

# Prevalence and Variation of Occupational Illness and Diseases among Construction Workers in Niger Delta, Nigeria

Ifeoma Blessing Sam-Gabriel, Charles Uwadiae Oyegun, Chinemerem Patrick

**Abstract**— The construction industry is one of the most hazardous industries in the world, which has a direct part in the development of countries. The purpose of this study was to investigate the prevalence and variation of occupational illness and diseases among construction workers in Niger Delta, Nigeria. The data utilized in this study were based on stratified sampling of construction workers representing the selected companies in the study. Out of the 236 self-administered questionnaires distributed, 213 were used for the study, representing a response rate of 90.25%. Data were analyzed using descriptive and inferential statistics and presented in tables and figures. Findings from the study shows that the diseases more common among these construction workers include: vision related illnesses, musculoskeletal disorders, skin diseases and nasal related illness/diseases. Result from the study shows  $F(2, 210) = 27.318, p < 0.05$  which indicates that there was a significant variation in occupational diseases among workers based on safety management implementation in the study area. Considering the high prevalence of occupational illnesses/diseases among construction workers, more stringent occupational safety and health interventions are recommended in construction workplaces.

**Index Terms**— Construction workers, Occupational disease/illness, Prevalence, Variation.

## I. INTRODUCTION

The construction industry is among the largest and most hazardous industries in the world, which has a direct role in the development of countries. Construction workers are exposed to work-related health and safety hazards since this industry is not well organized in developing countries due to its rapid growth [1]-[3]. About 350 million workers currently work in this industry around the world [2].

While in developed countries approximately 6-10 % of the workers are employed in the construction industry, about 20-40 % of deaths are attributed to this industry [4]. The International Labour Organization (ILO) estimates that approximately 6000 workers die each day world wide and 337 million people are victims of work-related accidents or illnesses arising from occupational injuries [5]. In Nigeria, the construction industry loses at least 5% of its workforce

annually to injuries and fatalities, while the influx of new blood has reduced by 17% compared to that of 1970s [6].

Atsumbe et al. [7] describes work-related diseases or occupational disease and illness as any chronic ailment that occur as a result of work or occupational activity. According to [8], an occupational disease is any chronic ailment that occurs as a result of work which is usually more prevalent in a given body of workers than in the general population within the same domain. Occupational diseases are related to exposures to physical, chemical, biological and psychological hazards; they usually develop over a period of time and often resemble or duplicate diseases occurring in other settings. It is an aspect of occupational safety and health [7].

Muchemedzi and Charamba [9] define occupational health as a science concerned with health in its relation to work or working environment. According to [10], the health and safety of all employees is closely linked to the company's productivity in all workplaces. In most cases, occupational health and safety (OHS) is largely measured by negative outcomes such as workplace injury and illness but these measures have a shortfall. For instance, a low incidence of injury or illness does not necessarily mean that adequate health and safety systems and controls are in place [11].

The construction workers are exposed not only to hazardous equipment, machinery and situations but also to work-related diseases due to workplace health problems such as harmful factors including physical factors (noise, vibration, thermal stress), chemical factors (aerosols, gases and vapors) and ergonomic factors (manual handling, improper body positioning, exerting excessive strength and repetitive movements) [1], [12], [13]. However, limited studies have been conducted on the prevalence and variation of occupational diseases in the construction industries. Various studies have reported respiratory [14], ocular [15], skin [1], and neurological diseases [16] as well as musculoskeletal disorders [16], [17] as the most common work-related diseases in the construction industry in other countries. In Nigeria, there is no information available on work-related diseases in this industry.

Given that there is no comprehensive and complete information based on actual recorded data on the prevalence and variation of work-related illness and diseases in the construction industry in Nigeria, the purpose of this study was to identify the information gap on the prevalence and variation of work-related illness and diseases among construction workers in the Niger Delta in order to provide correction and control strategies.

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II. RESEARCH METHODOLOGY

A. Research Design

This cross-sectional study was conducted to investigate the prevalence and variation of work-related diseases and illnesses among construction workers in Niger Delta, Nigeria. Niger Delta comprises of nine (9) States (Abia, Akwa-Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers) with 185 LGA. 236 construction workers were selected out of seven construction workplaces in northern, southern, eastern, western and central parts of the Niger Delta.

B. Participants

The target participants for this research consisted of site managers, engineers, foremen, quantity surveyors, architects, building trade operatives such as bricklayers, carpenters and others who work in major building construction companies in the Niger Delta, Nigeria. 236 workers with at least one year of work experience in the construction workplaces participated in the study.

C. Data Collection and Quality Control

Data were collected by researcher-made questionnaire containing questions about the prevalence of work-related diseases/illness and demographic characteristics of the study participants. The formal validity of the questions was confirmed by occupational health and safety experts. For this purpose, questionnaires were sent to experts by e-mail and they gave us their feedback regarding the necessary corrections. Questionnaire was computed and administered to 236 construction workers including the site managers, foremen, quantity surveyors, engineers, architects, building trade operatives. Confidentiality was maintained and informed consent was obtained. The workers were told that the collected data was just for the purpose of conducting a scientific study and they could discontinue participation in the study whenever they wished.

During training of data collectors and supervisors, issues such as the data collection instrument, sampling technique, inclusion-exclusion criteria and recordkeeping were emphasized. The researchers coordinated the process, spot-checked and reviewed the completed questionnaires on a daily basis to ensure the completeness and consistency of the data collected. The questionnaire was pre-tested on 20 respondents in order to identify potential problem areas, unanticipated interpretations and cultural objections to any of the questions. Based on the pre-test results, the questionnaire was adjusted contextually. Out of the 236 questionnaires distributed, a total of 213 questionnaires were deemed fit for use for the data analysis, representing a response rate of 90.25%.

D. Data Analysis

Data analysis was performed using SPSS software version 22. Data gathered were presented via tables and charts and analyzed with descriptive and inferential statistics. Descriptive statistics comprised: frequencies, mean, percentages, standard deviation, ranks and relative importance index. Inferential statistics included the analysis of variance (ANOVA).

III. RESULTS AND DISCUSSION

A. Demographics of Respondents

The result of the demographic of the respondents are shown in Figure 1. For age, demographic criteria showed that there were more male respondents than female. More than

half of the respondents indicated that they were married. A total of 54% of the respondents agreed to be married while 46.5% agreed not to be married. Most of the respondents indicated that they have at least obtained a bachelor degree. A total of 65 respondents stated that the highest level of educational qualification they have is a WAEC certificate which accounted for about 30.5% of the total respondents, 111 respondents stated that they obtained a bachelor degree which accounted for about 52.1% of the total respondents while 37 respondents stated that they have obtained a degree higher than a bachelor degree.

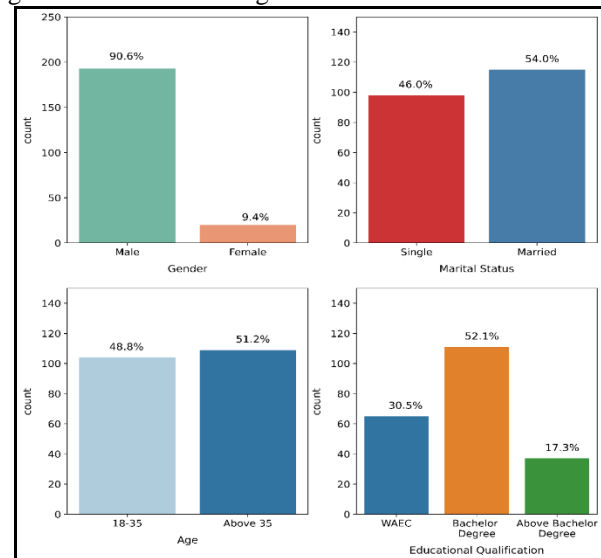


Figure 1: Demographic criteria of Respondents

B. Job Designation in the Construction Industry

The result of the job designation of construction worker in the Niger Delta region of Nigeria is shown in the pie chart in Figure 2. The result shows that majority of the worker surveyed were building trade personnel. The building trade personnel are made up of the skill workers (e.g., carpenter, welder etc.) in the construction industry. 86 respondents stated that they were building trade personnel which accounted for about 40.4% of the total respondents, 55 respondents stated that they were engineers which accounted for 25.8% of the total respondents, 40 respondents stated that they were project managers which accounted for 18.8% of the total respondents. Quantity surveyor and architect were the two job roles in the construction industry which accounted for 8.9% and 6.1% of the total respondents respectively.

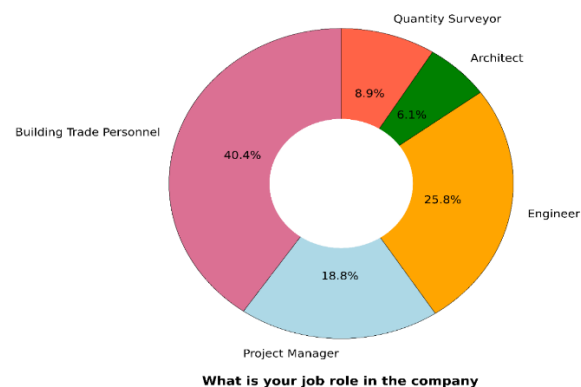


Figure 2: Pie Chart of Job Designation

C. Prevalence of Occupational Diseases That Mostly Affect Construction Workers

Result from Table 1 shows that the diseases more common among these construction workers include: vision related illnesses (with rank of 1<sup>st</sup>), musculoskeletal disorders (with rank of 2<sup>nd</sup>), skin diseases (with rank of 3<sup>rd</sup>) and nasal related illness/diseases (with rank of 4<sup>th</sup>). The result in Table 2 shows that respiratory related illnesses, respiratory related illnesses, gastrointestinal diseases, vibration related illnesses, cardiovascular related illness/diseases and lung related issues

were experienced most among workers who recorded low implementation of SMS and lowest among workers who recorded high implementation of SMS. This result indicates that occupational diseases is influenced by SMS implementation in the construction companies under the study area. This implies that high implementation of safety management system reduces occurrence of occupational diseases/illnesses.

Table 1: Prevalence of Diseases that mostly affect Construction Workers in the Niger Delta

| S/N | Occupational Diseases  | SA        | A         | D         | SD         | U          | Rank |
|-----|--|-----------|-----------|-----------|------------|------------|------|
| 1   | Respiratory related illnesses (e.g., asthma).                            | 0<br>0%   | 0<br>0%   | 20<br>9%  | 100<br>47% | 93<br>44%  | 8th  |
| 2   | Vision related illnesses (e.g., conjunctivitis).                         | 44<br>21% | 47<br>22% | 65<br>31% | 33<br>15%  | 24<br>11%  | 1st  |
| 3   | Hearing related problems (e.g., hearing impairment).                     | 0<br>0%   | 0<br>0%   | 31<br>15% | 99<br>46%  | 83<br>39%  | 5th  |
| 4   | Lung related issues (e.g., cancer).                                      | 0<br>0%   | 0<br>0%   | 23<br>11% | 83<br>39%  | 107<br>50% | 9th  |
| 5   | Skin diseases (e.g., dermatitis).  | 19<br>9%  | 18<br>8%  | 56<br>26% | 66<br>31%  | 54<br>25%  | 3rd  |
| 6   | Cardiovascular related illness/diseases (e.g., Ischemic heart diseases). | 0<br>0%   | 0<br>0%   | 23<br>11% | 95<br>45%  | 95<br>45%  | 7th  |
| 7   | Vibration related illnesses (e.g., Hand-Arm Vibration Syndrome-HAVs).    | 0<br>0%   | 0<br>0%   | 26<br>12% | 99<br>46%  | 88<br>41%  | 6th  |
| 8   | Nasal related illness/diseases (e.g., rhinitis).                         | 9<br>4%   | 10<br>5%  | 67<br>31% | 69<br>32%  | 58<br>27%  | 4th  |
| 9   | Gastrointestinal diseases (e.g., irritable bowel syndrome)               | 0<br>0%   | 0<br>0%   | 24<br>11% | 80<br>38%  | 109<br>51% | 10th |
| 10  | Musculoskeletal disorders (e.g., neck pain).                             | 45<br>21% | 40<br>19% | 76<br>36% | 25<br>12%  | 27<br>13%  | 2nd  |

Table 2: Variation in Occupational Diseases among Construction Workers

| Occupational Diseases  | Safety Management System Implementation |    |    |     |    |                         |    |    |     |    |                     |    |    |     |    |
|--|---|----|----|-----|----|-------------------------|----|----|-----|----|---------------------|----|----|-----|----|
|  | Low Implementation                      |    |    |     |    | Moderate Implementation |    |    |     |    | High Implementation |    |    |     |    |
|  | *SA                                     | *A | *D | *SD | *U | *SA                     | *A | *D | *SD | *U | *SA                 | *A | *D | *SD | *U |
| Respiratory related illnesses (e.g., asthma).                            | 0                                       | 0  | 5  | 14  | 6  | 0                       | 0  | 15 | 67  | 63 | 0                   | 0  | 0  | 19  | 24 |
| Vision related illnesses (e.g., conjunctivitis).                         | 5                                       | 11 | 9  | 0   | 0  | 39                      | 36 | 47 | 13  | 10 | 0                   | 0  | 9  | 20  | 14 |
| Hearing related problems (e.g., hearing impairment).                     | 0                                       | 0  | 4  | 12  | 9  | 0                       | 0  | 27 | 65  | 53 | 0                   | 0  | 0  | 22  | 21 |
| Lung related issues (e.g., cancer).                                      | 0                                       | 0  | 4  | 13  | 8  | 0                       | 0  | 19 | 52  | 74 | 0                   | 0  | 0  | 18  | 25 |
| Skin diseases (e.g., dermatitis).  | 3                                       | 4  | 6  | 8   | 4  | 16                      | 14 | 37 | 44  | 34 | 0                   | 0  | 13 | 14  | 16 |
| Cardiovascular related illness/diseases (e.g., Ischemic heart diseases). | 0                                       | 0  | 5  | 12  | 8  | 0                       | 0  | 18 | 57  | 70 | 0                   | 0  | 0  | 26  | 17 |
| Vibration related illnesses (e.g., Hand-Arm Vibration Syndrome-HAVs).    | 0                                       | 0  | 4  | 11  | 10 | 0                       | 0  | 22 | 64  | 59 | 0                   | 0  | 0  | 24  | 19 |
| Nasal related illness/diseases (e.g., rhinitis).                         | 3                                       | 2  | 3  | 7   | 10 | 6                       | 7  | 53 | 43  | 36 | 0                   | 0  | 11 | 19  | 13 |
| Gastrointestinal diseases (e.g., irritable bowel syndrome)               | 0                                       | 0  | 3  | 9   | 13 | 0                       | 0  | 21 | 55  | 69 | 0                   | 0  | 0  | 16  | 27 |
| Musculoskeletal disorders (e.g., neck pain).                             | 6                                       | 8  | 11 | 0   | 0  | 39                      | 32 | 50 | 9   | 15 | 0                   | 0  | 15 | 16  | 12 |

\*SA= strongly agree, A = agree, D = disagree, SD = strongly disagree, U = undecided

To further analyze how occupational diseases vary based on implementation of safety management, analysis of variance (ANOVA) was employed which is presented in Table 3. Result from Table 3 shows  $F(2, 210) = 27.318, p < 0.05$ . This indicates that there was a significant variation in occupational diseases among workers based on safety management

implementation in the study area. Consequently, there was need to conduct post hoc test to ascertain where the difference occurred. Duncan post hoc test was used to achieve this and is presented in Table 4.

Table 3: ANOVA for Variance in Occupational Diseases Based on Safety Management System Implementation

| Sources of Variation | Sum of Squares | df  | Mean Square | F      | p-value |
|----------------------|----------------|-----|-------------|--------|---------|
| Between Groups       | 6.332          | 2   | 3.166       | 27.318 | .000    |
| Within Groups        | 24.339         | 210 | .116        |        |         |
| Total                | 30.671         | 212 |             |        |         |

\*With a significance level  $\alpha=0.05$

Table 4: Duncan Post Hoc Test for Occupational Diseases Based on Safety Management System Implementation

| Level of Implementation | N   | Subset for alpha = 0.05 |        |        |
|-------------------------|-----|-------------------------|--------|--------|
|                         |     | 1                       | 2      | 3      |
| High                    | 45  | 1.8089                  |        |        |
| Medium                  | 149 |                         | 2.1772 |        |
| Low                     | 19  |                         |        | 2.4000 |
| Sig.                    |     | 1.000                   | 1.000  | 1.000  |

\*With a significance level  $\alpha=0.05$

Result obtained shows that the diseases more common among these construction workers include: vision related illnesses, musculoskeletal disorders, skin diseases and nasal related illness/diseases. From the result, vision related illnesses and musculoskeletal disorders occur moderately. Skin diseases, nasal related illness/diseases, hearing related problems, vibration related illnesses, cardiovascular related illness/diseases and respiratory related illnesses occur sometimes. Gastrointestinal diseases and lung related issues rarely occur.

This result corroborates with the findings of [18] that eye strain, skin diseases among others were diseases that commonly affect construction workers in Pakistan. The findings also corroborate the finding of [19] whose research disclosed that most building construction workers suffer from eye injuries, skin irritations and muscles skeletal disorders. Similarly, the finding agrees with that of [8] that muscles, bones, joints, skin diseases were widespread among artisans and factory workers in Ife, Nigeria.

From the result, vision related illnesses which ranked 1<sup>st</sup> had the highest occurrence (100%) among workers who recorded low implementation of safety management system. Furthermore, it has the lowest occurrence (20.9%) among workers who recorded high implementation of safety management system. Again, musculoskeletal disorders which ranked 2<sup>nd</sup>, had the highest occurrence (100%) among workers who recorded low implementation of safety management system and lowest percentage occurrence (34.9%) among workers who recorded high implementation of safety management system. Skin diseases which ranked 3<sup>rd</sup> had highest percentage occurrence (52.0%) among workers who recorded low implementation of SMS and lowest percentage occurrence (30.2%) among workers who recorded high implementation of SMS.

In this study, as in other studies [15], on construction workers, the prevalence rate of eye (vision) diseases was

higher than that of musculoskeletal disorders due to lack of use of personal protective equipment such as glasses. This difference may also be due to the difference in the type of construction activities and data collection methods.

Bhuiyan et al. [1] reported skin diseases (59.5 %) as the most prevalent diseases among construction workers. This is not consistent with the results of the present study and the difference in results can be due to clothing contamination or the use of personal protective equipment such as gloves.

The prevalence of respiratory diseases among construction workers in the present study was significantly different from that in other studies [14], [20], in this study, respiratory diseases were among the least common among work-related illnesses probably due to the least exposure to chemical harmful factors in the workplace based on the workers' self-reports. Other reasons for these differences could be attending a safety training program in addition to timely and correct use of personal protective equipment, including respiratory protectors.

Similarly, respiratory related illnesses, respiratory related illnesses, gastrointestinal diseases, vibration related illnesses, cardiovascular related illness/diseases and lung related issues all had the highest percentage occurrence among workers who recorded low implementation of SMS and lowest percentage occurrence among workers who recorded high implementation of safety management system. This result suggests that occurrence of occupational diseases is influenced by safety management system implementation in construction companies under the study area, implying that that high implementation of safety management system reduces occurrence of occupational diseases/illnesses.

This result corroborates the result obtained by [21] who from their study discovered a significant relationship between poor safety culture and rate of fatalities and illnesses in construction companies in Nigeria. The result also agrees with that of [22] who found that implementing occupational health and SMS significantly reduced rate of accidents and illnesses in construction companies in South Korea.

There were some limitations in this study that should be taken into consideration when interpreting the results. The

cross-sectional design of the study, self-reporting of collected data may not allow actual causative conclusions to be made. Furthermore, since the current research was conducted among the construction workers with conservative data, bias in the collected data may have affected the results obtained.

#### IV. CONCLUSION

The results of this study showed that vision related illnesses (with rank of 1<sup>st</sup>), musculoskeletal disorders (with rank of 2<sup>nd</sup>), skin diseases (with rank of 3<sup>rd</sup>) and nasal related illness/diseases (with rank of 4<sup>th</sup>) were the most common work-related illness/diseases among the construction workers in Niger-Delta, Nigeria. Furthermore, variation was revealed in the occupational diseases across the construction companies studied and these occupational diseases are influenced by safety management system implementation in construction companies under the study area. This implies that high implementation of safety management system reduces occurrence of occupational diseases/illnesses.

#### DECLARATION OF INTEREST

The author(s) declare no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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