

Soiled Diapers Disposal Practices among Caregivers in Poor and Middle Income Urban Settings

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Abstract- With the rise of Environmentalism in the 1960s, there was a growing realization by individuals, organizations and governments that the environment was being adversely affected by human activities. Nakuru for the last few years has seen a rapid population growth. This in turn, has seen an increase in the generation of non biodegradable solid waste. One type of such waste is disposable diapers. The purpose of this study was to investigate used diaper disposal practices among the care givers in Low and middle household income setting in Nakuru, Kenya. This type of setting was selected due to the fact that it houses the majority of the population. Specifically the study sought to identify the magnitude of diaper usage among this category of care givers as well as methods used in the disposal of the soiled diapers. The study also sought to determine the willingness of caregivers to make use of used diaper collection centre. This was a cross sectional research which used mixed research method methodology. Samples were taken from four low and middle income households in the town. Both quantitative and qualitative research method was used. Observational checklist and structured interview schedules with care givers were employed. Data analysis was done using Statistical Package for the Social Sciences version. The study established a high use of use of disposable diapers. Majority of the care givers disposed of diapers in the open field. Moreover, care givers were unwilling to transport used diapers to a collection centre. The study recommends that the public should be sensitized on the use of reusable diapers and need for separation of garbage from the source.

Index Terms- Biodegradable, Diapers, Garbage, Nakuru

I. INTRODUCTION

Waste management in the developed countries is safe and advanced compared to middle and low income countries. Less developed countries like Kenya, generally lack adequate means to handle and dispose off many wastes in an environmentally safe manner.

Disposable diapers have been introduced recently in our society and their use has been embraced by our generation without considering their impact. A report by transparency market research stated that due to increase birth rate and increased awareness in hygiene and demand for sanitary products, the diaper market in areas like India, West Asia and Africa is growing fast and it is expected that babies in this regions will use about 8 billion diapers in a year by 2017 (African Market Potential, 2014).

In Kenya, as in many developing countries, it appears that little information is available regarding handling and the proper disposal of disposable diapers despite a significant rise in usage of such during the last decade by women of child bearing age.

Proper disposal of diapers reduces incidences of contamination of drainage water, which can subsequently lead to diarrheal diseases. Non-renewable energy, global warming, and respiratory effects from in organics are the most relevant of the potential environmental impacts for the diapers. Moreover, promotion of hygienic behaviours has been identified as a public health intervention likely to have considerable impact in the reduction of diarrheal diseases in young children in developing countries.

It is generally regarded that waste management is the sole duty and responsibility of local authorities, and that the public is not expected to contribute. Contrary to this statement however, there is need for community involvement and participation in decisions regarding proper disposal of waste material to maintain a health and safe environment. There is limited literature on the proper disposal of soiled diapers in households. Therefore, the study aims at identifying current practices regarding soiled diaper disposal and to recommend interventions that could improve the disposal of soiled diapers in the low and middle income settings. The results of this study may be used by policy makers to come up with policies and guidelines on proper disposal of soiled diapers to reduce contamination and environmental hazards

II. LITERATURE REVIEW

The environmental concern

Solid waste has been mounting in most developing countries, but their primary focus is on achieving high economic growth, paying little attention to waste management (Metet, 2009). Municipal solid wastes (MSW) is the waste produced from residential area and industries that are of non-process wastes, commercial and institutional sources with the exception of hazardous ones, construction and demolition wastes, and liquid wastes (Tchobanoglous & Kreith, 2002). In the light of the relationship between environmental factors and development, assessment of the impacts must be done because production and consumption patterns that stimulate growth are dependant on use or extraction of natural resources and ecosystem services as well as waste disposal to dumping sites, water or the atmosphere (NEMA, 2011).

Unsustainable patterns of production and consumption have resulted in a considerable garbage synthesis in both quantity and variety of waste. This is as a result of rapid urbanization, economic growth and industrialization which are growing

problems for national and local governments. These cause severe impacts on the environment in terms of pollution, natural resource depletion, public health and cost to the local economy (NEMA, 2011).

According to scientists, the combination of population growth, resource depletion and unrestricted use of industrial technology will disrupt the world ecology and economy. This will lead to mass starvation, widespread suffering and destruction of the physical environment (Meadows et al., 1973). This calls for new set of attitude and policies towards environmental protection, and if they will not be put in place then the environment will be permanently damaged and the people's living standards will fall (Rubenstein, 1999). There is also need for national accounting system that embraces the environmental accounting as accounting methods underestimates the natural capital hence the environmental cost of economic activities (Burnett and Hansen, 2008).

Gaps in our societal systems

Open dumping of solid waste seems to eliminate and contain pollution, but it may only hide it- temporarily. There is need for suitable control system to be put in place as diapers are new in our society and mitigation measures should be enhanced before things get out of hand and blame games kick off with no one accepting responsibility. Chemicals released by decomposing solid wastes can leak from dumping site and landfills to ground water. They can contaminate water wells, soil and nearby water streams (Rubenstein, 1999). When we discard something, we never really eliminate it, but simply put it elsewhere. Our local authorities are too busy trying to get rid of the garbage that they do not worry in better ways of disposing them (Marshall, 1972). NEMA and Kenya Bureau of Standards (KEBS) have helped lessen the use of plastics, but have done little to encourage the recycling, reuse or proper disposal of the plastics (NEMA, 2011). Technology can produce almost anything but it is usually at a very high price of the consumption of resources and accumulation of waste (Mason and Flockerts, 1973). The diaper is of no exception to this phenomenal and as modern parents continue to celebrate the enjoyed convenience, there is a high price to pay.

Overlooked areas

Past studies have looked into the area of pollution but have overlooked the issue of involving some stakeholders like the consumers of the product. Most users of the disposable diapers have no idea of the hazard the product has on the environment. If they are enlightened on the same then they can own up and take responsibility of the waste being generated. "As individuals we must do what we can to cut down what we throw away. We must behave as we cared much about the whole world as we do about our living rooms" (Marshall, 1972: 92).

There is also need to consider how the product's consumption can be Reduced, Repaired, Reused and Recycled. In Kenya recycling is done on plastics, paper and glass. It is normally sold to private firms who buy at exploitative prices mainly due to absence of elaborate waste recycling, material recovery, and reuse policies and guidelines (NEMA, 2011). Recycling of solid wastes addresses problems of both pollution

and resource depletion as it uses resources that had already been extracted.

Legislation.

The Kenyan environmental law consists of the legislation, standards, regulations, institutions and administrations adapted to control activities on environmental management. The government's concern on environmental and protection of human health from pollution is quite evident. Though contained in different government documents and executed by different arms, they all endeavor to protect the environment and human health.

Environmental Management and Co-ordination Act 1999

The EMCA came into force on 14th Feb 2000 and it provides an institutional framework and procedures for management of the environment, including provisions for conflict resolution. Section 3(1) of EMCA 1999 states that every person is entitled to a clean and healthy environment and has a duty to safeguard and enhance the environment. The new constitution also obligates the government to ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources (NEMA, 2011). The environmental action planning committee recommends legislative measures for preventing, controlling or mitigating adverse environment impacts.

EMCA (Waste Management) Regulation, 2006

Section one states that no person shall dispose off any waste on a public highway, street, road, recreation area or in any public place except in a designated waste receptacle. A Waste generator shall collect, segregate and dispose such waste in a manner provided under these regulations.

A waste generator shall minimize waste generated by adapting the following cleaner production methods;

- i. Improvement of production through conservation of raw materials and energy and eliminating the use of toxic raw materials.
- ii. Monitoring the product's cycle from beginning to the end by identifying and eliminating potential negative impacts of the product. Enable recover and reuse of the product.

Reclamation, recycling and incorporating environmental concerns in the design and disposal of the product (Kenya gazette, 2000).

Public Health Act (Cap 242)

Part IX, Section 115, of the Public Health Act states that "no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health". Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health. Such nuisance or conditions are defined under Section 118 as waste pipes, sewers, drainers or refuse pits in such state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health.

The product under study

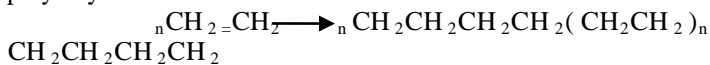
The word *diaper* originally referred to the type of cloth rather than its use; "diaper" was the term for a pattern of repeated, diamond shapes, and later came to describe a white cotton or linen fabric with this pattern (Webster, 2013). This has over time been used to refer to the disposable napkin. The word *nappy* is a diminutive form of the word napkin and is often used to refer to cloth diapers. The use of disposable diapers has been on the increase over the last few years in Nakuru Municipality and in Kenya as a whole. This could be due to the reduction in their price or an increase in the income of the parents in this generation compared to others who used cloth napkins.

A quick scan at the supermarket shelves and retail shops gives an indication of the high usage of the product. They are also more convenient especially when one is travelling or working hence preferred by most mothers as they are less bulky compared to the cloth ones. In the day care, caregivers require the little ones to wear them as they can be changed with ease and are of high hygiene. Unlike the cloth napkins that take time to dry especially during rainy seasons, disposable diapers are always dry and available. Pediatricians also advice parents to use them so that the little ones can have undisturbed sleep with minimal interference especially at night as they do not require changing very often compared to cloth napkins.

The composition of the disposable diaper

In the year 1984 introduction of a super absorbent material from polymers known as Sodium Polyacrylate was done, an improvement from what was originally developed in 1966 (Carl et al., 1991). The polymer is an amazing water absorber and can absorb 200 to 300 times its weight and hold it in a gooey gel. The vast majority of the polymeric material are based on petroleum which is a non-replaceable resource hence the need to preserve it (Morris et al., 1993). Man is said to be rapidly depleting non replaceable resources with half of the energy used in the past 2000 years being consumed in the past few years (Mason and Flokerts, 1973).

Polyethylene, a synthetic polymer where ethylene which is derived from petroleum is made to react with itself to form polyethylene as indicated in the formulae below



The polyethylene forms a breathable shell film of the diapers and another film that prevents wetness and soil transfer. The diapers also have a layered construction that allows transfer and distribution of urine to an absorbent core structure where it is locked in.

The synthetic petroleum materials remain in the environment for several years. Unlike natural polymers which are broken down by micro organisms to get smaller molecules, the C-C single bond of polymers like polyethylene cannot be metabolized by many pathogens (Morris et al., 1993). According to the US Environmental Protection Agency, a single diaper may take almost five hundred years to decompose.

Petroleum is a non-renewable resource and its depletion is at a very high rate. This calls for rapid measures to be put in place to replace the dwindling supplies. The plastics used, which are made from petroleum must be made with other materials

(Calzonetti and Barry, 1985). The key issue is that it is a global phenomenal that requires individuals, organizations and governments to work together. Developing communities like China are said to be increasing their consumption of non-renewable resources at an alarming rate but they argue that they cannot forego increased standards of living which have been enjoyed by developed world for years who are the biggest polluters of the environment (Brinkman et al., 2010).

An average child will use thousands of diapers which are disposed after every single use leading to a disaster especially when it comes to their disposal. In the US it is estimated that an average child uses over 5,000 diapers in the period before being trained to use the toilet, hence a total of over 16 billion diapers (EPA, 1990.) The disposable diapers use more raw materials for production and generate more solid waste after use than cloth diapers. The inner absorbent layer of a disposable diaper is treated with chemicals, which can trigger allergic reactions. Disposable diapers often contain dyes and dioxin, which is formed as a by-product of the chlorine bleaching process. Dioxin is a carcinogen, which means it can cause cancer. When released into the environment, the toxin can accumulate in humans and animals.

Disposal of waste materials

Particular environmental concerns have been greatly affected by the residential and industrial expansion which has led to unplanned urbanization and demand for more land. This situation is aggravated by the fallen standards of urban services, increased pollution and increased health issues hence need for a new approach towards urban planning and management.

In Kenya, the responsibility of waste management lies with the local authority that are generally financially, technically and institutionally weak. This includes a poor on site storage, lack of onsite separation facilities, poor or unavailable transport system, poor formal recycling practices and plants and lack of appropriate waste disposal sites hence leading to crude dumping and open burning of waste (NEMA, 2011). As a county we have mixed, uncollected unsafe waste disposal methods that remain a serious problem. Waste separation is not considered as a priority as transporters and home owners would rather put all the rubbish together (Metet, 2009). This pose a great risk as most are disposed with general household garbage or in black bags yet they should be treated as biological waste. They have potential threat to the public health and the environment.

Transportation of waste is poor and ranges from makeshift hand carts, poorly serviced and maintained ordinary open trucks wastes that are inappropriate as they transport waste in an unsanitary manner where waste is likely to spill or get blown as the vehicle moves (NEMA, 2011). On site waste segregation, classification and quantification are not practiced in the country and thus domestic waste and hazardous waste are intermixed, rendering the entire waste stream potentially dangerous (NEMA, 2011). The local authority heaps the garbage at dumping sites and does not get any treatment to meet carbon reduction target. Another potential problem could be leachate, primarily from dumped waste, entering ground water supplies, pollution of air and of land.

Disposal of diapers

Diapers contain faecal matter and urine, and are likely to contain infectious material. Hazardous waste are a category of waste that have immediate or long term health effects including asthma, allergic reaction, skin rashes, cancer and other long term diseases (GOA, 2009). Viruses excreted in human faeces could pose health problems in the long term. Most diapers are dumped together with household garbage, others in compost pits and others litter the estates' streets posing a great danger of infection to those who come into contact with them.

According to the National Environmental Sanitation and Hygiene Policy (2007), 80 percent of hospital attendance in Kenya is due to preventable diseases. About 50 percent of the said illnesses are related to water, sanitation and hygiene (GoK, 2007). There is garbage heaps everywhere as evidence of management of solid waste is poorly handled. NEMA recommends that waste should be sorted to match the content for ease of disposal and recycling processes (Standard Newspaper 2014).

There is need to raise awareness among the people utilizing the product on proper disposal of the diapers. Most people are not aware of the plastics used in the products and manufacturers do not print a full list of materials used on the packaging. Waste reduction, involves redesigning products or changing societal patterns of consumption, use, and waste generation to prevent the creation of waste and reduce the toxicity of waste that is produced (USEPA, 1995).

Possible control measures

Waste is described as worthless material, but in nature nothing is discarded. Industrial ecology makes it clear that discarding material on the earth has a great cost and is caused by having a short sighted view (Enger and Smith, 2007).

In biodegradation the organic material is converted to environmentally accepted materials like water and carbon dioxide, minerals and biomass. The products are naturally broken down over time by saprophytes and other inorganic organisms like fungi and bacteria and can then be absorbed by living organism, completing the cycle. Materials that are no longer in use should be termed as residue. Residues are materials that our economy has not yet learnt to use efficiently (Enger and Smith, 2007).

Cuban mothers have come up with a recycling process where, they unfold the used diaper and remove the padding, and then they wash the diaper and leave it out to dry. Once it has dried, they fold pieces of cloth and stuff them into the pocket where the padding was. If the adhesive has worn off, they use

two safety pins to keep the diaper on the baby (Havana times, 2013). This can be used by caretakers to give diapers another life.

A scientist named Alethia Vázquez-Morillas found a way to turn that 500-year span (which is the estimated time taken for a diaper to decompose) to a mere four months, by using oyster mushrooms to accelerate the breakdown (Cowan, 2011). Companies like Natra Care has done much to lessen the environmental impact of sanitary pads and liners made from biodegradable, totally chlorine free cellulose and bio plastics that are compostable under the correct conditions and are safe for septic tanks.

In the United Kingdom, two companies Versus Energy and Knowaste partnered to build the diaper recycling plant that converts the organic materials into energy. The bulk of the remaining materials will be separated to eventually find their way into various products.

The use of a modern cloth diaper is also possible. This is a custom-made baby pant which protects the child from experiencing leakage in case they soil themselves. The diaper is reusable and is made from natural fibres, man-made materials, or a combination of both (Leverich, 2011).

Theoretical framework

The study will adopt the Theory of Reasoned Action (TRA) model. The model addresses the internal determinants of peoples' behaviour across a wide range of physical and social situations. The TRA is founded on individuals' behaviour being strongly related to their attitudes towards the same. People form attitudes that result from his beliefs about the consequences of a particular action and his evaluation of those beliefs. If an individual expects that a particular behaviour has good consequences, then he will have a positive attitude towards that behaviour. In the same way, the more the person expects a behaviour to have undesirable consequences, and then they will have a negative attitude towards it. Educational and promotional tools such as staff education, event promotion and training are essential for the successful implementation of a waste management plan (CCME, 1996). Raising awareness about different waste management programs can have positive effects, but there are several methods which can be used to change behaviour to enhance participation or rectify problems (Timlett & Williams, 2009). Once new initiatives are introduced, people will need time to adjust until the new plan becomes normal behaviour, but once this behaviour is established it is difficult to break (Timlett & Williams, 2009).

Conceptual framework of disposal of diapers

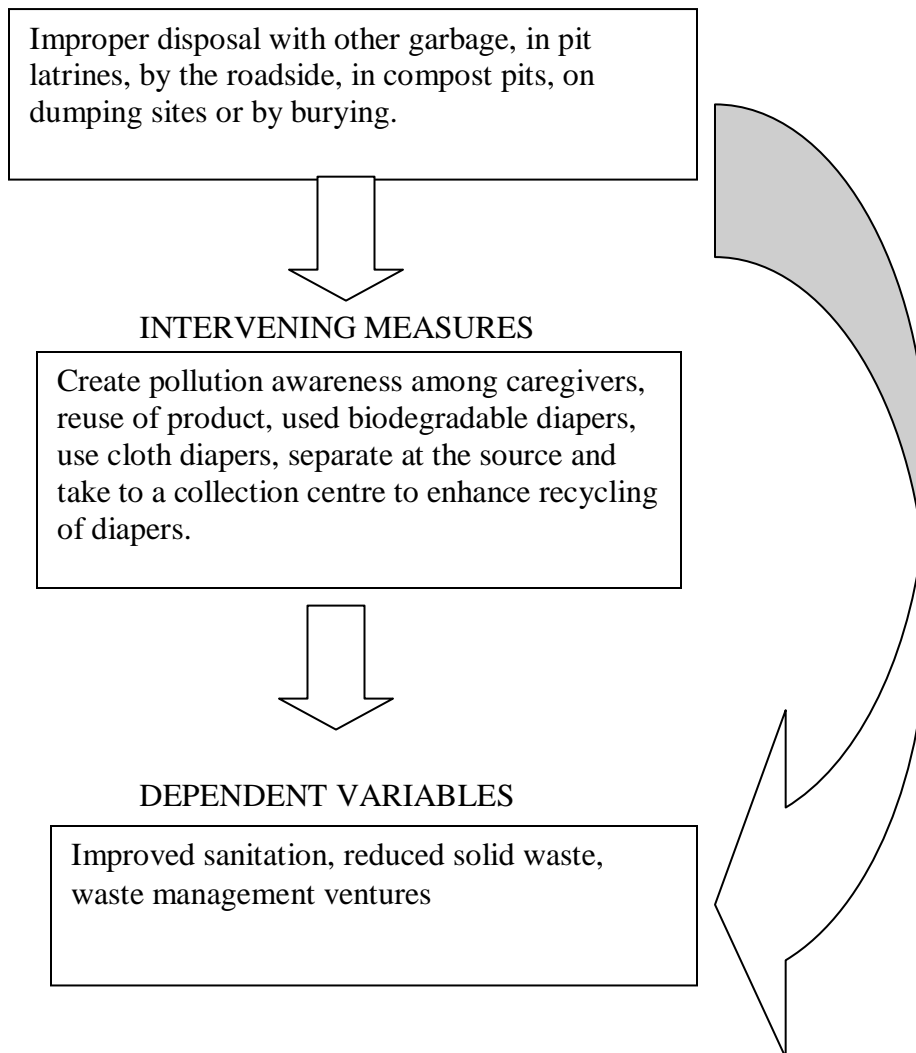


Fig 1 Conceptual framework of disposal of diapers

Improper disposal which includes disposal with household garbage, pit latrine, compost pit, by the roadside leads to impacts like spreading of diseases, pollution of land and water, rapid filling of latrines and compost pits, slow degradation of the plastics and other non biodegradable components in the product. Mitigation measures include creating awareness, establishment of collection centres, recycling the product, reusing the product, using more environmental friendly raw materials. Results will be improved sanitation, reduced solid waste and entrepreneurs can have waste management ventures.

III. METHODOLOGY

Study Area

The study was conducted in Nakuru Municipality, the fourth largest town in Kenya after Nairobi, Mombasa and Kisumu. It is 160 kilometres North West of Nairobi and has an altitude of 1859m above sea level. Nakuru is densely populated and has had a huge influx in 2009 due to the 2007/08 post election crisis that

saw a number of internally displaced people come to the town. This influx and rapid population growth has presented the local authority with serious environmental challenges (Kopejo and Kirui, 2010).

Once dubbed "the cleanest town in East-Africa", Nakuru, has lost a lot of its past glory. The town generates about 200 tonnes of household waste daily; with an additional 20 to 50 tonnes generated from different markets within the town. Waste collection services are provided by three vehicles that collect two to three trips in a day, a total of about 70 tonnes. The waste surpasses the capacity of the council hence private institutions and community based organizations are involved. There are eight private sectors allocated different zones as provided by the Local Urban Observatory (LUO) (NEMA, 2005). They get the waste from the estates and disposal is done at the open dumping site at 'Gioto' near London estate in Nakuru town which comprises of an abandoned quarry, where most of the waste generated by the town dwellers ends up. The local government does not prioritize waste management in the financial budgetary allocation. This may be lack of information on potential economic value that waste has (NEMA, 2011).

The study included the following estates; Race track, Shaabab, Kenlands, Pipeline, and London estates. These are low and middle income estates. The estates were selected because their high population densities. Consequently, they were thought to be high users of disposable diapers as most are middle aged parents who live in rented flats or bungalows and are thought to have a average income. Most of them also comprise of working mothers who have no time to wash cloth napkins. While some areas in the states receive garbage collection services from privately owned companies that charge between a hundred shilling and five hundred shilling a month for the disposal of garbage, others do not and individual households have to device a way of disposing of they own waste. As a result of this its common to see open dump sites that are within residential.

Study Design

This was a cross sectional research that used mixed research method methodology involving the use of both quantitative and qualitative research methods. Observational check list and structured interviews with care givers was employed.

Study Population/Target Population

The target population of the study were caregivers of infants and toddlers who are still using diapers and have not been potty trained.

Sampling Method and Procedure

The study employed cluster sampling techniques in which the estates were picked using road passages to identify clusters. The purposive sampling was used to identify household, where indicative cases that offered in-depth information were selected.

Sample size determination

In survey research 100 observations are required for each major group and 20 to 50 for a minor group (Borg and Gall, 1989). Thirty samples were collected from the five estates giving a total of 150 as the sample.

Data Collection Tools/ Instruments

An observational checklist and structured interviews were used in the study. The closed ended questionnaire had questions relating to the gender of the care giver, household income, number of diapers used per day made of disposal and willingness to take soiled diapers to the collection center. The observational check list had items on mode of disposal, size of the residential, house type of the residential house, and the location of the house. Permission to collect data was obtained from the Ministry of Higher Education, National Council for Science and Technology (NCST) and acquired a research permit. Research assistants were trained to aid in collection of data so as to maximize on time. Both English and Swahili languages were used to get all the relevant information. Structured onterview was also used

Data Analysis, Presentation and Interpretation

Analysis and presentation of data was done with the aid of Statistical Package for the Social Sciences version 20. The raw data was coded and entered in to the software. Both descriptive and inferential statistics were used.

Ethical Issues

Ethical Clearance was sought from the Mount Kenya University's ethical committee. Moreover, the information that could not remain anonymous, research assistants were trained on the need of confidentiality. All the information obtained was stored in anonymous way.

FINDINGS AND DISCUSSIONS

The study was conducted on five estates namely Kenlands, Shabab, Pipeline, Race track and London. The expected target was achieved but there were two spoilt schedules as the information given contradicted and therefore they were not taken into account. Overall a response rate of 98% was obtained. Three estates (Kenlands, Shabab and Race track) had 29 samples while one had 31. This is as indicated in Table 1

Table 1: Sample distribution

Estate	Respondents	Percent
KENLANDS	29	19.6
SHABAB	29	19.6
PIPELINE	30	20.3
RACETRACK	29	19.6
LONDON	31	20.9
Total	148	100.0

The communities in which the study subjects were drawn are generally low and middle incomes. It was noted that Kenlands and Racetrack had similar kind of residential houses, with house units ranging from four to six family units in a plot. On the other hand Shabab had various types of houses which included bungalows with one unit in a plot, flats that had an average of ten

units hence making it a middle class estate. London and pipeline estates did not have a consistent pattern of housing but had a mixture of both the middle class and the low income houses. Diapers usage was different across the estates in the study.

On gender results were as indicated in table 2 below.

Table 2 Gender of the caregiver

Gender	Frequency	Percent
Male	5	3.4
Female	143	96.6
Total	148	100.0

The study established there were more female who are caregivers compared to men. This was expected given the cultural back ground of the respondents.

In terms of education level majority of the respondents 72(48.6%), had secondary education, 51(34.5%) tertiary. The rest of the information is as indicated in the following table.

Table 3; Education level of the caregiver

Education Level	Frequency	Percent
No formal education	8	5.4
Primary	17	11.5
Secondary	72	48.6
Tertiary	51	34.5
Total	148	100.0

The study also sought to know the preferred type of diapers. The results were that majority of the respondents preferred to use disposable diapers (%). Some of the reasons given for this preference included that they are comfortable to the children, convenient especially while travelling, comfortable while sleeping and that they are good in situation where water is scarce. Other reason includes that diapers are not tiring as there is no washing and therefore requires less labour, they are safe for baby and caregiver as no pins are used, and that some diapers have colour indicator that shows when it is time to change the diaper.

This is similar to what the Euronometer found with the Thai parents who look for diapers that can offer infants more comfort, dryness, no irritation, flexibility and which sooth the skin (Passport, 2011)

A report by Mwololo indicated that rising in disposable income in Kenya had increased the use of tissues and hygienic products. Diapers benefited from the widening availability of single units packs which target low to mid income consumers who use nappies and diapers are used at night or when travelling (Mwololo, 2013).

According to Kenya Euromonitor report, 7% of mothers regularly used diapers in 2013 and there was a considerable

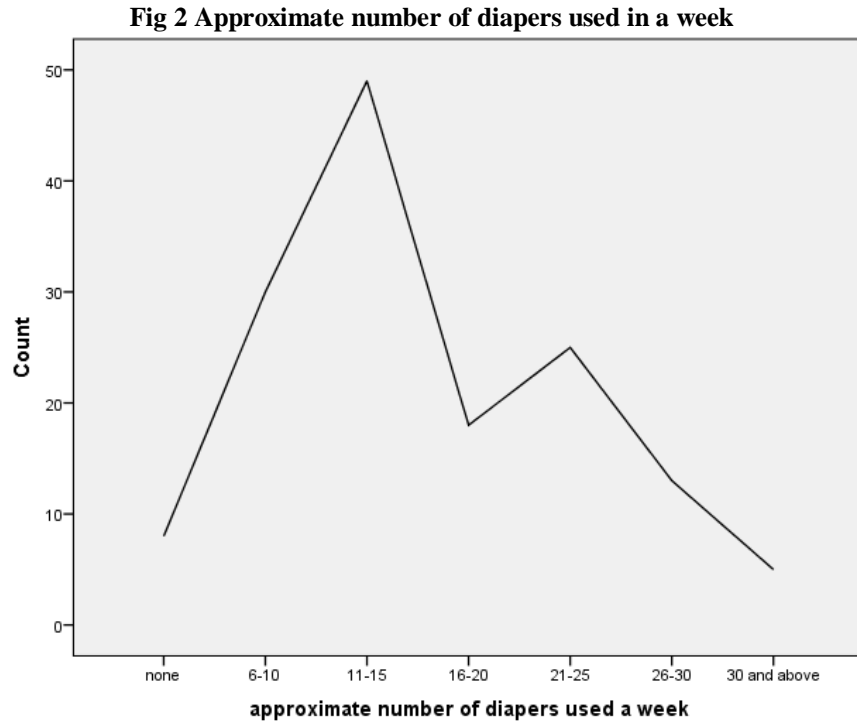
scope for growth with the country's birth rate expected to remain high. (Country report, 2015).

Mwololo also reported that diaper manufacturers have taken the diapering education to maternity facilities where they educate mothers with new born babies on importance of diapering, immunization, nutrition and skin protection and also attributed to rising of young educated working mothers who are more conscious on hygiene and health of their babies.

She also noted the refastened able straps of Velcro makes them easier and faster to use compared to napkins as they have no safety pins. These factors were also captured during the survey.

Water shortage in Senga/Nehosho suburbs in Zimbabwe was said to be a factor that contributes to use of disposable diapers, the area at times goes for three days without water (Remigios, 2014).

To estimate the number of disposable diaper used by the respondents, respondents were asked to state the number of diapers they used every day. Findings are as indicated in the figure below.



From the graph the mode is at the class 11-15 per week, which has a mid value of 13 and 33.8 % indicating most of the sampled population fall in this category

The mode of disposal

The study sought to know how caregivers dispose off diapers. Table 4 gives a summary of the same.

Table 4; Methods of diaper disposal method of diaper disposal used

Disposal site	Frequency	Percent
pit latrine	28	18.9
With other garbage	109	73.6
composite pit	1	0.7
Other	2	1.4
Total	148	100.0

It was observed that 5.4% of the population that was sampled used only cloth napkins and therefore the mode of diaper disposal was not applicable to them. Another category that comprised of 1.4% used other methods which included drying

the diaper then later burning it while there were others who buried the used diapers. The largest population, which comprised of 73.6% disposed with other garbage. The remaining 0.7% disposed in compost pits and most live in their own compounds.

Table 5; Mode of disposal employed as compared to education level

Education level	Where is the diaper disposed?						
	0	pit latrine	With garbage	other	composite pit	other	Total
No formal education	0	2	6		0	0	8
primary	3	4	8		1	1	17

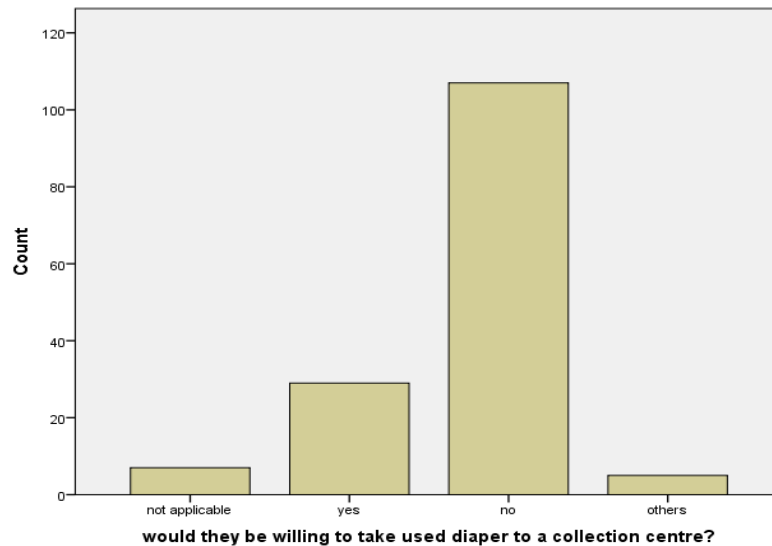
secondary	4	15	53	0	0	72
tertiary	1	7	42	0	1	51
Total	8	28	109	1	2	148

On running Chi square test there was a significant statistical relationship between the mode of disposal and the level of education of the caregiver, ($\chi^2= 21.15$, $P= 0.048$).

Willingness to take the diapers to a collection centre

The third objective was to determine the willingness of the caregivers to take the soiled diapers to collection centres. To achieve this, caregivers were asked whether they would be willing to take diapers at a collection centre. The following graph shows the results.

Fig 3; Would the caregiver be willing to take the soiled diaper to a collection centre?



Only 19.6% were willing to take the used diaper to a collection centre. Others would take to a centre if paid to do so. There was a significant statistical relationship between the education level and the willingness to take the soiled diaper to a collection centre ($\chi^2= 18.221$, $P= 0.033$). People with more the education were more likely to be willing take diaper to a collection centres compared to those with low or no at all. There was a statistical significance relationship between residential estate that one lived in and the willingness to take to a collection centre ($\chi^2= 31.195$, $P= 0.002$).

IV. CONCLUSION

Disposable diapers are popular among the care givers in the study. Their usage is likely to grow due to the growing population in the Nakuru. Moreover, majority of the respondents dispose off diapers in the open. This may lead to contamination of water surfaces and therefore diarrhoea diseases. Further more, diapers do not degrade and when incinerated gases from the plastics are released into the air. The most obvious impact of disposable diapers on the environment is that they are thrown away pilling up garbage every day. For this reasons therefore

awareness on proper disposal of diapers is the most practical strategy that can be used to manage refuse disposal.

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