

ASSESSMENT OF INDUSTRIAL AIR ON HEALTH OF THE WORKERS AND DWELLERS OF THE RESIDENTIAL AREAS IN OYO STATE

BY

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ABSTRACT

This study specifically examined the air from the industries on the health of the workers and dwellers of the environment in Ibadan metropolis of Oyo State. Two hundred and forty respondents consisting of one hundred and twenty workers and one hundred and twenty residents around the industrial areas were selected using accidental sampling technique. A self-developed questionnaire that was validated with reliability coefficient of 0.84 was used for the study. The data collected for this study was analyzed using simple percentages and inferential statistics. The results of the study discovered that not many of the respondents in the study areas were knowledgeable about the importance of health education. Majority of the industrial workers indicated that first aid equipment and aid gargets were available in their working places, very few of the respondents in the industries/factories identified some diseases contracted through air pollution as against the residents of the environment. But very few of the respondents signified that they contracted some of the diseases identified on the table. The study further revealed that air pollution will have significant influence on the health status of workers and the residents of the environment in the study area. It is therefore recommended that the government should create awareness of health implication on the health of the residents. The government should see that the industries and engineering workshop be built away from residential areas.

KEY WORDS: - Assessment, Industrial Air, Workers, Health, Residential Areas, Dwellers

INTRODUCTION

From time immemorial wastes into the atmosphere from the Industries and factories have been a major source of environmental disaster which establishes health problems to the immediate environment particularly people within the environment. The quality of atmospheric air in the environment plays vital roles in individuals and community health. Whereas poor quality of air in the environment has a lot of evil consequence to human's illness and death worldwide (Grason & Misra, (2009). The Particulate substance pollution has being a problem on health with short-term and long-term effect of individuals (Vinnikov, Tulekov,& Raushanra, 2020; Liu, et at,2019; Luo et al 2018). Pollution is the total collection of impurities in the environment that can affect individuals (Walker, & Xanthos, (2018).

In a study conducted by (Obanya, Amaeze, Togunde and Otitoloju (2018), the major air quality factors seen to be higher around the bus stops were very significant. Air pollution is an aspect of environmental problem with significant negative influences on the health of individuals in the public (World Health Organisation 2013). Oltra, and Sala, (2014), opined that air in the industries is the cause of air pollution. Air pollution is the release of gas, hostile odour and other hazardous materials into the atmosphere which may have negative effect on the health of human beings leading to diseases (Woodford, 2010, Johansson, & Sommer, 2017). The authors further explained that when polluted air is breathed in, can have harmful effect on the eyes, nose and respiratory issues. Pollution related cases are generally the cause of death in Nigeria (Oyedepo, 2012).

Power and industrial plants do often create large amount of carbon dioxide into the air thereby creating global warming (Adimekwe, 2013; Oltra, & Sala, (2014). Air pollutants have aggressive consequences to our health causing chronic respiratory disease, lung cancer, heart disease, also harmful to the brain, nerves, lungs, liver, or kidneys (Oltra,. and Sala, (2014). In a study conducted by Adimekwe, (2013), it was discovered that air pollution is a chief cause of ill health in the public leading to allergies, asthma, and bronchitis in Imo State Nigeria. According to Blacksmith Institute/Green Cross Switzerland (2013), globally, over millions of people's health is usually threatened by pollution. According to Jiaxiu, Haoming, & Alberto (2019), majority of people living in developing countries are exposed to concentrated high level visible particles which are considered to be detrimental to health might affect well-being individuals. People working in extremely polluted areas for longer time could have their nature altered to work due to working in disturbed areas with pollution.

According to Johansson, & Sommer (2017), injurious substances released to the atmosphere can cause illness, sensitivities and death to humans. In industries and factories, processing plants used in manufacturing goods often showed substantial quantities of air pollution. In a study conducted by Howel, Moffatt, Bush, Dunn, & Prince (2003), revealed that the observations of the public showed that there was a strong link between air pollution and health in Northeast England. According to Johansson, & Sommer (2017), dangerous elements out to the atmosphere can cause diseases, allergies and death to humans. In industries/factories, processing plants used in manufacturing goods often revealed substantial quantities of air pollution.

According to Woodford (2010), the concentration of chemicals and particles are sources of air pollution which is deleterious to the health of individuals. Exposure of human beings to long-term air pollution can result to chronic respiratory illnesses, lung cancer, and heart ailment, impairment

to the brain, nerves, liver, or kidneys. Khan, & Ghouri, (2011), opined that polluted air can lead to nose, mouth eye and throat problems, lung not functioning appropriately and respiratory disease. Studies of have shown that air pollution causes Cancer; (Blaxill, (2004). In emerging countries, respiratory, cardiac disease and mortality could be observed in individuals as a result of polluted air (Rodríguez-Villamizar, Rojas-Roa, et al, 2018; Sanyal, et al 2018; & Tian et al. 2018).

In a study conducted by Obanya, Amaeze, Togunde,, and Otitolaju (2018), one of the results identified that the quality of air (particulate matter) in the study area was poor, particularly the transport sector locations (TSLs). According to WHO (2014), in year 2012, people who died in rural and urban areas of air pollution were approximated to 3.7 million. Several countries have air quality monitoring website that can easily report monitored air quality data estimates (Kelly, Fuller, Walton, & Fussell, 2012). In Almaty city, workers outside their work place or in open places are exposed to very high levels of hazards. Therefore, there is the immediate need for the awareness of related dangers among the workers in factories/industries (Vinnikov, Tulekov,& Raushanra, 2020).

However, the public knowledge and awareness about the effects of air pollution on human health are still little (Webber, & Willett, 2010). In the study conducted by Bickerstaff, & Walker, (2003), it was also observed that the understanding of the public on air pollution and environmental hazard are still very low. The study by Obanya, Amaeze, Togunde, & Otitolaju (2018), concluded that the relevant agencies under the Federal Ministry of Environment should formulate policies for the people in urban areas on air pollution particularly the most vulnerable people within the population.

STATEMENT OF THE PROBLEM

Air pollution has become a major problem in the universe particularly developing and under developed countries. Industries and companies have become source of polluted air due to equipment and facilities being used making this a significant health problem to both the workers and the dwellers of the environment. Despite the observed destructive outcome of air pollution, the public knowledge/awareness understanding by the public on air pollution and environmental risk are still very low. There is therefore the need to give attention to environmental pollution and its impact on health of the populace. Hence, this study

SPECIFIC OBJECTIVES

- (a) Examine the knowledge of the importance of health education among the workers on air pollution in the study area.
- (b) Determine the availability of first aid equipment and aid gargets in the industries
- (c) Identify the diseases that could be contracted through air pollution in the residential area, and
- (d) Ascertain the diseases experienced as a result of air pollution by the workers in the study area

METHODOLOGY

Survey research design was adopted. The population for this study involved industries in Ibadan, Oyo State which was purposively selected for the study because of many industries and factories in the areas. One hundred and twenty respondents from the residential area and 120 workers in the industries making a total of two hundred and forty respondents were selected using accidental sampling technique for this study. A self-structured questionnaire titled “industrial air, health of workers and inhabitants of the environment” tagged (IAHWIE) was used for the study. The questionnaire consisted of two sections. Section A was bio-data variable such as worker/Inhabitants of the environment, age, sex, religion, and educational qualification, while section B

provided information for the objectives of the research topic. The section B was divided into 4 sub-sections to cater for all the objectives. The researcher with the help of four research assistances visited the industries/factories and the residential areas to observe and administer the questionnaire. The research assistances were educated by the researchers on how to effectively administer the questionnaire of the differences in their level of education. The questionnaire was validated by Experts, while the reliability of the instrument was found reliable at 0.84 significance levels with test retest method. All the questionnaires were returned back immediately for the next action. The data collected for the study was analyzed with simple percentages and inferential statistics.

Table 1: Demographic characteristics of the respondents

Variables	Responses	Industrial workers 120%		Residents of the environment 120 %	
		Frequency Percentage		Frequency Percentage	
Age	25yrs and below	20	(8.3%)	14	(5.8 %)
	26-30yrs	26	(10.8%)	26	(10.8%)
	31yrs- 40	34	(14.2 %)	46	(19.2 %)
	41yrs & above	40	(16.7%)	34	(14.2 %)
Sex	Female	20	(8.3%)	68	(28.3%)
	Male	100	(41.7%)	52	(21.7%)
Religion	Christianity	42	(17.5 %)	26	(10.8%)
	Islam	66	(27.5 %)	78	(32.5%)
	Others	12	(5%)	16	(6.7%)
Education	Illiterate	10	(4.2%)	12	(05%)
	Primary school certificate	44	(18.3%)	26	(10.8%)
	Secondary school certificate	42	(17.5%)	48	(20%)
	Higher institutions	24	(10%)	34	(14.2)

Research question 1: Are the respondents knowledgeable about the importance of health education on air pollution

Table 2: Descriptive analysis of respondents’ knowledge of the importance of health education on air pollution

S/N	Variables	Industrial workers 120 %		Residents of the environment 120 %	
		Agreed	Disagreed	Agreed	Disagreed
	I have the knowledge about the importance of health education	34(14.2%)	86(35.8%)	58 (24.2%)	62 (25.8%)
	I am aware that air pollution is hazardous to health	24(10%)	96 (40%)	68 (28.3%)	52 (21.7%)
	I have the understanding that diseases could be contracted through air pollution.	28(11.7%)	92(38.3%)	64 (26.7%)	56 (23.3%)

From table 2 above, a total of 34 (14.2%) industrial workers and 58 (24.2%) residents of the environment agreed that they had knowledge about the importance of health education, while 86 (35.8%) industrial workers and 62 (25.8%) residents of the environment disagreed to this statement. A total of 24 (10%) industrial workers and 68 (28.3%) residents of the environment agreed that they were aware that air pollution is hazardous to health. As regards to diseases that could be contracted through air pollution, a total of 28 (11.7%) industrial workers and 64 (26.7%) residents of the environment agreed to this statement, while 92 (38.3%) industrial workers and 64 (26.7%) residents of the environment disagreed. It was shown here that majority of the respondents were not knowledgeable about the importance of health education on air pollution. This is in line with the studies of Webber & Willett, (2010) who stated that the public knowledge and awareness about the effects of air pollution on human health are still little. And study conducted by Bickerstaff, & Walker, (2003), which stated that the understanding of the public on air pollution and environmental hazard are still very low.

Research question 2: How available are the first aid equipment and aid gargets in the industries

Table 3: Descriptive analysis of the availability of the first aid equipment/facility and aid gargets in the industry

S/N	Variables	Industrial workers 120 %	
		Available	Not Available
1.	Protective device/clothing	76 (63.3%)	44 (36.7%)
2.	Waste bins	120 (100%)	0 (0%)
3.	First aid box equipment	90 (75%)	30 (25%)
4.	Well/ tap/ borehole/ or overhead tank water	120 (100%)	0 (0%)
5.	Incinerator/Burning site	86 (71.7%)	34 (28.3%)
6.	Toilets	120 (100%)	0 (0%)

Table 3 above showed that a total number of 76 (63.3%) industrial workers stated that protective device/clothing were available in the industry. All the industrial workers stated that waste bins, Well/ tap/ borehole/ or overhead tank water and toilets were provided in the industries. As regards First aid box and equipment and Incinerator, a total of 90 (75%) and 86 (71.7%) stated that First aid box equipment and Incinerator were available respectively in the industry. The finding of this table revealed that majority of the respondents (industrial workers) stated that the first aid equipment and aid gargets were available in the industry.

Research question 3: What are the diseases that could be contracted through air pollution in the study areas?

Table 4: Descriptive analysis of the diseases that could be contracted through air pollution in the study areas

Variables	Industrial workers (120)		Residents of the Environment (120)	
	Agreed%	Disagreed %	Agreed%	Disagreed %

Headache,	22 (9.2%)	98 (40.8%)	64 (26.7%)	56 (23.3%)
Respiratory illness (Asthma)	95 (39.6%)	25 (10.4%)	100 (41.7%)	20 (8.3%)
Lung malfunctioning (Bronchitis)	34(14.2%)	86 (35.8%)	98(40.8%)	22(9.2%)
Cough	88 (36.7%)	32 (13.3%)	96(40%)	24(10%)
Liver problem	52(21.7%)	68 (28.3%)	68(28.3%)	52(21.7%)
Kidney problem	24(10%)	96(40%)	78(32.5%)	42(17.5%)
Damage to the brain	12 (5%)	108 (45%)	66(27.5%)	54(22.5%)
Cardio-vascular illness,	68(28.3%)	52(21.7%)	88 (36.7%)	32 (13.3%)
Cancer risk	20 (8.3%)	100 (41.7%)	78 (32.5%)	42 (17.5%)
Skin irritation	0 (0%)	120 (50%)	24 (10%)	98 (40%)
Stomach upset/ nausea	24 (10%)	96 (40%)	34 (14.2%)	96 (35.8%)
Body pains/ fever	16 (6.7%)	104 (43.3%)	25 (10.4%)	95 (39.6%)
Eye problem	26 (10.8%)	94 (39.2%)	40 (16.7%)	80 (33.3%)
Nose irritation	66 (27.5%)	54 (22.5%)	38 (15.8%)	82 (34.2%)
Mouth and throat problem	96 (40%)	24 (10%)	68 (28.3%)	52(21.7%)

From table 4 above, a total of 22(9.2%) industrial workers and 64 (26.7%) residents of the Environment agreed that headache could be contracted through air pollution, a total of 95 (39.6%) industrial workers and 100 (41.7%) residents of the Environment agreed that respiratory illness (Asthma) could be contracted through air pollution. A total of 88 (36.7%) industrial workers and 96(40%) residents of the Environment agreed that cough could be contracted through air pollution. A total of 24 (10%) industrial workers and 78 (32.5%) residents of the Environment agreed that kidney problem could be contracted through air pollution. Sixty eight (28.3%) industrial workers and 88 (36.7%) residents of the Environment agreed that Cardio-vascular illness could be contracted through air pollution. A total of 66 (27.5%) industrial workers and 38 (15.8%) residents of the Environment agreed that noise irritation could be contracted through air pollution. From the finding of the analysis of the above table, it was discovered that majority of the Industrial workers believed and stated that respiratory illness (Asthma), cough, cardio-vascular illness, nose irritation, mouth and throat problem were the diseases that could be contracted. This is in line with Khan and Ghouri (2011) opined that that polluted air can lead to nose, mouth eye and throat problems, lung not functioning appropriately and respiratory disease, Oltra, and Sala, (2014), who said

air pollutants have aggressive consequences to our health causing chronic respiratory disease, lung cancer, heart disease, also harmful to the brain, nerves, lungs, liver, or kidneys, in a study conducted by Adimekwe (2013), which revealed that air pollution is a major cause of ill health in the community. And the earlier researcher Woodford (2010), that the concentration of chemicals and particles are sources of air pollution which is deleterious to the health of individuals and exposure of human beings to long-term air pollution can result to chronic respiratory illnesses, lung cancer, and heart ailment, impairment to the brain, nerves, liver, or kidneys.

Research question 4: What are the diseases experienced as a result of air pollution in the study areas

Table 5: Descriptive analysis of the diseases experienced as a result of air pollution in the study areas

Variables	Industrial workers (120)		Residents of the Environment (120)	
	Agreed%	Disagreed %	Agreed%	Disagreed %
Headache,	20 (8.3%)	100(41.7%)	54 (22.5%)	66 (27.5%)
Respiratory illness (Asthma)	38 (15.8%)	82 (34.2%)	20 (8.3%)	100 (41.7%)
Lung malfunctioning (Bronchitis)	56 (23.3%)	64(26.7%)	32(13.3%)	88(36.7%)
Cough	88 (36.7%)	32 (13.3%)	46(19.2%)	74(30.8%)
Liver problem	08 (3.3%)	112(46.7%)	00(0%)	120(50%)
Kidney problem	22 (10%)	98(40%)	00(0%)	120(50%)
Damage to the brain	12 (5%)	108(45%)	06(2.5%)	114(47.5%)
Cardio-vascular illness,	64 (26.7%)	56(23.3%)	18 (7.5%)	102 (42.5%)
Cancer risk	00 (0%)	120 (50%)	00 (0%)	120 (50%)
Skin irritation	00 (0%)	120 (50%)	24 (10%)	98 (40%)
Stomach upset/ nausea	24 (10%)	96 (40%)	14 (5.8%)	106 (44.2%)
Body pains/ fever	16 (6.7%)	104(43.3%)	20(8.3%)	100 (41.7%)
Eye problem	26 (10.8%)	94 (39.2%)	30 (12.5%)	90 (37.5%)
Nose irritation	14 (5.8%)	106 (44.2%)	38 (15.8%)	82 (34.2%)
Mouth and throat problem	96 (40%)	24 (10%)	68 (28.3%)	52(21.7%)

From table 4 above, a total of 20 (8.3%) industrial workers and 54 (22.5%) residents of the Environment agreed that they experienced headache, 38 (15.8%) industrial workers and 20 (8.3%) residents of the Environment agreed that they experienced respiratory illness (Asthma), 56 (23.3%) industrial workers and 32 (13.3%) residents of the Environment agreed that they

experienced lung malfunctioning (Bronchitis). As regards cough, 94 (39.2%) industrial workers and 46 (19.2%) residents of the Environment agreed to this statement. A total of 64 (26.7%) industrial workers and 18 (7.5%) residents of the Environment agreed that they experienced Cardio-vascular illness, a total of 88 (36.7%) industrial workers and 32 (13.3%) residents of the Environment indicated that they experienced cough, while 64 (26.7%) industrial workers and 18 (7.5%) residents of the Environment that they experienced Cardio-vascular illness. Whereas 96 (40%) industrial workers and 68 (28.3%) residents of the Environment agreed that they experienced Mouth and throat problem. The findings of the above table revealed that very few or none of the Industrial workers stated that they experienced headache, respiratory illness (Asthma), liver problem, kidney problem, damage to the brain, cancer risks, skin irritation, stomach upset/nausea, body pain/fever, eye problem and nose irritation except cough, cardio-vascular illness, mouth and throat problems which had a greater responses. This contradicts the earlier researchers Johansson, & Sommer (2017), who stated that injurious substances released to the atmosphere can cause illness, sensitivities and death to humans.

TEST OF HYPOTHESIS

Hypothesis 1: Air pollution will not have significant influence on the health status of workers and the residents of the areas in Oyo State

Table 6: Descriptive and chi-square of significant influence of air pollution on the health status of workers and the residents of the study area

Level	Industrial Workers	Residents of the environment	Total	Percentage	(χ^2) value	P	df	Decision
	Frequency	Frequency						
Agreed	108	106	214	89.2	12.369	3.642	3	Sig
Disagreed	12	14	026	10.8				
Total	120	120	240	100				

Table 3 above showed the chi-square analysis of how air pollution will not have significant influence on the health status of workers and the residents of the areas in Oyo State. The data analysis showed that the chi-square value is 12.369, $P= 3.642$, $df= 3$, $P< 0.05$ alpha level. Based on this result, the null hypothesis which stated that air pollution will not have significant influence on the health status of workers and the residents of the areas in Oyo State was rejected. This implied that the rate at which Air pollution will have significant influence on the health status of workers and the residents of the environment in Oyo State was high. Therefore, Air pollution will have significant influence on the health status of workers and the residents of the environment in Oyo State.

CONCLUSION

The following major conclusions were made:

- The residents of the environment were more knowledgeable about the importance of Health Education than industrial workers.
- Waste bins, well/ tap/ borehole/ or overhead tank water and toilets were more available than protective device/clothing, first aid box and Incinerator
- Majority of the residents of the environment agreed that Respiratory illness (Asthma), Lung malfunctioning (Bronchitis), Cough, Liver problem, Kidney problem, Cardio-vascular illness, Mouth and throat problem could be contracted through air pollution.
- Whereas many of the residents of the environment disagreed that liver and kidney problems could also be contracted through air pollution.
- Majority of the industrial workers agreed that they had experienced mouth and throat problem, cough and cardio-vascular illness.

- And that air pollution will have significant influence on the health status of workers and the residents of the areas in Oyo State.

RECOMMENDATION

The following recommendations were drawn:

- The 3 tiers of the government should create awareness of the importance of health education among people in any environment.
- The three tiers of the government should help to protect and maintain the health of people by formulating laws to ensure that industrial companies be built away from residential areas.
- The three tiers of the government should also see to the welfare of the people by providing health centers close to industrial areas.
- The owner of industrial companies should see to the availability and adequacy of first aid equipment and aid gargets in their industries.
- Owner of industrial companies should see that the workers go for medical checkup quarterly in a year.

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