



Knowledge, Attitudes and Perceptions of Nursing Mothers towards Recycling and Safe Disposal of Diapers in Izayi Park, Zvishavane Community in Zimbabwe

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ABSTRACT

The research intended to establish the knowledge, attitudes and perceptions of nursing mothers towards recycling and safe disposal of diapers in Izayi park Zvishavane community in Zimbabwe. The research also sought to establish why nursing mothers indiscriminately dump used diapers without washing them. Questionnaires were distributed to a sample of nursing mothers in the Izayi community. Some key informant interviews were held with the environmental health officers, district hospital, community health directors and influential health and environmental practitioners in the study area. Observations and first-hand information was also used in addition to the questionnaires and interviews. The results seemed to reflect that most nursing mothers preferred disposable diapers to traditional cloth napkins mostly because of their convenience and cheap prices. Disposable diapers do not require washing. They do not require regular changing, some experts also indicated that diapers save time and their novelty brings a sense of elitism and modernization. This research showed that most nursing mothers did not receive any education of training on safe disposal of pampers. Research also noted that some users of diapers complained about skin disorders and also lack of proper disposal channels. 90% of the participating mothers seemed to be against the idea of having their waste recycled.

Keywords: Diapers; Pampers; Bio waste; Environment; Recycling; Knowledge; Attitudes; Perception

INTRODUCTION

Most modern parents use prefers to use diapers for baby sanitary. This wonderful hygiene product was designed by materials engineers to make life easier for nursing mothers. Diapers are easy to put on and do not have to be washed and reused. Diapers or pampers are made using special superabsorbent polymers. According to researchers these polymers can absorb and retain water up to 3000 times their own size [1]. These SAPs polymers carry carboxylic acid groups, modified starches and other hydrophilic components made of polymers that carry carboxyl groups such as polyacrylates, modified starches, polyacrylamide or other hydrophilic components. These resins are also patented by innovation a hygiene companies such as Johnson and Johnson[®] which invests so much in research and development. Super adsorbent polymers are also used in female hygiene pads, pant liners bed

pads and other hygiene products. The most common use is of these super polymers are in making baby and adult diapers. The SAP absorbs all the moisture and wetness keeping the baby or adult dry even if they pee on themselves. The baby can continuously play without any discomfort. The diapers are also made of plastic material and a cotton cellulose part for comfort [2]. Some dyes are also used by different manufacturers to enhance colour and branding. Diapers come in different sizes suiting different stages of growth in babies and adults. There are different qualities or brands of diapers. Although most Zimbabwean nursing mothers generally refer to all baby diapers as 'pampers', it is important to note that pampers[®] is a trademark of one of the various brands of diapers used [3]. Other notable diapers brands include huggies, masters among other. Some adhesives are also used during sewing. The plastics used to make diapers have environmental issues and is not biodegradable [4]. Zimbabwe imports and uses nearly US\$

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million dollar worth of pampers monthly [5]. Due to their complex nature and combination of different materials, used diapers are difficult to recycle. [6]. reported that every year billions of used diapers are disposed as solid wastes globally and only a very small fraction of them are recycled or properly disposed of. The global production of disposable used diapers increases exponentially and is expected to exceed US \$71 billion/year by end 2022. It is also estimated that about 20 billion pieces of the used diapers were dumped in landfills yearly, generating more than 3.5 million tons of diaper waste that require almost 500 years to be fully decomposed. The indiscriminate disposal is mainly due to the lack of technologies for efficient and cost-effective recycling or waste management. In Zimbabwe most used diapers end up as solid waste piling up in landfills or incineration sites (Figure 1).



Figure 1: Illegal dumping site with used diapers.

Nursing mothers do not take due course when disposing or incinerating the diapers to the extent that most diapers will still contain urinary and faecal matter. These soiled diapers are also difficult to burn completely. The faecal matter is also a threat to the environment, underground water and human health [7]. Used diapers potentially contain bacteria, dioxins and viruses that are capable of leaching into the groundwater causing serious health problems to the community. Most local authorities and municipalities in the Zimbabwe do not regularly collect refuses or do not collect at all due to financial and resources constrains. Years of economic decline has resulted in most authorities failing even to supply waste bin to residents. Residents can no longer afford to properly sort waste and disposing it properly into different bins. Most of the waste will be dumped on street corners, illegal dumping sites, bushes and drainages. Hundreds of viruses can be detected in human excrement many of which can live for months outside the body. Human pathogenic viral particles are shed from infected individuals and introduce into wastewater; subsequently causing waterborne diseases to humans these viruses can be transmitted from wastewater to human beings *via* direct contact and/or ingestion/inhalation of aerosols. Even the advanced wastewater treatment technologies are unable to remove pathogenic viruses from wastewater completely, posing a serious health risk [8]. Used diapers are classified as bio waste. Some of the bacteria and viruses which may be present in human faecal matter include gastrointestinal viruses, hepatitis, *E. coli*, *Salmonella* and *Norovirus*. Polio has also been detected in used diapers. The

coronavirus (SARS-CoV-2) is frequently shed in the stool of patients hospitalized with COVID-19 [9].

MATERIALS AND METHODS

This scenario makes the behavior of discarding plastic wrapped diapers containing human waste into the trash very reckless and hazardous. With growing poverty, people scavenge bare hands for recyclable material on waste sites. Users are supposed to wash off and flush the faecal matter into the toilet chamber before disposal of a diaper. The safest place for faecal matter is in a public sewage or private septic system, where it can be effectively processed and not come in contact with the general public. The unpleasant smell during washing can be suppressed with lozenges or peppermint oil.

Area of study

Zvishavane was historically known as Shabanie. It was founded in the 1900's as a result of asbestos mining in the area. The town lies along the great dyke in central part of the midlands region of Zimbabwe. The mining town is surrounded by largely small scale to medium gold miners and what was a very active Shabani asbestos mine [10]. There are very big mines such as Mimosa platinum mine, Sabi gold mine and Murowa diamond mine. The estimated population of the town is 45,230 with a total around 12,370 according to the 2012 national census [11]. The town has 2 hospitals and 7 clinics with a dozen private clinics. It also houses a professional soccer club FC platinum, 2 stadiums and a radio station YaFM. Izayi park is one of the new medium density suburbs in the town which has 10 wards.

In Zimbabwe, urban councils are responsible for service provision in urban areas. Urban councils are responsible for the treatment and management of services from municipal water, sewerage and refuse removal departments. In line with the United Nations ambitious Sustainable Development Goal (SDGs) number 6 which advocates for the availability and sustainable management of sanitation facilities for all, it is important that waste management be addressed at local level [12]. Sanitation and hygiene must be prioritized and an end to open defecation should be a priority. The constitution of Zimbabwe prohibits the indiscriminate dumping of waste. Environmental management act 13 of 2002 clearly states in section 70 that no person shall discharge or dispose of any wastes, whether generated within or outside Zimbabwe, in such a manner as to cause pollution to the environment or ill health to any person no person shall transport any waste other than. The Environmental Management Agency (EMA) has been pushing with little success towards the ban diapers. The government of Zimbabwe in 2018 went a step further to uphold environmental fundamental rights and freedoms provided for in the section 73 of the constitution of Zimbabwe the "right to an environment that is not harmful to tier health and well-being" and declared that every first Friday of each calendar month as a national cleanup day (Figure 2).



Figure 2: Map showing location of Zvishavane.

Research design

A case study was done on the Izayi park community in Zvishavane town in midlands of Zimbabwe. The methods used to collect data included survey questionnaires handed out to nursing mothers in the community. Key informants who included health experts were also interviewed. Researchers also made personal observations and site visits to dumping sites. The research questions sought to establish whether the indiscriminate dumping is influenced by age of mothers and level of education. The questions in the survey questionnaires and interviews also sought to establish if why mothers preferred using diapers to traditional cloth napkins. Researchers also sought to check if mothers know how to dispose used diapers and their views on recycling of diapers. Other related questions on environmental and health awareness were also asked. The targeted population was at least 30% of all nursing mothers in Izayi park residential area in Zvishavane town Zimbabwe. Thirty nursing mothers were sampled and consented to participate in the research. The statistics was provided by the district health office at Zvishavane hospital. A snowball effect was exploited in identifying the households that had young children. The area was also selected because of noticeable diapers littered on corner streets. The location is a relatively new neighborhood that has new houses and stands. It sprouted as a result of the expansion of Zvishavane town at the turn of the decade as platinum and diamond mining at Mimosa and Murova increased sizes. There are also a number of households who work at Sabi gold mine and other small scale miners. The community is fairly populated and majority of their children attend Marian Junior and High School which are world class schools known for producing good grades. The schools are also on the forefront in environmental awareness campaigns. Izayi Park is therefore a thriving community and will lead to increased volumes of waste. Nursing mothers or parents living in the area with children from infants to 1 and half years old were targeted with the assumption that they use disposable diapers.

Personal observations enabled the researchers to appreciate firsthand the severity of indiscriminate and illegal dumping of soiled diapers in open spaces and street corners. . These observations were necessary to compliment responses by participants. All participants fully consented and participated voluntarily with confidentiality of the information given.

RESULTS AND DISCUSSION

The findings of the research were analyzed. Data was presented using excel tools such as pie charts and graphs. The response rate for the questionnaires was 29 out of 30 participants. This gives a 97% response rate. The response rate was however 100% for key informant interviews (Figure 3).

Age of the respondents

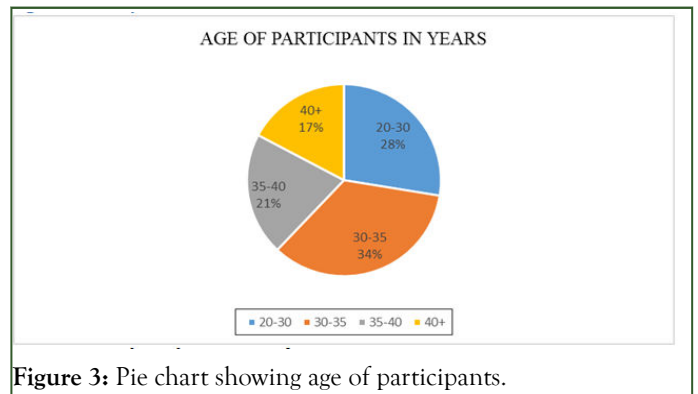


Figure 3: Pie chart showing age of participants.

The demographic picture shows that greater percentage of the nursing mothers are between 30-35 years of age constituting up to 34%. Women of ages 20-30 constitute 28% and 35-40 sitting on third place with 21%. It is also noted that women above 40 years of age participated in the research. The 17% participants of over 40 years could have been grannies and baby sitters who use diapers although some mothers have children in their late 40s. It is very clear that most middle aged women constitute the majority of women who use disposable diapers. The information seems to tally with health experts’ suggestion that these women prefer these types of napkins. In their responses, mothers of all ages admitted to indiscriminate dumping of diapers regardless of age (Figure 4).

Educational levels of participants

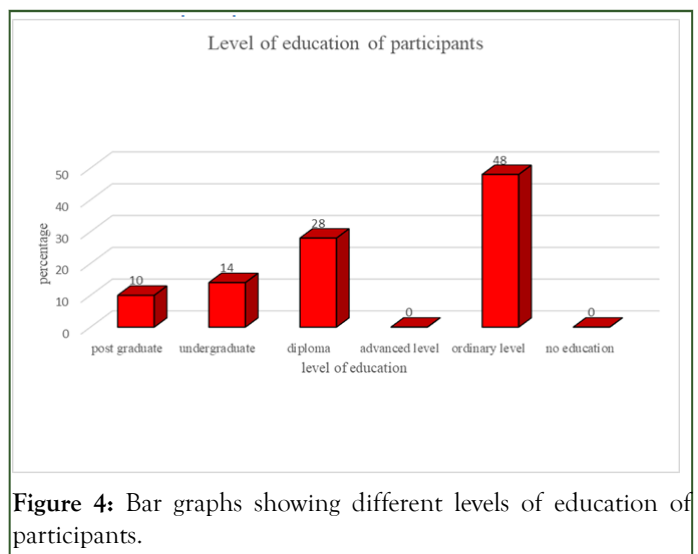


Figure 4: Bar graphs showing different levels of education of participants.

All the participants who participated said they had some level of formal education as limited to the questionnaire. 48% of the mothers hand studied up to secondary school ordinary level. 28% of the mothers had studied up to diploma level at tertiary

institutions. 14% of the mothers had a degree from a university. About 10% of the responding mothers had a master's degree and probably PhD as the questionnaire did not specify the level of postgraduate. It is pleasing to note that all the mothers who participated are educated. Their perception and attitudes towards waste management is therefore not linked to illiteracy but to something else. This seems to tally with the sentiments aired by some key informants who argued that mothers use and indiscriminately dispose diapers illegality of education status (Figure 5).

Employment status of participants

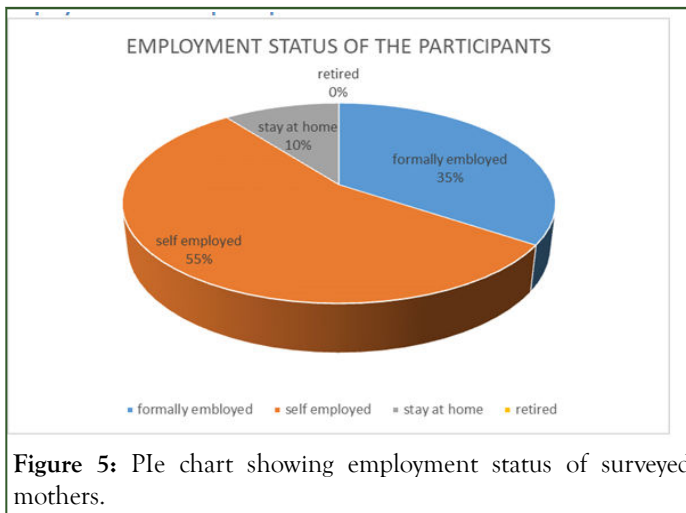


Figure 5: Pie chart showing employment status of surveyed mothers.

The research shows that 55% of the participants are self-employed. With unemployment rates rising globally, it is understandable that only 35% of the participants are formally employed. Some 10% of the participants indicated that they were full time stay at home mothers. It has been argued by nursing mothers that use of disposable diapers gives them time to do their work without disturbances.

Use of disposable diapers and cloth napkins

100% of the participants said they used disposable diapers. Mothers responded and almost all said they preferred diapers as they are not washed, save time and are very convenient. Mothers also cited that disposable diapers are dryer and cleaner. They do not cause discomfort to children and do not require constant changing. Other cited reasons included convenience when travelling. Mothers also noted weather conditions such as rainy seasons pushing them to use disposable diapers as cloth will require sun drying. Disposable diapers were also preferred as there is no washing labor. Some mothers also said that the diapers are not bulky and are light to carry. The community is also facing water shortages and it will be difficult for them to wash napkins in time.

Challenges with the use of disposable diapers

Nursing mothers cited a number of challenges with the use of diapers. The disposable diapers are said to be expensive especially the more comfortable brands. A baby can use at least three diapers per day. Some mothers confessed to ending up

resorting to cheaper and less comfortable brands that causes rashes and irritation to babies. Another challenge cited by participants was on how to dispose of the waste. Mothers lamented that pampers did not come with instructions on how to dispose waste (Figure 6).

Methods of disposal

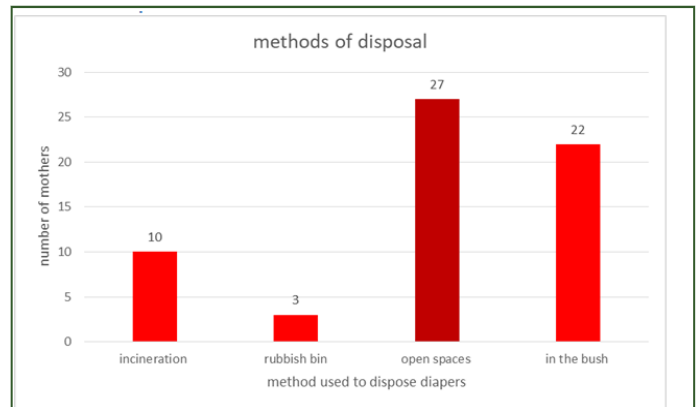


Figure 6: Methods used to dispose used diapers by mothers.

27 mothers said they dumped disposable diapers in open spaces and street corners with some also dumping in the bushes close to the neighbourhood. The trend seems to show that most mothers are unable to properly incinerate the diapers. Participating mothers also cited lack of resources such as waste bins and plastic bags to store their used diapers. Some mothers also said they stored the soiled diapers in a closed bucket and occasionally dump them when the quantity and smell becomes significant. Local authorities and town's housing and health officials admitted that during their cleaning up of street corners, they remove a lot of soiled diapers. They also reported a lot of flies all over. Some people also scavenge for recyclable materials in waste. Children have also been reported to play at the dumpsite picking up attracting containers and items. This poses a great health risk.

Safe waste management training

In an interview with key informants, all of them said they offered training to people on safe disposal of waste including diapers. Research also noted that there is no law that deals with diapers specifically. EMA has been pushing through for the ban without success. However authorities cited the public health act of Zimbabwe as a good tool to use to press charges against disposal of diapers. All nursing mothers which constitute 100% confessed never to have ever received any training on handling of soiled diapers. The mothers however admitted that authorities have been erecting 'no dumping' signage on areas that people dump waste. Some mothers also admitted that they heard on YaFM radio as authorities and sometimes in conjunction with Mimosa mining company encouraging residence to keep a clean environment.

Perceptions towards recycling of used diapers

Recent advances in technology have developed ways of recycling used diapers into useful products. Used diapers can be recycled

to get biogas, plastics, resins based on density. The process involves disinfecting the diapers then washes them before shredding them into small pieces. A Netherlands innovative company ARV BN is also on the forefront in this area (Figure 7).

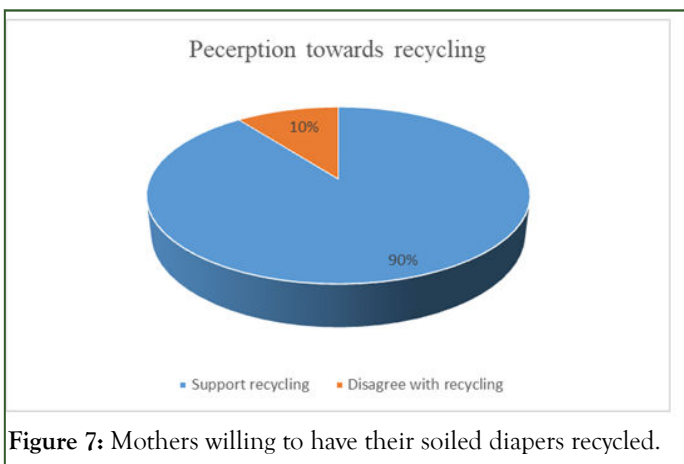


Figure 7: Mothers willing to have their soiled diapers recycled.

Twenty nine mothers were asked about their view on recycling of soiled pampers. 90% of the mothers said they did not support the idea. Mothers said they did not support the idea of having their children faeces being recycled because of cultural reasons. Some mothers cited ethical issues while others they believed someone can use the faeces to spiritually harm their baby or cause misfortunes.

Legislation and waste management

From the data collected, it is clear that not a single other was ever fined by authorities over illegal dumping of waste. The mothers are also not aware of anyone who was ever fined or arrested by authorities over illegal and indiscriminate dumping of waste. In an interview with a medical doctor and community health expert, baby diapers pose a great threat to human health if improperly disposed. Diseases such as cholera, typhoid and skin rashes are easily transmitted in bio waste. Most health experts said they gave waste management training to nursing mothers but admitted that they did not take the programs frequently. The town engineering section also lamented the blockage of city drainage system by used diapers. The Environmental Management Agency have a mandate to protect the environment. The agency admitted that due to lack of manpower it may not be able to enforce or trail the source of the diapers that are usually dumped at night without anyone noticing. However many cities including Zvishavane have been fined several times over lapses in waste management. The agency noted with concern that most towns do not collect refuse regularly leading to mothers helping themselves by illegal dumping, uncontrolled incineration and burning waste in holes. Due to financial constraints, the Zvishavane town council said it had some interruptions in refuse collection and water supply. The town council health officers encouraged citizens to wisely manage and conserve water. They also urged members to punctually follow the waste collection timelines. The district health officer encouraged mothers to properly dispose used diapers by first flushing the faecal matter in the toilet with water then wrap the diaper and store waste bag for refuse collection.

CONCLUSION

The perceptions of nursing mothers on the issue of indiscriminate dumping of diapers is that it should be heavily discouraged. Most of the respondents demonstrated awareness of the environmental hazards associated with this behavior. The major reason why they do so is due to unavailability of waste collection services. It is also clear that water supply is very erratic and most of the time families have no water to wash diapers before disposal. There is also no water to encourage mothers to use traditional cloth napkins. It is important for health officials, corporate world, environmental management agency and council to jointly organize training workshops to teach mothers on keeping environment clean. The program can be in the form of billboards, radio talk shows or workshops in their communities. It is possible that with increased awareness, mothers can stop the behavior of indiscriminate disposal of soiled diapers. The proper way of cleaning diapers according to health experts should be properly outlined by manufacturers. Government should also recruit more enforcement manpower to monitor illegal dumping. The research can also be extended to high density suburbs which are more vulnerable to waterborne diseases. There is also need to come up with ways to economically recycle diapers.

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