The Use of Personal Protective Equipment (PPE) among Workers of Five Refuse Disposal Companies within Port Harcourt Metropolis, Rivers State, Nigeria

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ABSTRACT— ***The use of personal protective equipment (PPE) is a crucial functional element that guard against or minimize the effects of occupational hazards. This has prompted the American occupational safety and health administration (AOSHA) agency, to insist that employers protect employees from work place hazards that can cause serious injuries. One of such jobs is done by the refuse disposal companies where hazards refuse exist in different forms at refuse disposal sites. This study seeks to evaluate the compliance level to the use of PPE among workers of five refuse disposal disposal companies in Port Harcourt Metropolis, Nigeria. Adequate use of PPE is minimizing or avoiding occupational /workplace hazards/ injury. Two sets of workers were randomly selected: the senior staff and field workers of the five companies. Three senior staff members from each of the companies were selected and a survey using questionnaire was conducted among them for a period of one week to evaluate their knowledge and opinion on PPE. Field workers were monitored(We got to work the same time as the workers,followed them to their different pickup sites and observed whether they used PPE or not in while they discharged their duties every day for the period of the study) and interviewed(we tried to find out from the field workers what they know about PPE, their opinion of the importance of PPE and whether they agreed to the use of PPE) for a period of four weeks. Results obtained showed 28% compliance and 72% non-compliance revealing a need for companies to step up on their use of personal protective equipment in the field.***

Keywords— Personal Protective Equipment, Knowledge, Opinion, Compliance .

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1. INTRODUCTION

Personal Protective Equipment (PPE) type of specialized clothing, barrier products or gadgets used by workers to prevent injuries and workplace hazards / diseases that may arise from working environment[6]. The efforts of the American occupational safety and health Administration[8] cited by Foley[3] requires that employers protect their employees from work place/occupational hazards that can cause injuries. Over the years, outcomes(environmental health, productivity, and sustainable development from companies and organizations have not yielded much desired results due to little or non-usage of proper and appropriate PPE at work sites, thus refuse disposal field workers are always exposed to the hazards of their job and are hindered from performing at their best. PPE are seen to be equipment worn by workers to reduce or minimize the exposure or contact with physical, chemical, ergonomic or biological agents in work place[7]. Examples of PPE include items such as gloves , safety boots, eye goggles and lenses, ear muffs and plug , hard hat or helmets, cover-roll or protective suits , nose masks etc. Every year, hundreds [are any] of people are injured or killed in the industries , mines and other workplace due to non –usage of PPE. In 1973, OSHA[7] was established to safe guard the health and safety of workers. This program addressed the hazards present, the selection , the maintenance , and the use of PPE, the training of employees, and monitoring of the program to ensure its effectiveness. This guide was meant to help employee and employers to:

i) Understand types of PPE

ii) Know the basis of conducting a hazard assessment in a workplace

iii) Select appropriate PPE for a variety of circumstances and

iv) Understand the kind of training that is needed in the proper use and care of PPE.

In this respect, the use of PPE can play an important role in safeguarding the health and life of workers in any working environment. It was in view of this, coupled with hundreds of people being injured or killed in industries that OSHA [8], recommended that employers provide their employees with proper PPE in order to reduce, avoid or minimize the effects of workplace hazards. It is also important to realize that PPE like any other protection does not eliminate danger, but simply serves as a screen between the worker and the source of danger. In most cases the danger and injury [6].

1.1 Why a PPE Hazards

Not long ago, a worker died from complications resulting from burns on his face and hands when he tried to remove the bottom of a 55-gallon drum, which contained traces of motor oil, with a plasma cutter. The drum exploded. He should not have been using a plasma cutter on an oil drum until it had been cleaned and decommissioned; however, he might have survived with less severe burns ,if he had been using a face shield and appropriate protective gloves. He was wearing gloves, but they were made with fabrics that melted on his hands from the heat of the explosion. His employer had not done a PPE hazard assessment[2].

PPE safety gadgets are used differently for different purposes, cleaned and kept and are not to be shared among workers. The most common routes to some of the workplace hazards includes incineration , skin contact, falling objects and electrocution .however, the hazards addressed in this study are those concerned with dump sites and refuse disposal. In Nigeria not much work has been carried out in the area of safety and protective environment, but is emerging. Some workers in Nigeria have reported that, the health status survey on respiratory disorders carried out on Miners and Quarry workers showed that many of them have low respiratory capacity than those in the administrative work, this could be attributed to accumulated effect of inhalation of respirable particles e.g. coal dusts, silica dusts etc. some of the workers with bad habits of smoking or sniffing also had low respiratory capacity. Workers in most of the companies visited were not provided with PPEs and where available the uses were not enforced thus workers were not using them. Health and safety education need to be carried out among workers. Workers in the informal sectors are exposed to more hazards due to the lack of awareness of the danger inherent in their jobs. Most facilities does not have medical, safety or welfare facilities. Health and safety of the informal sector should be considered better[12] (Lagos State Ministry of Health, 2002). Solid waste today has become the number one environmental problem facing the country (i.e. Nigeria) with its consequent effects on the pollution of water, air and land. The problem of solid waste in our urban and rural areas cannot be overemphasized. As men who engage in solid waste disposal spend half of their time and days clearing the heaps of refuse on the street , there is every likelihood that this may affect their health and socio-economic well being . However, even though waste disposal business has its attendant risks or problems, it still provides means of livelihood to some dynamic youths and adults ,which makes them to carter for themselves and families[10]. Research has also shown that, in most solid waste workers, there is a significant increase in lymphocyte. The lymphocyte may indicate the presence of bacterial infections, protozoal infections and granulomatous process like hypersensitivity[11] [10] . In some other workers, mild eosinophilia that indicate allergic disorders and helminthic infections are other associated hazards. High malaria parasitaemia is also noticed in some other refuse disposal workers, this may be due to the fact that the waste dump offer an excellent breeding ground for mosquitoes, the vector of the malaria parasites[13] . Since the solid waste workers are not using adequate PPEs while at work, the female anopheles mosquitoes see them as easy preys for their blood meals. This accounts for slight decrease in their haemoglobin concentration and their complain of general body malaise[11][10] . The use of proper and adequate PPEs by refuse disposal workers is imperative for their health and safety. It is against these backgrounds of safety values, relevance and importance of PPE for workers of refuse disposal companies that this study seeks to investigate and evaluate the use of PPE among workers of five(5) refuse disposal companies within Port Harcourt metropolis.

2. MATERIALS AND METHODS

The study was carried out between July and August , 2011. The monitoring and observation of field worker of the five refuse disposal companies was carried out for five(5) weeks. The first one week being used for the distribution of copies of questionnaires questionnaires to the senior staff members of the selected companies, whose services were employed by the sanitation Authority and the Ministry of Environment, Rivers State. The descriptive survey research was designed to determine the use/compliance, opinion and Knowledge of personal protective equipment among workers of refuse disposal companies within Port Harcourt metropolis by monitoring(following them to their different refuse disposal sites) and observing them do their job of loading the wastes onto their trucks. The monitoring and observation exercise was for 5 weeks. The first one week was used for the distribution of the questionnaire to the senior staff members of the companies (since, they as administrative staff/Supervisors carry out their jobs in the offices, as they are more lettered than the field workers , and were able to quickly supply the needed information). The main instrument used for this study was the close observation of the field workers at their different refuse disposal sites, followed by the questionnaire administered to selected senior staff members of these companies. There is scarcity of information on PPE usage by refuse disposal workers in this region (Port Harcourt Metropolis), thus this study seeks to provide base-line

information on the usage/compliance, knowledge and opinion of PPEs by refuse disposal workers, provision of PPE for field workers by refuse disposal companies, and the associated/possible hazards and health implications of non-compliance to PPE usage. The refuse disposal companies recruited for this study were:

1) Manufil international Nigeria Limited, which covers first and second Artillery, Woji, Water Tank, Rumuodara, Eliozu, and Rumuokurushi axis of the city.
2) Numac Project Company Limited, which covers GRA, Eligbam, Rumuola, and Water lines axis.
3) O.C and Sons Limited ; covering Mile 3, Mile 4 , Rumuokwuta, Rumuigbo, Rumuokoro, Nkpolu, Mbguoba, Iwofe, and Rumuolumini axis.
4) Fieldman Nigeria Limited;which covers Garrison , Slaughter , Trans Amadi, Elekahia, Eastern bye-pass, and Ogbunabali axis.
5) Jam Services C ompany Limited ; covering Borokiri, Aggrey, Lagos street, Azikwe Road, Forces Avenue, Mile 1, D-line , Moscow road and Marine base axis.

The five refuse disposal companies were randomly selected from the Port Harcourt metropolis; these companies were expected to serve as representative samples of refuse disposal companies in Port Harcourt metropolis. It is generally anticipated that the outcome from this study could be generalized since they are constituent companies within the metropolis of Port Harcourt and in the same operation of disposing refuse. The study was at two levels, a questionnaire survey among the senior staff of the companies and a monitoring /observation exercise of the field workers. 15 senior staff (three from each company) were recruited for the questionnaire survey (based on their job ranking /position i.e. the top most three in the organogram of the companies). Field workers (exempted from the questionnaire survey because a good number of them were not literate) were monitored and closely observed, which constituted the main crux of the study.The data obtained and the information from the copies of questionnaire were arranged separately and presented in tables to ease computation. To aid in the interpretation of the data collected, sample tables, percentages as well as simple bar charts were used. Tables and Charts respectively represents the number of persons that complied to the use of PPEs, the number of persons that do not comply to PPE usage and the percentages of both (Tables 4,5,6,7,8 and Fig 1). Information obtained from copies of the questionnaire were represented separately in tables(Tables 1,2and 3) The number of compliance to PPE usage were compared statistically to the number of non-compliance to PPE usage (using simple bar chart, fig 1and tables).

3. RESULT

Out of the 15(fifteen) senior staff members of the five refuse disposal companies investigated, only 2(13.33%) had qualification up to a PhD, 4 had B.SC and its equivalent. A greater percentage 9(60%) had NCE level of Education (Table1). Analyses conducted to ascertain their awareness level of the use of PPE showed 93% awareness and 7% ignorance, Table 2. Some workers in most sites studied, used PPE without knowing what they are. In one of the sites, the staff who indicated that he is not aware of the existence of personal protective equipment was wearing coverall, hand gloves and a pair of safety boot but had no hard hat and nose mask, rather he used handkerchief to cover his nose as he loads refuse into a truck. He did not realize that what he was wearing were personal protective equipments (PPEs). Also, after an interaction with him, it was revealed that he was only a first school leaving certificate(FLSC) holder and did not know what PPEs are and how important it is in his job(Table 2). However, this was(PPE usage by the workers) inadequate, as most of the workers encountered use no or incomplete PPE gadget for their work.

For the senior staff members, who responded to the research question 2 in the questionnaire, some of them though aware of PPE and their importance, do did not make these available to their workers(Table3). Of the 15 respondents, 12 reported that they use PPE in their companies, while 3 reported that they not use PPE in their companies, most workers observed in this study complained of not being comfortable , wearing the PPE gadgets while performing their duties, which formed the major excuses for non-usage of PPE. However, this (PPE usage) increased as the study progressed, probably, because the workers knew they were being monitored or because they became aware of the importance of PPEs (Tables 5,6,7,8)

Further studies conducted to access the compliance level of individual workers in the different companies are as shown in tables 4 and fig .1

4. DISCUSSION

Monitoring and observation on the use of personal protective equipment (PPE) carried out for a period of four (4) weeks among workers of five ref use disposal companies within the metropolis of Port Harcourt, Rivers State, produced an interesting result. We got to work at the same time as the workers for the 4 week period of this study, followed them to their various pick up sites, observed the workers to know whether they used PPE or not as they carried out their tasks , and interacted with the workers to find out what they knew, think and whether they agreed to the use of PPE or not(Tables 5,6,7,and 8).

Most of the field workers and the senior Staff (Supervisors) though aware of PPE and its importance, did not fully comply with the usage. In week one (1), compliance level was 13.95% while non-compliance had a higher figure of 86.05%. Weeks two, three and four showed compliance and non-compliance values of (21.05%,32.50%,42,86%) and (78.95%,67.50%,57.14%) respectively(Table 4).

Statistical analyses with a simple bar chart showed an inverse proportionality between compliance and non-compliance rate among workers.

Compliance rate among the field workers slowly increased as the weeks went by, possibly because the workers were aware that, they were being monitored in this research work. Analysis by British Health Safety Executive of the 2005HSE FIT 3 Work Place Survey, suggests that 5.5 million employees in 224,000 work place in Great Britain, could be at risk of respiratory disease[5]. With respect to the associated hazards(Respiratory diseases, significant increase in lymphocyte indicative of the presence of bacterial infections, protozoal infections and granulomatous process like hypersensitivity, mild eosinophilia that indicates allergic disorders and helminthic infections, high malaria parasitaemia etc), a study conducted in Port Harcourt city, Nigeria, observed that, the years of exposure has no serious impact on the solid waste disposal workers blood indices, probably because those who have consistently worked for that length of time (7-8 years) may become supervisors and are less in contact with the wastes or toxicants.This study showed that, if the level of awareness on the importance and relevance of PPE among workers of refuse disposal companies increases, the compliance rate would tremendously increase.

Personal protective Equipment (PPE) is worn to minimize exposure to a variety of hazards. Hazards as items which exist in every workplace in different forms, include sharp edges, falling objects, flying sparks, chemicals, noise and other potentially dangerous substances. By using the correct and complete PPE, workers would be able to prevent and protect themselves from injuries and work place hazards [6].

A case study published by US Environmental Protection Agency (EPA) provides an excellent illustration of the role of management and supervision [9]. The strategy described had three 'key components'. Awareness's of hazards, Use of PPE and Employee Training. A workshop manager was dedicated to ensuring that the workers knew the risk of working without complete PPE and how to use the PPE to protect themselves.

5. CONCLUSION

Findings from this study reveal that the management of refuse disposal companies in this study area have not understood the utmost essentiality of adequate and appropriate PPEs for their job, hence before this study, there were limited PPEs available for the field staff. However, with continuous monitoring and awareness campaign on PPEs, there would be an appreciable improvement. (do not see PPE as essential.) Refuse handling and disposal are chains of events, and every stage involves human contact and exposure leading to health risk among field workers in these companies. Despite the number of refuse disposal licensed companies in Port Harcourt and the effort of Government to provide healthy working environment for workers of these refuse disposal companies, it is obvious that these companies are not closely being monitored or scrutinized by Government agencies prior and after issuance of the licenses. Routine checks on refuse disposal workers and regular appraisal of these companies is therefore pertinent, to ascertain compliance to environmental regulations including the use of PPE. On this premise therefore, This study strongly recommends that:

i. Intensive awareness campaign and training programs should be organized by Government and Non-Government organizations (NGOs) dealing with environmental issues.

ii. Licenses to refuse disposal companies should only be issued after compliance with established Environmental policies and requirements, including provision of complete and adequate PPEs, and should be renewed yearly.

iii. Employers should ensure that all employees adequately and completely make use of PPE and strict measures be enacted against defaulters.

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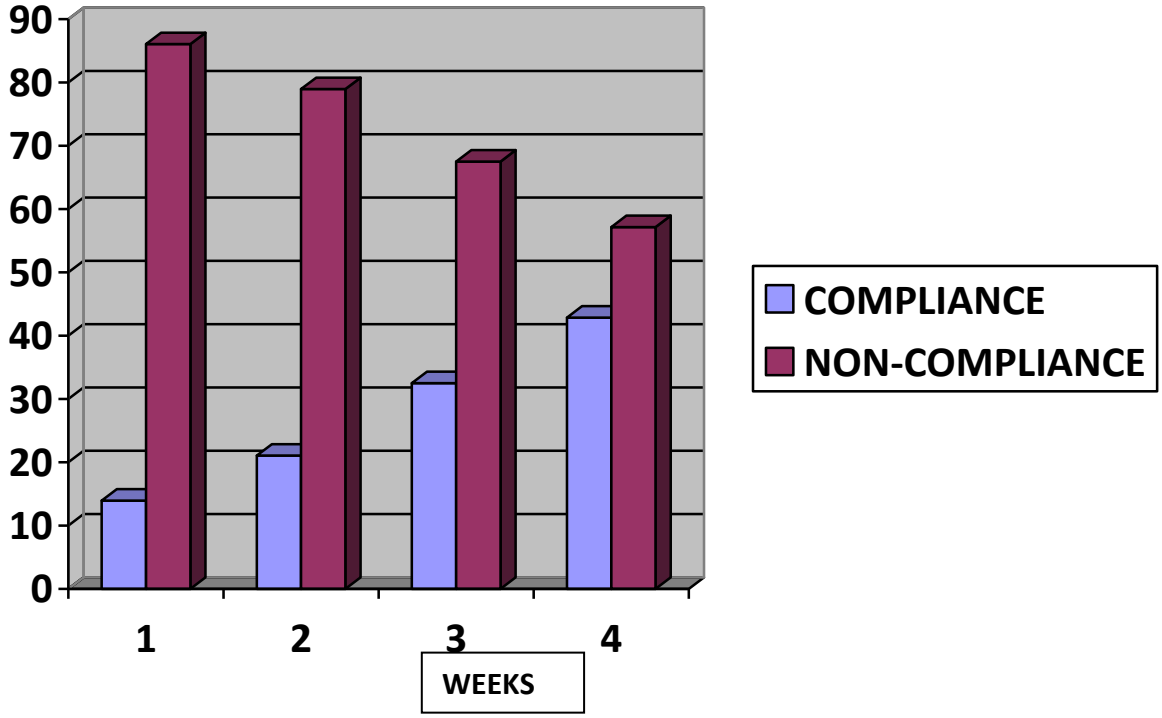

FIG 1: Compliance and Non-Compliance Level From The Observation on The Use of Personal Protective Equipment Among Workers of Five Refuse Disposal Companies Within Port Harcourt, Rivers State, Nigeria Metropolis.

Table1:Qualifications of Senior Staff in Five Refuse Disposal Companies Within Port Harcourt Metropolis

Qualification	**Number**	**Percentage(%)**
M.ED,M.SC, and PhD	2	13.33%
B.ED,B.A, and B.SC	4	26.7%
FSLC,WAEC, and NCE	9	60%
TOTAL	15	100%

Table 2: Staff Response to Research Question On Awareness Of PPE: Are You Aware of the Existence of Personal Protective Equipment?

Respondent	**Number**	**Percentage(%)**
YES	14	93.0%
NO	1	7.0%
TOTAL	15	100.0%

Table 3: Staff Response to Usage of PPE: Do you use PPE in your company?

Respondent	**Number**	**Percentage(%)**
YES	12	80.0%
NO	3	20.0%
TOTAL	15	100.0%

Table 4: Compliance and Non-Compliance Rate

Weeks	**Compliance**	**Non-compliance**
1	13.95%	86.05%
2	21.05%	78.95%
3	32.50%	67.50%
4	42,86%	57.14%
TOTAL AVERAGE RATIO	28.0% 7	72.0% 18

Compliance to The Use of PPE Among Workers of Five Refuse Disposal Companies Within Port Harcourt Metropolis, in Rivers State

Table 5: Compliance Level in Week One

TYPES OF PPEs USED	NUMBER OF WORKERS OBSERVED	PERCENTAGE(%)
Some of the PPEs used(Hand Gloves and Rain boots)	6	13.95
Some of the PPEs not used(coveralls, nose masks, helmet and eye goggles)	37	86.05
TOTAL	43	100

Table 6: Compliance Level in Week Two

RATING OF PPE	NUMBER OF WORKERS OBSERVED	PERCENTAGE (%)
Some of the PPEs used (hand gloves and coveralls)	8	21.05
Some the PPE not used (nose masks, rain boot, helmets and eye goggles	30	78.95
Total	38	100

Table 7: Compliance Level in Week Three

RATING OF PPE	**NUMBER**	**PERCENTAGE**
Some of the PPEs used (hand gloves and rain boots)	13	32.50
Some the PPE not used (nose masks, rain boot, helmets and eye goggles	27	67.5
Total	40	100

Table 8: Compliance Level in Week Four

RATING OF PPE	**NUMBER**	**PERCENTAGE**
Some of the PPEs used (hand gloves, coveralls and rain boots)	15	42.86
Some the PPE not used (nose masks, rain boot, helmets and eye goggles	20	57.14
Total	35	100