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Effect of Industrial Waste Management on Workers Health in Selected Industries in Nigeria

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Abstract

Industrial wastes are basically hazardous and as the name implies pose potential risk to human health and the environment if not properly addressed. Thus, this study examines effects of industrial waste management on workers health status in selected industries.

Descriptive survey research design was adopted for this study. The study population comprised industrial workers in Ibadan, Oyo State. A purposive sampling technique was used to take a total population of 270 employees. The major instrument used for the collection of data was a questionnaire tagged "Industrial Waste Management and Workers Health Status Questionnaire (IWMWHSQ)". Four research hypotheses were formulated and were analysed by using simple percentages, ANOVA, Multiple Regression and Pearson Moment Correlation Analysis at 5% level of significance.

Findings revealed that there is a positive significant relationship between incineration and workers health status (r=0.323, N=250, P<0.05). It also revealed a positive significant relationship between recycling and workers health status (r=0.240, N=250, P<0.05). There was positive significant relationship between workers safety practices and workers health status (r=0.160, N=250, P<0.05). There was also a positive significant relationship between workers' occupational health attitude and workers health status (r=0.168, N=250, P<0.05).

Based on the findings of the study, it was recommended that the government should put policy in place to check industries which engage in demeaning waste management practices that damages workers health because despite compensations that are being paid by some organisations employees' health can never be bought.

Keywords: Waste; Hazardous wastes; Industrial waste

Introduction

Waste generation is a fundamental process with all living things. Human activities and process undergo a cycle which generates waste at varying sizes. The production and conversion of materials and substances and consumption of its products within an urban setting or a municipality produces waste. In such a context, the waste generated is referred to as Municipal Solid Waste (MSW) [1]. Industrial waste management is an important issues plaguing Nigerian industries as a result, occupational health and safety practices remains in its infancy when compared to what obtains in more developed societies. Many industries in Nigeria do discharge their waste water into surface (oceans, seas and streams) more often than not without any form of remediation or treatment source [2].

World Health Organization [3] defined waste as something which the owner no longer want at a given time and place and which has no current or perceived market value. One of the few statuses in Nigeria, which attempt to define waste, is the Lagos state environmental sanitation edict 1985, there in section 322, waste is defined as follows: (a) waste of all description (b) any constancy which constitutes scrap materials or an effluent or other, unwanted surplus substance arising from the application of any process [2].

The IFC [4] reported that, an environmental and industrial context of waste can be defined as any solid, liquid or contained gaseous materials that is being discarded by disposal, recycling, burning or incineration which may be a by – product of a manufacturing process or an obsolete commercial product that can no longer be used for intended purpose and requires disposal [4].

Waste from industrial activities includes liquid waste water or effluents, gaseous emission and solid waste. While gaseous emission have assumed a position of tremendous concern, liquid waste and effluents poses the most shattering and direct effect on workers health [5]. Industrial wastes are basically hazardous and as the name implies pose a threat or potential risk to human health and the environment if not properly managed.

Hazardous wastes contaminate soil, water and air. The pollution of these three key components tied to the existence of mankind undoubtedly creates a precarious relationship detrimental to sustainable growth and development. Health impact include exposure to toxic chemicals through air, water and soil media; exposure to infection and biological contaminants, stress related to odour noise, vermin and visual amenity, risk of fires, explosions and subsidence, spills, accidents and transport emission.

Workers are undoubtedly exposed to a wide array of hazards of varying magnitude depending on the job specific functions. For instance, a worker in a mine may endanger his life through exposure to heat, unstable lighting condition and deoxygenated air, while an industrial worker in asbestos plant may be exposed to such air pollutants

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like toluene and benzene [1]. An estimated 2 million working hours is lost to work – related illness while another two million people say they suffer from illness they believe was caused by their work [6].

Industrial pollution directly affects health through serious chemicals they discharge focus on the nature of the industry. These chemicals, beyond a specified limit have adverse effects on human health. The effects are seen in the heart, blood, kidneys, reproductive organs, lungs, liver amongst others. Hence, this study examines the effects of industrial waste management on workers health in selected industries in Ibadan.

Research Objectives

The study intends to examine the effects of industrial waste management on workers health in selected industries. Specifically, this study will try to:

1. Examine the impact of incineration/burning on workers health.

2. Explore the influence of recycling on workers health.

3. Examine the impact of safety practices on workers health.

4. Assess the relationship between workers attitude to occupational health and workers' health status.

Research Hypotheses

$H0_1$: There is no joint contribution of incineration, recycling, workers' safety practices and workers occupational health attitude on workers health status.

$H0_2$: There is no significant relationship between incineration and workers health status.

$H0_3$: There is no significant relationship between recycling and workers health status.

$H0_4$: There is no significant relationship between workers safety practices and workers health status.

$H0_5$: There is no significant relationship between workers attitude towards occupational health and workers' health status.

Methodology

The research design adopted for this study is the descriptive survey method. The target population of this study consists of industrial workers in Ibadan, Oyo State, Nigeria. The sample population of the study consists of 270 industrial workers in Ibadan South West Local Government, Oyo State, Nigeria. Stratified random sampling technique was used for the study. The first stage involved the purposive selection of Ibadan, Oyo State, as the population is heterogeneous. The second stage involved the selection of industrial workers in Ibadan South West Local Government using simple random technique. The third stage involved the selection of Zartech Farms and Sumall Foods. This allows every member of the population an equal chance of selection without bias.

Research Instrument

The major instrument used for the study is the Questionnaire. The questionnaire was sub-divided into two sections. Section A consists of demographic factors while section B consists of thirty (30) questions that were adapted from World Health Organization [3] Municipal Solid Waste Management Questionnaire, University of East Anglia, Norwich Staff and Student Occupational Health Services Scale and University of Cambridge Occupational Health and Safety Questionnaire.

The construction of the questionnaires were based on four point rating scale with which the respondents were asked to indicate to which extent they agree or disagree with the statement in each item by ticking: SA, A, D and SD, where: SA – implies Strongly Agree, A – implies Agree, D – implies Disagree, SD – implies Strongly Disagree. The questionnaire was adapted by the researcher and adequately validated by the supervisor.

Data Collection Procedure

The research instruments were administered to the workers in their industry with the assistance and cooperation of the human resource personnel. In addition to instructions written on the questionnaire, the subjects were given verbal instructions and clarifications where necessary. The entire administered questionnaires were properly filled according to instructions and retrieved by the researcher.

Method of Data Analysis

The data collected from the questionnaire were collated and analysed using simple percentage and ANOVA. The hypotheses formulated for the study were tested at 0.05.

Results

Based on the table presented above which revealed that, 180(72.0%) of the respondents were male while their female counterparts were 70(28.0%). The highest percentage of respondents was male. 126(50.4%) respondents were within 21-30 years, 111(44.4%) were within 31-40 years, 11(4.4%) were within 41-50 years while 2(0.8%) were within 51-60 years. This implies that highest percentages of respondents were within age range 21-30 years. 155(62.0%) of the respondents were Christians, 94(37.6%) were Muslims while 1(0.4%) was a Traditional worshipper. The Christian respondents have the highest percentage. Majority 171(68.4%) of the respondents were married while 79(31.6%) were single. 92(36.8%) of the respondents were junior staff, 56(22.4%) were middle staff while 102(40.8%) were senior staff respectively. This means that the highest percentage of respondents were senior staff.

Research Hypotheses

Hypothesis 1

There is no joint contribution of Incineration, Recycling, Worker's safety practices and Worker's occupational health attitude on workers' health status. The Table 1 showed the joint contribution of the four independent variables to the prediction of the dependent variable i.e., Workers' health status. The table also shows a coefficient of multiple correlation (R=0.362 and a multiple R_2 of 0.131. This means that 13.1% of the variance was accounted for by four predictor variables when taken together. The significance of the composite contribution was tested at $P<0.05$. The table also shows that the analysis of variance for the regression yielded F-ratio of 9.209 (significant at 0.05 level). This implies that the joint contribution of the independent variables to the dependent variable was significant and that other variables not included in this model may have accounted for the remaining variance.

Hypothesis 2

There is no significant relationship between incineration and workers health status. It is shown in the above Table 2 that there was a significant relationship between incineration and workers health

Demographic Variables	Frequency	Percentage
Sex		
Male	180	72.0
Female	70	28.0
Total	250	100.0
Age		
21-30 years	126	50.4
31-40 years	111	44.4
41-50 years	11	4.4
51-60 years	2	0.8
Total	250	100.0
Religion		
Christianity	155	62.0
Islam	94	37.6
Traditional	1	0.4
Total	250	100.0
Marital status		
Single	79	31.6
Married	171	68.4
Total	250	100.0
Position		
Junior staff	92	36.8
Middle staff	56	22.4
Senior staff	102	40.8
Total	**250**	**100.0**

Table 1: Distribution of respondents by demographic characteristics.

R	R Square		Adjusted R Square	Std. Error of the Estimate	
0.362	0.131		0.117	3.5523	
ANOVA					
Model	**Sum of Squares**	**DF**	**Mean Square**	**F**	**Sig.**	**Remark**
Regression	464.852	4	116.213	9.209	0.000	Sig.
Residual	3091.664	245	12.619			
Total	3556.516	249				

*Sig. at 0.05 level.

Table 2: Multiple regression analysis showing the joint contribution of incineration, recycling, worker's safety practices and worker's occupational health attitude on workers' health status.

status (r=0.323, N=250, P<0.05). Hence, incineration had influenced on workers' health status in the study. Null hypothesis is rejected. This result is supported by the findings of Lee et al. [7] who estimated the exposure status of hazardous substances and their health effects in workers and residents near a municipal solid waste (MSW) incinerators and residents near the industrial waste incinerators in Korea. They found that workers around industrial waste incinerator are exposed to hazardous substance such as Polychlorinated dibenzo-p-dioxins (PCDD) which causes respiratory infections and diarrhoea diseases.

Hypothesis 3

There is no significant relationship between recycling and workers health status. It is shown in the above Table 3 that there was a significant relationship between recycling and workers health (r=0.240, N=250, P<0.05). Hence, recycling had influenced on workers' health status in the study. Null hypothesis is rejected. The result correlates with the findings of Ana et al. [1] who discovered that physical contact with poisons, dust inhalation, exposure to organic and inorganic chemicals of industrial workers during recycling of waste have adverse effects on human health. The effects are seen in damaged heart, blood, and kidneys. The study also found that health effect such as skin disorders and respiratory tract infections were associated with exposure to high concentrations of the atmospheric pollutants, via ammonia and total suspended articles during recycling of waste.

Model	Unstandardized Coefficient		Stand. Coefficient	T	Sig.
	B	Std. Error	Beta Contribution		
(Constant)	6.218	1.899		3.275	0.001
Incineration	0.258	0.067	0.254	3.842	0.000
Recycling	0.135	0.083	0.109	1.633	0.104
Worker's safety practices	6.785E-02	0.123	0.037	0.552	0.581
Worker's occupational health attitude	0.156	0.103	0.098	1.525	0.129

Table 3: Multiple regression analysis showing the relative contribution of incineration, recycling, worker's safety practices and worker's occupational health attitude on workers' health status.

Hypothesis 4

There is no significant relationship between workers' safety practices and workers health status. It is shown in the above Table 4 that there was a significant relationship between workers' safety practices and workers health status (r=0.160, N=250, P<0.05). Hence, workers' safety practices had influenced on workers' health status in the study. Null hypothesis is rejected. This result is supported by the findings of Lee et al. [7] that workers safety practices within an industry has a direct effect on their health and safety. A worker may be instructed to wear personal protective equipments which he or she may not comply with when there are no strict instructions. This attitude may lead to damage to health and safety of such a worker at the detriment of the industry. Based on this finding, adequate compliance mechanism should be readily made available and stronger punitive measures taken against erring workers.

Hypothesis 5

There is no significant relationship between workers' occupational health attitude and workers health status. It is shown in the above Table 5 that there was a significant relationship between workers' occupational health attitude and workers' health status (r=0.168, N=250, P<0.05). Hence, workers' occupational health attitude had influenced on workers' health status in the study. Null hypothesis is rejected. The result correlates with study of the components of effective health and safety management system in industries. The study found that the kind of attitude workers have towards occupational health will have a positive or negative effect on their health status irrespective of effective health management system put in place by the employer. For instance, a worker may be instructed to wear personal protective equipments which he or she may not comply with when there are no strict instructions. This attitude may lead to damage to health and safety of such a worker at the detriment of the industry. To enforce control methods of workers attitude toward occupational health, management should develop a constructive enforcement policy, and communicate the consequences to employees and the steps that will be taken if noncompliance occurs. As a result of the findings of this study, it can therefore be concluded that industrial waste management have effect on workers health. Efforts should therefore be directed at reducing waste generation and proper management of waste in order to promote workers health and the environment in general (Tables 6 and 7).

Conclusion and Recommendations

Industrial waste management policies and programmes should be tailored towards enhancing workers health. This will have positive reflections on the workers family, industrial productivity and the society at large. Thus, the industrial worker is a happy individual and the positive energy will spread to his/her family, industry and the society.

Variable	Mean	Std. Dev.	N	R	P	Remark
Incineration	10.8440	3.7239	250	0.323	0.000	Sig.
Workers Health Status	13.9560	3.7793				

*Sig. at 0.05 level.

Table 4: Correlation analysis showing the relationship between incineration and workers health status.

Variable	Mean	Std. Dev.	N	R	P	Remark
Recycling	11.8640	3.0678	250	0.240	0.000	Sig.
Workers Health Status	13.9560	3.7793				

*Sig. at 0.05 level.

Table 5: Correlation analysis showing the relationship between recycling and workers health status.

Variable	Mean	Std. Dev.	N	R	P	Remark
Workers' Safety Practices	14.4480	2.0396	250	0.160	0.011	Sig.
Workers Health Status	13.9560	3.7793				

*Sig. at 0.05 level.

Table 6: Correlation analysis showing the relationship between workers' safety practices and workers health status.

Variable	Mean	Std. Dev.	N	R	P	Remark
Workers' Occupation Health Attitude	15.1040	2.3638	250	0.168	0.008	Sig.
Workers Health Status	13.9560	3.7793				

*Sig. at 0.05 level.

Table 7: Correlation analysis showing the relationship between workers' occupational health attitude and workers health status.

The following are the recommendations from the study:

1) Government should put policy in place to check industries who engage in demeaning waste management practices that damages workers health.

2) Industries should continually invest in engineering controls and equipments designed to reduce the impact of waste generation on workers health. These will assist in ensuring prevention of waste or its reduction as well as guarantee a safer and healthier workforce.

3) Employers should establish sick bay or health centre in the industry where workers can get quick and quality medical attention to any of their health challenges.

4) Workers attitude to health and safety practices must be pruned by total compliance and zero tolerance for incidents and accidents.

5) Management should encourage workers involvement and participation in health and safety issues. Workers contribution should be entertained through regular study and research within the facility.

6) Industrial social workers should design interventions for enhancing emotional intelligence of industrial workers and design support systems to enable them to shoulder their work responsibilities effectively and efficiently without damaging their health.

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