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**HEALTH AND ENVIRONMENTAL IMPACTS DUE TO FINAL  
DISPOSAL OF SOLID WASTE IN ZALINGY TOWN - CENTRAL  
DARFUR STATE – SUDAN 2015**



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**ABSTRACT**

*Developing countries face serious environmental challenges concerning solid waste management due to rapid urban development. Indiscriminate disposal of solid waste in dumpsites located within urban areas has proved to be a problem to nearby residents in most developing cities of the world, Open dumps have environmental safeguards; they can pose major public health threats and environmental effects in urban cities The Research aimed to determine the environmental and health impacts of solid waste disposal at Zalingy Town. After determined of sample size then (130 persons) were selected randomly by using a questionnaire tool which designed according to objectives of this study, then obtained data were analyzed by using SPSS & Excel programmes, the main results of this study are: 93% of study population do not know dangerous of solids wastes and its impact on their health, The study showed that 56% of study population dispose from their solid wastes by open burning and 30% of them dispose by throw it directly in near environment and weakness of law and legislations that judge solid waste . then the study recommended by the following : establish effective solid waste management programme and support it with regulations and laws, increase environmental education about solid waste in study area, modern method should be used for solid wastes disposal such as landfill.*

**Keywords:**

*Health; Solid Waste Disposal; Dumpsite; Pollution; Zalingy Town.*

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## 1. INTRODUCTION

Solid wastes could be defined as non-liquid and nongaseous products of human activities, regarded as being useless. It could take the forms of refuse, garbage and sludge (Leton and Omotosho, 2004). Cities in developing countries, being among the fast growing cities in the world are faced with the problem of solid waste generation. The implication is serious when a country is growing rapidly and the wastes are not efficiently managed. Solid waste management has become a global problem particularly in the developing countries of the world (Ramachandra et al., 2003, Tchobanoglous et al., 1993). The majority of human activities inevitably result in the generation of waste due to the improper utilization of energy and resources. According to European Protection Act (1990), “waste is any substance, which constitutes scrap materials or any effluent or other unwanted surplus substances arising from the application of a process, or any substance or article, which requires to be disposed of as being broken, worn out, contaminated or otherwise spoiled.” Although solid waste does not include human excreta but it may have some hazardous material as its subset (Ramachandra, 2009).

### *ENVIRONMENTAL PROBLEMS*

There is abundant release of gaseous, toxic substances into zalingy environment as well as jeopardizing of health of scavengers as a result of burning of obsolete e-wastes. Due to contact with smokes from burning of solid wastes and gaseous emission from dumpsites, cases of several diseases have been recorded (Oyelola et al., 2009). Solid wastes are dangerous in nature since they accumulate and contaminate the ground and surface water and are toxic and breeding grounds for insects and fly which in turn are the sources of several diseases. Further, percolation of leachate to ground water sources may cause severe health problems if used for drinking water purposes (Tchobanoglous et al., 1993, Anjaneyulu., 2005, Anand et al., 2005, Beigl et al., 2009). As such, environmental friendly methods for management of municipal solid waste management have become a global challenge in face of competition with limited resources, rapidly increasing population, urbanization and worldwide industrialization (Katiyar et al., 2013).

Government should reinforce waste collection and disposal systems in every state while strengthening and enforcing the appropriate laws. To prevent serious environmental disaster, priority should be given to waste management (Oyelola et al., 2009).

Open dumpsite approach as solid waste disposal method is a primitive stage of solid waste management in many parts of the world. It is one of the most poorly rendered services by municipal authorities in developing countries as the systems applied are unscientific, outdated and in-efficient. Solid waste disposal sites are found both within and on the outskirts of developing urban cities. With in-crease in the global population and the rising demand for food and other essentials, there has been a rise in the amount of waste being generated daily by each house- hold. This waste is ultimately thrown into municipal dis- posal sites and due to poor and ineffective management, the dumpsites turn to sources of environmental and health hazards to people living in the vicinity of such dumps. One of the main aspects of concern is the pollution caused to the earth—be it land, air and water. According to Nguyen (2011), many cities in developing countries face serious environmental degradation and health risks due to the weakly

developed municipal solid waste management system. Several studies have been conducted in order to examine the health and environmental effects arising from waste dumps. Such studies showed that a link exists between the two (Aatamila, *et al.2010*); (Yongsi, *et al.*, 2008).

Solid waste disposal sites are found on the outskirts of urban areas. These areas become children's sources of contamination due to the incubation and proliferation of flies, mosquitoes, and rodents. They, in turn, are disease transmitters that affect population's health, which has its organic defenses in a formative and creative state. The said situation produces gastrointestinal, dermatological, respiratory, genetic, and several other kind of infectious diseases (Salam, 2010).

The UNEPA stated that wastes that are not managed properly, especially solid waste from households and the community, are a serious health hazard and lead to the spread of infectious diseases. The report further stated that unattended wastes lying around attract flies, rats, and other creatures that, in turn, spread diseases. Normally, it is the wet waste that de-composes and releases a bad odor. The bad odor affects the people settled next to the dumpsite, which shows that the dumpsites have serious effects to people settled around or next to them (UNEPA, 2006). The group at risk from this un-scientific disposal of solid waste includes-the population in areas where there is no proper waste disposal method, especially the pre-school children, waste workers and workers in facilities producing toxic and infectious materials. Other high-risk group includes population living close to the waste dump (Aatamila, *et al.2010*). In particular, organic domestic waste poses a serious threat, since they ferment creating conditions favorable to the survival and growth of microbial pathogens. Direct handling of solid waste can result in various types of infectious and chronic diseases with the waste workers and rag pickers being the most vulnerable (Nwanta and Ezenduka, 2010).

Studies conducted by Yongsi (World Bank, 2005), show that exposure to hazardous waste in dumpsites can affect human health, children being the most vulnerable to these pollutants. Direct exposure can lead to diseases through chemical exposure as the release of chemical waste into the environment leads to chemical poisoning (Rushton, 2003).

Rushton in his studies to establish a connection between health and hazardous waste showed that waste from agriculture and industries can also cause serious health risks. Other than this, co-disposal of industrial waste with municipal waste can expose people to chemical and radioactive hazards. Health care waste and other medical waste disposed in dumpsites mixed with domestic waste, in-creasing the risk of infection with Hepatitis B and HIV, and other related diseases (World Bank, 2005).

Open dumpsites are a major problem to the environment especially to the air that we inhale. Dumpsites emit obnoxious odors and smoke that cause illness to people living in, around, or closer to them (Marshall, 1995). According to (Medina, 2002) pollution, a major environmental effect of dumpsites, is not directly transferred from land to people, except in the case of dusts and direct contact with toxic materials. Pollutants deposited on land usually enter the human body through the medium of contaminated crops, animals, food products, or water. Also, the dumpsite has smelly and un-slightly conditions. These conditions are worse in the summer because of extreme temperatures, which speed up the rate of bacterial action on biodegradable organic material. Disposal sites can also create health hazards for the neighborhood (Boardi and

Kuitunen, 2005) high-lighted that in a number of health surveys a wide range of health problems, including respiratory systems, irritation of the skin, eyes and nose, gastrointestinal problems, psychological disorders, and allergies, have been discovered. In addition, dumpsites closer to residential areas are always feeding places for dogs and cats. These pets, together with rodents, carry diseases with them to nearby homesteads (Gouveia and do Prado, 2009).

## 2. METHODOLOGY

### *STUDY AREA*

This descriptive cross-sectional study was conducted in Zalingy, Central Darfur state in order to assess the Environmental and health impacts of final disposal from solid wastes. Zalingy Town located in the middle of Central Darfur, bordered from east by Sweeteners Jebel Marra, and local Azoum from west side, from south by part of local and Wadi Saleh and from north by Saraf Umra, this area characterized by local semi-desert climate.

### *SAMPLE SIZE*

123 persons were determined (100 residents and 23 solid waste's workers). Then simple random sample was used to apply this study.

### *DATA COLLECTION*

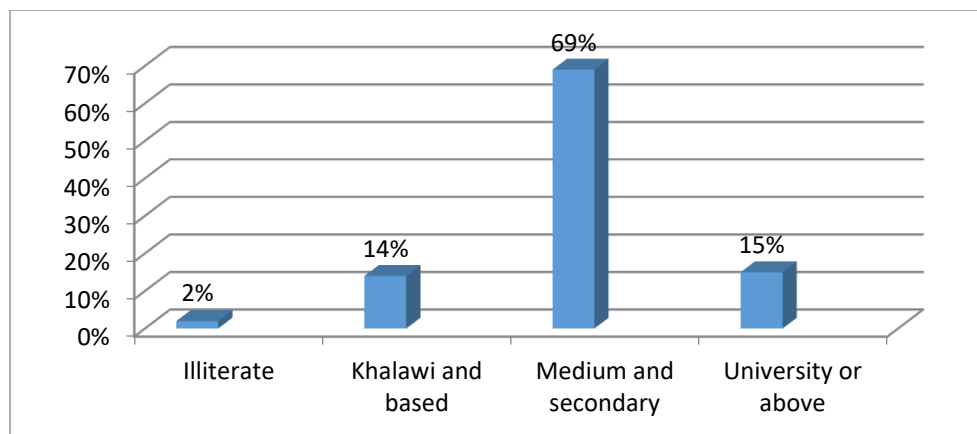
Questionnaire was designed and faced to residents and solid waste's workers in Zanlingy Town to collect information about solid waste management to know health and environmental problems according to target of this study. Also, interview and personal observation were employed. Observations and notes administration had been taken about Environmental Health Activities in Zalingy and environmental sanitation operations in this city.

### *DATA ANALYSIS*

Obtained Data was analyzed by a computer through the program (SPSS) and excel programme, then presented in tables and figures.

## 3. RESULTS

After conducted this study we obtained many results as following:



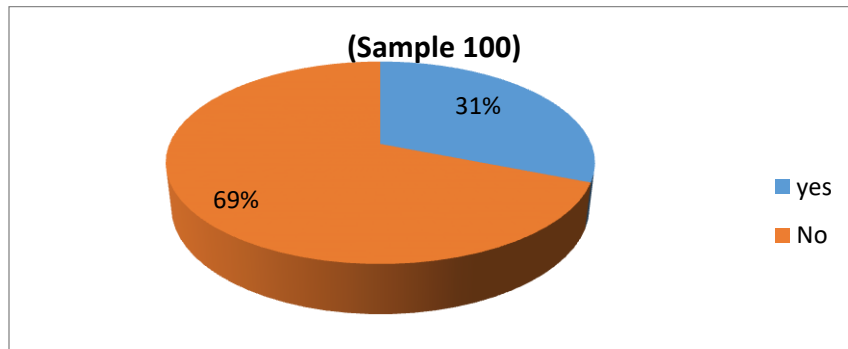
*Figure 1:* Educational level of population

The above figure shows that 14%, 69% and 15% of population group their educational levels are Khalwa/ basic, medium/ secondary and university respectively.

**Table 1:** Practical experience of workers in solid waste management

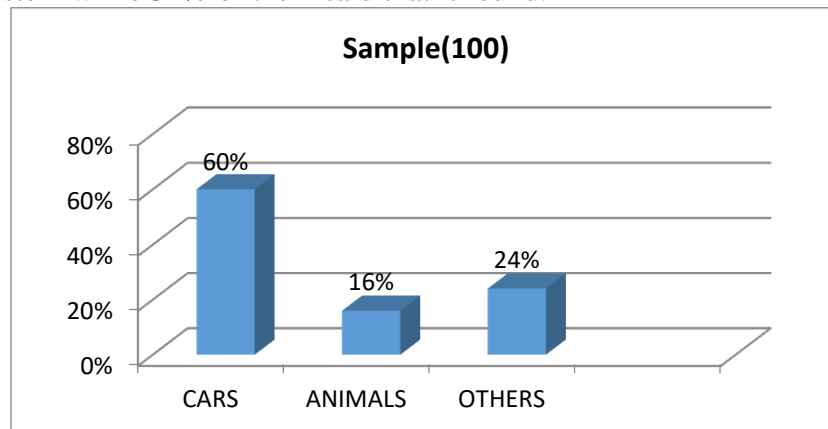
Practical Experience	Frequency	Percentage
Less 5 years	11	47.8%
6-10 years	6	26.1%
More than 10 years	6	26.1%
Total	23	100%

The above table shows that 47.8% of workers their experiences less than 5 years and 26.1% their experience 6 years or more.



**Figure 2:** Presence of solid waste collection system

The above figure shows that 69% of study population said that there is no solid waste management system while 31% of them said that it found.



**Figure 3:** Mechanism of transportation of solid waste for disposal

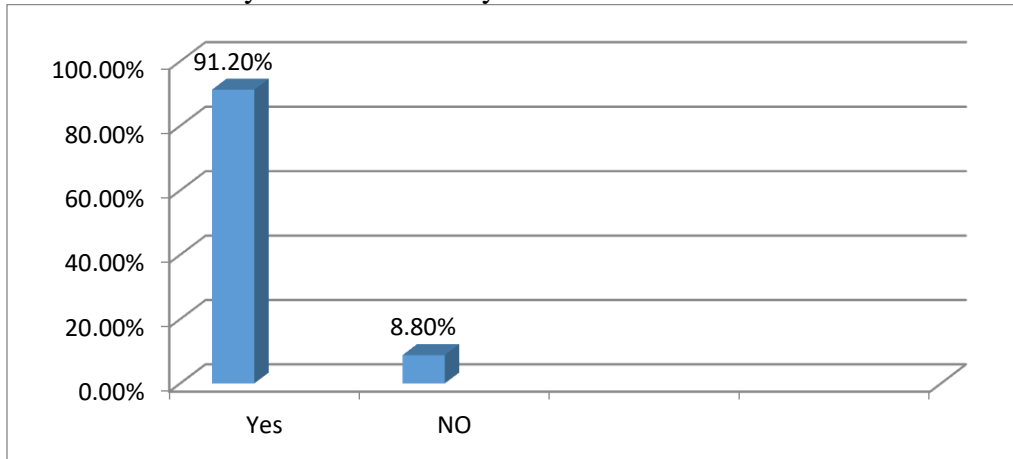
The above figure shows that 60%, 16% and 24% of population group Trans their solid wastes by cars, animals and different modes respectively.

**Table 2:** Mode of final disposal of solid wastes

Method	Frequency	Percentage%
landill	5	5%

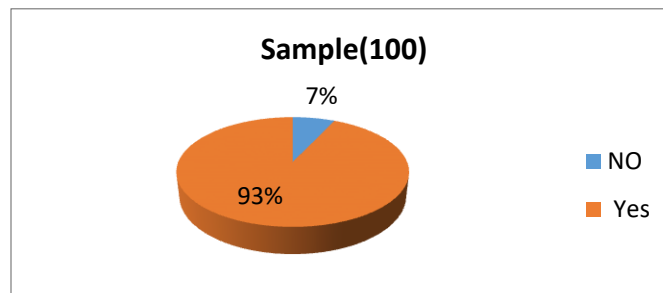
incineration	9	9%
Open burning	56	56%
Throw in environment	30	30%
Total	100	100%

The above table shows that 56% of study populations dispose from their solid wastes by open burning and 30% of them by throw out directly in environment.



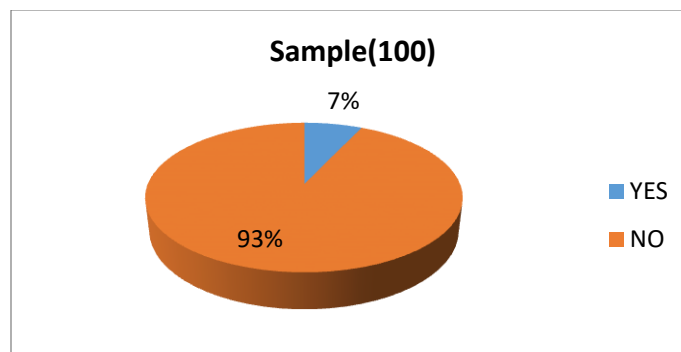
**Figure 4:** Presence of offensive odor due to disposal of solid wastes (workers N= 23)

The above figure shows that 91.20 % of workers said that there are bad odor emits from disposal of solid wastes.



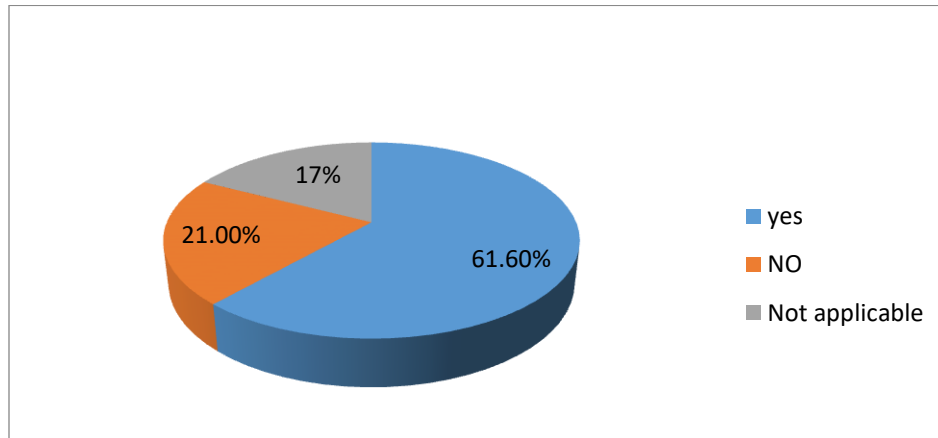
**Figure 5:** Presence of bad odor due to disposal of solid wastes

The above figure shows that 93. % of population said that there are bad odor emits from disposal of solid wastes.



**Figure 6:** Knowledge of health and environmental hazards of solid wastes

The above figure shows that 93% of people said that there is no awareness about solid waste while just 7% of them said it found.



**Figure 7:** Effectiveness of law of solid waste management

The above figure shows that 61.6% of study population said that the current law is effective, while 21% of them said that it not effective.

#### 4. DISCUSSION

The study showed that 69% of study population their educational level medium and secondary while just 15% of them above university (figure1) this is lead to lack of knowledge by solid wastes management at place of generation and it's hazards so most of residents may be dealing with their solid wastes without any care, and also study revealed that 93% of study population do not know dangerous of solids wastes and its impact on their health (figure 6), so majority of people dealing with this wastes by random and wrong method. The study revealed that 69% of respondents said that there is no regular collection of solid wastes (figure 2) this mean the wastes remain long time at household and in producing places, thus it become of bad odor and vectors transporter diseases such as flies and rodents. The current study revealed that 60% of study population said that their solid wastes transport by cars (figure 3), through this study we observed most cars that used in carry of solid wastes are open for this reason we found high rate of solid waste spread in local environment and main roads so this is may be lead to environmental pollution and health problems. The study showed that 56% of study population dispose from their solid wastes by open burning and 30% of them dispose by throw it directly in near environment, this is the main reason behind accumulation of solid wastes in households, roads, markets and all places of human activities, so these areas become children's sources of contamination due to the incubation and proliferation of flies, mosquitoes, and rodents. They, in turn, are disease transmitters that affect population's health, which has its organic defenses in a formative and creative state. Thus we expect produces gastrointestinal, dermatological, respiratory, genetic, and several other kind of infectious diseases.

Also current study revealed that 91.20% of workers and 93% of residents they said that presence of offensive odor due to solid waste (figures 4,5) this means decomposition of organic solids wastes due to spend long time at places of storage and became source of health hazards on community and environmental pollution. The study showed that 61.6% of study population said

there are effective law and legislation for solid waste in study area (figure 6) , but through this current study we observed that law and legislation which judge solid waste are very weak because spread of waste in any place and everybody can throw and dispose from his solid waste at any location without accountability and punishment.

## 5. CONCLUSION

Management of solid waste in Zalingy Town need to more efforts, final disposal of solid wastes complete by improper methods, weakness of environmental awareness about solid wastes , presence of health hazards and environmental problems due to final disposal of solid wastes, and finally regulations and law that recognize solid waste management are not effective .

## 6. RECOMMENDATIONS

According to results of this study it is recommended that: establish effective solid waste management programme and support it with regulations and laws, increase environmental education about solid waste in study area, modern method should be used for solid wastes disposal such as landfill and more studies must be conduct to identify rate of health impacts and environmental pollution due to solid wastes.

## 7. ACKNOWLEDGMENTS

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