation during the course of the study within Delta State. Actual sawmills are where logs from forest are cut by band saw machines into desired specifications of cants and fitches. Systematic random sampling was adopted for sawmill sites selection (7 sawmill sites per location). The respondents from the twenty-one sawmills within the three locations were clustered location-wise into three classes (Sapele, Udu and Warri).

In determining the sample size for effective data collection, the proportion equation was employed at a tolerance error of 5% (Cornish, 2006; Rosner, 2010).
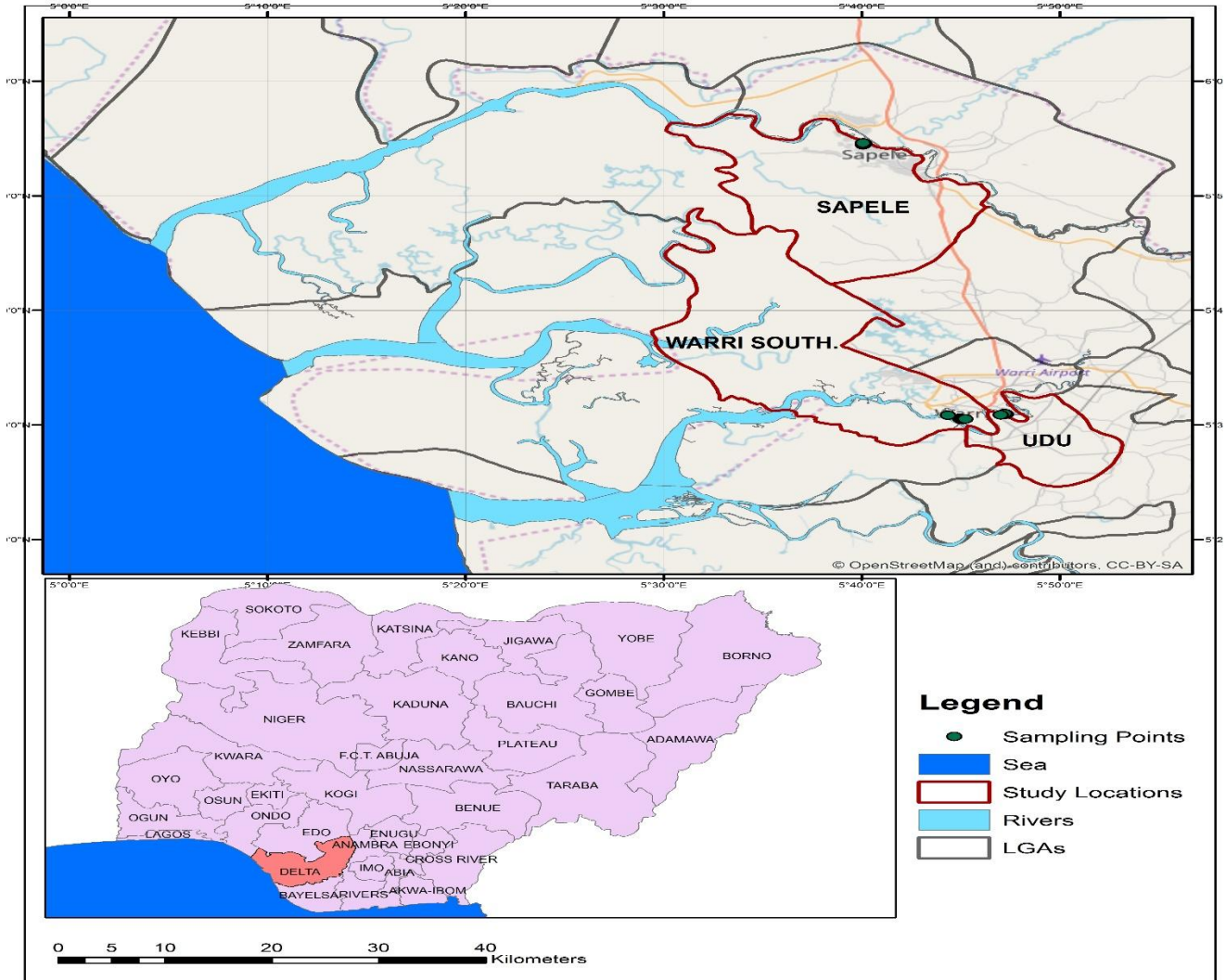
Figure 1. Map showing the Study area with three sawmill locations; Sapele, Warri South and Udu.

$$n_r = \frac{Z^2 \, P(1-P)}{T^2} \tag{1}$$

where; n_r represents the required sample size, T = tolerance error (0.05); P = probability of 95% of the total population and z = 1.96, which is the level of significance which corresponds to 95% confidence level. Evaluating Equation (1) yields:

$$n_r = \frac{1.96^2 \times 0.95 \times (1-0.95)}{0.05^2} = 72.99 \approx 73$$

Thus, the required sample size for this study = 73 respondents (sawmill workers). However, applying a finite population correction (fpc) factor due to the approximate population of sawmill workers within Delta State from literature (MAFDDS, 2016).

The adjusted sample size will be given by Equation (2)

$$n_a = \frac{n_r}{1 + \frac{(n_r - 1)}{N}} \tag{2}$$

Where; n_a = adjusted sample size; n_r = required sample size; N = Approximate population size

$$n_a = \frac{73}{1 + \frac{(73-1)}{2104}} = 70.58$$

The minimum sample size for this research per location = 71 respondents.

Eleven respondents were drawn through simple random sampling (lucky dip) from each of the twenty-one sawmills using the balloting system. One hundred and fifty-four (154) respondents were drawn from Warri and Udu locations that made up the experimental group. The choice of putting them together as experimental group was because of closeness in proximity of the locations. The remaining 77 participants were drawn from Sapele location and clustered into a control group. The two groups (experimental and control) are far apart and are separated by rivers, thus the risk of cross interference was minimized (Figure 1). However, there was an attrition rate of 9.1% making the sampled size per location = 70 respondents. Given the three classes, the total sample size for the study now consist of 210 sawmill workers from the 21 sawmill industries within the three locations (Sapele, Warri and Udu) in Delta State. The resultant sampling population is in agreement with the rationale of Owie (2006), Elendu (2010), Kothari and Garg (2014) which stated that 10% of an entire population of a study is appropriate for generalization. The work of Bedard et *al., (*2008) using the formula for the comparison of two independent groups (pre- and post-intervention) further justified the minimum sample size (per group) of 70.

Data Collection

The research instrument employed for data collection was a structured questionnaire (modified Adaptable KAP model questionnaires, 2014). The questionnaire was structured to collect data from the respondents on knowledge, attitude, practices and skills with regards to occupational safety practices. The questionnaire consisted of five sections: Section A, focused on socio-demographic data of respondents, section B sought information on the variables of knowledge, section C, collected data on attitude, section D, sought information on safety practices while section E, elicited information on skills of workers in sawmills. Data collection for this study was in two stages with the first stage being the pre-intervention stage which involved the collection of safety practice baseline data of the respondents with respect to their knowledge, attitude, practices and skills level. The second stage was the post-intervention stage, where safety education modules/tutorials were designed to teach and train experimental group as intervention for ten weeks. This duration of intervention is in agreement with the I.E.C. Public Health, Guideline for Conducting Knowledge, Attitude and Practice (KAP) Study (Kaliyaperumal, 2004; WHO, 2011).

Data Analysis

The analyses applied on the collected data were normality test, Kolmogorov-Smirnov Test, Attitude, Practice and Skill (KAPS) analyses. The normality test was to establish the distribution of the collected data and thus aid choice of analysis of variance (whether parametric or non-parametric). The normality test applied for this study was the Shapiro-wilk (W-S) test at a significant level of (5%). Furthermore, in order to check for any variances between the post- and pre-intervention data Kolmogorov-Smirnov Test was employed in the course of data analyses. This was applied at 5% significance level. Knowledge, Attitude, Practice and Skill (KAPS) analyses is a modification of KAP but with an addition of Skill, this is with respect to this study. KAP from literature tends to assess the Knowledge, Attitude and Practice of a group of people or community with respect to a subject matter. The major objective of the modified KAP is to explore changes in Knowledge, Attitude and Practice alongside Skills. It reveals increases in knowledge, changes in attitude and practices with respect to the subject matter and influencing skill changes. To evaluate the impact of the educational intervention on the respondents multiple regression was applied at 95% confidence level.

RESULTS AND DISCUSSION

The demographic statistics of the sampled respondents is presented in Figure 2. Also, Figures 3-5 present the probability – probability plots of the collected data for Sapele class (control group) and Warri and Udu classes (experimental group).

The instrument employed for data collection with respect to assessing the knowledge, attitude, practice and skill of the sawmill workers is same as the likert scale weighting system. With *"Yes"* and "N*o*" having "2" and "1" weight. While "Strongly Agree (SA)", "Agree (A)", "Disagree (D)" and "Strongly Disagree (SD)" having the "4", "3" and "2" and "1", weights respectively. Also, "True", False"
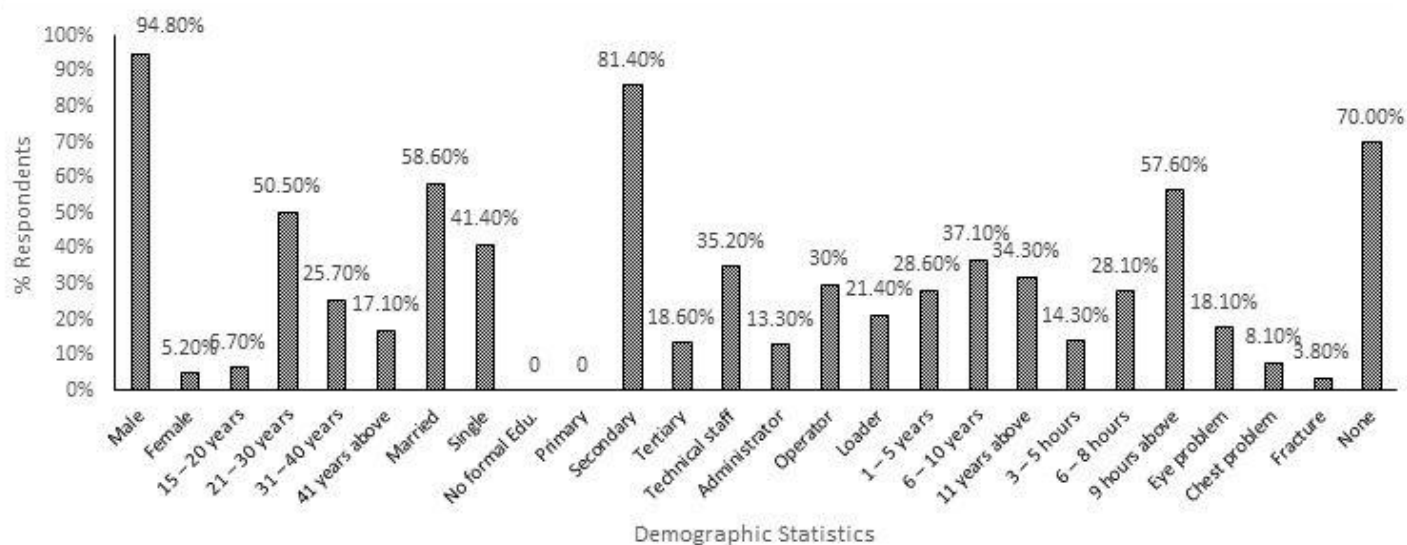
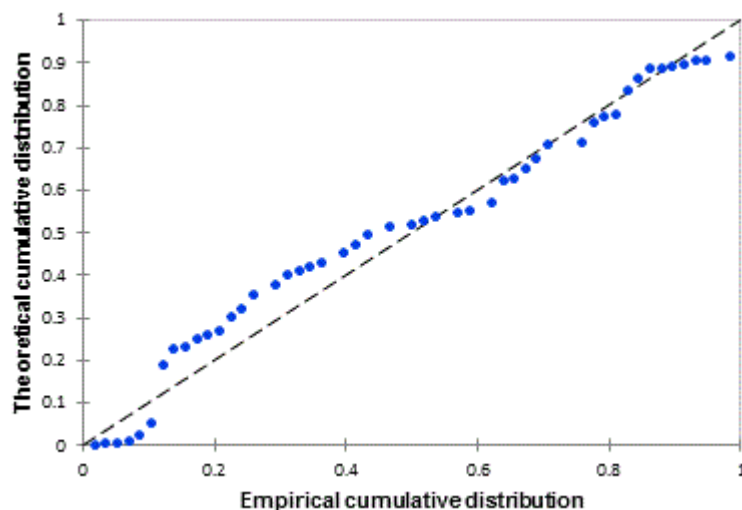**Figure 2.** Demographic statistics of respondents.

Figure 3. P-P Plot for Sapele class.

and "I don't know" were assigned weights "3", "2", and "1", respectively (see Appendix A). Figures 6 – 7 present the plot of the percentage positive responses ("YES", "True" and "SA") with respect to awareness, knowledge, attitude, practice and skill of the sampled respondents on occupational hazards before and after the safety intervention with respect to this study.

For illustration, applying data from respondents on Awareness of Hazards from Warri class, the criterion grand mean for the post – intervention was obtained as follows (Table 1).

Analogous to Table 2 is the summary of the criterion grand mean with respect to the other questionnaire parameters (expanded Table 5).

Two-sample Kolmogorov-Smirnov test / two-tailed test was carried out on the results with sample 1 as pre-intervention data and sample 2 post-intervention safety data. This was to assess the outputs from the safety intervention (Pre against Post safety
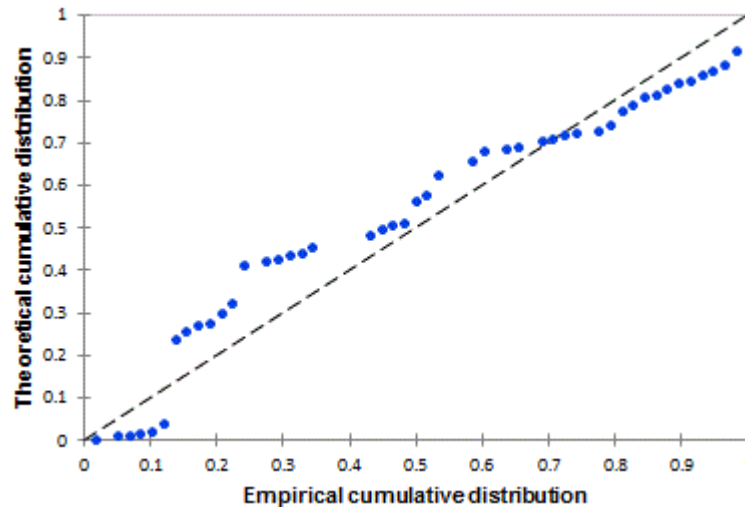
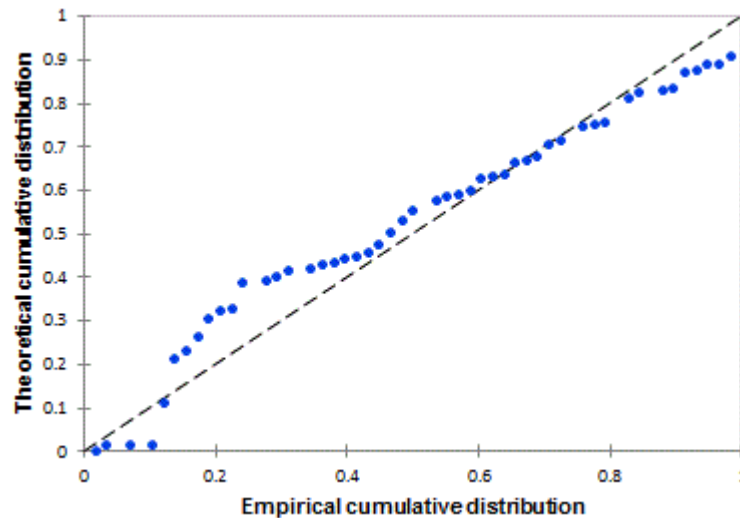**Figure 4**. P-P Plot for Warri class.

Figure 5. P-P Plot for Udu class.

intervention). The output with respect to the control group (Sapele class) and the experimental group (Warri and Udu classes) is presented by Figures 8 – 11, respectively.

In order to assess for the significance of Knowledge (K), Skill (SK) and Practice (P) on the Attitude (A) of the respondents with respect to their occupation, models were developed at confidence level of 95% by applying multiple regression analysis. Tables 3 and 4 present the output from the

analysis (goodness of fit and Model parameters) with respect to Warri, Udu and Sapele classes. Equations (3-5) present the resultant multiple regression models.
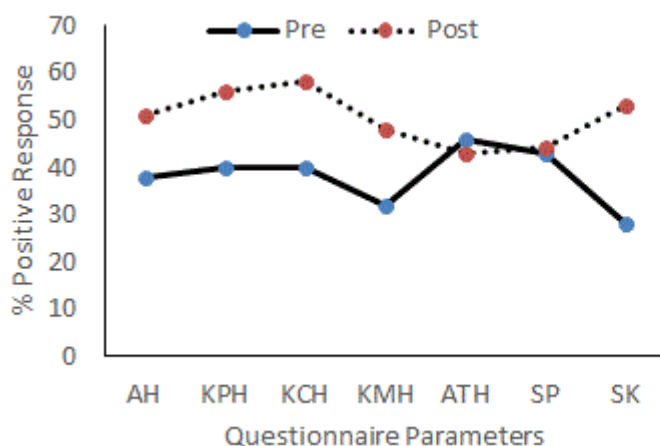
For Sapele sawmill:
$$A = 21.811 + 0.380SK - 0.051K \tag{3}$$
For Warri sawmill:
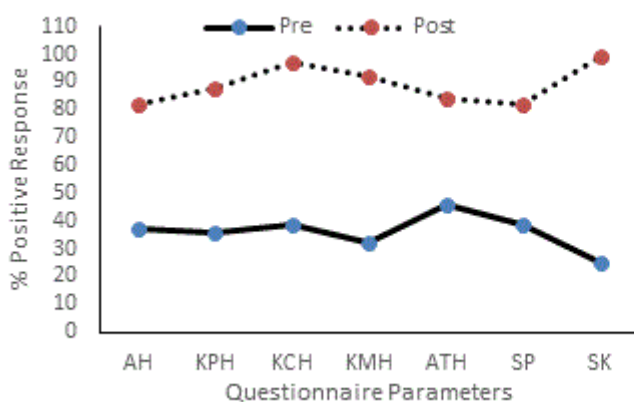$$A = -10.499 + 0.162SK + 1.073SP \tag{4}$$
For Udu sawmill:

Figure 6. Percentage Response to Questionnaire Parameters (Sapele).

Figure 7. Percentage Response to Questionnaire Parameters (Warri).

$$A = -25.671 + 0.185SK + 1.407SP \qquad (5)$$

DISCUSSION

Pre- and Post- Intervention Awareness Assessment

From Table 1, comparing the resultant grand means of the pre- and post-intervention assessments, it revealed very high positive awareness level (1.51, 1.82 and 1.89 out of 2 for Sapele, Warri and Udu), a higher knowledge of physical (2.52, 2.88 and 2.94 out of 3 for Sapele, Warri and Udu), chemical (2.49, 2.96 and 2.98 out of 3 for Sapele, Warri and Udu) and mechanical (2.41, 2.91 and 2.96 out of 3 for Sapele, Warri and Udu) occupational hazards. Furthermore, comparing the resultant grand means of the pre-intervention assessment with that of the post-intervention, it revealed a very high improvement (2.41, 3.18 and 3.35 out of 4 for Sapele, Warri and Udu) on the attitude of the workers towards occupational hazards. Looking at their safety practices a notable increase was recorded (2.44, 3.12 and 3.31 out of 4 for Sapele, Warri and Udu). Also recorded was an increase in skills as related to occupational safety (2.60, 3.37 and 3.40 out of 4 for Sapele, Warri and Udu.

Table 1. Illustration for Analyses on Criterion Grand Mean.

S/N	ITEMS	Post Yes (2)	Post No (1)	Criterion mean
1	Hazard is anything or situation that has potentials to cause accident (damage to property or injury) to workers in a workplace.	59	11	1.84 ±
2	Are there occupational hazards in the sawmill?	64	6	1.91
3	Sawmilling processes such as debarking, sawing, stacking of wood, generate hazards,	63	7	1.90
4	I am aware that hazards in sawmills can lead to health problems and injuries.	65	5	1.93
5	Fire is a common hazard in sawmills	24	46	1.34
6	Are employers responsible for workers health, safety and welfare?	70	0	2.0
Grand Mean				$\dfrac{(1.84+1,91+1.90+1.93+1.34+2.00)}{6} = 1.82$

$$^{\pm}1.84 = [(59 \times 2) + (11 \times 1)]/70$$

Table 2. KAPS Analyses with respect to the criterion grand mean values.

Questionnaire Parameters	SAPELE PRE	SAPELE POST	WARRI PRE	WARRI POST	UDU PRE	UDU POST
Awareness(Hazards)	1.38	1.51	1.37	1.82	1.44	1.89
Knowledge (Physical Hazards)	2.04	2.52	2.12	2.88	2.15	2.94
Chemical Hazards	2.07	2.49	2.07	2.96	2.16	2.98
Mechanical Hazards	1.94	2.41	1.94	2.91	2.08	2.96
Attitude	2.39	2.41	2.41	3.18	2.59	3.35
Practice	2.33	2.44	2.3	3.12	2.38	3.31
Skill	2.06	2.6	2.04	3.37	2.03	3.4

Findings from this study based on the pretest results, was that the sawmill workers in the study area had just fair knowledge of occupational hazards in sawmills and which affects their attitude and thus level of safety practices. This finding contradicted the findings of Osagbemi et al. (2010) which showed that there is high level of awareness but improper conceptualization of occupational hazards among Nigerian sawmill workers. The sawmill workers were exposed to various occupational hazards and injuries but showed poor compliance with safety devices utilization. However, the findings from this study corroborate that of Faremi et al. (2014), study which showed that majority of sawmill workers in Nigeria had improper conceptualization of occupational hazards in spite of their awareness.

Kolmogorov-Smirnov test of Significance on Pre- and Post-Intervention Outcome.

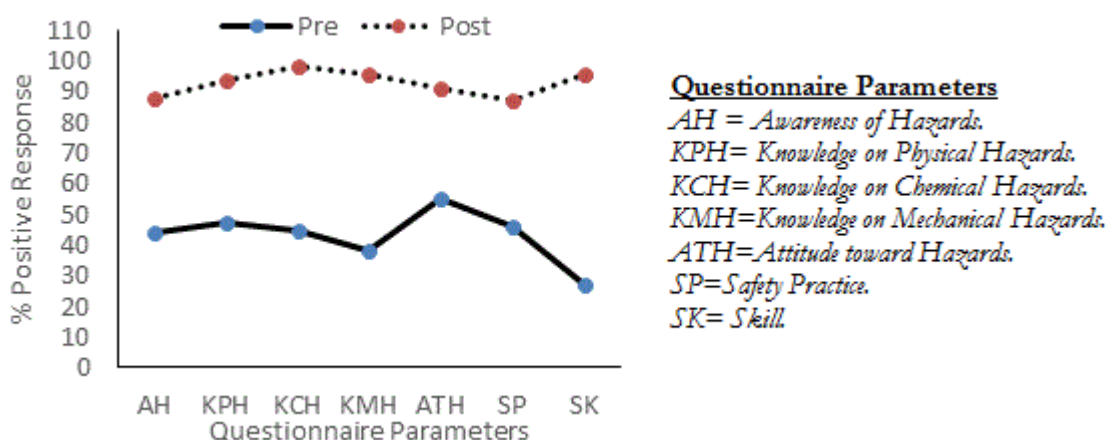In other to establish if the notable positive increases

Figure 8. Percentage Response to Questionnaire Parameters (Udu).

Questionnaire Parameters
AH = Awareness of Hazards.
KPH= Knowledge on Physical Hazards.
KCH= Knowledge on Chemical Hazards.
KMH=Knowledge on Mechanical Hazards.
ATH=Attitude toward Hazards.
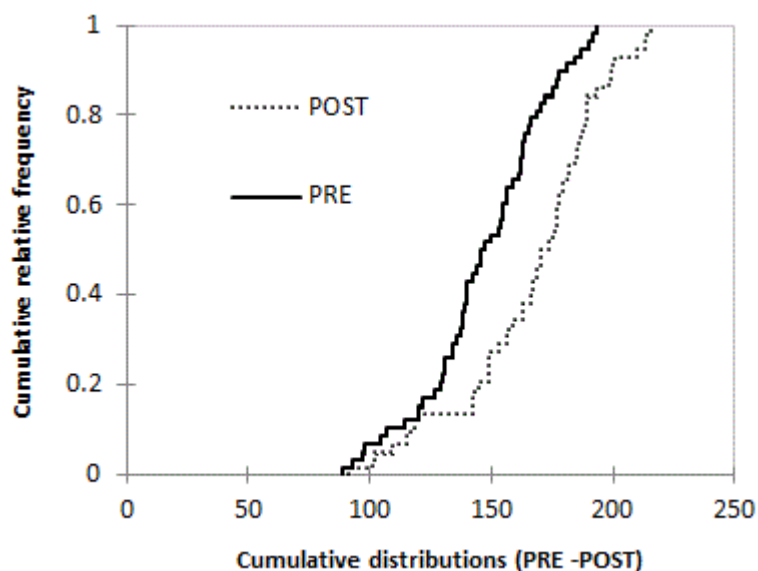*SP=Safety Practice.*
SK= Skill.

Figure 9. Output from two-sample Kolmogorov-Smirnov test / two-tailed test for Sapele.

in job hazard awareness, knowledge, attitude, practice and skill as related to occupational hazard intervention, a two-sample Kolmogorov-Smirnov test/ two-tailed was employed as it is a non-parametric analytical approach synonymous to a two tail t- test.

From Figures 9 – 11, it revealed that actually there is significant difference between the output of the pre-intervention and the post-intervention among the three sampled classes. However, the significant difference is more notable among the classes belonging to the experimental group (Warri and Udu classes). This could be seen graphically from the plots of the cumulative relative frequency against the post and pre interventions from the output of the Kolmogorov-Smirnov test. The significant difference noticed in the control group though there was no educational intervention carried out on the group
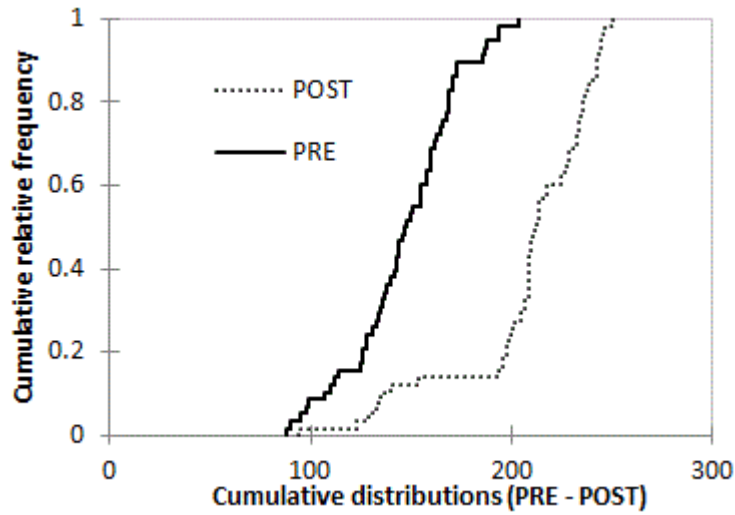
Figure 10. Output from two-sample Kolmogorov-Smirnov test / two-tailed test for Warri.
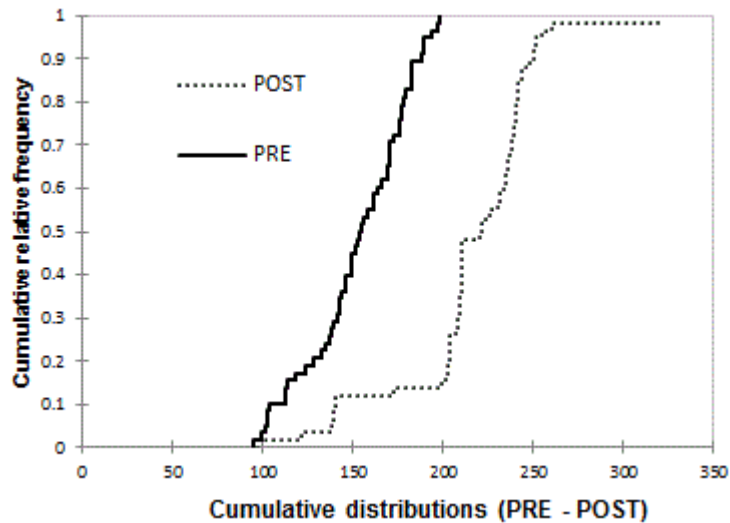

Figure 11. Output from two-sample Kolmogorov-Smirnov test / two-tailed test for Udu.

could be attributed to an awareness level as a result of self-curiosity aroused by the questionnaire being earlier administered during the course of the study. Furthermore, the finding of this study on KAPS with respect to knowledge on Chemical, Mechanical and Physical Hazards (KPH, KCH, KMH) in sawmills confirmed the reason for the rate of non-use of hand gloves, aprons, ear mufflers and lifters (PPE) by

Davies et al. (2000); Osagbemi et al. (2010), Aliyu and Saidu, (2011) which ranged from 72.3% - 79.8% among their respondents. The non-use of safety devices among sawmill workers according to the above researchers as found in their study was largely due to forgetfulness or believes that they were not convenient or not necessary. All these were due to the workers' poor knowledge of hazards

Table 3. Summary of model parameters from regression analyses using XLSTAT.

Goodness of fit statistics	Warri	Udu	Sapele
R²	0.6041	0.6813	0.2016
Pr> F	**0.0155**	**0.0058**	0.3631

Table 4. Model parameters - Pr> |t|.

	Warri	Udu	Sapele
Intercept	0.4996	0.2083	0.0129
SK	0.4326	0.3812	0.1808
K	-	-	0.4741
P	**0.0211**	**0.0142**	-

inherent in their job.

Developing Multiple Regression Models on Intervention Parameters

To further evaluate the impact of the intervention on the groups (experimental and control), the collected data were subjected to multiple regression analysis. Attitude (A) was assumed as the dependent variable while Knowledge (K), Skills (SK) and Practice (P) were assumed as independent variables. This assumption is supported by the theory of planned behavior (Ajzen, 1991; Grau et al., 2002) and the theory of behavioural change (Zanna and Rempel, 1988; WHO, 2011; World Bank, 2017). The output from the regression analyses produced a goodness of fits for Sapele, Warri and Udu sawmills of 0.2016 (20.16%), 0.6041 (60.41%), 0.6813 (68.13%). From Tables 3 and 4, it revealed that with respect to the intervention (safety education) in the Experimental sets, (that is Warri and Udu classes) safety practice had a significant positive contribution on the attitude of the respondents. Also, the R^2 values of the resultant regressions for Warri and Udu classes (Tables 3) are higher than the 20.16% of the control class where no intervention was undertaken. The findings from this study agree with that of Sivaprakash and Sakthivel (2011) and Abere et al. (2016), where it reveals that there is a significant positive influence on the attitude of workers to occupational safety practices by embarking on a behavioural safety intervention.

CONCLUSION

The conclusion drawn from this study includes: the resultant grand means of the pre-intervention assessment and that of the post- intervention revealed that there was a notable high positive improvement (2.41, 3.18 and 3.35 out of 4 for Sapele, Warri and Udu) on the attitude of the respondents towards the presence of occupational hazards. Also, a significant positive increase (2.44, 3.12 and 3.31 out of 4 for Sapele, Warri and Udu) for safety practices was recorded with respect to the safety education/ training intervention. Furthermore, there was an increase in skills as related to occupational safety (2.60, 3.37 and 3.40 out of 4 for Sapele, Warri and Udu) comparing the pre intervention data with the post intervention. The resultant regression revealed that there is a significant positive impact of the safety education intervention on safety practice (P) which in turn reflects on the attitude (A) of the respondents towards occupational hazards.

RECOMMENDATIONS

From the findings of this study it is recommended that continuous in-house safety education and training is recommended for employers and employees of various sawmills. Also, government should appoint qualified occupational health and safety experts to oversee and enforce safety regulations. Furthermore, there should be frequent safety training and briefs organized to enlighten the workers on the presence of hazards with respect to their occupations.

COMPETING INTERESTS

The authors of this article have declared that no competing interests exist while in the course of preparing this manuscript.

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APPENDIX

Table 5. Questionnaire Responses (Pre and Post Interventions)-Warri.

	PART 1: AWARENESS OF HAZARDS				
	Instructions: Indicate your personal opinion of YES or NO to the following items.				
S/N	**ITEMS**	**Post**		**Pre**	
		YES	NO	YES	NO
1	Hazard is anything or situation that has potentials to cause accident (damage to property or injury) to workers in a workplace.	29	41	59	11
2	Are there occupational hazards in the sawmill?	28	42	64	6
3	Sawmilling processes such as debarking, sawing, stacking of wood, generate hazards,	25	45	63	7
4	I am aware that hazards in sawmills can lead to health problems and injuries.	37	33	65	5
5	Fire is a common hazard in sawmills	18	52	24	46
6	Are employers responsible for workers health, safety and welfare?	20	50	70	0

	PART 2: KNOWLEDGE OF PHYSICAL HAZARDS					
	Instructions: Indicate False or True or I don't know to the following items.					
S/N	**ITEMS**	**Post**			**Pre**		
		TRUE	FALSE	I Don't Know	TRUE	FALSE	I Don't Know
1	Sawmill processes generate noise	40	22	8	53	17	0
2	High noise (over 90 decibels) can lead to loss of hearing	21	16	33	59	10	1
3	Vibration is a common hazard in sawmills	31	29	10	62	8	0
4	Vibration can lead to dead or numbness of fingers	49	10	11	62	7	1
5	Heat emanates from machines used in sawmills	19	27	24	59	11	0
6	Spilled water on the floor can lead to slips and falls that can cause injuries	25	21	24	69	1	0

Table 5. Continue.

7	Falling woods or logs from height can cause injuries to workers.	13	28	29	68	1	1

PART 3: KNOWLEDGE OF CHEMICAL HAZARDS

S/N	ITEMS	Pre			Post		
		True	False	I don't know	True	False	I don't know
1	Smell from wood sawn in the sawmill are hazardous to workers' and customers' health.	24	20	26	69	1	0
2	Sawmill machines' exhausts generate smoke and fumes that affect workers' health.	24	18	28	69	1	0
3	Sawdust is a common hazard in sawmilling	37	24	9	70	0	0
4	Sawdust can lead to lungs diseases such as bronchitis, emphysema, pneumoconiosis, etc.	29	12	29	69	1	0
5	Chemicals used as insecticides, fungicides and preservatives (solignum, timbo, boric acid and ACO) are harmful to workers' health.	30	16	24	59	10	1
6	Burning of sawdust and wood cut offs pollute the air which can affects workers health.	20	33	17	70	0	0

PART 4: MECHANICAL HAZARDS

	ITEMS	Pre			Post		
		TRUE	False	I don't know	TRUE	False	I don't know
1	Machines and tools used by sawmill workers can cause hazards	27	24	19	65	5	0
2	Unguarded/unfenced-off machines can cause accidents to workers.	17	21	32	58	11	1
3	Moving part of machines or rotating cutter blocks can injure workers.	29	16	25	69	1	0
4	Conveyors belts and cutting blades can entangle cloth or cut workers.	21	25	24	68	1	1
5	Poor body positions/postures in lifting/pushing/pulling cause injuries (such as split disc) to workers.	19	18	33	57	12	1

Table 5. Continue.

6	Carrying or lifting of heavy logs can lead to health problems	21	22	27	69	1	0

Table 5. Continue.

SECTION C: ATTITUDE TOWARDS HAZARDS IN SAWMILL

Instructions: Indicate the extent to which you agree or disagree to the following items.

S/N	ITEMS	Pre				Post			
		SA	A	D	SD	SA	A	D	SD
1	I do not feel comfortable when working in the mist of hazards (eg. Noise, dust, vibration) in the sawmill.	17	24	18	11	35	27	5	3
2	I do care about my health why working in the mist of hazards in the sawmill.	12	22	12	24	8	18	24	20
3	I have complained to my supervisor about the presence of hazards (noise, vibration, dust) in our sawmill.	10	13	29	18	27	26	8	9
4	I still wear personal protective equipment like eye goggle even though it inconveniences me.	17	13	24	16	34	28	5	3
5	I always close my month because of sawdust while working.	10	23	14	23	46	20	3	1
6	I always obey safety instructing while working.	16	12	16	26	27	34	6	3
7	I do wear ear muff to prevent noise from the machines even though it will prevent proper listening to the machine sound.	11	20	30	9	23	32	11	4
8	I feel more confident while working with PPE	13	18	21	18	31	33	5	1
9	As a worker, I am particular about cleanliness in the sawmill.	11	19	22	18	23	36	7	4
10	There is need to control hazards in the sawmill	20	22	20	8	29	39	2	0
11	Workers are prone to accidents when they engage in conversation while working.	16	14	23	17	30	36	4	0

Table 5. Continue.

S/N	ITEMS	Pre				Post			
		SA	A	D	SD	SA	A	D	SD
1	I always wear PPE while working in the sawmill	10	8	27	25	27	22	17	4
2	I always wet drill the sawmill floor before resuming work in the morning.	9	19	25	17	30	30	8	2
3	I always check machines and all working tools before using them.	21	11	18	20	38	29	2	1
4	Machines are regularly maintained and serviced (change oil/filter etc.) in our sawmill.	15	17	22	16	20	40	4	6
5	Sawmill machines are regularly checked (water/oil level etc.) in the sawmill	16	16	19	19	34	35	1	0
6	I use push stick to move timbers away from machine blade and not hands.	11	19	19	21	27	36	6	1
7	I make myself comfortable and safe when sawing wood of different sizes with the saw machine by doing regular saw parameter (adjustment).	8	21	19	22	25	39	4	2
8	When the material I am working with is causing a problem or injury, I replace it.	15	15	20	20	37	29	4	0
9	When I am tired and it is not closing time, I will rest.	14	18	21	17	26	30	5	9
10	To control/reduce noise in the sawmill I will recommend containment/ blocking the source of the noise	9	20	21	20	30	36	1	3
11	To reduce noise from machines, I always wear earmuff.	9	19	15	27	20	39	6	5
12	There is a first aided attached to our sawmill.	10	15	25	20	6	5	25	34

SECTION D: SAFETY PRACTICES IN SAWMILL

Table 5. Continue.

S/N	ITEMS	Pre				Post			
		SA	A	D	SD	SA	A	D	SD
1	Training of workers for safety is necessary in the sawmill.	23	20	15	12	38	30	2	0
2	I have attended a number of safety trainings since I have been doing this sawmilling job.	6	10	25	29	35	35	0	0
3	As a sawmill worker, I have attended training at least once in a year.	2	4	30	34	29	41	0	0
4	I acquired new skills from the training sessions attended.	4	2	24	40	33	37	0	0
5	I have been trained on how to lift logs from one position to the other in the sawmill by using the jack or push stick.	6	0	38	26	37	33	0	0
6	I was trained on the skill of cutting and debarking logs in sawmill safely.	10	12	27	21	34	30	3	3
7	I was trained on how to keep all parts of body away from the blade in cutting and debarking by drawing away the body or using push stick.	9	6	33	22	33	33	1	3
8	To prevent arranged logs (stacked) from falling on workers and visitors accidentally I make use of wedges.	19	18	23	10	28	36	3	3
9	To measure and cut logs in sawmills, I was thought to measure twice and cut once.	8	12	26	24	31	39	0	0
10	Every worker is given first aid training.	4	9	28	29	18	28	18	6

SECTION E: SKILLS/TRAINING