

Physical and Chemical Health Risks and Control Measures among Woodworkers in Rivers State

Raphael Barididum Kemgbara^{1*}, A. O. Onyeaso²

^{1,2}Department of Health Promotion, Environment and Safety Education, University of Portharcourt, Nigeria. E-mail: raphaelkemgbara@yahoo.com

Abstract

This study investigated physical and chemical health risks and control measures amongst wood workers in Rivers State. Twelve (12) research questions and six (6) hypotheses were formulated to guide the study. The study adopted a cross-sectional survey design. The population of the study comprised 3679 registered members of unions in wood industries in Rivers State. A sample of 600 sawmill and furniture workers were selected from sawmill and furniture industries in the study area. A multi-stage sampling procedure was used to select the sample. A 64 item self-structured questionnaire titled “Physical and Chemical Health Risks and Control Measures of Wood Workers Questionnaire (PCHRCMWWQ) was used for the study. The instrument was validated and Cronbach’s alpha method was used to establish the reliability coefficient of 0.97 for health risks and 0.92 for control measures respectively. Mean and standard deviation were used to answer research questions while regression inferential statistics was used to test the null hypotheses at 0.05 level of significance. The findings revealed among others that workers in the sawmill and furniture industries in Rivers State were highly exposed to physical health risks with grand mean (2.76), chemical health risk (2.74). It was also found that the hazard control practices in the industries is poor with grand mean of (2.55) example nonuse of head protection at work, non-guarding of machine on their rotating, pinch and sharp part to prevent injury. The authors recommended that employers of labor in sawmill and furniture companies should inculcate health and safety culture or hazard control measures in planning and work practices in the industries to prevent and minimize exposure to health risks..

Keywords: Physical, Chemical, Health risks, Control measures, Wood workers

Introduction

All jobs are risky but some are more dangerous than the other. The International Labor Organization (ILO., 2016), estimated that 2.02 million people die each year from work related incidents or injury and over 3.7 million people suffer from work related diseases while estimated 337 million fatal and non-fatal work related accidents per year are all associated with occupational hazards. Bureau of Labor Statistics (2019) presented the ten most dangerous and hazardous jobs in the world and adjured that workers on logging works, fishermen and related fishing workers, aircraft pilots and flight engineers, roofers, refuse and recyclable materials, structural iron and steel workers, truck drivers and other drivers, farmers’ ranchers and agricultural managers, supervisors of construction workers and grand maintenance workers are mostly at risk chronic diseases emanated from their jobs.

Similarly, Marlin (2019), Uche (2020) and Corey (2020) affirmed that the fatality rate of a job is calculated by taking 100,000 full-time workers which ensure that every profession is represented correctly no matter how large or small the industry. Hence, the occupation with the highest fatality rate is logging workers with 135.9 fatal work injuries per 100,000 workers over the course of a year. This makes logging the most hazardous job in the year 2019. According to Bureau of Labor Statistics reported (2016) log workers have the highest rates of deaths with an average death count of about 136 deaths out of 100,000 workers- at 91

reported workplaces. Most of these deaths occurred from equipment errors and falling from trees. Carpenters who engage in roofing works are in the categories of the fourth most dangerous jobs as roofing comes fourth in the list with a fatality rate of 48.6 with more than 100 fatalities each year, (Marlin, 2019).

The intention of man for work is not limited to generating income for a reasonable standard of living but by extension to derive happiness, fulfillment and enjoy most aspect of it, (Achalu, 2016; Maceij, 2018). Implicitly the stress, dissatisfaction, illness, disability and even death emanating from work constitute a great deal of undesirable outcomes of work. This validates the relentless efforts of Government institutions, organizations, and individuals such as occupational health practitioners on the management of occupational health and safety issues.

Health risk is described as the likelihood that a given exposure or series of exposure may damage the health of an individual. Health risk is an adverse event or negative health consequence due to exposure to a specific hazard, it is the chance or likelihood that something will harm or otherwise will affect one's health, (Dave, Cecil, Don, Paul, Lawrence, Murrey, Karen, & Tom, 2011). The idea of occupational risk exists upon two dimensions: the first is the probability that a given injury or illness will occur, the second is the potential severity (Pashar & Basal, 2010). In line with the findings of Mumuni (2015), timber products are on high demands in both local and export markets because of the availability of timber woods in Nigeria, and workers in wood industries are frequently exposed to various allergenic, immune-toxic, pernicious, noxious, carcinogenic and toxic substances that arise from wood dust, bacteria and fungi growing in timber. This exposure causes lung and nasal cancer, bronchitis, rhinitis, decline lung function, contact dermatitis, bronchial hyper responsiveness, asthma and allergic rhinitis. It is therefore important to note that the devastating effects of health risks are not felt by members of wood workers alone but their families, and the entire community.

According to Hazards Information Sheet (2012) and Raheleh, Hannaneh, and Marhdi (2018), sneezing, coughing, eye irritation, lung tissue swelling, asthma and throat infections were found to be more prevalent among individuals exposed to occupational dust. Moreover, the symptoms associated with impaired lung function may lead to occupational lung diseases. Wood dust particles can bring about a number of respiratory diseases such as Obstructive Chronic Pulmonary diseases, lung cancer, asthma, hypersensitive pneumonia and lung scarring caused by repeated respiratory attack. Prolonged exposure to certain wood dust is now connected with specific kind of nasal / sinus cancer called Adenocarcinoma. The latency of this type of disease is between 40 to 45 years. Studies also show that 7 of 10,000 workers are likely to develop this disease (HIS, 2012).

According to Achalu (2016) the dimensions of health risks in the workplace include physical, chemical, psychosocial, biological and ergonomic health risks. However Dave, Cecil, Don, Paul, Lawrence, Murrey, Karen, and Tom, (2011) investigated occupational health and safety issues in Ontario sawmills and Veneer/plywood manufacturing industries and physical and chemical health risks were the most prevalent among the workers. Johnson, and Umorai (2018) studied occupational hazard and health problems of saw dusts workers in Uyo and recorded the highest mean scores for physical and chemical health risks among the workers. Mumuni (2015). respiratory health problems among sawmill workers at timber market in Accra, Ghana. The respiratory problems identified among the workers were related to the exposure to dust and chemicals used in the industry.

A wood worker is someone who produces woods from trees, builds a variety of products such as cabinet furniture that are made out of wood and synthetic wood materials. The wood work industries engage workers of various types including loggers, joining men, sprayers, upholstery men, saw doctors, machine operators, laborers, back men, front men, packers, drawn men, wood sellers, union representatives, sales boys and girls, apprentices, in their workshops where the woods are cut into various sizes and processed (Nenbee, 2021).

There are many machines that are used to process wood in the wood industries. Workers in the wood industry set up and operate all types of wood machines such as drill presses, lathes, sharpeners, routers, sanders, and wood nailing logs splitters, and firewood processors, jig saw, radial saw, drilling machine, molding or wood shaping machine, mortising machine and portable machine. Others are turning lathe, thickener, planer, jointer or hand planer, sanding machine, circular saw and band saw, (Dino, Karan, & Luciano, 2012). Occupational Safety and Health Administration, OSHA (2021) noted that despite the mechanization, which have removed much of the arduous toil of manual works the modern practices, have presented its conditions, processes and materials that are hazardous to health and safety of workers in the industry.

Prevention and control practices or measures of occupational risk are important investment in all work settings. Where there is existence of hazard and prevalence of health risks among workers control measures become imperative. Industrial hygienists acknowledge that work hazards and risk control methods and process is concerned with recognizing, evaluating and eliminating / mitigating hazards that occur because of human errors and physical deficiency within the workplace, (Jain & Rao, 2017). Industrial hygiene is the science devoted to the recognition, evaluation and control of those environmental factors and stresses, arising in or from the workplace which may cause sickness, impaired health and well-being or significant discomfort and inefficiency to workers or residents of the community, (Achal, 2010). There are different methods of controlling health risks. In modern occupational health and safety practices health risks are controlled by Engineering controls, Administrative controls, Work practice controls, and personal protective equipment.

Research Questions

- 1) What are the physical health risks of wood workers in Rivers state?
- 2) What are the chemical health risks of wood workers in Rivers state?
- 3) What are the control measures for physical and chemical health risks adopted amongst wood workers in Rivers State?

Methods

The study adopted a cross-sectional survey design. The population of the study comprised 3,679 registered members of wood work unions in wood industries in Rivers State. A sample of 600 sawmill and furniture workers were selected from sawmill and furniture industries in the study area. A multi-stage sampling procedure was used to select the sample. The approach was in the following stages: stage 1: from the three Senatorial zones the researcher wrote out all the names of all the Local Government Areas (LGAs) and place them in three separate bags, (Rivers West, Rivers East and Rivers South- East Senatorial Districts). Stage 2: simple random sampling of balloting without replacement was used to select three local Government Areas from each senatorial District. Stage 3: based on the number of accessible sawmills and furniture industries in each LGA, a systematic sampling techniques was used to select 2 (two) sawmills and 2 (two) furniture workers from each selected Local Government. Each senatorial District, 12 sawmill and furniture industries were selected. This sum up to 18

sawmills and 18 furniture selected for the study. This gave a total of 36 industries selected for the study. Stage 4: Proportionate Sampling Technique was used to Select Workers from each Sawmill and Furniture based on size and staff Strength. A 64 item self-structured questionnaire titled Health Risks and Control Measures of Wood cross check the stages Workers Questionnaire (HCMWWQ) see the abstract for the corrected version was used for the study. The instrument was validated and Cronbach’s alpha method was used to establish the reliability coefficient of 0.97 for health risks and 0.92 for control measures respectively. The completed and retrieved questionnaires were coded and analyzed by the researcher using the statistical Package for Social Science (SPSS) version 20.0. Simple percentage was used to analyzed the demographic variables. A four point Likert scale was used in the data collection, the weighted mean $(4+3+2+1) / 4$ of 2.50 established and used as the criterion mean for decision on the responses on each item in the questionnaire. Mean and standard deviation were used to answer research questions while regression inferential statistics was used to test the null hypotheses at 0.05 levels of significance. Ethical approval was obtained from the ethical committee, University of Port Harcourt.

Results

Table 1: Mean and Standard Deviation on Physical Health Risks for Wood Workers

S/N	Items	Mean	SD	REMARK
1	Workers are exposed to heat in a way that it hurts while working in the shop	2.57	0.88	High exposure
2	Vibration from power driven hand tools cause white finger disease (finger turns white or pale due to cold or vibration)	3.04	0.73	High exposure
3	The noise from the machines is deafening	3.57	0.66	High exposure
4	Kickback (when a saw seizes the wood and hurls it back on the operator) is experienced while cutting woods	3.24	0.70	High exposure
5	Visibility is poor in the factory	2.03	0.71	Low exposure
6	unguarded machines cause injuries	3.11	0.59	High exposure
7	Vibration tools such as chain saw can cause pain	2.57	0.64	High exposure
8	I have experienced impact on eyes resulting from flying wood particles at work.	2.57	0.59	High exposure
9	Faulty machines expose workers to injuries	2.64	0.58	High exposure
1	Use of wrong type of machine for a particular operation cause injuries	2.70	0.75	High exposure
1	Workers are often caught in or struck by operating machine	2.53	0.74	High exposure

1	Improper ventilation causes breathing problem	2.55	0.72	High exposure
	Grand mean	2.76	0.69	High exposure

Table 1 shows mean and standard deviation on physical health risks of wood workers. The grand mean of the cluster is 2.76 and standard deviation of 0.69 which shows that workers are Highly exposed to physical health risks in the wood industries with Noise as the most disturbing health risk in the industries responsible for hearing problems followed by vibration from powered driven hand tools with item mean of 3.04 and kickback 3.24 respectively.

Table 2: Mean and standard deviation on chemical health risks

S/N	Items	Mean	SD	Remark
26	Smoking is allowed in the workplace	2.54	0.68	High exposure
27	Workers feel irritated at work due to the smell of certain substance used in wood work	2.60	0.62	High exposure
28	Some workers feel very uncomfortable when some chemicals are sprayed	3.28	0.68	high exposure
29	Dust is a highly disturbing hazard in your factory	2.54	0.59	High exposure
30	Chemical splash do occur in the factory while on duty	2.67	0.59	High exposure
31	smoke from burning of wood pieces and saw dust cause breathing problem	2.79	0.77	High exposure
	Grand Mean	2.74	0.65	High exposure

Table 2 above shows responses on the chemical health risks associated with wood workers in Rivers State. Item 26 and 27 shows high exposure on Smoking in the workplace, feeling irritated at work due to the smell of certain substances used in wood work with mean scores of 2.54 and 2.60 respectively. Item 28 shows that some workers feel very uncomfortable when some chemicals are sprayed with a mean score of 3.23. Item 29 shows that dust is a highly disturbing hazard in the factory with a mean score of 2.54, item 30 and 31 shows that workers are highly exposed to Chemical splash in the factory while on duty and smoke from burning of wood pieces and saw dust which cause breathing problem with mean scores of 2.67 and 2.79 respectively. However, the grand mean of the cluster is 2.74 which is adjudged high exposure of chemical risks among wood workers in Rivers State.

Table 3: Mean and Standard Deviation on Control Measures among Wood Workers

S/N	ITEMS	Mean	SD	Remark
1.	Pre-employment medical tests are conducted on workers before employment in the factory	1.66	0.99	Disagree
2.	I use safety boots when at work	2.69	1.10	Agree
3.	Most of the machines used are regularly serviced	2.04	1.08	Disagree

4. Machines are guarded on their rotating, pinch and sharp part to prevent injury	2.34	1.19	Disagree
5. I use eye goggle when at work	2.78	0.98	Agree
6. I obey health rules relating to my work	2.02	0.99	Disagree
7. Periodic training, seminars are conducted when new machines are introduced in the factory	2.01	1.09	Disagree
8. Well-equipped first aid kit in the factory	2.69	1.06	Agree
9. Workers are updated on the use and dangers of a new chemical substance in the factory	1.70	0.76	Disagree
10. Individual knowledgeable in first aid services is available	2.11	0.69	Disagree
11. I wear protective cap (helmet) when at work	2.46	0.79	Disagree
12. I wear safety boot while working	2.11	0.69	Agree
13. Employer provides PPE for my use	2.94	0.63	Agree
14. Saw doctors are employed for sharpening and maintenance of tools	2.21	0.79	Disagree
15. There is incentives for obeying safety rules	3.27	0.62	Agree
16. There are rules and regulations against health risk	2.06	0.69	Disagree
17. I use repellent while working on site to prevent insect bite	2.85	0.89	Agree
Grand Mean	2.35	0.88	Disagree

**Criterion mean: 1.00-2.50 poor control practice
2.51 and above, Good (acceptable) control practice**

Table 3 shows that the control practices amongst the wood workers are poor with grand mean of 2.35 ± 0.88 .

Discussion

This discussion was based on the following variables: Physical health risk, chemical health risks, and control measures adopted among wood workers in Rivers State. The findings in Table 1 acknowledged that workers in the wood industries in River State are highly exposed to physical health risks with grand mean 2.76 and suffer associated illnesses. The physical health risks include the revelation that workers are exposed to heat in a way that it hurts while working in the furniture and sawmill factories, (2.57) Vibration from power driven hand tools cause white finger disease (finger turns white or pale due to cold or vibration). (3.04). The finding also revealed that noise from the machines result in deafness among workers, Kickback is experienced while cutting woods, (3.24). Visibility is poor in the factory, (2.03) unguarded machines cause injuries, (3.11) (Vibration tools such as chain saw cause pain on workers, (2.57) workers experienced impact on eyes resulting from flying wood particles at work. (2.57). Faulty machines expose workers to injuries, (2.64) Use of wrong type of machine for a particular operation cause injuries, (2.70) Workers are often caught in or struck by operating machine, (2.53) Improper ventilation causes breathing problem (2.55). These conditions were statistically significant. More so protective devices would help immensely to

protect the health of workers in the factory. Unfortunately use of protective devices seriously constitutes a challenging task in the industries.

This finding is congruent with Johnson and Umora (2018) who investigated the perceived hazards and health problems amongst workers in sawmills industries in Uyo Nigeria. Long work hours as workers work for 8-10 hours daily. Occupational physical hazards reported were dust, Noise vibration, and heat. These conditions resulted in Health problems amongst workers included injuries low back pain, cough and eye irritation. Cough was significantly associated with the number of work years the most commonly used Personal Protective Equipment, (PPE) were face masks and goggles. It was concluded that despite the hazards and health problems reprinted by the workers the use of PPE was poor. Legislation, such as the all occupational safety and health framework directive which obliges employers to take appropriate preventive measures to make work safer and healthier should be enforced in all saw mills. Health and safety training and occupational health services should also be provided for sawmills workers to ensure a healthier workforce. This is not how to discuss findings. The researcher needs to state the summary of the findings, and then include studies both in support of and against it.

The findings on chemical health risk workers in the industries have high exposure to various chemical health risks with grand mean score of 2.74. It was found that Smoking is allowed in the workplace which despite the fact that it can predispose workers to cancer and other respiratory diseases it can also be a common source of fire outbreak in the industries. Also Workers feel irritated at work due to the smell of certain substance used in wood works, some workers feel very uncomfortable when some chemicals are sprayed, dust is a highly disturbing hazard in the factories, Chemical splash do occur in the factory while on duty, smoke from burning of wood pieces and saw dust cause breathing problems among workers.

Some of the chemicals used in the industries include Pentachlorophenol. This is highly toxic by route of entry. It can be absorbed through the skin and can cause liver damage. Chromatid copper arsenate. This is extremely toxic by inhalation and ingestion and highly toxic by skin contact which can cause skin irritation and allergies, skin thickening, ulceration and skin cancer. Creosote. It is a chemical that has a tarry look and is used for outdoor wood. It is a strong skin and respiratory irritant. Zinc and copper naphthenate are slightly skin irritants. Copper naphthnate is moderately toxic by ingestion. If suspended in solvent, the solvent would be the main hazards. All of these are used in wood treatment. This finding is in agreement with Agu, Itmeokonkwo, Nnabi, and Odusanga (2021) who investigated the health problems and risk assessment amongst sawmill workers in Abakaliki . It was found that the most prevalent respiratory symptoms were cough, phlegm and chest pain were associated with chemical substances used in the wood industries. Patrick, Caleb, Temitope, and Olanewaju (2013) studied knowledge of chemical hazards and safety practices among furniture workers exposed to organic solvent in Ile- Ife Nigeria. The study found that nonof the workshops inspected met the specifications stipulated for spray painting. It was concluded that furniture makers are at risk of the health effects of chemical hazards. Majority of the respondents had poor knowledge of the effects of the hazards and did not use Personal Protective Equipment, (PPE) thus putting them at risks.

According to the National Bureau of Statistics (2017) Rivers State is the six most populous State in the country with a population of 5,198716 and there are number of logging, timber/sawmill, furniture and carpentry workers in the state. Workers in the sawmill and furniture industries are exposed to many unfavorable conditions that result in accidents and occupational diseases. Working in a sawmill and furniture industry is associated with various

physical and chemical health risks. These health risks can lead to accident, illnesses or diseases and death.

Finding from table 3 showed that most of the respondents disagreed that wood workers in Rivers State practice health risks preventive and control measures such as pre-employment medical test before and during period of employment (with mean score of (1.66), use of safety boots at work (2.69), regular service of the machine (2.04), machine are guarded on their rotating pinch and sharp part to prevent injury (2.34), use of eye goggle at work (2.02) conduct of periodic training, seminars before using a new machine in the factory (2.01) workers receive update in the use and dangers of a new chemical substance in the factory (2.69) availability of a first aider (1.70) wearing of protective cap at work (2.46) provision of PPE by the employer (2.11) availability of saw doctors for sharpening and maintenance of tools (2.46) incentives for obeying safety rules, (2.21) existence of rules and regulation against health risks, (3.37) use of repellent while working on site to prevent insect bite (2.06) workers take rest in between work (2.85). The grand mean of 2.35 is less than the criterion mean of 2.50 indicated that workers and employers do not practice health risk control measures the various health risks in the wood industries.

This finding is in agreement with a recent study conducted by Agu, Itmeokonkwo, Nnabi, and Odusanga (2021) on Health problems among sawmill workers in Abakaliki. Study revealed that workers are properly taught on the dangers of chemicals used on the job before they are allowed to use. Goggles are used consistently at work and these goggles are provided by the employers in the industries. Thomas (2000) cited in Aguwu (2013) explained that “unless and until the employer has done everything and everything means a good deal, the workman can do next to nothing to protect himself: although he is naturally willing enough to do his share”. All workmen should be told something of the danger of the material with which they come to contact and not be left to find it out to themselves Aguwu (2013). By above aphorisms he emphasized the need for employers to do everything to protect the employee especially when new chemical is introduced or new task is given. Basically in order to prioritize workplace hazard control, the employer should think of elimination by substituting agent or process, engineering control, administrative control, good work practices, provision and use of personal protective measure.

Conclusion

Based on the findings as revealed in this study it is appropriate to conclude that the safety and health condition of wood workers depends on their work environment and behavior. Wood workers in Rivers state had high exposure to physical and chemical health risks and the control measures adopted amongst wood workers in the study area are poor.

Recommendations

Consequent upon findings of the study, the following recommendations were made:

1. Employers of labor in sawmill and furniture companies should inculcate health and safety culture in planning and work practices and among their employees to prevent and control occupational health problems
2. Workers in the wood industries should be properly trained on the dangers inherent in the chemicals used in the industries to enable them adopt precaution to prevent illness.
3. Managers and unions of sawmill and furniture industries should priorities pre-employment health assessment, on –the- job health assessment and provision of first aid equipment and services during emergencies.

References

- Achalu, E. I. (2016). *Fundamentals of Occupational Health and Safety*. Splendid Publishers.
- Achalu, E.I., (2010). *Occupational Health and Safety*. Splendid Publishers.
- Agu A.P, Itmeokonkwo C. D., Nnabi R. C., Odusanga. O., (2021). Health problems among sawmill workers in Abakaliki.. *Journal Of Community Health Medicine And Primary Health Care* 28 (2) 1-10
- Agu, A. P., Itmeokonkwo, C. D., Nnabi, R. C., & Odusanga, O. (2021). Health problems among sawmill workers in Abakaliki. *Journal of Community Health Medicine And Primary Health Care*, 28(2), 1-10
- Aguwu E.N., (2013). A Review of Sir Thonas Legges Aphorisms and work place personal protective equipment. *Journal of Occupational Medicine And Health Health Affairs*
- Amanze, H. E. & Agu, B. N., (2014). *Concept of Occupational Health and Safety Technology: For Public Health and Safety Professionals*. Harey Publications coy.
- Amanze, H. E. & Agu, B. N., (2014). *Concept of Occupational Health and Safety Technology: For Public Health and Safety Professionals*. Harey Publications coy.
- American Academy of Family Physicians, (2016). Hidden Tradey: Underreporting of workplace Injuries and Illness. Retrieved from www.gpo.gov/G-11ohhrg4288/pdf.
- Bureau of Labour Statistics, (2019). *Ten Most Dangerous Jobs and Hazardous Jobs in 2019*. [https://www. Marlincompany.com](https://www.Marlincompany.com).
- Bureau of Labour Statistics, (2019). *Ten Most Dangerous Jobs and Hazardous Jobs in 2019*. [https://www. Marlincompany.com](https://www.Marlincompany.com).
- Corey A. (2020). *Ten Most Dangerous Jobs in the world*. [https://www.google.com/amp/brightside.me/wondercuriosities/the most dangerous jobs in the world](https://www.google.com/amp/brightside.me/wondercuriosities/the%20most%20dangerous%20jobs%20in%20the%20world).
- Dave, K.V., Cecil, D., Don, S., Paul, V., Lawrence, K., Murrey , F., Karen D.T. & Tom, W (2011). Occupational health and safety issues in Ontorio sawmills and Veneer/plywood manufacturing industries. *Journal of environmental and public health*. 2 (10), <https://doi.org/10.1155/2010/526487>
- Dino, L.P., Karan, E. & Luciano, M. (2012). Wood dust exposure dusting furniture manufacture. *American Industrial Hygiene Association Journal*. <https://dn.org/10.1080/15296691365090>

- Jain, R.K. & Rao, S.S. (2011). *Industrial safety, health and environment management systems*. Khana
- Johnson, O. E. Umorai, Q. M (2018). Occupational hazard and health problems of saw dusts workers in uyo Nigeria. *Journal Of Environmental And Occupational Health*, 7 (2),17-24
- Marlin, I., (2019). *The Top Ten Most Hazardous and Dangerous Jobs in the world in 2019*. <https://www.the-marlin-company.com/blog-articles/dangerous-jobs-2019>.
- Mumuni, M.,(2015). Respiratory health problems among sawmill workers at Timber Market Accra, Ghana. <http://www.osha.mddsz.gov.si/resources>
- Nenbee, N. D.(2021). *Wood waste processing as predictor of employment generation and pollution control in sawmills in Rivers State*. Thesis Submitted To The Department of Human Kinetics And Health Education, Faculty Of Education, University of Port-Harcourt
- Occupational Safety and Health Administration (2016). *Code of Federal Regulations on Air Contaminants*. <https://www.c.amedd.army.mil>
- Patrick, A. A., Caleb, A. A., Temitope, O. O, & Olanrewaju, E. (2013). *Knowledge of chemical hazards and safety practices Among furniture makers exposed to organic solvents in Ile- Ife Nigeria*. www.texilajournal-
- Prasha, & Prathiba, B. (2010). *Industrial safety and environment*. Plus Computers.
- Raheleh, H. H., Hannaneh, N, & Mahdi, N. (2018). Effects of dust exposure on the respiratory health symptoms and pulmonary functions of street sweepers. *Malays J M.Sc* <https://www.nch.nlm.nih.gov/pmc/article>
- Uche, C. (2020). *Ten most Dangerous Jobs in the World*. [https://www.after-school-Africa.com/47712/top 10 Most Dangerous jobs in the world](https://www.after-school-Africa.com/47712/top-10-Most-Dangerous-jobs-in-the-world).