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### Occupational hazards and environmental health associated with the traditional palm kernel oil extraction method

*(A case study of the abura palm kernel oil industry in the central regional capital, cape coast of Ghana)*

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#### ABSTRACT

Occupational and environmental hazards associated with our traditional Industries are hardly considered or discussed to provide an improved form for them. With the Palm Kernel Oil Industry in the Central Region of Ghana, it was observed that, some of the daily occupational hazards are exposure to intense fire source, sharp hot flying objects and smoke. Out of the 50 respondents reported 31%, 6%, 26%, 16% and 21% respectively. Similarly, percentage accidents usually encountered during work were cuts (35%), burns (33%), Oil splashes (26%) and oil spills (6%). Of the various wastes generated, fiber was (21%), residue (38%), shells (38%) and wastewater (3%) and their main disposal method was landfilling (36%), fuel source (36%), selling (25%) and dumping (3%). Some other negative effects of that practice on the environment were bad odor (8%), blocking of waterways (4%) and particulate matter (fiber) recording (4%). Some of the sicknesses usually reported at the hospital by both the employees and residents within the locality were abdominal pain (2.5%), coughing (12.7%), itching eye (21.5%), sleeping disorders (5.1%), respiratory problems (17.7%) headache (13.9%), fatigue (3.8%), sore throat (8.9%), general body ache (3.8%) and Malaria (10.1%).

**Key words:** Occupational Safety, Palm Kernel Oil, Environmental Hazard, Workplace condition.

#### INTRODUCTION

Occupational and environmental hazards are dangers associated to human health and its well being which are usually associated with specific occupations. The World Health Organization (WHO) defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” [1]. It may lead to illness, injury or death. It is a cross-disciplinary area which affects the safety, health and welfare of people engaged in work or employment. Inasmuch as it affects the health situation of the workers, there is therefore the need for some programmes on occupational safety and health to foster a safe and healthy work environment in most small and large industrial organizations [2]. It may also protect co-workers, family members, employers, customers, and many others who might be affected by the nature of the workplace environments. Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize, the adaptation of work to man and of each man to his job. The main focus in occupational health is on three different objectives namely the maintenance and promotion of workers' health and

working capacity, the improvement of working environment and work to become conducive to safety and health and development of work organizations and working cultures in a direction which supports health and safety at work and in doing so also promotes a positive social climate and smooth operation and may enhance productivity of the undertakings. Environmental hazard is generally related with hazards that affect land, air and water bodies. On land, it describes the effect of man's activities such as mining, industrial waste, construction, toxic releases and others. These activities by man tend to degrade the environment and subsequently transferred to humans. In air, most of the environmental problem associated is dust. Whenever people inhale airborne dust at work, they are at risk of occupational disease. Year after year, both in developed and in developing countries, overexposure to dusts causes disease, temporary and permanent disabilities and deaths [3]. Dusts in the workplace may also contaminate or reduce the quality of products, be the cause of fire and explosion, and damage the environment. As a matter of social justice, human suffering related to work is unacceptable. Moreover, appreciable financial losses result from the burden of occupational and work related diseases on national health and social security systems, as well as from their negative influence on production and quality of products. All these adverse consequences, which are economically costly to employers and to society, are preventable through measures which have been known for a long time, and which are often of low cost [4]. It has also been observed that exposures to various environments such as toxins, radiation, chemicals, infectious diseases, pesticides, electronic equipment in either their work environment, or in their homes and neighborhood could have serious effect. In some cases such as exposures to lead, mercury, carbon monoxide, organic solvents, ionizing radiation and viruses like rubella, can be potentially 'teratogenic' (or capable of causing birth defects), or that some may reduce the fertility of both men and women or affect the growth and development of their unborn baby [5]. Trace amounts of are important in industry [6], as a toxicant [7], and biological nonessential [8], as an environmental pollutant [9], and an occupational hazard [10]. Temperature extremes can also pose a danger to workers. Heat stress can cause heat stroke, exhaustion, cramps, and rashes. Heat can also fog up safety glasses or cause sweaty palms or dizziness, all of which increase the risk of other injuries. Workers near hot surfaces or steam also are at risk for burns [11]. Dehydration may also result from overexposure to heat.

#### MATERIALS AND METHODS

Generally, about sixty (60) workers are employed with most of them being women and only a male at the Abura Palm-Kernel Oil industry. In this case study, fifty (50) employees were sampled. The sampling was based on the main occupational and environmental hazards of their operations, seeking to also know how much information they have about occupational safety, risk assessment as well as waste management and disposal. The study was carried-out by administering questionnaires which sought to know their personal data, knowledge on occupational hazards and safety, cases reported to the hospital, waste generated and its disposal,

Some residents who stay very close to the production area were also interviewed on how they were affected by the operations of the industry. The detailed content or outline of the questionnaire is provided at the Appendix.

The information gathered was analyzed using SPSS software as well as other statistical methods.

#### RESULTS AND DISCUSSION

This research was performed to assess the quality of life of the traditional palm kernel producing people within the Abura community of the Central region of the Ghana. Below are the results obtained.

TABLE 1: SOME OF THE CAUSES OF SICKNESSES REPORTED

CAUSES	FREQ.	PERCEN.(%)
Carrying heavy load	11	22.0
Exposure to fire	5	10.3
Standing and working for long periods in the sun	15	29.4
Smoke inhalation	16	32.4
Noise	1	1.5
Hand-mixing of clay-bath	2	4.4
TOTAL	50	100

SOURCE: SURVEY DATA

**TABLE 2: ACCIDENTS ENCOUNTERED DURING WORK**

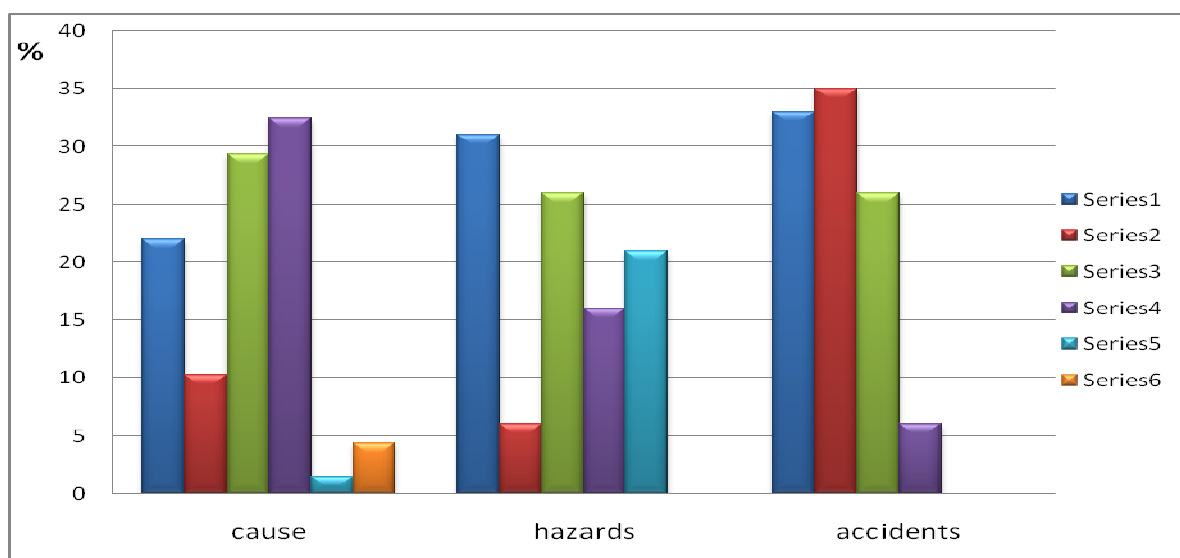
ACCIDENTS	FREQUENCY	PERCENTAGE
Burns	16	33.0
Cuts	18	35.0
Oil splashes	13	26.0
Oil spills	3	6.0
TOTAL	50	100

SOURCE: SURVEY DATA

**TABLE 3: SOME HAZARDS ASSOCIATED WITH THE WORK**

HAZARDS	FREQUENCY	PERCENTAGE(%)
Fire	16	31.0
Flying objects	3	6.0
Sharp objects	13	26.0
Hot objects	8	16.0
Smoke	10	21.0
TOTAL	50	100

SOURCE: SURVEY DATA



**A GRAPH OF CAUSES, HAZARDS, AND ACCIDENTS AGAINST PERCENTAGE (%)**

- Series 1- Carrying heavy load, Fire, Burns respectively,
- Series 2- Exposure to fire, Flying objects, Cuts respectively
- Series 3- Standing and working for long periods in the sun, Sharp objects, Oil splashes
- Series 4- Smoke inhalation, Hot objects, Oil spills respectively,
- Series 5- Noise, Smoke respectively
- Series 6- Hand-mixing of clay-bath

**TABLE 4: TYPE OF WASTE GENERATED**

WASTE GENERATED	FREQUENCY	PERCENTAGE (%)
Fibre	10	21.0
Residue	19	38.0
Shells	19	38.0
Waste water	2	3.0
TOTAL	50	100

TABLE 5: METHODS OF WASTE DISPOSAL

WASTE DISPOSAL	FREQUENCY	PERCENTAGE (%)
Land-filling	18	36.0
Source of fuel	18	36.0
Selling	13	25.0
Dumping	1	3.0
TOTAL	50	100

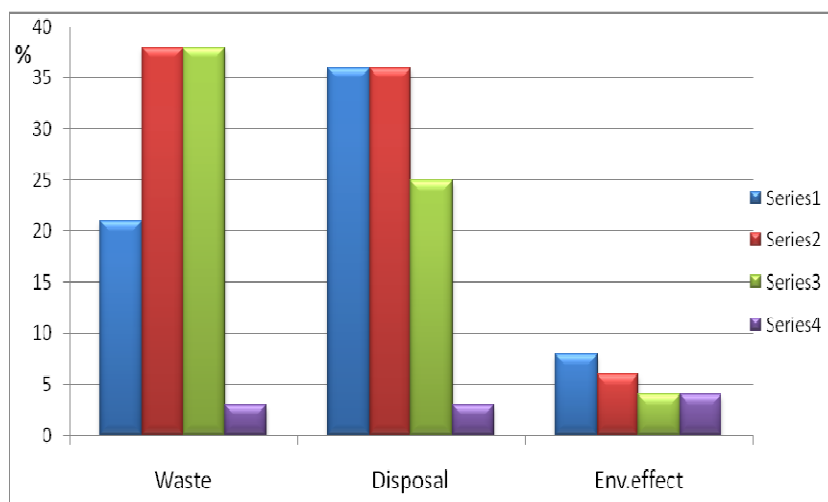
TABLE 6: KNOWLEDGE OF ENVIRONMENTAL WORK

	FREQUENCY	PERCENT (%)
YES	11	22.0
NO	39	78.0

SOURCE: SURVEY DATA

TABLE 7: SOME ENVIRONMENTAL EFFECT OF THE EFFECTS OF THE WORK

EFFECTS	FREQUENCY	PERCENT (%)
Bad odor	7	8.0
Blocking water-ways	5	6.0
Smoke	3	4.0
Particulate matter (PM)	3	4.0
TOTAL	18	22.0



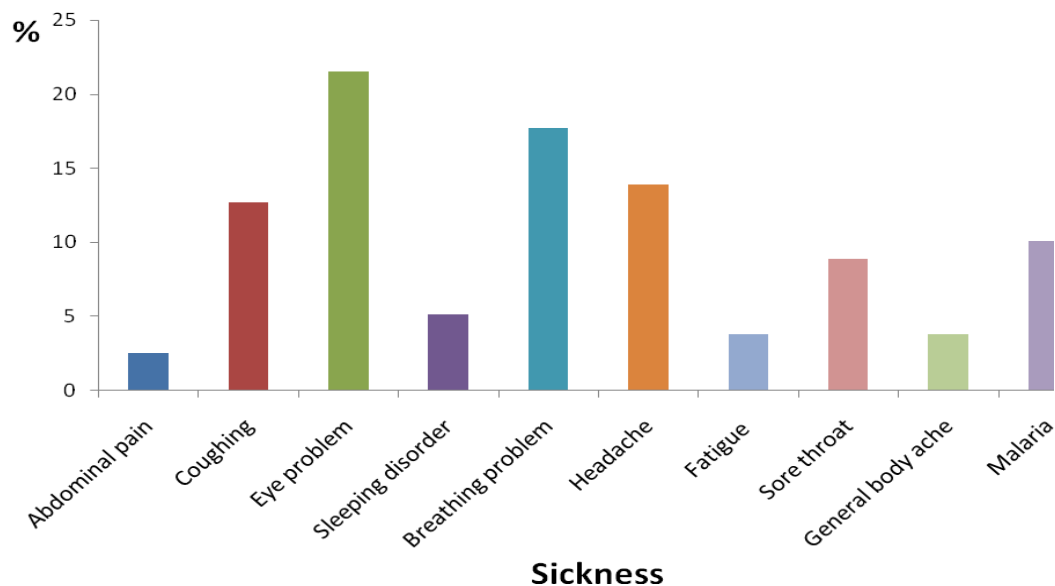
A graph of type of waste generated, disposal method and it's environmental effects in percentages

Series1- Fibre, Land-filling, Bad odor, Series2- Residue, Fuel source, Blocking waterways, Series3- Shells, Selling, Smoke, Series4- Waste water, Dumping, Particulate matter (PM)

TABLE 8: SICKNESSES OFTEN REPORTED AT THE HOSPITAL BY RESIDENTS

SICKNESSES	FREQUENCY	PERCENTAGE (%)
Abdominal pain	1	2.5
Coughing	6	12.7
Eye problem	11	21.5
Sleeping disorders	3	5.1
Breathing problems	9	17.7
Headache	7	13.9
Fatigue	2	3.8
Sore throat	4	8.9
General body ache	2	3.8
Malaria	5	10.1
TOTAL	50	100

SOURCE: SURVEY DATA



## DISCUSSION

The study revealed that the occupational and environmental situation at the Abura local palm kernel oil industry was not the best in terms of workplace conditions. The workers were mostly women (female) from the locality, Abura-Aseibu Kwamankese district and that accounted for the 100% female respondents. Similarly, factors such deprivation form basic social amenities, illiteracy, poverty, and unemployment accounted for that large number.

On education, the illiterates accounted about 56%, whereas 44% had some little form of basic education. Most of the youth (34%) have spent 1-5 years in the industry followed by 6-10 years (30%), 11-15 years (12%) and above 15years (24%).

On health issue, 94% had visited the hospital before with a few (6%) who rarely visit the hospital. Most of them did not visit the hospital as often as expected, with those visiting once in a year recording about 56%. They gave some reasons such as the expensive nature of medical care and limited time. The high percentage of those who have visited the hospital is as a result of their constant exposure to fire and smoke as well as the strength demanding nature of their work. They reported quite a number of sicknesses with the prevalent one among them being general body ache (18%), Sore throat (12%), swollen leg (12%) and headache (10%). They also complained of respiratory diseases (42%) and skin diseases like dermatitis, (22%) and most had sought medical attention. Most had some knowledge of the possible causes of the sicknesses they had suffered representing 95.9% and they identified them as; smoke inhalation (32.4%), exposure to fire (10.3%), standing and working under the sun for long periods (29.4%) and carrying heavy load (22%). Others are hand mixing of clay bath (4.4%) and noise (1.5%). Although reported events of accidents were common in the industry (100%), very few workers had taken any preventive measures. The use of Personal Protective Equipment (PPEs) was small (10%) as most answered “No” to its usage. Most of the employees are aware of the occupational hazards associated with the work they do (100%). Some of the work-associated hazards were identified as fire, for the heating and cooking processes (31%), flying objects during the nut cracking process (6%), sharp shells edges (26%), hot objects (16%) and smoke (21%).

Most of the wastes generated from the local or traditional method of extracting palm kernel oil are solid in nature. These include fiber from the winnowing process (21%), residue obtained after oil extraction (38%), shells (38%) and to very low extent wastewater (3%). Disposal of these wastes from this industry is a problem. Sometimes the fiber and shells are utilized as source of fuel for the extraction process (36%), the other residues are mainly used for land-filling within the processing site (36%) since they have no other alternative. On some occasions it is also sold to telecommunication companies and electricity companies as a filling material for erecting transmission poles.

Most of the employees (78%) had little idea of the environmental effects of their processing method and this is mainly due to the level of illiteracy. Some had knowledge of these effects but attributed them to poor waste disposal and management around the area. Some effects of the environmental mismanagement mentioned were bad odor (8%), smoke (4%) and waste blocking of waterways which create breeding grounds for mosquitoes.

For accurate information of the environmental effects within the community, some residents who stayed within two hundred meters (200m) from the production area were also interviewed. It was realized that, they did not visit the hospital as often as they should, with once a year recording highest together with others (those who never visited the hospital) at 48%. Interestingly, almost all of them (96%) were affected in one way or the other by the operations of the industry. This is evident in the fact that, they reported similar sicknesses to the hospital as the employees in the industry. The few times they visited, they reported sicknesses such as; sore throat (8.9%), headache (13.9%), eye problem (21.5%) coughing (12.7%), breathing problems (17.7%), sleeping disorders (5.1%), abdominal pains (2.5%), general body aches(3.8%), fatigue(3.8%) and malaria (10.1%). A higher percentage (53.1%) did not know the causes of these sicknesses whilst others (46.9%) had an idea, and attributed them to the smoke, odor, particulate matter (PM) as well as the breeding grounds created by land-filling which blocked the water ways.

Surprisingly, the residents tried in some way to protect themselves from these hazards. Some resorted to spending little time at home (24%) whereas majority of them (76%) do nothing at all.

Results of the study strongly indicate that, the Abura local palm kernel oil industries, where quite a number of workers are employed are exposed to a lot of hazards. This could be the reason for the high prevalence of different health related problems among workers. Although the findings of this study cannot be generalized to all such industries, it would help analyze trends and shifting patterns amongst the industrial work force.

The study demonstrates the need for further research on occupational and environmental health with inclusion of other local industries.

### CONCLUSION

The occupational health and safety practices in some of the Small Scale and Household Industries (SSHI) such as the Abura Palm Kernel Oil Industry are found to be unsatisfactory. Health status of workers was unsatisfactory and the majority of them were suffering from possible work related health problems.

#### *Recommendation*

There is an urgent need to introduce a legally binding policy for small scale local industries in terms of their Occupational Health and Safety (OHS) requirements with the creation of an appropriate authority to supervise its implementation and enforcement. The Environmental Protection Agency (EPA) must also monitor the effects of these industries on the environment. This will help to ensure a uniform standard of occupational and environmental; health care at all levels ensuring efficiency and well-being of both workers and residents. There should be a strong provision of occupational health services, carrying out activities in the work place with the aim of protecting and promoting environmental and working conditions.

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**APPENDIX**



Roasting of Palm nuts



Cooling of roasted palm kernel nut



Oil producing reactors with a worker stirring the heating mixture



Environmental condition of the Palm Kernel production area

