

Assessment of safety practices in south-western Nigerian sawmilling industries

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Abstract. The study identified the prevailing hazards in sawmilling industry in southwestern zone, Nigeria, examined the availability and usage of protective equipments by individual workers. It also determined the relationship between personal characteristics of sawmilling workers and use of protective equipments. The study adopted a survey design, 256 workers drawn from 54 sawmills in Ondo, Ekiti, Oyo and Osun states participated in the study by responding to a questionnaire which elicited information on hazards experienced by sawmill workers and efforts put in place by individuals and industry at apprehending such hazards. An observation checklist was also used to assess the availability and usage of protective equipments. Findings revealed that hand (46.9%) and feet (32.4%) injuries were preponderant while eye (12.9%) injury is the least. Abnormal sneezing (14.1%) and continuous body pain (11.4%) were the most peculiar sicknesses of sawmill workers. Appropriate signage were seldom used by the sampled workers while safety clothing and respiratory protector were the most used protective equipments. Significant relationships were found between each of age, sex, work designation and use of protective equipments.

Keywords: protective equipments, signage, workplace. injury, hazards.

INTRODUCTION

For many years, the sawmilling industries had had a poor safety record with very high rate of fatal and major accidents. In fact, sawmilling had been adjudged to be a high risk business with a major injury rate that is over two and a half times that of general manufacturing. HSE (2002) observed that machinery accident remains a major cause of injury the world over. Accident investigation in sawmilling showed that risk activities include, band saw blade or pulley cleaning procedures, round and sawn timber stacking, guarding of power operated cross cut saws, management of site transport activities, lock out procedures for interrupting mechanized production processes etc. But Arvofo (2000) grouped sawmilling hazards into environmental hazards as a result of poor forestry practices and management, poor solid waste management and toxic emission to air, noise pollution hazards due to machinery use and ergonomic hazard resulting from lifting of heavy loads, reaching for objects, repetitive work and poor work posture. Sawmill workers are also exposed to injuries in the process of scrap removal, kickback injuries occur when blades are not properly placed. A times death do occur as a result of manual handling (Bello and Mijinyawa, 2002).

In Nigeria, majority of the sawmilling activities are carried out in the rain forest zone which include Lagos, Ekiti, Osun, Ondo, Cross River, Imo, Oyo, Delta, Edo and Ogun states (RMRDC, 2003). Previous works have established and identified the existing hazards in Nigeria sawmilling industries for example, Bello and Mijinyawa (2010) assessed the injuries sustained by saw-millers in Ondo, Oyo and Osun states and established that mill workers suffer the highest injury rate of 83%. Other identified risks include timber stacking accidents, log transport to the mill, milling operations and maintenance accidents. The study however did not examine the safety practices employed by the said workers or safety provisions put in place by both the employers and the employees. In a recent study, Faremi, Ogunfowokanmi, Mbada, Olatubi and Ogunyemi (2014) assessed the occupational hazards and safety practices of sawmilling workers in Nigeria but a major limitation of the study was that all the respondents were drawn from Ile-Ife in Osun state, thus the findings of the study may obscure some salient information. Glossop (2000) identified three steps as necessary to the management of health and safety at work. These steps are, spotting the hazards or hazard identification, risk assessment and risk control which has to do with making changes. Thus a

study is needed that will identify the prevailing hazards and examine the risk control measures that are in place in this sawmilling zone. This is the gap the study attempts to fill using south western states of Nigeria as a case study.

The following objectives will guide the study.

- Identify the prevailing hazards in sawmilling industries in the southwestern zone.
- Assess the extent to which appropriate signage were used in the sawmilling industries.
- Examine the extent of availability and usage of protective equipment for and by individual worker.
- Determine the relationship between personal characteristics such as (age, sex, educational qualification, job experiences, work designation) of sawmill workers and use of protective equipments.

METHOD

The study adopted a survey design with all saw mill workers in the southwest geo-political zone as population for the study. Two hundred and fifty six workers randomly drawn from 54 sawmills in Ondo, Ekiti, Oyo and Osun states participated in the study by responding to a questionnaire. The questionnaire named Sawmill Workers Questionnaire (SWQ) was used to elicit information from sawmill workers on hazards experienced in the course of their sawmilling activities and efforts put in place by individuals and industries in apprehending such hazards. A Sawmill Observation Checklist (SOC) was also used to assess the availability and usage of protective equipments as well as use of appropriate signage in the sawmilling environment. Data were collected within 4 weeks in the sampled states. The resulting data were analyzed using both inferential and descriptive statistics of simple percentages and chi-square.

RESULTS

In identifying the prevailing hazards, Table 1 shows that 47% of the sawmill workers had at one time or the other experienced hand injuries in the process of work, 32% had experienced leg and foot injuries, 32% accidental wood falling resulting into serious injuries on different parts of the body. Eye injuries from saw dust and other particles have been experienced by 12.9% of the interviewed population.

Other sicknesses identified by the sawmill workers and which are peculiar to the workers in the sawmilling environments are, abnormal and continuous sneezing, 14% of the workers were reported to have suffered this ailment, and another 12% reported a continuous body pain and ache, 2.7% of the sawmill workers were asthma patients and others were malaria and general body weaknesses, hearing impediments and sight problems.

Table 1. Identified Hazards in Sawmilling Industries

S/N	Prevailing Hazards in Sawmilling Ind.	Number	Percentages
Ever experienced			
1.	Accidental falling of wood	81	31.6
2.	Temporary disability of hand	120	46.9
3.	Temporary disability of feet	83	32.4
4.	Eye injury	33	12.9
Peculiar sickness resulting from sawmilling work			
1.	Hearing impediment	1	1.6
2.	Asthma	4	0.4
3.	Sight Problem	7	2.7
4.	Abnormal sneezing	36	14.1
5.	Continuous body pain	30	11.7
6.	Others	13	5.1

On the use of appropriate signage, only 9.3% of the industries used signage indicating “no smoking” in the appropriate areas, 22.2% had signage that showed ‘High Voltage’ in the appropriate places, 11% had “Fire hazard” indicators in the right places. Signage showing “Restricted areas” were used by 39% of the sawmills while “Maximum working load” had a record of just 11% of the sampled sawmills, another 7% did not make use of any signage whatsoever (see Table 2.)

Table 2. Use of Appropriate Signage by Sawmilling Industries.

Use level of signage	Number	Percentages
No smoking	5	9.3
High voltage	12	22.2
Fire hazard	6	11.1
Restricted area	21	38.9
Maximum working load	6	11
No signage at all	4	7.4
Total	54	100

To determine the extent to which sawmilling workers protect themselves from industrial injuries, workers of different categories and tasks responded to a questionnaire enquiring their possession or otherwise of relevant protective equipments. Table 3, shows the findings from the sampled workers.

Table 3. Availability of Safety Equipments

Safety Equipments	Number	Percentages
Safety Helmets	23	7.8
Hearing protection	21	8.2
Respiratory protection	44	17.2
Eye protection	39	15.2
Safety clothing	47	18.6

From the table, the most available protective equipments were safety clothing and respiratory protective cover used by only 18.6% and 17.2% respectively. Only 7.8% of the interviewed workers made use of helmets. Despite the fact that the availability of the equipment’s were very low, findings revealed that even the few that were available were not properly utilized. Table 4, shows the level of usage of protective clothing and safety equipments among those that had them.

Table 4. Level of Usage of Protective Equipments

	Always	Rarely	Never
Safety helmet	10 (43.5%)	10 (43.5%)	3 (13.0)
Hearing problem	11 (52.4)	8 (38.1)	2 (9.5)
Respiratory protection	21 (47.7)	21 (47.7)	2 (4.5)
Safety Clothing	27 (57.4)	15 (31.9)	5(10.6)
Eye Protection	7(17.6)	4(11.3)	28 (71.1)

From table 4,. only 43.5% always use safety helmets, while 43.5% rarely used it and 3% never used it,52.4% always made use of hearing protective equipments ,while 38.1% rarely used it and the remaining 2% have never used hearing protector. Out of the 44 people who had respiratory protective equipments, 47.7% use it always, another 47.7% rarely did and the remaining 4.5% never did. Safety clothing enjoyed better usage as 57.4% were in this category, 31.9% rarely did and 5% never use it. Eye protections are the most rarely used of the safety equipments, only 17.6% of those who have it made use of it, 11.3% rarely do while 71.1% never use.

Table 5. Relationship between Personal Characteristics and Use of Protective Equipment

Use of appropriate signage						
	Never use		Use at least one		χ^2	P
Age group	N	%	N	%		
< 30	55	53.9	47	46.1	7.951	0.047
30 – 39	54	62.1	33	37.9		
40 – 49	22	48.9	23	51.1		
>=50	18	81.8	4	18.2		
Sex						
Male	134	56.1	105	43.9	6.751	0.009
Female	15	88.2	2	11.8		
Educational qualification						
None	9	50.0	9	50.0	7.274	0.122
Primary	34	69.4	15	30.6		
Junior secondary	32	68.1	15	31.9		
Senior secondary	64	52.9	57	47.1		
Tertiary	10	47.6	11	52.4		
Job experience						
< 5 years	75	63.0	44	37.0	3.417	0.332
5 – 9 years	39	56.5	30	43.5		
10 – 14 years	14	45.2	17	54.8		
>=15 years	21	56.8	16	43.2		
Work designation						
Machine related activities	88	51.5	83	48.5	15.938	0.001
Log/plank related activities	41	71.9	16	28.1		
Waste/dust related activities	16	88.9	2	11.1		
Management/Administrative control activities	4	40.0	6	60.0		
Total	90		166			

* Likelihood ratio test used due some cells having expected counts less than 5

Significant relationships were found between age and use of protective equipments ($\chi^2_{(3,56)} = 7.951$, $P < 0.05$), sex and use of protective equipments ($\chi^2_{(3,56)} = 6.751$, $P < 0.05$) as well as work designation ($\chi^2_{(3,56)} = 15.938$, $P < 0.01$). Sex, educational experience and job experience were not found to be significantly related with the use of protective

DISCUSSIONS

. Most of the workers that were interviewed has experienced one type of injury or the other in the work place, these range from leg, hand, fingers, and eye injuries others had complaints about continuous body pain/ache, hearing difficulty, eye and sight problems and other weaknesses in their body parts..Judd et al, (2004) observed that the nature of work done in the sawmills and the type of equipment and materials used in the course of processing expose the workers to various forms of on-the -job hazards. The mother earth news (2014) also described the sawmilling work as one that demands muscle straining and is back tasking. Machine accidents and accidental fall of wood are major problems in the sawmills

These form of accidents have reduced greatly in the modern world where new technologies have been introduced into the sawmilling process. Log loading in all the sampled sawmills were done manually unlike what operates in some developed world where advanced log loading and log orientation systems are employed. The uses are employed of multisaw Titan twinband and an automated material removal system is also used to offload the sawn wood after removing the side boards and the cants. The use of these machines has to a large extent increased the rate of wood production, improved the quality of production and increased the recovery rate as well as ensuring safety as it prevents accidental cuts both on the hand and feet. The major type of log conversion machine used in the Nigerian sawmills is the CD horizontal band saw which expose the operators to lots of injuries. No wonder the rate and level of accidents in the Nigerian sawmills remains high.. The lumber recovery rate in the Nigerian sawmills has been put at between 45 and 50% (Aliviar, (1983), Fuwape, (1989) Implying that about 50 to 55% of log input into the sawmills are left as wood residues.

At the Ohio - woodmixer sawmill, little human labour is required in the operation due to the use of the twin cut continuous and simultaneous machine which is a portable automated machine that saws logs, move them, load and transfer lumber to the out feed both simultaneously and continuously (Scragg, 2014). The use of this machines allow for little contact with the log during production thereby reducing work accidents and injuries. When manual handling of wood is reduced, exposures to saw dust and engine noise will also be reduced and viz-a-viz, safety at the factory will be ensured. The use of modern machines and tools also reduce to a large extent the occurrence of accidental cuts both on the legs, hands /arms. Abnormal sneezing was found to be the most peculiar sickness followed by continous body pain. It is however suprising that despite the prevalence of abnormal sneezing, workers disagreed with having asthma. Eventhough this might be so but abnormal sneezing was found to be one of the symptoms of occupational asthma often caused by workplace dust or fume (The Asthma Center, 2015).

Most of the sawmill owners in the sampled industries are either illiterates or semi-illiterates who hardly know the importance of the use of signages in work places. Hence the low level of their uses in the factories. One of the requirements of the occupational safety and health administration (OSHA) is that workplace provide a safe work environment for their employees to protect them from harms and work injuries. It is also recommended that slogans be posted on signs as an effective cautionary reminder to workers.

Even in some places where these signage were written, they were hardly put in the right places where they can be seen to perform the functions for which they were meant. These signages were to serve as warning of possible dangers that a worker or anybody visiting a factory site may be exposing themselves to if certain cautions are not taken. A sign showing 'no smoking' for example needs be displayed in places where inflammable materials are kept. In the western world and some Asian countries, there were bodies such as "Occupational Safety and Health Administration" (OSHA) and "Environmental Health and Safety Organization who are meant to train employers and their employees on the various safety precautions in work places. These bodies were also to train on the use of signage but in Nigeria such supervisory or oversight body is either non-existent or ineffective thus the workplace safety is left at the mercies of sawmill owners. Omoti, et al (2008) and Ajaiyeoba, (1995) reported that occupational health and safety measures are not routinely practiced or enforced by employers of labour in Nigeria. Safety clothing and respiratory protectors were the prominent protective wears (by availability and usage) but the reason why sneezing was prevalent despite the use of respiratory protector is not immediately apparent. The effectiveness of the protective wears need be examined. There is need however for the enforcement of protective wears. Uhumwangho et al (2010) opined that ocular injuries among sawmill workers could be prevented to a large extent if the use of protective wear is enforced. Maxfield (2010) recommended the training and constant retraining of staff on work place safety practices, the same is recommended by Occupational Safety and Health Organizations (OSHA) and Health and Safety Executives (HSE). It is necessary to make this happen in Nigeria.

Lastly, findings revealed that age, sex and work designation were related to use of protective wears while job experience and educational qualifications were not. The reason for age as a factor is not yet clear but regarding sex, females naturally take less risks than males thus females are likely to be more disposed to wearing protective equipments than males. On work designation, risks vary with work designation thus different work designation would likely possess different compliance level with with protective wears based on their perceived risks.

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