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INDUSTRIAL HAZARDS AND OCCURRENCE OF DISEASES AMONG THE INHABITANTS OF TRANS-AMADI, PORT HARCOURT, RIVERS STATE, NIGERIA

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Abstract:
Industrial hazards involves a wide range of different raw materials, intermediates, waste products and final products, these hazards encountered are fire, explosion, toxic release and environmental damage. The study review Industrial Hazards and Occurrence of Diseases among the Inhabitants of Trans-Amadi, Port Harcourt. The population consist of 50,000 persons. Descriptive survey design was used; multistage random sampling technique was adopted with sample size of 1000 respondents. A self-structured questionnaire was used which was analysed using inferential statistics of Chi Square at 0.05 alpha level. The findings revealed significant relationship between the variables and health of the inhabitants of the respondents negatively. The study concluded that the respondents are exposed to numerous health hazards such as fire outbreak, noise pollution, toxic chemical concentrates, smokes leading to soot all over Rivers states, environmental degradation among others. Based on conclusion, it was recommended that government should make environmental pollution a priority issue and provide incentives and requirement for industries to meet the responsibilities.

Keywords: industrial, hazards, occurrence of diseases, inhabitants of Trans-Amadi

1. Introduction

Industrialization is central to economic development and improved prospects for human well-being. It is the transformation of agrarian-rural societies to industrial-urban societies which are dominated by manufacturing of goods and services (Balk, Mc Granahan, & Anderson, 2008). The improvement in the health and living standard of

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many people especially in Port Harcourt as well as the creation of new employments in the manufacturing of certain appliances is linked to industrialization.

Brettd (2016) noted that industrialization has greatly contributed to widespread and large scale changes to how people live, and how well they live. He added that industrialization has served as engine for the development of technology, modern conveniences, medical advances, changes in lifestyle, education, popular living locations, transportation as well as engine for employment, wealth and technical skills. Though, as postulated by Tejani and Milberg (2010) industrialization was not designed principally to improve the health of the community, its influence on health and standard of living of the people in the western world is encouraging.

Industrialization develops the world and makes life better, but the lives of people who work and dwell around the vicinity where these industries are located are hunted by the huge volume of waste products dumped in the environment. Teka, (2011) also asserted that location of industries proceeds alongside urbanization with accompanied equal rapid, poor planned urban expansion-rapid growth of dense living within the neighbourhood without adequate expansion of clean water supply and sewage systems.

Shimeles & Ncube (2015) cited a report from Mexico in year 2000, which revealed the growth of the manufacturing sector that changed the costs of education and healthcare. They reiterated that because of the numerous industries situated in the areas with higher densities of schools and health clinics, there was increased access to good health and education but added that industrialization can also expose people and communities to harmful pollution. A population report in the community of Mumbai, India , indicated that 84000 deaths were directly attributed to outdoor air pollution in Indian cities, while in-door pollution accounted for 496,000 deaths in the villages and 93 deaths in cities and these often resulted in incidence of bronchitis, cancer, pneumoconiosis as well as water-borne diseases (Lin, 2011).

Industries introduce harmful agents to the atmosphere polluting the air and thus causing the inhabitants of such areas a considerable amount of health problems. Air pollution damages body cells and organs, causing cancer and increasing risk of other chronic and degenerative diseases including respiratory problems, loss of visibility leading to accident (Teka, 2011). Maji, Kamal; Arora, Mohit; Dikshit, and Anil Kumar (2017) reported that the magnitude of industrial hazards such as air and water pollution pull up the number of people suffering from respiratory and water-borne diseases around the industrial areas.

According to Commission on Growth and Development, (CGD) (2008) the positive economic and social results of industrial growth have been accompanied by serious environmental degradation, as well as growing threats to health from occupational hazards. To some extent, these problems are analogous to those of early industrial Europe. As conceptualized by Somik and Chakravorty (2009) location of industries in many areas of the developing world has made water pollution, air pollution and hazardous wastes, pressing environmental problems. Industrial

emissions coupled with vehicle exhausts to cause air pollution, while concentrations of heavy metals and ammonia loads are often high enough to cause hazards to the health of the people around the areas.

WHO, (2009) also asserted that cholera; diarrhoea, hepatitis, typhoid etc are common water-borne diseases which are endemic in industrial settings. According to Okpako and Berewari (2014), industrialization programmes, processes and expected positive output have taken an overwhelming technological dimension beyond the hitherto analogue age. They noted that apart from the more meticulous and exceptionally experienced advanced nations like Europe, America, and part of Asia who adequately handles the by-products of industries and other human activities from endangering the health of the people whose comfort, industrialization is meant to achieve, the reverse is usually the case in the less developed nations such as Nigeria.

In Nigeria, therefore, labour migration from rural to industrial areas such as Port Harcourt, Lagos, Jos and several other cities constitute enormous problems in occupational pursuits. Increased human activities such as industrialization coupled with over population and increased ambient temperature amongst other factors have become major environmental issues in recent years (UNIDO, Industrial Development 2009). According to Innes, & Sam, (2009) activities of oil prospecting and other industries result in pollution through gas flare ups, constant oil spills and individual influence which affect both aquatic and terrestrial ecosystems, with destruction of forest and farm lands. The wide range of pollutants associated with the existence of industries during the transformation of raw materials into industrial finished products, at the various stages of the process, resulted in heavy soot. These products which include petro-chemicals, steel production, papers and textile manufacturing, food, breweries, water, pharmaceuticals etc. generate overwhelming pollutants that seriously endanger the health of the people especially those living close to the site of production or where the wastes are disposed. The implication of the above may lead to diseases like leukaemia, pulmonary oedema, cardio respiratory failure tuberculosis among others (Okpako & Berewari, 2014).

Rivers state which is located in the Niger Delta region is endowed with abundant oil resources, giving rise to increased industrial activities. Nwachukwu (2000) posited that there are numerous industries located in Rivers State especially the Trans-Amadi Area. These industries carry out varieties of activities such as grinding, moulding; welding, cutting and painting of materials or products are going on with the residents of adjoining communities potentially at risk from excessive heat, noise and the inhalation of polluted air, soil and water usually associated with their presence. Ogboo, Hussain, Al-Kayiem, Mesfin, and Meheron, (2015), added that volumes of hazardous waste are generated at the expense of the inhabitants of the areas. They further concluded that all these factors not only lead to deteriorating environmental conditions, but also have adverse effect on the health of the people. These health hazards caused by the industrial activities are major contributors to the occurrence of various diseases in the oil bearing communities that has affected the residents of the Trans-Amadi Area of

Port Harcourt. It is based on this premise that these researchers collaborated to investigate the implications of industrials hazards and occurrence of diseases among the inhabitants of Trans-Amadi Area of Port Harcourt.

2. Statement of the Problem

Since the year 1960, Nigeria as a developing nation was embarked on economic emancipation to sustain her self-reliance. To this, industrialization, which is the bedrock of development, is being concentrated in most cities in the country.

The researchers observed that one of the main problems of industrialization is contamination of the air by industrial and automobile sources. The unplanned location of industries in Port Harcourt city especially Trans-Amadi area and its adjoining communities introduce harmful agents to the atmosphere polluting the air and thus, causing the inhabitants of the areas a considerable amount of health problems.

It was perceived that discharges from industrial activities such as steel, glass, paint manufacturing making, grinding machines, panel beating workshops etc. polluted the air, water and soil thus endangering the environment as they ultimately find their way into the food chain which accumulates overtime to pose serious health hazards to man. Other pollutants include chloroform which produce cancer, while other domestic and industrial sewages transmit agents of infectious diseases such as typhoid, dysentery, cholera etc. and other synthetic organic chemicals like pesticides and detergent are also found to be carcinogenous to man mainly affecting the kidneys.

The above, no doubt are likely to have direct and indirect consequences on the health of Trans Amadi dwellers and as well contribute to the disease burden of rivers state. It is on this premise therefore that the researchers were motivated and prompted to carry out this study as the uncontrolled activities of these numerous industries may impose some negative health and environmental challenges to the inhabitants of the area and largely the people of Rivers state.

3. The Aim and Objectives of the Study

The aim of this study was to investigate and expose the industrial hazards associated with the various industries located in Trans Amadi area. The objectives are to determine the rate of occurrence of diseases among the inhabitants of the area, exposed to these hazards and make useful suggestions on possible control measures of the hazards.

3.1 Research Hypotheses

To guide this study, two research hypotheses were formulated and tested at 0.05 alpha level.

1) There is no significant relationship between the rate of occurrence of diseases and industrial hazards among inhabitants of Trans-Amadi areas.

2) The use of preventive measures and occupational legislation will not significantly affect the control of hazards among inhabitants of Trans-Amadi.

3.2 Delimitation of the Study

The study was delimited to:

1) Trans-Amadi area of Port Harcourt, Rivers State
2) Diseases that may likely be caused by industrial hazards due to activities of the industries
3) The inhabitants of the area and the adjoining communities such as Nkpogu, Oginigba, Elekahia, Rumuomasi and Azuabie communities in Trans Amadi, PH.

3.3 Significance of the Study

It was hoped that the results of the study could help to ascertain the rate, types and occurrence of diseases and other health problems industrialization may have on the people who dwell and do business in industrial areas. The results of the study may be useful to the inhabitants of Trans Amadi area in their efforts to control industrial hazards. It may assist the inhabitants of the areas to know their rights in ensuring that the companies operate through the legally acceptable framework and also help them know when to seek medical attentions when faced with the challenges imposed by industrial activities. Finally, the findings of the research may assist policy makers who would ensure that all policies formulated based on industrial laws are adequately implemented to safeguard the health of the areas that are potentially at risk.

5. Methodology

The method adopted for the study was the descriptive survey design. The population for the study consisted of 50,000 males and female workers of the companies, other residents of the communities including visitors to Trans Amadi area of Rivers State. One demographic structural feature of this area is that it is generally known to be unstable in population particularly due to influx of job seekers.

The multi stage random sampling technique was used for the selection of the respondents. Out of the nine communities that make up Trans Amadi industrial area, five communities were selected. Two hundred persons were selected from each of the five communities Rumuomasi, Nkpogu, Oginigba, Azuabie and Elekahia and a total number of one thousand (1000) persons were used for the study.

The major instrument used was self-structured questionnaire of the modified liked scale with four options (SA, A, DA, SD) which was validated by experts to the related field of study. The inferential statistics of x^2 set at .05 alpha level was used to analyse the variable under study.

5.1 Data Analysis and Discussion of Findings

5.1.1 Hypothesis 2

Table 1: X^2 analyses of the relationships between the rate of occurrence of diseases and industrial hazards among inhabitants of Trans-Amadi area of Port Harcourt Rivers State, Nigeria

Criteria	**Responses**					
Diseases	**Comm1 Nkpogu**	**Comm2 Oginigba**	**Comm3 Elekahia**	**Comm4 Rumuomasi**	**Comm5 Azuabie**	**Total**
Cancer	50(48)	50(48)	45(48)	45(48)	50(48)	240
Respiratory problems	45(48)	55(48)	45(48)	50(48)	45(48)	240
Hearing impairment	55(54)	45(54)	60(54)	55(54)	55(54)	270
Depression	50(50)	50(50)	50(50)	50(50)	50(50)	250
Total	200	200	200	200	200	1000

Source: Survey data, 2008.

From Table 1, we therefore apply chi-square test

x^2

Cal

$X^2 = \frac{(fo - fe) \times 2}{fe} = 4.6$

Table 1 above, revealed that the calculated chi-square of 4.6 was greater than the critical region of 3.84. Therefore referring to the decision rule, the null hypothesis was rejected and accepting the alternative hypothesis which states that there was significant relationship between the rate of occurrence of diseases and industrial hazards among inhabitants of Trans-Amadi area.

5.1.2 Hypothesis 2

There is no significant relationship between the use of Occupational legislation and the control of hazards among inhabitants of Trans-Amadi area.

Table 2: Use of Occupational legislation and the control of hazards

Criteria	**Responses**					
Measures of control	**Comm1**	**Comm2**	**Comm3**	**Comm4**	**Comm5**	**Total**
Provision of safety equipment	50(46)	40(46)	50(46)	45(46)	45(46)	230
Environmental methods of hazard control	45(49)	60(49)	45(49)	45(49)	50(49)	245
Storage of inflammable substances	45(51)	55(51)	50(51)	50(51)	55(51)	255
Research and monitoring	60(54)	45(54)	55(54)	60(54)	50(54)	270
Total	200	200	200	200	200	1000

Source: Survey data, 2008.

From Table 2, we apply this chi-square test:

$$X^2 = \frac{(fo - fe)2}{Fe} = 9.5$$

The testing of Hypothesis shows that the calculated chi-square of 9.5 was greater than the critical region of 3.84 and referring to the decision rule the null hypothesis was rejected and accepting the alternative hypothesis which states that there was significant relationship between the use of Occupational legislation and the control of hazards among inhabitants of Trans-Amadi area.

6. Discussion of the Findings

6.1 Occurrence of Diseases and Industrial Hazards

Table 1 above, the null hypothesis (Ho) was rejected in favour of the alternative hypothesis (Hi). This is because the calculated chi-square of 4.6 was greater than the critical value of 3.84. This showed a clear indication that there were greater relationship between the rate of occurrence of diseases and industrial hazards among the inhabitants of Trans Amadi area of Port Harcourt, Rivers State, Nigeria.

The result revealed that the industries in Trans Amadi introduce harmful agents to the atmosphere polluting the air, water and soil, and thus causing the inhabitants of the area a considerable amount of health problems and diseases which most people are victims.

From the above statistics, cancer and respiratory problems account for 48% of the death, problems of the people within the five communities, and this indicated that cancer and respiratory problems are predominant in the area, while 50 – 54% of the respondents indicated that hearing impairment and depression account for the figure.

This finding was in line with Athukorala, & Sen, (2016) asserts that volumes of hazardous wastes are generated at the expense of the inhabitants of the area. He further opined that all these factors not only lead to deteriorating environmental conditions, but also have adverse effect on the health of the people as it has greatly contributed to the occurrence of various diseases in the oil bearing communities especially the Trans Amadi dwellers. This finding is also consistent with the position of Nwachukwu (2000) that there are numerous industries located in Trans Amadi area carrying out various activities such as grinding, moulding, welding, cutting and painting of material or product are going on with the residents of adjoining communities potentially at risk from excessive heat, noise and inhalation of polluted air, soil and water.

6.2 Occupational Legislation and the Control of Hazards

The finding revealed that certain measures are found to be appropriate for the control of negative effects of Industrialization and its hazards. Among such control measures are provision of safety equipment and their frequent maintenance, the implementation

of Occupational Legislations by the Government as to moderate the various effects, and the use of research and monitoring of the industrial activities. This was revealed based on the calculated X^2 of 9.5 that was greater than the critical value of 3.84. The finding is similar to Cotter, Boyle, Khan, Boo, and O'Connell (2012) that prevention of occupational hazards is much more effective and usually cheaper if it was considered at the planning stage of any community, work process and workplace, rather than as control solutions of already existing hazardous situations. However, environmental consequences include the effect of fine particles on atmospheric visibility, damage to buildings, effects on vegetation and animals, and health effects on people outside the plant. Environmental methods of hazard control should be based on hazard elimination by substitution, good housekeeping and monitoring of work environment. Each year in Trans-Amadi area, people are exposed to noise levels that could potentially harm their health, (Morata, Thais; Lotz, 2016). Occupational hearing loss is the most common occupational illness in the manufacturing sector.

Furthermore, the view of (Sperber, William, 2015) also agrees with the finding that once the relevant measures have been implemented and the hazard is controlled, constant vigilance and regular monitoring are necessary to ensure that the hazard does not slip from control and that changes to the products and pressures are not produced thereby introducing new hazards.

Based on the finding, it was discovered that because of the awareness that hazards can constitute injuries, diseases or even death, adequate preventive measures have been provided by most of the companies who operate in Trans-Amadi.

7. Conclusion

Industrialization in Port Harcourt is the period of social and economic change that transforms a human group from an agrarian society into an industrial society, involving the extensive re-organisation of an economy for the purpose of manufacturing. Industrialization increased social services, job opportunities, rapid infrastructural developments and the overall living standard of the people. However, the communities are often exposed to numerous health hazards such as fire outbreak, noise pollution, toxic chemical concentrates, smokes leading to soot all over Rivers states, environmental degradation among others.

7.1 Recommendations

Based on the findings, the following recommendations were made;

1) Government should make environmental pollution a priority issue and provide incentives and requirement for industries to meet the responsibilities.
2) Aggressive public enlightenment and awareness campaign should be mounted by various organs of the government, NGOs and the operating companies on the people on the danger of shifting abode to industrial areas, the common health

problems that may affect them and when and where to receive medical attentions if health problem is noticed.

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