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IMPACT OF WASTE DISPOSAL ON HEALTH OF A POOR URBAN COMMUNITY IN ZIMBABWE

F. S. Makoni MSc, J. Ndamba, PhD, Institute of Water and Sanitation Development, P.O. Box MP 422 Mount Pleasant, Harare, Zimbabwe, P. A. Mbatl, PhD, University of the North, Qwa-Qwa Campus, Parasitology Research Group, Faculty of Natural and Applied Sciences, Private Bag X13, Phuthaditjhaba, South Africa and G. Manase, MSc, Institute of Water and Sanitation Development, P.O. Box MP 422 Mount Pleasant, Harare, Zimbabwe

Request for reprints to: F. S. Makoni, Institute of Water and Sanitation Development, P.O. Box MP 422 Mount Pleasant, Harare, Zimbabwe

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F. S. MAKONI, J. NDAMBA, P. A. MBATI and G. MANASE

ABSTRACT

Objective: To assess excreta and waste disposal facilities available and their impact on sanitation related diseases in Epworth, an informal settlement on the outskirts of Harare.

Design: Descriptive cross-sectional survey.

Setting: This was a community based study of Epworth informal settlement.

Subjects: A total of 308 households were interviewed. Participating households were randomly selected from the three communities of Epworth. Secondary medical archival data on diarrhoeal disease prevalence was collected from local clinics and district health offices in the study areas.

Results: Only 7% of households were connected to the sewer system. The study revealed that in Zinyengere extension 13% had no toilet facilities, 48% had simple pits and 37% had Blair VIP latrines. In Overspill 2% had no toilet facilities, 28% had simple latrines and 36% had Blair VIP latrines while in New Gada 20% had no toilet facilities, 24% had simple pits and 23% had Blair VIP latrines. Although a significant percentage had latrines (83.2%), over 50% of the population were not satisfied with the toilet facilities they were using. All the respondents expressed dissatisfaction with their domestic waste disposal practices with 46.6% admitting to have indiscriminately dumped waste. According to the community, diarrhoeal diseases were the most prevalent diseases (50%) related to poor sanitation. Health statistics also indicated that diarrhoea was a major problem in this community.

Conclusion: It is recommended that households and the local authorities concentrate on improving the provision of toilets, water and waste disposal facilities as a way of improving the health state of the community.

INTRODUCTION

The International Drinking Water and Sanitation Decade launched by the United Nations' World Health Organisation (WHO) in 1981 emphasised the need to have adequate safe water supplies as well as sanitation facilities for all. Although there was an improvement in the number of people with access to water and sanitation, population growth erased the gains especially in urban areas resulting in the number without water remaining the same and those without sanitation rising by 70 million(1). For many towns and cities of developing countries including Zimbabwe, access to basic sanitation has been of major concern. This encompasses waste and human excreta disposal especially in poor urban and in informal settlements where most of these communities live in over crowded settlements and poor living conditions(2).

The growing urban population poses a great challenge to sanitation provision as well as excreta disposal for governing authorities in many developing countries where the urban poor have to cope with non-

existing sanitation policies and inadequate water and sanitation facilities(3). The rapid migration from rural to urban areas has resulted in overcrowding and pressure on sanitation services that are already facing critical overloading and a long list of service management deficiencies(4). In Zimbabwe the situation is aggravated by the fact that local authorities in small urban areas depend on government funds which have been cut as part of the International Monetary Fund's (IMF) Economic Structural Adjustment Program (ESAP) in 1991. The cut in grants coupled with the Zimbabwe government policy that does not clearly outline the rules governing the provision of sanitation services as well as roles and responsibilities of different agencies in peri-urban and informal settlements has exacerbated the situation.

The inadequate sanitation and safe drinking water supplies are major challenges for service providers to poor urban dwellers. The problem is compounded by the improper waste disposal practices and the unhygienic practices that expose these communities to water and sanitation related diseases. According to Esrey *et al*(5) more people die of poor sanitation related diseases than

global conflicts. An estimated 600 000 children in developing countries die from the more than 50 communicable diseases associated with poor sanitation every year(6). The current statistics about health risks in third world slums have demonstrated that the urban poor are worse off than the rural poor(4). Incidences of diseases in informal settlements where sanitation services are inadequate or non-existing are higher than in middle and high-income residential areas. For example in Bangladesh infant mortality rate in urban slums is twice that in urban areas and many of these deaths are associated with diarrhoeal diseases with infections stemming from poor hygiene(4). The problem has been exacerbated by the common trend of most government and local authorities' policies of hostilities and eviction of poor urban informal settlers(7).

This study assessed the human excreta and waste disposal facilities and their health implications among residents of the poor urban settlement of Epworth a few kilometers south east of Harare, Zimbabwe's capital city.

Study area: Epworth is located 20 Km south east of Harare and has an estimated population of 120 000 people. The settlement is administered by a local board, responsible for the collection and setting of rates. Epworth was initially developed into four areas but as the population increased the area has an extensive squatter settlement. Health services are provided by two polyclinics in the area.

MATERIALS AND METHODS

The study in Epworth followed a descriptive cross-sectional survey in which households from the area were randomly selected from the three localities of New Gada (NG), Overspill (O) and Zinyengere Extension (ZE). This study is part of a bigger study on "Linking Urban Sanitation Agencies with Poor Community Needs" that was conducted between July 1999 to March 2001. Epworth being one of the study sites, data from this site was collected in

four weeks. Participating households were randomly selected from the three localities of Epworth by simple random sampling. A total of 308 households were interviewed using a questionnaire designed to collect information on demographic factors, water and sanitation facilities, waste disposal methods, sanitation related diseases and community needs. Secondary medical archival data on diarrhoeal disease prevalence was collected from local clinics and district health offices in the study area. Data collected was entered into an SPSS spreadsheet where the statistical analyses was done using simple frequencies to describe the situation in the study area.

RESULTS

General living conditions and household characteristics: Most houses in Epworth were developed as temporary structures with the intention of upgrading them. In Zinyengere Extension (ZE) 75% of the surveyed houses were in very poor conditions. In overspill (O), a legally developed area, the situation was less critical with 55% of the houses in poor conditions. In New Gada (NG) there was balance between the poor and good accommodation. The results in Table 1 show that a significant percentage (68.6%) of household heads had formal education with New Gada having the highest percentage of household heads with formal jobs. Results of the survey indicated that on average households earned about \$2000 ZWD (US\$38) per month. Assessing the incomes from the three settlements it was clear that most households earned less than the stipulated minimum wage of \$8000 ZWD (US\$145) per month (ZCTU, 2000). The low household incomes seem to have an impact in terms of resource allocation for household developments such as latrines construction. The lack of resources in households would therefore imply that control of the spread of sanitation related diseases would be difficult in the absence of sanitation facilities and money to seek treatment.

Table 1

Household characteristics of Epworth residents

Area	Level of education of household head		Formal job (%)	Informal job (%)	Median of household incomes
	No formal education (%)	Formal education (%)			
ZE (n=124)	46.4	53.6	48.6	51.4	\$1540 zwd (US\$ 28)
O (n=136)	25.8	74.2	36.8	63.2	\$2585 zwd (US\$ 47)
NG (n=48)	9.3	90.7	12.5	87.5	\$2585 zwd (US\$ 47)
Total (n=308)	31.4	68.6	39.5	60.5	Average household incomes \$2000 zwd (US\$ 36)

Excreta disposal facilities in Epworth: Figure 1 shows that 13%, 2% and 1.8% of households in ZE, O and NG respectively have no fixed place to defecate. The worst affected area was ZE which had 13% of the households with no toilet facilities. Only 7% of the households interviewed were connected to the sewer line. A significant proportion of households used pit latrines, 48% in ZE, 28% in O and 24% in NG, however most of these latrines had poor structures which were ranked as not effective in preventing the spread of sanitation related diseases.

Access to safe water supply was critical. It is evident that the urban poor use different sources of water supply as shown in Table 2. In Overspill majority of the residents (89.5%) had piped water supply within their households while in New Gada 98.3% of the residents used other sources such as shallow wells, unprotected sources and dams.

Figure 1

Distribution of toilets by type for Zinyengere Extension(ZE), New Gada (NG) and Overspill (O)

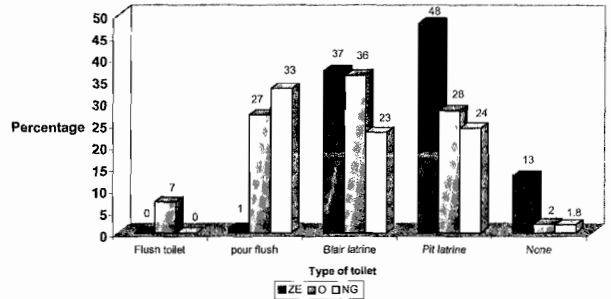


Table 2

Water sources in the three localities of Epworth

Water source	Tap within household (%)	Communal tap (%)	Borehole (%)	Private vendor (%)	*Other sources(%)
Zinyengere Extension (n= 124)	0	73.1	3.8	0	23.1
Overspill (n=136)	89.5	0	0	5.0	5.5
New Gada (n= 48)	0	0	0	1.7	98.3

From interviews of the selected households, over 50% of the population were not satisfied with the toilet facilities they were using. On average eight people were using a single latrine. In some extreme cases such as in Zinyengere Extension more than twelve people were using a single latrine. The reasons for being unsatisfied ranged from, the toilet being inappropriate for children, unclean to over utilised. Poor durability of the construction material and very poor structures that seem to be on the verge of collapsing were also given as some of the reasons for poor or low utilisation of toilet facilities. The bad status of some of the latrines greatly affected their usage leading to many utilising other means such as the bush system.

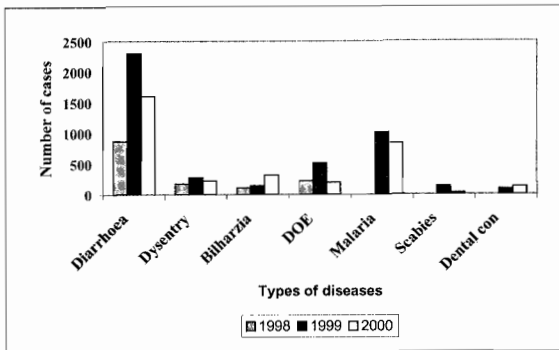
Domestic solid waste disposal facilities in Epworth: The lack of solid waste management services in Epworth resulted in households resorting to using refuse pits. In Zinyengere Extension 93.4%, 93.2% Overspill and 97.4% in New Gada used refuse pits while 46.3%, 83.3% and

9.5% in Zinyengere Extension, Overspill and New Gada respectively admitted having indiscriminately dumped solid waste. The residents expressed concern over the problems of flies from the refuse pits, which was further aggravated by the fact that most children also used the refuse pits as latrines due to the inappropriateness of the available latrines.

Sanitation related diseases: According to the survey results, households singled out diarrhoeal diseases as the most prevalent and related to poor sanitation. A total of 74% of the respondents from ZE, 39% from O and 38% in NG linked diarrhoeal diseases to poor sanitation. Helminths infections were observed to be common with ascariasis reported to have affected 35% of the households in Overspill, 37% in New Gada and 6% in ZE. Medical archival data from 1998 to 2000 indicated that diarrhoea was a major problem in the study areas and in 1999 over 2000 cases were reported (Figure 2). Diseases of the eye, bilharzia and dysentery were also common.

Figure 2

Incidences of poor sanitation related diseases in Epworth 1998 to 2000



*DOE = Disease of the eye

Dental con = Dental condition

DISCUSSION

Epworth is a dynamic community which has residents from different backgrounds. After independence in the 1980 and even to date the area is experiencing an influx of people who engage themselves in the construction of temporary housing structures with the intention of upgrading them. However no much upgrading was done and most of the people have been living in these houses for up to 12 years or more. The stagnant approach to development of household facilities could be a result of uncertain land tenure that has seen a number being evicted as they were regarded as squatters. In areas such as as overspill, more permanent and better housing structures were observed. In terms of educational level and formal jobs it was evident that there was no much difference between residents of New Gada (illegal settlement) and Overspill (a legal settlement). Generally in a society certain level of education is linked to the way of life. However in Epworth it was observed that most of the people led a similar way of life despite the different educational levels. This revelation suggests that the people living in the illegal settlements migrated from the high-density areas of Harare for various reasons such as high cost of formal accommodation, retrenchments and death of bread winner. According to the results of the survey most households in Epworth earned far much less than the stipulated Zimbabwe minimum wage of \$8000 ZWD per month(8). This therefore implies that most households were living in absolute poverty with most households not affording even the most basic needs like food suggesting that resources allocation for household developments such as latrine construction would be difficult. Lack of resources plays a significant part in the type of toilet structure and most of the observed structures were hanging precariously and seeming to be on the verge of collapsing. The majority of the toilets in general

were ranked as not effective in serving their purpose of safe excreta disposal and prevention of the spread of sanitation related diseases. The survey also revealed that only 7% were connected to the sewer and the rest indicated that they were promised connection by the local authority since Epworth was developed along urban structures. In this vein the urban council's act comes into effect and it does not allow the construction of on-site sanitation thus the residents had to wait for the promised connections while in the mean time utilised whatever available means for relieving themselves. Majority of residents admitted that they used unsanitary pit latrines, neighbours' toilet and the bush. In general most residents in Epworth utilises on plot sanitation for disposal of excreta. Poor disposal of human waste is often related to the spread of many sanitation related diseases such as diarrhoeas and intestinal worms. The presence of helminthes infections such as ascariasis reflects the need to pay more attention to the disposal of human excreta which is the main source of these diseases.

Solid waste management in most developing countries including Zimbabwe is given low priority especially in poor-urban areas and informal settlements. In Epworth there was no solid waste management services. The lack of solid waste management and latrines was a serious health concern as most households used different sources of water, some of which included shallow wells and unprotected sources such as streams, rivers and dams. These sources are easily contaminated especially when there is no proper waste disposal mechanism and adequate sanitation, which would result in the spread of water borne diseases. A large population (98.3%) in New Gada have no access to safe water which was a serious health hazard and also an impediment in terms of managing water related diseases which would not only affect New Gada but the whole of Epworth as indicated by the high incidence of diarrhoea disease (Figure 2).

The interpretation of the direct relation between diseases and toilet facilities could be obvious but it is complicated as many other factors are involved. The study documented the major diseases the communities are suffering from. According to the health posts and the communities, diarrhoeal diseases were the most prevalent and related to sanitation. The cause for concern is that some of these diseases also cause disabilities however the explicit cost of sanitation related diseases in terms of ill health, time spent caring for patients, medical expenses and cost to development in general are higher than the cost of providing water and sanitation facilities to prevent these diseases.

Good quality latrines have been advocated as best measure to curb the spread of sanitation related diseases. However recent research have suggested that on plot sanitation pollute underground water as latrine effluent seeps into the soil and groundwater(9,10). The degree of contamination has been shown to be difficult to

quantify(11). The concern for underground water pollution has been raised worldwide and current research are indicating that sewer leakages impact groundwater in developed countries whilst on site sanitation impact underground water in developing countries(12). In Tanzania pollution of water sources for city of Dar-es-Salaam were shown to originate from haphazard disposal of solid wastes and lack of standard sanitary facilities(13,14). The impact of groundwater contamination in a scenario where there is no solid waste management, proper standard sanitary facilities and where most residents utilise underground water such as in Epworth has far reaching consequences in terms of public health management.

The impact of the situation is that residents have to live in an environment of flies, mosquitoes and stench of clogged water bodies, choking smoke from burning refuse. The high number of diarrhoeal cases in Epworth could be linked to poor sanitary conditions which are a health hazard. The most impact is on children which is a cause for concern that hundred of thousands of children die every year due to water and sanitation related diseases(6).

CONCLUSIONS

The communities in Epworth are using very different kinds of toilet facilities of which most of them are in a critical condition of disrepair. In general it can be drawn that there is lack of adequate facilities in most areas of Epworth with 61% of the population in ZE, 30% in Overspill and 44% in New Gada lacking adequate sanitation. Lack of adequate sanitation left many households with no option but to practice unsanitary methods of waste disposal such as the bush system. In the survey 96% of the households expressed need for improved toilets. Though the majority expressed demand for improved sanitation, the usefulness and necessity of a toilet, it may have and the priorities of the communities were often not in accordance. This could be because the majority of the population lives in deep poverty since most incomes were below the poverty datum line resulting in difficulties of allocating resources to build or improve their toilet facilities. Unsanitary living conditions observed in Epworth could be the main cause of sanitation related diseases and these may lead to a reduction in human capabilities, high morbidity (and even mortality especially of infants).

RECOMMENDATIONS

Approaches to sanitation problems in poor urban areas should be holistic and strike a balance of environmental sanitation concern with income generation and other social benefits which should involve communities in a participatory approach to ensure sustainability.

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REFERENCES

1. Briscoe, J. When the cup is half full, *Environment*, 1993; **35**:
2. Tayler, K and Cotton, A. Urban Upgrading: Options and procedure for Pakistan. WEDC, Loughborough, UK. 1994.
3. Mudege, N. and Taylor, P. Urban sanitation in Zimbabwe and the relation to environmental pollution. IWSD, Harare. 1997.
4. Black, M. Mega-Slums: the coming sanitation crisis. Water AID, London, UK, 1994.
5. Esrey, S., Gough, J., Rapaport, D., *et al.* Ecological Sanitation. Sida, Stockholm. 1998.
6. WHO. Medical Education Teaching Medical Students about Diarrhoeal diseases. 1999.
7. Gilbert and Gugler. Cities, Poverty and development: Urbanisation in the third world. *Oxford University Press*. 1992.
8. ZCTU. Wages and labour regulations. Harare Zimbabwe. 2000.
9. Chidavaenzi, M., Bradley, M., Jere, M. and Nhandara, C. Pit latrine effluent infiltration into groundwater: The Epworth case study. *Schriftenr Ver Wasser Boden Lufthyg.* 2000; **105**:107-121.
10. Howard, G. On-site sanitation and groundwater: the art of balancing unknown risk? *Waterlines*. 1999; **17**.
11. Cave, B and Kolsky, P.. Groundwater, latrines and health. WELL, UK (www.lboro.ac.uk/well), 1999.
12. Barret, M., Howard, G., Pedley, S., Taylor, R. and Nalubega, M. A comparison of the extent and impacts of sewage contamination on Urban groundwater in developed and developing countries. *Schriftenr Ver WasserBoden Lufthyg.* 2000; **105**:179-185.
13. Mukule, D.E. Pollution of water sources due to poor waste management: the case of Dar es-Salaam. *Schriftenr Ver Wasser Boden Lufthyg.* 2000; **105**:117-121.
14. Olanrewaju, D. Soak - away systems and possible groundwater pollution problems in developing countries. *J.R. Soc Health.* 1990; **110**:108-112.