

Health Implications of Industrial Hazards on the Inhabitants of Port Harcourt Metropolis, Rivers State, Nigeria

Okpako, J. E. F.

*Department of Human Kinetics and Health Education
University of Port Harcourt, Port Harcourt, Nigeria*

Berewari, J. C.

*Rivers State Ministry of Health
Port Harcourt, Nigeria*

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Abstract

The study investigated the health implications of industrial hazards on the inhabitants of Port Harcourt metropolis of Rivers State of Nigeria. The study was informed by series of hazards induced by industrial activities vis-à-vis the health of the people. The descriptive research survey design was adopted. The population consisted of all the inhabitants and workers in the industrial areas of the metropolis with a sample size of one thousand respondents selected through the multistage sampling technique. Two research hypotheses were formulated to guide the study. The major instrument used for data collection was the self-structured questionnaire which was analysed with the inferential statistics of χ^2 set at .05 alpha level. The results showed that all the variables tested were rejected in favour of the H1 hypotheses indicating that many hazards such as fire outbreak and environmental pollution are sometimes industrial related and that the health of the inhabitants are usually impacted negatively. Based on the findings, it was recommended among others that industries should be sited outside residential areas while environmental health agencies should guide, monitor and apprehend culprits – furthermore awareness should be created on the people on how to live healthy in industrial area

1. Introduction

1.1 Background to the Study

Good health is expected to be a statutory right of every person wherever he may be living at any given time. Health is the greatest natural endowment for man to attain his full potentials. Therefore health is fundamental, dynamic and an ingredient for successful achievement of life goals.

On the other hand, hazard is negative to positive health and attainment of fulfilled potentials. It is injurious and hindrance in nature. Mitchel (2006) sees it as the potential of a substance activity or process to cause harm. While Achalu (2006) described hazard as anything that causes accident, injury or ill-health.

Industrial hazards are occupationally induced injuries which occur as a result of human interaction with the industrial environment and in the handling of equipment and machineries at various stages of production, extraction, processing, manufacturing, hauling, storage, distribution and the disposal of the unneeded parts.

Mitchel (1990) explained Industrial hazards as threat to people and life-support systems which arises from mass production of goods and services. He stressed further that when the threat (posed by hazards) exceeds human coping capabilities or the absorptive capacities of

environmental systems, they give rise to industrial disasters.

Industrial hazards may be sudden and intensive such as explosion which may further lead to fire outbreak. It may be gradual and extensive as in the case of toxic release from leakage and spills or built-up ozone layers etc. In most cases, some hazards are avoidable and traceable to faulty machineries and equipment, poor technical-know-how of personnel and general carelessness.

Industrial hazards may be classified into: Chemical hazards occurring in form of gases, vapours, dust, liquid or solid. Examples include drugs, detergents, paints, disinfectants and insecticides; Biological hazards originate from plants and animals or specifically associated with certain professions or jobs. Causative biological parasites are bacteria, viruses, fungi, protozoa, metozoa, arthropods and rickettsial. Mitchel (2006) gave some examples of biological disease as HIV, Hepatitis B, Salmonella, E-Coli, Legionella, Weil's disease, malaria, and yellow fever.

Other industrial hazards are: Psychological hazards which pertains to psycho-social factors which affect health as being experienced in the leadership styles in various industries, sense of security, communication, stress, boredom, mental and emotional tension, frustration from low job satisfaction (Achal, 2006). Ergonomic hazards arise from environmental factors such as extreme heat, intense light, ultraviolet rays, contaminate atmosphere, sound. These may be due to natural weather condition of the environment (e.g. Northern part of Nigeria) or as generated by industrial machines and equipment.

One can assert without absurdity that industrialization is central to economic advancement of any nation of repute with the consequence increased prospect for the citizenry. In the world over, industrialization programmes, processes and expected positive output have taken overwhelming technological dimensions beyond the hitherto analogue age. However, apart from the more meticulous and exceptionally experienced advanced nations in Europe, Americas (USA) and parts of Asia, who adequately handle 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 almost the case in the developing nations such as Nigeria.

There is no doubt, many developing nations are currently experiencing reasonable share of the industrial growth. The concern here is in the area of proper articulation and management of the wastes and other by-products that normally accompany industrialization to prevent health hazards.

Dogwa (1997) noted that 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.

A wide range of pollutants always associate with the existence of industries during the transformation of raw materials into industrial finished products at the various stages of the process. Such products as oil prospecting industries, petro-chemicals, steel production, paper and textile manufacturing, food, water, beverages and breweries, pharmaceuticals, quarries, road constructions and cement manufacturing industries, 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. Udoka (2000) revealed that as part of industrial growth, wastes are growing in quantity and becoming more varied, toxic and difficult to dispose or degrade and densities in cities and around where industries are located far surpass those in the developed nations, hence the number of people exposed to pollutants are potentially much greater (in the developing nations such as Nigeria).

Statutory location/siting of industries (including waste disposal sites) is only permissive far away from residential areas. This is unfortunate as it is embarrassingly abused and not practiced beyond paper laws in most developing nations with special reference to Nigeria's case as exhibited in notable industrial cities of Lagos and Ibadan in the South West, Port Harcourt and Warri in the Niger Delta, Kano and Kaduna in the North, Enugu, Onitsha and Aba in the East. Abuja, the capital city at the centre seems to be the only exception probably being a new city and the seat of the government of Nigeria. Instances abound where various industries, factories whose wastes may

both be mild or volatile to people's health are indiscriminately sited where people live. For example, cement industries, quarry factories, breweries and even filling stations jointly share plots of lands or fences with highly populated indigenous areas. This practice constitute a potential hazard which may serious impede the health standard of the people.

It must be appreciated that the health of a population is strictly dependent on its environment (Miller, 1996). Udeh (1996) rightly observed that location of industries in many areas of the developing world has made water pollution, air pollution and hazardous wastes to be pressing environmental problems. This, is no doubt a precursor to such diseases from air, water skin diseases etc. that shorten the life span of the people.

The implication of the above may lead to all sorts of heat-related health problems, noise induced hearing impairment and deafness, Raynaud syndrome from vibration oriented equipment. Other health problems may include Leukemia and certain cancers from radiation; Pulmonary Oedema and cardio respiratory failure from chemical agents; AIDS, TB and anthrax from biological factors; frustration from psychological trauma, etc.

Nigeria is a tropical nation in the West African sub-region. It is classified as a developing nation which is fast growing in industrialization to cope with her economic needs for the over one hundred and forty million (140) people spread across all over the numerous rural and especially urban communities such as Lagos, Abuja, Kano, Kaduna, Warri and Port Harcourt, etc.

Port Harcourt is of course one of such growing cities. She is a major industrial city in the Niger Delta area of Nigeria and also serves as the administrative capital of Rivers State. There is serious labour migration into the metropolis due to the concentration of numerous industries ranging from large scale ones such as oil and gas prospecting industries such as Shell, Chevron, Total, Elf, Agip, Cornoil, Oando, etc., Nigerian National Petroleum Company (NNPC) and the Refinery, Cement factories such as Eagle cement at the Naval Base, The National Fertilizer Company of Nigeria (NAFCON) at Eleme, land and sea transport companies etc. to small scale industries and workshops. These industries are located in various parts of Port Harcourt metropolis but mostly concentrated in Trans-Amadi Area of the city. Therefore there is increased human activities accompanied with the byproducts generated which constitute nuisance and other health challenges to both personnel working in these industries and nearby inhabitants.

Nwachukwu (2000) noted that in most of the industries (located in Trans-Amadi), 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. Imeshore (2002) also observed and reported that the activities of oil prospecting and other industries result in pollution through gas flare ups, constant oil spills and industrial effluence which affect both aquatic and terrestrial ecosystems, and destroy forests and farmlands.

The above reports indicate that industrial activities are carried out at the expense of the helpless residents and visitors in the area with such detrimental adverse consequences on the health status of the people. It is based on this premise that these researchers collaborated to investigate the health hazards and the implications which may accompany industrial activities in Port Harcourt metropolis of Rivers State.

2. Statement of the Problem

This study investigated the effects of the growing industrialization in Port Harcourt metropolis of Rivers State. The researchers observed the series of activities by the numerous large and small scale industries and the accompanied chemical, biological and other mild and toxic wastes which may combine together to pollute the environment vis-à-vis the hazards this may have on the health of the workers, nearby neighbours and visitors. It was perceived that diseases and infections such as TB, anthrax, skin diseases, gastro-intestinal disorders, water related problems etc. may arise from temperature imbalance (low or high heat), Noise from heavy machines, serious vibrations,

radiations, smoke and dust generated by machines and haulage tankers along bad roads, etc.

The above without doubt are likely to impede the health of all biotic and abiotic inhabitants in the environment especially man who relies on the other components of the environment to live a good and productive health.

Therefore the major problems that challenged and prompted these researcher's were the uncontrolled and unprotected activities of the numerous industries in Port Harcourt metropolis and the negative impacts such may have on the health of the people vis-à-vis the economy of the Nation at large.

3. Purpose of the Study

The intentions of this study was to identify the general and specific health hazards from the activities of the numerous companies in Port Harcourt metropolis of Rivers State with the hope of making useful suggestions on how to drastically reduce or completely stop health problems that may accompany industrial operations now and in future without necessarily stopping operations which may jeopardize the economy of the area and the nation as a whole.

4. Research Hypotheses

For the purpose of this study, two research hypotheses were formulated and tested.

1. There is no significant relationship (effects) between industrial activities and occurrence of health hazards among the inhabitants of Port Harcourt metropolis of Rivers State.
2. Industrial hazards (activities) will not significantly affect the health status of the inhabitants of Port Harcourt metropolis of Rivers State.

5. Delimitation of the Study

The study was delimited to:

- Health hazards that may be created by industrial operations.
- Port Harcourt metropolis of Rivers State
- Industrial staff and inhabitants of the industrial areas.

6. Significance of the Study

It was hoped that the study may reveal all industrial induced health problems among all the stakeholders in that environment which may force/encourage industries to strictly operate within the ambit of global laws. It may also assist the inhabitants to individually or collectively know their rights and exercise it legally against any company operating without due consideration to the health of the inhabitants and the environment including where and when to take medical attention when confronted by health challenges from industrial operations. Lastly, the research findings may assist policy makers to ensure that all industrial laws are not only formulated but implemented to safeguard the health of the people they statutorily represent.

7. Methodology

The method adopted for this study was the descriptive survey research design. The population for the study consisted of all the workers of companies, inhabitants of the host communities and visitors to Port Harcourt metropolis of Rivers State.

The sample size for the study was made of one thousand (1,000) participants (respondents) while the sampling techniques was the multi-stage sampling technique. The purposive sampling technique was used based on concentration of companies. For example, 5 communities out of 9

were selected from Trans-Amadi with 150 respondents each (Total = 750). Rumuomeni had 150 respondents because of the cement factory at Marine Base while 100 from Eleme because of NAFCON and 100 from Choba because of the Wilbros Oil Servicing Company. The above gave the total of 1,000 respondents.

The major instrument for the study was self-structured questionnaire of the modified likert scale with four options (SA, A, D, SD) validated by experts in the related field of study.

The inferential statistics of χ^2 set at .05 alpha level was used to analyze the variables under study.

8. Data Analysis and Discussion of Findings

Table 1: χ^2 analysis of the relationship between industrial activities and occurrence of health hazards among the inhabitants of Port Harcourt metropolis of Rivers State, Nigeria.

S/No	Item	SA	A	D	SD	Total
A	Is fire-outbreak always associated with industrial activities in your area?	500	200	50	250	1000
		(50%)	(20%)	(5%)	(25%)	(100%)
b	Do you always experience excessive heat and noise in the industrial areas than other areas in Port Harcourt metropolis?	580	240	80	100	1000
		(58%)	(24%)	(8%)	(10%)	(100%)
c	Is there any disturbing emission of smokes in your area due to industrial activities to the level of pollution?	450	350	100	100	1000
		(45%)	(35%)	(10%)	(10%)	(100%)
d	Is water in your area rendered unsafe for consumption or other aquatic lives as a result of industrial operations?	910	80	10	-	1000
		(90.1%)	(8%)	(.9%)	-	(100%)
f	Is dust a frequent problem from the industries and the roads to the sites?	900	100	-	-	1000
		(90%)	(10%)	-	-	(100%)
g	Do you think the environment is being degraded following activities of the industries?	750	150	100	-	1000
		(75%)	(15%)	(10%)	-	(100%)
Total		4,090	1,120	340	450	6,000
		68.17%	18.67%	5.67%	7.5%	100%

Cal $\chi^2 = 6,200.41$; df = 15; P<.05; Cr. value = 25.00
Decision = Rejected

From Table 1 above, the null hypothesis (H_0) was rejected in favour of the alternative hypothesis (H_1) because the calculated or obtained of 6,200.41 is far greater than the criterion or table value of 25.00. This is a clear indication that there is a greater relationship between the occurrence of volatile health hazards and industrial operations where people live. The finding revealed a high correlation of 86. 84% between industrial activities and hazards such as fire outbreak, cloudy atmosphere from dusts and smokes, deafening noise and irritating heats, serious water pollution, earthshaking vibration due to movements of heavy tractors etc. all these act together to reduce the quality of the entire environment. From the above statistics, industrial induced fire outbreaks account for 70%, 82% for heat and noise, 80% for smoke emissions, over 95% for dust and general degradation of the environment accounting for 90%. Good examples of industrial activities induced hazards are daily experienced in fire outbreak from filling stations, petroleum products tankers, oil spillage, heavy smokes and dust from cement factories, toxic reaction from chemical industries polluting the land and water from uncontrolled refuse dump sites.

This finding is in line with the position of Headrick (1990) that industrial hazards are inevitable consequence of dominant cultural conceptions of technology. Davidson (2000) reported that industrial activities from steel, glass, paint accumulate overtime to pollute the air, water, soil and ultimately find their ways into the food chain to pose serious health hazards to man.

Table II: χ^2 analysis of the effects of industrial hazards on the health status of the inhabitants of Port Harcourt metropolis of Rivers State.

S/No	Item	SA	A	D	SD	Total
A	Is cancer a common health problem suspected to be industrially induced in your area?	490	360	100	50	1000
		49%	36%	10%	5%	(100%)
B	Have you ever experienced or observed complaints of any respiratory problems arising from dust or smoke from industries or trucks plying the site roads?	520	270	120	90	1000
		52%	27%	12%	9%	(100%)
C	Is there any observable hearing impairment traceable to constant and excessive noise generated through the industrial operations among the inhabitants in the area?	315	210	280	195	1000
		31.5%	21%	28%	19.5%	(100%)
D	Do people in your area complain of skin irritation or changes due to heat, chemical exposure or fire outbreak from industrial activities?	620	310	45	25	1000
		56%	31%	4.5%	2.5%	(100%)
E	Are residents medicated for water related diseases brought about by industrial activities?	560	290	120	30	1000
		56%	29%	12%	3%	100%
Total		2,505	1,440	665	390	5,000
		50.1%	28.8%	13.3%	7.8%	100%

Cal $\chi^2 = 2,735.90$; $df = 12$; $P < .05$; Cr. value = 21.03
Decision = Rejected

From Table II above (see response data in the table), the null hypothesis was similarly rejected while the alternative hypothesis retained. This simply means that industrial activities has significant effect on the health status of the inhabitants living in industrial areas of Port Harcourt metropolis of Rivers State. The overall table statistics show that 78.9% of the respondents account for diseases induced by industrial activities. Problem of skin diseases is 87%; water related diseases and cancer account for 85% each; Respiratory infections take 79% while hearing impairment due to industrial operation stood at 52.5%. These statistics are clear indictment of industries whose activities pose health risks to the people living near or working in the industries. It must be appreciated that the health of the people is derived from the health of the environment.

Nagdere (2002) reported World Development Indicators of 1997 that 1.5 billion people lives were exposed to dangerous levels of air pollution, one billion lives without clean water and 2 billion lives without sanitation. All these occur as a result of industrial operations. Dewaran (2002) also observed that industrial hazards arising from air and water pollution push up the number of people with respiratory and water-borne diseases which sometimes lead to serious health hazards or death. Achalu (2006) agrees with this finding that unfortunately workshops and factories located near residential areas produce noise; which serves as nuisance that may lead to fatigue, loss of concentration and deafness among those who work or dwell around this areas.

Therefore no other evidence is needed more than the above revelations that industrial activities pollute the environments from all fronts in the air, land and water which consequently result into both mid and volatile diseases that claim lives gradually or sporadically.

9. Summary and Conclusion

This study empirically investigated the health implications of industrial hazards on the inhabitants of Port Harcourt metropolis of Rivers State. Specific variables considered were the hazards induced through industrial activities within the area and whether various disease challenges experienced by the people are industrial activities related. It was found out that all the variables considered positively correlated with the hypotheses.

Based on the research findings it was concluded that; Industrialization of Port Harcourt metropolis is a positive conception geared towards the improvement of the economy of the area,

the state, the nation and other neighbouring international communities. This effort has increased social services, job opportunities, rapid infrastructural developments and the overall living standard of the people. However, it is displeased to note that the industrialization processes and activities are accompanied with certain diseases and other health hazards which negatively impact on the health of the people.

Therefore, it is submitted that the people living in and around the industrial plants are exposed to health hazards. Furthermore most hazards in the industrial areas such as fire outbreak, excessive noise, smokes, dusts, etc. are industrial related. The above act to pollute and degrade the environment against human conducive living

10. Recommendations

The following recommendations are made in line with the research findings:

1. In order to avoid or minimize hazards induced by industrial activities, the statutory rule of sitting industries far away and out of residential areas should be strictly enforced.
2. The Ministry of Environment and related agencies (e.g. FEPA) should be actively involved in guiding and monitoring the activities of manufacturers especially at disposing the wastes and protecting heavy machines from polluting the environment. Erring companies should be prosecuted and affected individuals or groups be adequately compensated.
3. 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.
4. Adequate medical arrangement (including emergencies) should be made available at no cost in well equipped health centres for the inhabitants to guide against minor ailments developing to volatile ones either at endemic or epidemic rates.
5. More research on industrial release vis-à-vis the health implications should be encouraged. This should be well funded by the industries (both local and multinational companies) and the government.

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