



THE ENVIRONMENTAL HEALTH IMPLICATIONS OF THE USE AND DISPOSAL OF DISPOSABLE CHILD DIAPERS IN SENGA/NEHOSHO SUBURB IN GWERU CITY, ZIMBABWE

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Abstract

This study discusses the environmental health challenges posed by the negligent disposal of disposable child diapers. Although traditionally the diapers were used for their convenience, when travelling they are nowadays used in many homes in Senga in Gweru as a replacement for cloth diapers. They reduce the burden of washing and ironing especially when water is not available regularly. Their disposal presented some challenges. They are either burnt, or buried in the ground or thrown dumped in illegal dumpsites in the suburb. This could result in the spread of communicable diseases such as cholera. The study recommends that the diapers should be collected using environmentally sound means. Women should be discouraged from the negligent dumping of diapers. Diapers should be cleaned of faecal matter before being disposed of. The council and residents should use separate bins for disposable diapers. This qualitative study used interviews and observations to gather data.

Key words: Senga/Nehosho, disposable diapers, diseases.

1.0. Background to the study

Disposable baby diapers have almost become indispensable in the list of baby care products as their use has been increasing steadily over the years (Kamat and Malkani, 2003). Although disposable baby diapers were used traditionally for their convenience especially when travelling, nowadays they are generally used in many parts of the developed and developing world as a replacement for cloth diapers. In the developed world approximately between 90% and 95% of diapers used are disposable (Odio and Friedlander, 2000; Rai et al 2009). The developing world is also adopting the use of disposal diapers because of their perceived advantages over the cloth diapers. It is therefore apparent that, the advent of disposable diapers has somehow resulted in the death of the napkin culture. Weisbrod and Van Hoof (2011) postulate that, pampers a type of disposable baby diaper, is one of the top-selling products globally. Disposable diapers have actually become a symbol of prosperity and complexity. Assadourian (2012) postulates that, since their entrance into the market, disposable diapers have become a symbol of affluence and sophistication. Pendry et al. (2012) claim that disposable diapers have become highly commoditised as they are regarded as an epitome of modernisation. They have in actual fact become a necessity rather than a luxury in fast paced lives.

The increased use of disposable diapers is associated with a number of environmental health challenges. The soiled diapers have two destinations. They either find their way to the disposal sites and landfills, or they litter public spaces where they are an aesthetic nuisance (Ayalon et al, 2009; Meallem et al. 2010). Unlike in the developed countries where the disposal of waste is more developed, with separation at the source, developing countries such as Zimbabwe still use traditional methods of mixing waste and dumping it at the tipping sites (Human Rights Watch, 2013). The refuse disposal systems are inadequate and it is common to find refuse containing human waste such as disposable diapers mixed with other domestic waste. This negligent disposal of soiled disposable diapers therefore increases the amount of human excreta in solid waste. It also exposes people who deal with solid waste such as municipal employees and waste pickers to contaminants which could cause serious illnesses as they may handle raw faecal matter in the process of disposing of soiled disposable diapers. Waste pickers use bare hands to salvage materials and food disposed of at the landfills (Mangizvo and Mupindu, 2012). They are therefore exposed to more than 120 different types of viruses which include enteroviruses, rotavirus, enteric adenoviruses and human caliciviruses (noroviruses) that may enter the environment through faecal matter (Stenstrom et al., 2011). Peterson (1974) contends that babies are the most effective carriers of enteroviruses. Some of these pathogens have the potential to live in the excrement for several months (Allred, 2009-2010). This therefore means that they have the potential to harm people long after they have been discarded.

Generally, people resort to the dumping of used disposable diapers at various dumping sites that have sprouted in most residential areas in the urban areas of Zimbabwe (The Standard, 2011). This is because, responsible authorities fail to collect refuse on a regular basis. Disposable baby diapers are among billions of plastic bags, kaylite and electronic junk which are scattered around the landscape across Zimbabwe's cities and towns (Chikwanha, 2013; Tsiko, 2011). According Ramaswamy and Sharma (2011) people in areas where waste collection is poor, residents tend to improvise by using plastic bags for storing their waste which include soiled diapers and then dump these in open spaces near their houses where they become part of the municipal solid waste stream. Tsiko (2011) observes that, noxious waste such as diapers are strewn along the Mukuvisi River in Harare. Plastics and disposable diapers are not easily biodegradable after their entry into the environment and will pollute the environment for very long periods. They take between 400 and 1000 years to break down (Pynthamil and Amarnath, 2011; Patel et al, 2011; Ohtsu et al, 2010). This is a serious environmental health challenge since an average baby uses 6000 diapers in their lifetime (US EPA, 1990). Once in the landfill soiled diapers are very toxic as they are prone to leach chemicals, contaminants and diseases (Meseldzija et al.,

2013). Chipunza (2012) contends that diapers that are recklessly dumped at illegal dump sites are usually ravished by stray dogs thereby exposing faecal matter which attracts the huge green flies. This is a serious health hazard because these flies later visit the nearby homes since they have the capacity to fly up to 5 kilometres (Prickford, 1983).

The non collection of refuse has encouraged people to bury waste such as diapers in the ground (The Standard, 2011). This however has devastating effects on water supplies as through seepage, waste will eventually mix with underground water and the probability of contaminating the source of drinking water by pathogens such as bacteria and viruses is very high (Maponga et al, 2013; Stenstrom et al., 2011). Bacteria such as *Salmonella* and *Shigella* which cause diarrhoea and dysentery are spread through contaminated water. Poor refuse collection also leads to sewer blockages because some residents flush disposable diapers. According to Murage (2013) the Department of Public Health in Kenya contends that, poor disposal of diapers is a leading cause of diseases as well as blockage of drainage in the country's major towns. The Human Rights Watch (2013) also observes that in Zimbabwe's urban areas disposable diapers have clogged the already overburdened sewer systems as some consumers tend to flush them in the toilets. Chinyama and Toma (2013) in a study on understanding urban sewerage systems that was conducted in Chinhoyi in Zimbabwe observed that, diapers were amongst the solid waste dumped in sewers and this contributed to blockages. Diapers tend to absorb water and expand but they do not breakdown. This reduces the sewer diameter, and in some cases once the diapers have absorbed water they cover up the whole sewer diameter (Chinyama and Toma, 2013). Ackers et al (2001) postulate that if solid waste become too much in the sewer the ability for self cleansing velocity is compromised; hence solids settle permanently in the pipes thereby causing clogging. The sewer water has numerous problems. It pollutes both surface and underground water (Mangizvo, 2009). Once enteric pathogens such as *E. coli*, *Shigella* and *Salmonella* are introduced into flowing water they can survive for up to 117 km from the point of discharge (Mason, 1991). This is quite terrible as actions in one part of the town could have serious repercussions to people and environment in the other part of town. Sewer water generally produces offensive smell while at the same time providing a breeding ground for disease vectors such as flies and mosquitoes (Mangizvo, 2009).

This study was motivated by two factors. Firstly, Zimbabwe produces and purchases large amounts of diapers which must be disposed of at the end of their lifespan (Tsiko, 2011). Secondly, the prevalence of disposable baby diapers in illegal dumping sites and at the city's official dump site is quite significant. The study therefore is aimed at understanding, why there was a sudden upsurge in the use of disposable baby diapers in Gweru; how the consumers dealt with the disposal of diapers; and recommended ways of improving the disposal of the used diapers.

2.0. Description of the Study Area and Methodology

The study was conducted in Senga/Nehosho Suburb in the city of Gweru in Zimbabwe. The suburb comprises of two main sections, that is, one Senga/Nehosho which is one of the oldest suburbs in the city and the other Senga/Nehosho which is newer part of the suburb. The findings can be replicated to other suburbs in the city. The study also looked at the disposal site as it was the destination of disposal sites that were collected in the bins in Senga/Nehosho and other parts of the city. This study triangulated a number of qualitative techniques in gathering data. As Bless et al. (2006) elucidate, the use of qualitative methods enabled this study to have access to the perspectives of the people in Senga/Nehosho on the impacts of disposable baby diapers. Furthermore the use of qualitative techniques enabled the study to observe the social life of women using diapers and be where the diapers were being utilised. This provided the study with a deeper appreciation of what was going on with regards the use of diapers. Purposive sampling was adopted for this study in the selection of respondents for interviews. It was felt that these individuals could provide rich and relevant data which the study could learn from. It was imperative to select respondents purposively particularly women with babies as they were deemed to have relevant information on disposal of diapers after use. The interview method was therefore used with a number of stakeholders such as the Cleansing Superintendent, nursing mothers and people with houses close to the illegal dumping sites. Direct observation methods were used to complement the interviews. The observation methods allowed the study to obtain first hand information through purposeful, systematic and selective way of watching the preponderance of diapers at the illegal dump sites as well as at the official disposal site. Transect walks were also utilised to explore the extent of casual disposal of diapers particularly in the open spaces in the northern and southern parts of Senga/Nehosho suburbs. It was also important to gather data through content analysis of newspaper articles and documents produced by the city council on diapers.

3.0. Findings and Discussions

Information obtained in the study areas showed that the use of diapers was becoming popular as most women used disposal baby diapers at one time or another. This was irrespective of level of education, social status and age. It was evident that both working women and housewives used the disposable diapers for various reasons. During interviews it was realised that women preferred using disposable diaper in place of the traditional cloth diaper because of its purported advantages. Most working women revealed that disposable diapers were convenient as they saved them on time. They also mentioned that, cloth diapers were cumbersome to deal with. Many respondents argued that, cloth diapers could be messy while at the same time they required a lot of laundry. They argued that the adoption of disposable baby diapers meant that they did not need to spend many hours washing and pressing as they would do with cloth diapers. Once the diaper was used it was quickly disposed of unlike the reusable cloth diapers. Furthermore, a number of women expressed the notion that they used fewer disposable diapers in any given day since they were ultra-absorbent, meaning that, a baby could spend several hours with one diaper. They further revealed that cloth diapers were difficult to work with since Senga/Nehosho suburbs often experienced water shortages. There were times when the suburbs would go for more than three days without water. This presented a serious challenge for mothers using cloth diapers because they could keep the soiled diapers for more than a day before washing them. Such diapers ended up producing foul smell whilst at the same time attracting flies. In such situations disposable diapers were preferable. It was also established through interviews that the power shortages that Zimbabwe experienced affected households in Senga/Nehosho suburb.

The power outages pushed some mothers into using disposable diapers since they could not use cloth diapers that had not been ironed. Those mothers that used cloth diapers that had not been ironed explained that, their babies were at times infected by maggots that penetrated the children's soft buttocks. In such cases the use of disposable diapers which did not require any pressing was a better option than using cloth diapers.

It also emerged during interviews that were conducted with a number of women that disposable baby diapers made their travelling comfortable as they did not have to carry smelly diapers with "poop" with them. They often travelled into the city centre to procure their groceries. In some cases they visited clinics for baby checkups. In such situations disposable diapers proved convenient. The general consensus was that since women had several gender-related daily chores such as cooking and cleaning homes, the advent of disposable diapers reduced the number of drudgeries associated with their livelihoods. Information obtained during this study showed that women preferred using disposable baby diapers since they were not affected by weather conditions whereas the cloth diapers were negatively affected by cloudy and rainy conditions.

It also emerged during the study that the use disposable diapers was guided by other factors other than those mentioned above. It has become fashionable for women to use disposable baby diapers as opposed to cloth diapers. Apparently disposable diapers were regarded as status symbols. Those using disposable diapers were regarded as being of a better social status compared to those using cloth diapers. During discussions it was observed that, younger women preferred using disposable diapers to give an impression that they were moving with the changing times. In some of the interviews some nursing mothers revealed that they were using diapers because everyone else was using them. Their use was guided by the notion that if someone whom they classified as belonging to a lower class than theirs used diapers then they had to be seen using them as well. It was clear therefore that conspicuous consumption was the main driving factor in the use of disposable diapers. Women wanted to stand out as belonging to a privileged group that could afford the disposable diapers. It is apparent that in such circumstances they did not consider the negativities that were associated with the use of these diapers. The consumers' main concern was the better status they derived from their association with the use of diapers. It was not surprising therefore that in some cases the disposable diapers had completely replaced the cloth diapers. Observations which were made showed that the market was flooded with diapers in response to the demand for the product. Some of diapers were of a very poor quality with a very short life span; hence several diapers were used in a single day. This contributed to an influx of soiled diapers in the open spaces and disposal sites.

The study observed that although the use of disposable diapers was prevalent in the study area their disposal was a major environmental health concern. There was no system in place to cater for their disposal. Information obtained from interviews conducted with the municipal health department showed that Gweru City Council being a local authority in a developing country was suffering from lack of capital to efficiently run its waste disposal system. It could not afford to provide bins to encourage separation of waste at source, let alone incineration of hazardous waste. Instead the council encouraged households to put disposable diapers in plastic bags which were then tied and placed in bins. This meant that in essence disposable baby diapers were mixed with other solid waste during disposal causing them to be a potential threat to the health of those who handled the solid waste during collection. They were also a health hazard to the waste pickers who made a living by recovering valuables from the waste at the disposal site. A visit to the disposal site showed that there were numerous disposable diapers all over the place and some of the waste pickers often used their bare hands to salvage any retrievable material from the waste which included disposable diapers risking contracting communicable diseases that could be transmitted from the diapers. Furthermore, the practice of mixing disposable diapers with the other waste allowed plastics to get to the disposable site where they were a menace to the environment since they take several years to decompose. They were easily blown away by the wind; hence they were strewn approximately two hundred metres away from the disposal site. Domestic animals such as cattle, donkeys and dogs which strayed into the disposal site were at risk of ingesting some of the plastics and this could lead to their gradual death.

In a survey carried out in supermarkets that sold the disposable diapers it was confirmed that all the available varieties on the market did not carry any information on the environmental health aspects such as cleaning any faecal matter from the diapers before disposing of them in the bins. Information that was written on the wrappers was that which encouraged users to place used diapers in the bins rather than flush them in the toilet. In interviews conducted in the study area, a few respondents confirmed that they cleaned the disposal diapers of faecal matter which they then flushed in the toilets. Most of the respondents however never cleaned the diapers of faecal matter because of a number of reasons. A number of women were not aware that it was important to clean the diapers of faeces before placing them in the bins. Some felt this was not necessary since all solid waste was destined for the solid waste disposal site at MacFaden Farm popularly known as "Kumadhii". Others argued that even if they cleaned the diapers of faecal matter they were still faced with the challenge of flushing the faecal matter as at most times the suburb did not have water. As a result it was unnecessary to clean the diapers. They therefore simply placed soiled diapers in shopping plastic bags, which they then tied and then deposited these into the dustbins together with other solid waste. Some of the women never bothered to place the soiled diapers in plastic bags. They simply rolled the soiled diapers with the faeces then placed them into the bins. The smell from the diapers attracted disease vectors such as flies. They also attracted dogs which often tipped the bins in order to retrieve the diapers. The dogs either carried the messy diapers to their homes or simply dumped them in open spaces creating an aesthetic nuisance.

Although the municipality collected waste from the bins once a week, usually on Thursdays there were times when this service was very erratic and bins would go uncollected for up to two weeks or more. At the same time some houses did not have bins even though it was mandatory. Most respondents said they could not buy bins because they were expensive and beyond their means. Other respondents revealed that they were lodgers who could change residence any time; hence they could not buy bins for their landlords. In such situations women using disposable diapers resorted to either burning the diapers, or burying them in the ground, or flushing them in the toilet, or simply dumping them in the open spaces in the evening when no one was watching. Those who burnt the diapers often used paraffin as catalyst as disposable diapers did not burn readily. Their wet condition together with faeces made it very difficult for them to be

consumed by fire. The plastics used as part of the disposable diapers produced noxious smoke during burning and this had a negative contribution to climate change as well as the health of those who inhaled it. A few respondents disposed of the disposable diapers by flushing them in the toilet. It was evident from the interviews that they lacked knowledge of the dangers associated with this practice. Diapers have a tendency of absorbing water and this caused them to increase in volume thereby filling the whole diameter of the sewer pipes and this resulted in sewer blockages in the suburbs. Interviews with residents from the suburb revealed that diapers were responsible for some of the prevalence of sewer bursts. During the time of the study stagnant pools of sewer water were observed at the intersection of Chikika and Chisina roads in Nehosho, and at a manhole situated close to the Seventh Day Adventist Church. These produced foul smell that affected several parts of the suburb. The pools were also a health hazard as some children, oblivious of the dangers played in the stagnant water. Information obtained from interviews with members of the local community showed that disposable baby diapers were among the prominent substances that caused sewer blockages.

During the study it was established through interviews and observations that some women buried soiled diapers in the ground. Some women revealed that they dug holes within their yards where they buried the diapers. They explained that they were not aware that this practice could pollute underground water which could pose long term health problems. The other group of women said that since there were no bins at their premises, they had no option but to dump the soiled diapers at the several illegal dumps that had mushroomed in the open spaces within and on the margins of the suburbs. The study team observed that disposable baby diapers were a common sight at such illegal dumping sites. Dogs often tore plastic bags containing the disposal baby diapers. One senior resident complained that he had to dispose of his dog since it was in the habit of bringing soiled diapers home. It also emerged that young children who visited the illegal disposal to salvage whatever material got their hands into contact with these diapers and risked being infected by contaminable diseases such as cholera. Most casual disposal sites were in most cases less than twenty metres from built up areas. This exposed households to flies which are capable of flying a distance of up to five kilometres (Pickford, 1983). This meant that both households which generated disposable diapers and those that did not, were all exposed to dangers posed by flies. Furthermore, disposable baby diapers with untreated human waste have the potential to contaminate underground water. Three transect walks that were conducted at the open spaces on the outskirts Senga/Nehosho Suburb showed that illegal dumping of domestic waste was rampant. An examination of the waste showed that baby diapers were amongst some of the solid waste dumped in the open spaces. In the western part of suburb in an area very close to the municipal hall several heaps of used disposal diapers were observed. It was evident residents used this place to dump diapers together with other solid waste. This place was barely 100 metres from the houses which meant that flies could easily fly from this place straight into homes and the potential to transmit communicable diseases such as diarrhea, dysentery and cholera.

The study also established that most of disposable diapers that were disposed in waste bins were eventually taken to the municipal landfill. Observations made at the MacFaden disposal site showed that the diapers were either burnt, or covered with soil, or were left uncovered. It was also observed that waste at the official dump site remained uncovered for several weeks if not months. Since this place was not fenced or guarded it allowed easy access to people such as vagrants and children who eventually tempered with waste in their bid to salvage any valuable material. Wind could also blow the diapers out of the disposal site as there was no fence to hold them back. This compromised the aesthetic value of the place surrounding the site. The uncovered waste tends to attract waste pickers. As already mentioned waste pickers who eke their survival by retrieving usable material from the waste that is dumped at the council's disposal site used their bare hands and this increased their chances of getting into contact with human excreta on baby diapers and also exposed them to the probability of being infected by enteroviruses as already mentioned. Furthermore, dogs that visited the dump site were likely to carry the soiled diapers from the site and could drop them anywhere including residential areas.

The disposal diapers that were left uncovered were unsightly and often affected by the falling rains. They quickly got putrefied and they attracted large swarms of flies which could easily fly into the nearby Ascot, Woodlands and Clifton Park suburbs. Untreated human waste is a breeding ground for communicable diseases such as cholera, dysentery and diarrhoea. Despite this environmental health threats observations made in the study area showed that soiled diapers in the city's disposal site, illegal dumping sites in the open spaces as well as diapers in the bins constituted a feeding ground for disease vectors such as flies. Residents from the three suburbs raised concern about the smell that at times emanates from the disposal site. Fire was at times started by both waste pickers and municipal workers at the disposal site. It was used as a way of either containing waste which includes disposable diapers or recovering some waste such as copper wire. Observations showed that diapers could not be consumed by the fire and remnants of partly burnt diapers were an ugly sight in the area. During the process of burning, disposable diapers produced noxious gases which were a threat to human health. At times soil is used to cover waste that includes diapers. When buried in the ground they have the potential of polluting underground water.

4.0. Conclusions

An increased number of women were using disposable baby diapers compared to earlier years when they used cloth diapers. This was due to their perceived advantages over cloth diapers. It was also realised that it had become fashionable for young women to use disposable baby diapers. It was however overtly clear that very little cognisance was being given to the environmental challenges posed by the advent of the disposable diapers. Very little attention was being given to product after its use and as such it was essential for all stakeholders to have a responsibility in the use and disposal of disposable diapers.

5.0. Recommendations

It is imperative to use a women-centric approach in dealing with the problem of disposable baby diapers. The women need to be educated on the negativities that are associated with the use of diapers to the environment. This study

recommends that child minders should go back to the use of reusable diapers which do not litter the environment. The use of reusable diapers is in line with cultural ethos that is against the throwing away of human waste in the open environment. It is traditional in Zimbabwe to conceal human waste. There is need for the government to charge some tax on the diapers. This will discourage the use of diapers.

Those responsible for changing baby diapers should be educated on the awareness to clean off soiled diapers before disposing them. This will reduce the incidence of flies taking advantage of the soiled diapers.

Zimbabwe as a country needs to take urgent practical steps to enforce how diapers should be handled as a way of ensuring sustainable development. This will then cascade down to local authorities such as urban councils for example systems that encourage separation of garbage at the household level should be put in place. The Gweru City Council encourages households to place diapers in plastic bags which they should tie at the end and then place these in bins or refuse bags. The bags containing solid waste such as diapers should not be taken to the waste disposal site. Somehow they should be incinerated. Since the council does not have one such facility, it could work in a synergy with organisations that have these so that they utilise their incinerators to destroy harmful solid waste.

It is imperative to avoid the disposal of disposable diapers with faecal matter and urine with regular waste as this leads to the contamination of groundwater and spread of diseases.

It is important at both international and national levels to insist on corporate responsibility so that companies that produce disposable diapers should be able to account for the entire life cycle of their products. The companies should put instructions on the wrappers on how to dispose of diapers in a sustainable manner. They should also supply bags that could be used to deposit used diapers before they are transported to the incinerator. In a way these companies should be motivated to make diapers which are biodegradable or easy to recycle.

The Zimbabwean Government could have an additional tax on disposable diapers. The tax will discourage consumers from buying the diapers. It is expected that individuals may be less inclined to purchase disposable diapers as a way of avoiding the additional tax. This will reduce the quantity of disposable diapers that enter the disposal sites or may be disposed of in open places. The additional revenue that is generated as additional tax can be used on programs that inform the public of the environmental, health, and safety challenges associated with disposable diapers.

The government should put in place legislation that deemphasizes the use disposable diapers. This will have many environmental and social benefits. The government can for example put in place subsidies as a way to incentivize the use of cloth diapers. This ultimately reduces the amount of solid waste in the form of disposable diapers that enters the landfills or the open spaces.

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