



Assessment of Occupational Diseases among Artisans and Factory Workers in Ifo, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author USO wrote both the protocol and the second draft of the manuscript, while Author SAI managed the literature searches. Author SOD designed the study and wrote the first draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

The ever increasing incidences of occupational diseases among workers have continually drawn the attention of researchers towards ameliorating the situation. Investigation was launched to assess occupational diseases among artisans and factory workers in Ifo, Nigeria. Structured questionnaires with oral interview were employed to complement the health records of the respondents at the Government accredited health center. Of the one hundred and fifty six (156) respondents, ninety six (62%) are males and sixty one (38%) female, sixty one point fifty four percent (61.54%) are youths of age 20 to 39 years, fifty one (32.69%) are illiterates and one hundred and eight (69.21%) earn ₦100, 000 (\$615) and below as monthly wages. The diseases prevalent in these workers were evaluated to include but not limited to disorders of muscles, bones, joints, skin and the respiratory organs indicating that most of the jobs are such that causes damages to these special parts of the body and could lead to deformities/incapacitation in old age. Common amongst these diseases are Pre-patellar bursitis and Eczema (1.92% each), Tuberculosis, Asthma and Sunburn (5.77% each). Toxic/inflammatory syndrome, hearing impairment, allergies and computer vision syndrome (7.69% each). Two (1.28% in each case) have been diagnosed of Lead poisoning, Lung cancer, Carpal tunnel syndrome, Pulmonary fibrosis, Meniscus lesion and Olecranon bursitis. Upper airway disorders

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(4.49%), Irritations (3.21%), Post-traumatic stress syndrome (11.54%), skin allergies (13.46%). Chronic bronchitis; Pneumonia; Pneumoconiosis; Hepatitis and Anthrax-like infection (0.64 % each). The causes of these diseases/disorders include dusts from quarry, textile, cotton, metal, paper, mineral, wood, cereals, cement, and chemical fumes industries, extreme posture of wrist, repetitive movements, inhalations from petrol fuel, prolonged pressure of the elbow region, prolonged kneeling/ squatting position, forceful exertions and microorganisms. Adequate occupational health and safety awareness through training and campaign should be provided. The use of personal protective equipment among workers should also be encouraged.

Keywords: Artisan; disease; exposure; hazard; lfo; occupational.

1. INTRODUCTION

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 [1]. 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. Among the environmental causes of occupational disease are subjection to extremes of temperature, unusual dampness or changes in atmospheric pressure, excessive noise, and exposure to infrared or ultraviolet radiation or to radioactive substances [2]. About half of all occupational diseases are skin disorders, followed in order by eye disorders, lung disorders, poisoning involving the body as a whole [3]. In the United States, it has been reported that 860,000 illnesses and 60,300 deaths from workplace exposures occur annually [4]. Also, it is estimated that more than 100,000 workers are occupationally exposed to free crystalline silica dusts 59,000 of whom will develop silicosis later in life [5]. There were approximately 3,400 reported cases of occupational illnesses in Connecticut in 2009 with a rate of 25.6 per 10,000 workers [6]. Studies by [7,8] have found that 75 percent of hospitalized and ambulatory primary care patients reported hazardous exposures, and 17 percent suspect that their illness is linked to their jobs. Many conditions commonly encountered in primary care practice may be work-related [9,10]. A widening array of exposures has been linked to occupational asthma related to possible exposure to allergens (e.g., grain dust), respiratory irritants (e.g., sulfur dioxide) or substances acting through other mechanisms (e.g., isocyanates) [11,12]. Less frequently, recurrent "flu" or "pneumonia" may actually be symptoms of hypersensitivity pneumonitis from exposure to mold, other organic materials or certain chemicals. Chronic organic solvent exposure is responsible for a syndrome that includes headaches, fatigue, light-headedness, cognitive difficulties and depression [13].

In many developing countries of the world especially in Africa, health and protective measures which are systematic ways of controlling possible hazards which usually leads to dangerous working conditions are yet to be established [14]. Pesticide exposure is the major occupational hazard facing farmers, females and children in India and researchers are working on the various effects of pesticide exposures and risk assessment throughout the country [15]. Though numerous studies [16,17,18,19] have been carried out on the pulmonary effects of silica exposure, the result of [20] suggested that in Shanghai, the main cause of bladder cancer was occupational exposure, especially to benzidine. Bladder cancer was also reported in dye manufacturing workers in South Korea [21]. Soyinka *et al.*, [22] investigated the possible effects of occupational exposure by textile dyeing and finishing

artisans to vat dyes on liver functions in Abeokuta, South Western Nigeria and the result indicated sub-clinical adverse effects on the liver involving inhibition of its synthetic function.

It has also been reported that quarry workers are exposed to various occupational dangers including cuts/injuries, falls from height, effect and complications of noise, vibrations, radiations etc and such hazards emanates from inhalations of air-borne particulates and posing lot of dangers to their health and safety [14,23,24,25,26,27] and usage of personal protective equipment (PPE) for controlling job hazards has not been given prominence [14,24,28]. In Nigeria, there is still paucity of information on health and protective/safety measures among workers and the few available studies were carried out in the Northern and Eastern parts of the country [14,28,29]. In this respect, the present research is to evaluate the occurrence, types and effects of occupational diseases among artisans and factory workers in Ifo, South-Western, Nigeria. The proximity of Ifo to major industrial cities like Ota, Lagos, Ibesse and Ewekoro position it to play host to lots of artisans, quarry and construction/factory workers. The choice of Ifo for this study is because there is presently no record of any study focusing on occupational diseases in the town.

2. MATERIALS AND METHODS

2.1 Study Area and Sampling Technique/Procedure

This study was carried out at Ifo municipality. Ifo is a Local Government Area in Ogun State, Nigeria. Its headquarters are in the town of Ifo at 6°49'00"N 3°12'00"E [30]. It has an area of 521 km² and a population of 524,837 at the 2006 census with well over 5% being artisans. Sampling was limited to artisans and factory workers within Ifo town and was carried out through distribution of the structured questionnaires followed by oral interviews with respondents who were earlier schooled on the purpose of the research thus obtaining their informed consent to participate in the exercise. Besides, out of the 200 supposed respondents, only 156 had health records in relation to occupational diseases at the general medical center from where their past health data (between May 2007 and June 2012) were obtained for the purpose of this research. The inclusion criteria were five (5) year experience on the job and those who did not meet up were excluded from the survey. Individuals involved includes but not limited to: Construction workers, Quarry workers, Motor repair Engineers (popularly called Mechanic), Carpenters, vulcanizers, Hairdressers/Barbers, Computer operators, Welders amongst others.

2.2 Instrument of Data Collection and Method of Data Analyses

The instrument used for this research is structured interviewer-administered questionnaires containing both closed and open ended questions followed by oral interview. The information elicited from respondents was analysed using descriptive analysis such as frequencies, mean and mode using the SPSS version 20 [31]. A total of 200 participants were initiated for this survey, however, only 156 of these provided full information on the questionnaire interview coupled with medical records at the State owned Medical center and thus was collated for analysis.

3. RESULTS

Table 1 shows the demographic characteristics of the respondents in this survey. The distribution of the subjects by sex shows that ninety six (62%) were males while sixty (38%)

are females. Forty two (26.92%) of the respondents are between the age 20-29 years, fifty four respondents (34.62%) are between 30-39 years of age, thirty six (23.10%) are between the age group 40-49, nine (5.77%) are of age bracket 50-59 years, fifteen respondents representing 9.62% are between the age of 60-69 while none of the respondents belong to the age group 70 and above.

Judging by the marital status of the 156 respondents, thirty nine (25%) are single, ninety are married representing 57.69% of the sample population, twenty one (13.46) are widowed while the remaining six are divorcee representing 3.85% of the sample population. Among the respondents, thirty had attained primary level of education which represents 19.23% of the population, thirty nine (25%) had secondary school qualifications, thirty six respondents 23.10% have successfully passed through tertiary institution while the remaining fifty one (32.69%) of the respondents are illiterates.

Table 1. Socio-demographic data of respondents

| Characteristics | Frequency | % |
|--------------------------------|-----------|-------|
| Gender: | | |
| Male | 96 | 62.00 |
| Female | 60 | 38.00 |
| Age: (n=156) | | |
| 20-29 | 42 | 26.92 |
| 30-39 | 54 | 34.62 |
| 40-49 | 36 | 23.10 |
| 50-59 | 9 | 5.77 |
| 60-69 | 15 | 9.62 |
| 70 \geq | 0 | 0 |
| Mean age \pm SD=38 \pm 1.8 | | |
| Marriage: | | |
| Single | 39 | 25 |
| Married | 90 | 57.69 |
| Divorced | 21 | 13.46 |
| Widowed | 6 | 3.85 |
| Education: | | |
| Primary school | 30 | 19.23 |
| Secondary school | 39 | 25 |
| Tertiary | 36 | 23.10 |
| Illiterates | 51 | 32.69 |

Table 2 reveals the work related characteristics of the respondents. On the basis of occupations, eighteen (11.54%) each are carpenters and hairdressers/barbers, fifteen each are mechanics (motor vehicle repairers) and vulcanizers which represents 9.62%, twenty one (13.46%) are welders, 12(7.69%) each are involved in baking/catering services and computer operation, nine (5.77%) each are construction and healthcare workers. Three respondents are soap makers constituting 1.92% while the remaining thirty nine (25%) are involved with different kinds of job specification in the chemical, quarry and cement industries. According to monthly income, thirty six earn between ₦1-20,000 and these represents 23.12% of the sample population, twelve (7.69%) make between ₦21-50,000, 60 (38.40%) earn ₦51-100,000, twenty eight (17.92%) respondent earn ₦101-150,000 while the remaining twenty (12.80%) of subjects makes above ₦150, 000 monthly. On the use of Personal protective equipment (PPE), thirty five representing 22.44% always use their PPEs

while the remaining one hundred and twenty one (77.56%) do not use PPEs at all. On the length of work, one hundred and nineteen (76.28%) workers work for 5 to 8 hours in a day while the remaining thirty seven (23.72%) work for over 8 hours in a day.

Table 2. Work-related characteristics of respondents

| Characteristics | Frequency | Percentage |
|--|-----------|------------|
| Occupation: | | |
| Carpentry | 18 | 11.54 |
| Mechanic | 15 | 9.62 |
| Vulcanizing | 15 | 9.62 |
| Welding | 21 | 13.46 |
| Hairdressing/Barbing | 18 | 11.54 |
| Catering | 12 | 7.69 |
| Construction | 9 | 5.77 |
| Healthcare | 9 | 5.77 |
| Computer operation | 12 | 7.69 |
| Soap making | 3 | 1.92 |
| Others | 39 | 25 |
| Income: (n=156) | | |
| ₦1,000-20,000 | 36 | 23.12 |
| ₦21,000-50,000 | 12 | 7.69 |
| ₦51,000-100,000 | 60 | 38.40 |
| ₦101,000-150,000 | 28 | 17.92 |
| ₦150, 000≥ | 20 | 12.80 |
| Mean income \pm SD=75948 \pm 71.1 | | |
| Use of PPE: | | |
| Always use | 35 | 22.44 |
| Do not use | 121 | 77.56 |
| Duration of work per day: | | |
| 6-8 hours | 119 | 76.28 |
| >8 hours | 37 | 23.72 |
| Number of years on the job: (n=156) | | |
| 5-10 years | 11 | 7.05 |
| 10-15 years | 13 | 8.33 |
| 15-20 years | 132 | 84.62 |
| Mean year \pm SD=16 \pm 31.1 | | |
| Training prior to work: | | |
| Received formal training | 153 | 98.08 |
| Didn't receive formal training | 3 | 1.92 |
| Awareness of work hazard: | | |
| Aware | 7 | 4.49 |
| Not aware | 149 | 95.51 |

The number of years each worker have been on the job was also evaluated and eleven (7.05%) workers were found to have been on their job for a duration of 5 to 10 years; thirteen (8.33%) workers have been on their job for between 10 and 15 year while the remaining one hundred and thirty two (84.62) have been on their respective jobs for 15 to 20 years. It was also evaluated that one hundred and fifty three (98.08%) respondents received formal training before commencement of work while the remaining three (1.92%) did not. On awareness of hazards related to these occupations, seven (4.49) respondents are ware of

such hazards while the majority one hundred and forty nine (95.51%) are not aware of the occupational hazards.

Fig. 1 shows the types of diseases for which the respondents has being diagnosed and are either living with it and dying in silence or are receiving treatment as at the time of this survey. Among the respondents interviewed, only three suffer from, Eczema, Pulmonary edema and Pre-patellar bursitis respectively representing 1.92% in each case, nine had Tuberculosis, Asthma and Sunburn representing 5.77% in each case, twelve (7.69%) each suffer from Toxic or Inflammatory syndrome, Hearing impairment, Allergies and Computer vision syndrome, two had been diagnosed of Lead poisoning; Lung cancer; Carpal tunnel syndrome; Pulmonary fibrosis; Meniscus lesion and Olecranon bursitis representing 1.28% in each case, seven (4.49%) suffer from Upper airway disorders, five (3.21%,) suffers from Irritations, eighteen (11.54%) respondents had Post-traumatic stress syndrome, twenty one had skin allergies representing 13.46%. One (0.64 %) each of the respondents suffers from chronic Bronchitis; Pneumonia; Pneumoconiosis; Hepatitis and Anthrax-like infection. Some workers however reported more than one disease.

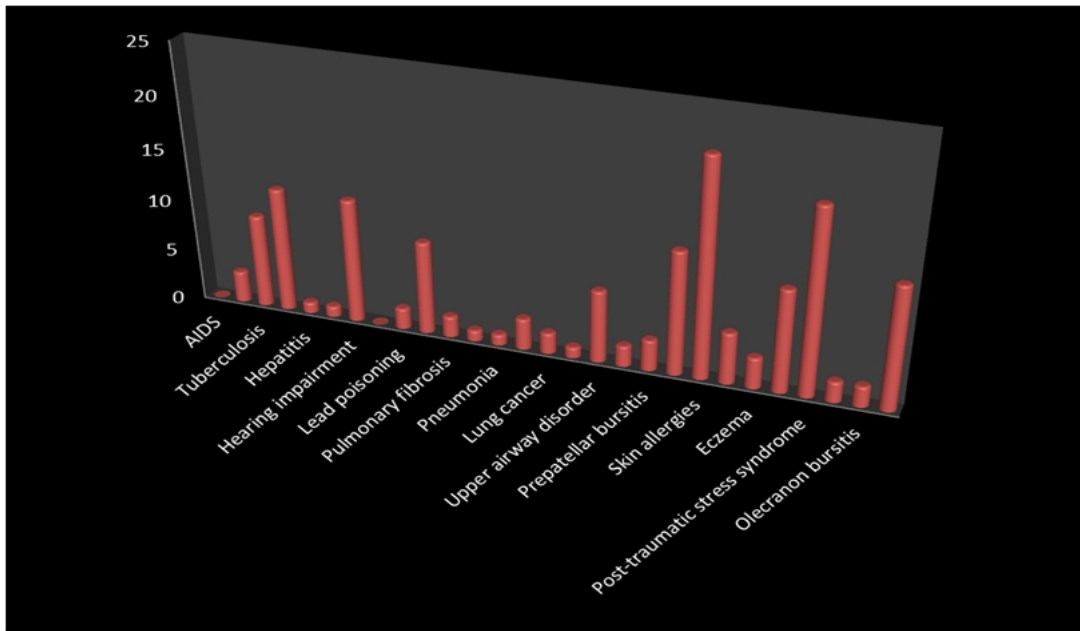


Fig. 1. Types of occupational diseases

Fig. 2 shows the various causes of the diseases/disorders as obtained from past health records of the respondents. Among the total one hundred and fifty six (156) participants, two (1.28%) in each case have been exposed to Stone quarry dusts and textile dusts which are the causes of occupational diseases they suffer from, One respondent each suffer from disease due to exposure to dust and cotton dust and these represent 0.64%, fourteen (8.97%) have been victims of Extreme posture of wrist, eighteen were victims of repetitive movements, inhalations from petrol fuel and exposure to hard metal dust resulting in the diseases they suffer from and these group account for 11.54% each of the entire subject. Twenty one workers were victims of prolonged pressure of the elbow region causing diseases and such individuals accounted for 13.46%, eight respondents had exposure to

paper dust, prolonged kneeling position and prolonged squatting position which are in turn the causes of diseases and these represent 5.13% in each case. Four of the respondents were pre-exposed to Mineral dust and is the cause of diseases and such amount to 2.56%, twenty four (15.38%) subjects had constant exposures to wood dust, cement dust and chemical fumes causing diseases for them. Three were exposed to Cereal dust causing diseases representing 1.92% while ten (6.41%) persons of the total respondents in each case suffered from disease as a result of exposure to Microorganisms and forceful exertions in their working environments.

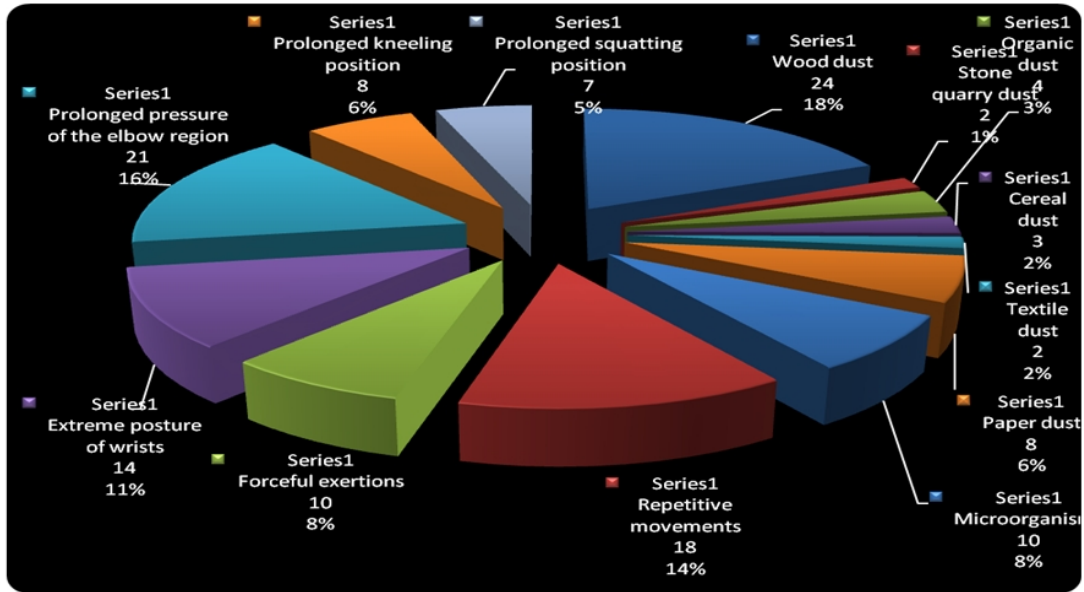


Fig. 2. Causes of occupational diseases

4. DISCUSSION

Males are the majority of artisans in Ifo town and this could be so because most of the job specifications examined in this study are heinous, herculean and tasking and as such requires a great deal of strength and energy from the persons practicing/participating in them. Males are generally known to be more powerful and daring than their female counterparts and this could be why majority of the people involved in artisanian jobs in Ifo are males. Aigbokhaode et al. [32] also reported that majority of workers in a quarry study in Edo State, Nigeria were males.

The age range of most respondents falls between 20 and 49 with majority being between the age group of 30 to 39. This implies that artisanian jobs are almost completely carried out by youths or young people leaving little or no room for the old and aged. The reason for this could also be due to the strength energy dissipation involved in such works, the young men and women are still very much full of strength and energy and so could engage in strenuous jobs while most old men and women have lost out in strength and energy and as such could not engage in difficult tasks anymore. Even those who were once artisans would have since retired from such jobs due to lack of strength. This confirms the study on quarry workers in Ikpesi community, Edo State where the workers were reported to be predominantly young

people [32]. Such results have been obtained by other researchers in Nigeria [14,25,29]. Besides, the age structure of this study population reflects the true demographic structure of Nigeria based on the 2006 National census report [34,35,36]. According to this data, fifty four point six (54.6%) of Nigerians are between 15 and 65 years. Other workers in Nigeria have reported similar age structures [33,36,37,38,39].

Taking a closer look at the marital status of the respondents, majority are married individuals with their own families which implies that they have responsibilities over wives, husbands, children and other dependents as the case may be. This corroborates the report of [40] who conducted a survey on the cardiovascular risk factors and non-communicable diseases in Abia state, Nigeria and reported that 58.3% respondents were married individuals. A good number of the workers are also single implying that young able bodied men and women are also involved in artisanian and menial factory jobs. Considering the educational level of the respondents, it was discovered that the illiterates among them are few in number compared to the literates with different levels of literacy. It could also be inferred that those with tertiary education certificates became artisans probably because of their inability to secure government or better company jobs. In the same vein, secondary and primary school leavers who lack the will to further their education or who could not due to finances mostly resort into learning a trade or becoming artisans. Previous researchers also reported high literacy levels among workers [32,40,41].

The subjects interviewed in this research are engaged in different types of jobs, among them all, chemical factory menial workers, welders, carpenters, hairdressers/barbers and motor repairers (mechanics) are the majority. Looking at their monthly income, majority of them earn between 20,000 to 100,000 Naira (\$123-615) which is an indication that these jobs barely sustain these individuals considering the cost of living in the country, one can say they are mainly surviving, living by the day. However, the jobs can be said to be lucrative and somewhat enticing due to high unemployment and high cost of living in this nation. A few of the respondents uses Personal protective equipment (PPE) during work and this agrees with the report of [32]. This result is also corroborates a study in Singapore where a few of the quarry granite workers use respiratory protective equipment [42]. This may be due to the poor awareness of job hazard among the workers. It is equally interesting that most of the artisans in this study are in compliance with the International Labour Organization (ILO) recommended average of eight working hours per worker in a day. Ogah et al., [40] in their study also reported that the average duration of time spent on by workers at workplace was 2.3 ± 2.7 hours. Also, the artisans in this study displayed a low level of awareness of work-related hazards and its impacts on their health and this contradicts the findings of [14] but agrees with a study carried out in Hong-Kong by [43].

Diseases recorded in this study, reveals disorders of muscles, bone, joints and skin as the most common indicating that most of the jobs are such that causes damages to these special parts of the body. This is similar to the findings of [6] who observed about 64% of chronic musculoskeletal disorders in Connecticut in the year 2009. It also corroborates the report of [44] that over 60% of reported occupational illnesses is work-related musculoskeletal disorders of various types. Researchers, [45,46,47,48] all reported high levels of musculoskeletal disorders in India. Skin allergies had the highest occurrence which agrees with [6] who reported contact dermatitis as the disease with highest occurrence in Connecticut. Post-traumatic stress syndrome was second in the list of disease among workers in Ifo. Cranmer and Goldberg, [13] and [49] equally reported headache, fatigue, depression, cognitive difficulties and stress as the probable kinds of neurologic diseases. These were followed by allergies, computer vision syndrome, Toxic inflammatory syndrome

and Hearing impairment. Next after these are Tuberculosis, sunburn and asthma. Asthma has been reported to have significant occurrence among workers [6,11,50,51].

Several causes of the above listed occupational diseases were evaluated among the artisans and factory workers during this study. Among them, wood dust, prolonged pressure of the elbow region, hard metal dust and repetitive movements have the highest occurrence in causing diseases. Hagberg et al. [51] reported that repetitions, force, awkward or static posture and vibrations are job factors that may contribute to the development of muscle and skeletal diseases. Extreme posture of the wrists also account for a significant cause of disease among the workers in the present study. This further corroborates the finding of [6,41] that repetitive movements, lifting and push (involving the excessive use of hands and wrists) and vibrations are the causes of muscle and skeletal diseases. Causes like paper dust, microorganisms, forceful exertions, prolonged squatting position, organic dust, stone quarry dust, chemical fumes and inhalations from petrol fuel account for little cause of diseases as seen in the health records of these workers. Exposures to grain dust and irritants have been identified as causes of occupational asthma [11,12]. Chronic organic exposure has also been reported to be responsible for headache, fatigue, light-headedness, cognitive difficulties and depression [13].

Workers in this research are in constant exposure to various chemicals in their working place. This agrees with [49] who reported that exposures to substances such as lead may cause conditions such as occupational asthma to progress to morbidity and disability states. Soyinka et al. [22] also established that exposure of textile workers to vat dyes resulted into sub-clinical adverse effects on liver and its functions. In the same vein, [52] discovered that exposure of workers to a bromoacrilamidic dye produced obstructive ventilator defect followed by arterial hypotension and urticarial.

The result of workers exposure to physical agents of disease is in conformation with previous research works; [2] listed fumes and smoke as occupational dangers. Likewise, [49] listed dusts (asbestos, silica and coal), noise, repetitive motions and radiations as sources of occupational diseases when workers are exposed to them.

The biological agents were associated to occupational diseases in this study. Out of these, microorganisms (bacteria and fungi) were constantly encountered and account for some of the diseases found among the artisans. Hepatitis virus is also common but on a low account while many other biological agents were incriminated by the respondents. Lax et al.[49] listed HIV, Hepatitis B and Tuberculosis as common biological agents of occupational diseases among workers. In the same vein, [6] reported that infectious diseases in Connecticut include both actual disease and exposure to potentially infectious agents. The authors recorded 577 reports of exposure to blood-borne pathogens which also included exposure to HIV/AIDS and Hepatitis C accounting for 68% of all infectious disease reported.

5. CONCLUSION

This report shows that the incidence and prevalence of several generalized and specialized occupational diseases among the factory workers and artisan in Ifo is high due to the many chemical, physical and biological agents they are exposed to on a daily basis. It is reasonable to conclude therefore that Ifo is an area with work force exposed to many occupational hazards and that the incidence is much likely to increase if the situation is not carefully arrested. It is recommended that adequate occupational health and safety awareness through training and campaign be provided in addition to effective labor laws to

protect workers from exposure to hazards. The use of personal protective equipment among workers should be encouraged. Stringent implementation of workers welfare schemes such as good medical care will to a large extent reduce job related diseases.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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