



Review Article

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Sanitation in Aburi Community: Review of Faecal Matter Disposal and Health Implications

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Abstract

Provision of improved faecal matter disposal systems is vital in reducing the incidence of faecal diseases. The main purpose of this study is to review faecal matter disposal practices in Aburi community in retrospect and health implications. The study reviews faecal management options employed by individuals and the District Assembly. In addition, the study analyses disease profile of the community in retrospect. Data analyzed were gathered from literatures through a comprehensive search by using electronic and non-electronic database. Published literature, documents and International Journals were searched in a systematic way using a range of key words relating to faecal matter disposal in Ghana and in the global community. All these were analyzed and described succinctly.

Keywords: Faecal Matter, Open Defecation, Health Implication, Aburi Community, Ghana.

Introduction

Access to basic sanitation is considered a fundamental human right, one that safeguards human health, protects human dignity and promotes economic and social development. Yet, over a decade now, 2.6 billion people (39%) world over, still do not have access to safe sanitation system and 1.1 billion of this number have no sanitation facilities at all and practiced open defecation (WHO and UNICEF 2004). Of these figure, 75% live in rural communities in East Asia and Sub-Saharan Africa. Today, Ghana's population stood at 24.2 million people and 4.8 million of this number have no latrines at all and defecate in the open (WSP, 2011). According to World Bank's Joint Monitoring Program, (2010) the problem of faecal matter disposal resulting from open defecation alone contributes about 20% of sanitation problems in

Ghana. Faecal contamination of the environment has not only been implicated for the annual average of **1,800 cases of cholera** affecting Ghana (WHO, 2005—2009) but it also responsible for early childhood diarrhoea that contributes to stunting; wasting and reduced long-term cognitive development of children in schools (World Health Report, 2005; Guerrant *et al.*, 2002). Approximately 19,000 Ghanaians, including 5,100 children under 5, succumbed to diarrhoea each year. The financial burden on the Ghana's economy also has considerable social costs. Loss of dignity and privacy and risk of physical attack and sexual violence may not be easily valued in monetary units, but these issues are the reality when sanitation facilities are not available. Poor sanitation has led to continued spread of sanitation related diseases: cholera,

typhoid, amoebic dysentery, skin diseases and increased high incidence of worms and diarrhoea affecting mainly children. According to desk study carried out by water and sanitation program (WSP) poor sanitation indebts Ghana 420 million cedis each year (World Banks Water & Sanitation Project, 2010). This sum is equivalent to 1.6% of the Ghana's National Gross Domestic Product (GDP) of 39.2. Costs associated with shared sanitation are likely to be higher than shown if time taken to reach and queue at a public latrine as well as user-fees were added. Poor sanitation is a public health issue and people are affected by their neighbours and communities sanitation status as well as their own. The costs of open defecation are therefore felt throughout the community. The current challenges facing the country's effort at meeting the MDG 7 target on sanitation are huge and require urgent attention. At the current pace of increase in the use of improved sanitation, the number of Ghanaian who would be without improved toilet facilities will be 18.7 million by 2015 (GSS,2010). Improvements in rural and urban sanitation can be widely accepted and embraced if relevant cultural and social factors are taken into consideration during planning and implementation. Ghana therefore needs to improve on its strategies to expedite the progress towards MDG 7, particularly sanitation.

Problem Statement

Out of Ghana's population of 24.2 million, 4.8 million have no latrines and defecate in the open whilst 16 million use unsanitary or shared latrines (WSP, 2011). Open defaecation alone contributes about 20% of sanitation problems in Ghana (World Bank's Joint Monitoring Program, 2010). Faecal matter contamination of the environment has been implicated to be the root cause of an annual average of 1,800 cases of cholera affecting children aged less than 5 years in Ghana (WHO, 2005-2009). Childhood diarrhoea contributes to stunting, wasting and reduced long-term cognitive development of children. Aside this, 16 million cases of typhoid fever occur annually, causing 600,000 deaths (WHO, 2004). Also, close to 14,000 to 30,000, children die every day from preventable cholera, dysentery, and typhoid infections (Aforo, 2006 & Gobah,

2005). All these indebts Ghana 420 million Ghana Cedis each year, a sum equivalent to 1.6% of the national GDP of 39.2 (WSP, 2012). This hugely compromises Ghana's effort towards achievement of the MDGs 7 target (UNDP, 2007/2008). If Ghana is to attain the 2015 MDGs on sanitation, there is the urgent need to effect attitudinal and behavioural change in the people through extensive educational and awareness creation programmes of maintaining healthy lifestyles and good sanitary conditions.

This is a descriptive desk review study of facts from the relevant literature sources including 2010 PHC, which is the fifth and recent census conducted in Ghana since independence. Since the MDG 7 target was set in 2000, data from post-independence censuses conducted in 1960, 1970, 1984 and 2000 were also used so as to provide empirical basis for comparison with the information obtained from the 2010 census. To complement these data sources and advance comprehensive arguments, data from World Bank and IMF global monitoring reports on the MDGs, Africa MDG reports, and various Ghana MDG reports produced by the NDPC, UNDP, WSP, Planned Ghana and Water Aid. Literature from International Journals and website were included. These published literature and documents sources were searched in a systematic way using electronic and non-electronic database and a range of key words relating to sanitation and its impacts. All these were analyzed and described.

Ethical Review

Ethical approval was obtained from the Ethical Review Board of Ghana Health Service through the University of Ghana Institute of Environmental and Sanitation Studies. Approval was obtained from the Municipal Director of Health services. We begin this review by considering Ghana's the basic sanitation policy.

Literature review

Basic sanitation policy in Ghana

Today's challenges facing Ghana's effort at meeting the Millennium Development Goal 7C target on sanitation are huge and require urgent

multi-stakeholder action plan to address them. At the present snail pace of increase in the use of improved sanitation, the number of Ghanaian who would be without improved toilet facilities by 2015 will stand at 18.7 million. Ghana therefore needs to improve on its strategies to expedite the progress towards MDG 7, particularly sanitation. Ghana, like any other countries, has well defined environmental sanitation policy which ensures that its environment is clean and safe for every Ghanaian. Since May 1999 the Ministry of Local Government and Rural Development has published the National Environmental Sanitation Policy. This policy considered the basic principles of environmental sanitation, problems and challenges. The Ministry of Local Government and Rural Development (MLGRD) in reference to the National Sanitation Policy also developed technical guideline documents which are implemented by the Metropolitan, Municipal and District Assemblies (MMDAs). All MMDAs have developed waste management and environmental health plans to help address the numerous sanitation challenges. The national laws, specifically the Criminal Code (**Act 29**), 1960, and Revised Bye-laws of all the 110 MMDA's have enough laws to support the Environmental Sanitation Service delivery and enforce the compliance of sanitation rules and regulations. Ghana's sanitation policies appear well developed on paper yet sanitation coverage is clearly inadequate. Today, these laws are not deterrent enough and logistical problems make MMDA's ineffective in ensuring clean, safe and healthy environment. The Environmental Health and Sanitation Unit of the Policy Division of the MLGRD have been mandated to ensuring safe, clean and healthy human settlements throughout the country. Today, the basic sanitation constraints militating against provision of good and sustainable sanitation are the lack of funding, education, water, proper planning, rural and urban communities' unwillingness to incur cost, and lack of adequate funds to pay for user systems.

These have led to the continued spread of sanitation related diseases including malaria, cholera, typhoid, worms' infestation and high incidence of diarrhoea affecting mainly children. Thus we consider the issues surrounding sanitation in the Aburi community.

Policy Framework on Provision of Toilet Facility Country-Wide

In what follows, we discussed policy framework on provision of country-wide improved toilet facilities. The first project considered is the Northern Region Small Towns Sanitation Project. This is a seven year (2008-2015) CIDA supported project that is aimed at providing increased access to sanitation services for 30 selected small towns in the Northern Region. CIDA provided the budget in support of the project (CWSA Annual Report (2009). Next is the Peri-urban, rural and small towns sanitation project in the Brong Ahafo Region. This is four year project spanned between 2008-2012 and being implemented in 22 Districts in the Brong Ahafo Region. The component is aimed at improving sanitation through the construction of 3,000 household latrines and 100 institutional latrines basically for schools and health clinics. The funding was secured by the Government of Ghana from Agence Française Développement (AFD) (CWSA Annual Report, 2009). Another project aims at improving sanitation in selected communities in six (6) districts in the Ashanti Region is rural sanitation initiative financed by African Development Bank (AfDB). About 436,000 Ghanaian are to be provided with improved sanitation facilities at the end of project implementation (CWSA Annual Report. (2009). The Community Led Total Sanitation (CLTS) programmes have been implemented in five regions namely Central, Northern, Upper East, Upper West and Volta. It is expected that 1,500 open defecation free communities will be achieved by December 2012 (MLGRD, 2012).

Challenges: Budget Constraints

The key sources of sector financing include tariffs, government budget allocations, private sector investments and donor contributions. CWSA has not received the full complement of its annual budget either from government or its development partners over the years. In the case of government there has been little or no contribution to the investment budget, and funds for administrative expenses have always been cut back by more than half (CWSA Annual Report (2009).

Limited Capacity at District Assembly Level

Limited Capacity at District Assembly Level for Sanitation Delivery. The capacity of the districts to effectively manage sanitation projects under their jurisdiction is still a challenge. Apart from the fact that the proposed Works Departments are not established in many District Assemblies, the rampant transfer of trained staff on specific sanitation projects also immensely undermines the capacity of the District Assemblies (CWSA Annual Report (2009).

There is the need for the District Assembly to develop effective monitoring and evaluation tools on the monitoring of the fecal matter disposal services in the community. Facilitating the rolling out of Community Led Total Sanitation (CLTS) concept in the community to increase access to sanitation is relevant.

Achievements within the Period Specifies

Despite numerous constraints faced by the CWSA in the planning and implementation of these sanitation projects, the total number of sanitation facilities provided country wide rose from 8,076 to 64,854 between 1999 and 2009. Most significant was the rise in the number of household latrines from 7,666 to 61,384. The increase in the number of institutional latrines was equally significant, rising from 410 in 1999 to 3,470 in 2009 (CWSA Annual Report 2009).

Human Excreta Management in the Aburi Community

Aburi is home toThousands Ghanaian residents. The types of toilet facility used in the town are public KVIP and Pit Latrines with few Water Closets in some selected households. The town is divided into four sections namely, Domiabra to the north, Esuafum to the west and Jamaicaso and Kem to the east and south respectively. Each division has at least one public KVIP with some households having pit latrines. Considering the population of the community, public toilet facilities in the community are often not enough for containment of fecal matter generated by inhabitants daily. As a result, it is not uncommon to see fecal matter on toilets floor.

Also, the poor maintenance of the KVIP results in persistent open air defecation. Community members who stay far from the public toilets practice open air defecation. A little over half of the households in the communities access public toilets on pay per use basis whilst few households having private latrines. Majority of the privately owned toilets (pit latrines) were however shared between two or more households. Bucket/pan latrines are sparingly used in the entire community. Lack of space to construct new toilets when old pits get filled is a major challenge to private households that own toilets in the community. The absence of private pit latrines in most households is mainly attributed to high premium on use of private toilets by household landlords. This situation has led to high incidence of open defecation in drains, bushes, refuse dump sites, and football fields as well as any obscured environment. The community is without flying toilets. People living close to poor drainage sites practice this primitive form of fecal disposal method. Indiscriminate disposal of children's faeces on open plots, gutters and dump sites are common practices of the people. This can serve as potential source of contamination of the community's drinking water sources via runoff and/or infiltration. The most challenging problem in most households in the Aburi community is the final disposal of faecal sludge. Households could not provide adequate facilities for safe disposal of the faecal matter. This has resulted in indiscriminate disposal of faecal sludge into open drains, gutters, refuse dumps and any open space. This situation has made parts of the community, particularly the outskirts very filthy. Burying the fecal sludge close to the latrine is common practice among the most households with pit latrines in the community. Though this is preferred to open air defecation, the technology is limited by availability of space and the depth of the groundwater table, as groundwater can be contaminated. Safe disposal of human excreta is therefore essential for human health protections and wellbeing. Efficient excreta management provides significant reductions in diarrhoeal disease (Esrey et al., 1991; Esrey, 1996). Provision of appropriate fecal matter disposal technology is one of a number of emergency responses essential for people's dignity, safety, health and well-being in the Aburi community.

Today, the faecal matter management options available in the Aburi community are collection, transport, and disposal. Fecal treatment is virtually absent. These management practices are carried out either on-site or off-site depending on the faecal matter containment involved. The main sanitation facilities used in the faecal matter containment by the individuals and the District Assembly are pit latrines and KVIP respectively. Bucket latrines, Toilet connected to a septic tank, WC and Aqua Privy are used in some selected affluent households. Both basic and second cycle institutions in the community use KVIP as the main faecal matter containment technology. Faecal matter from these collection points is disposed off at unauthorized sites such as bush, drains, or refuse dumps in the community has not landfill sites. This poses health hazards to the inhabitants from direct contact with the excreta. They also serve as breeding grounds for house flies as excreta are often spilled when it is being removed or conveyed to disposal sites. A vacuum tanker provided by the District Assembly is responsible for the conveyance of the excreta to the disposal sites. There are technical limitations, however, to the use of the vacuum tanker. These include inadequate road access to the collection points (households with toilets), frequent breakdown of the vacuum tanker due to overuse, shortage of spare parts and lack of funds to purchase fuel. Manual emptying is therefore common in many parts of the community due to lack of accessibility. Large vacuum tankers are simply unable to traverse the narrow paths in the community due to unplanned settlements. Manual emptying generally involves accessing the pit, which in some cases done by destroying the squatting slab and digging the sludge out with simple hand tools such as spades, shovels and buckets by a team of workers for fees. Liquid sludge is scooped out using buckets and rope (Eales, 2005). Emptying pit latrines is therefore a major problem in the community. Irregular evacuation of the faecal sludge to disposal points has also compounded the management problems in the community. Increasing population, lack of appropriate and sustainable technological options and meager resources available to District Assembly to deal with the situation has been identified as the main management challenges and constraints. In addition to these problems, the

vacuum tankers are expensive to purchase and maintain and can lead to large tariffs for the owners that they cannot pay. According to Boots (2006), this often leads to the operator practicing indiscriminate dumping to cut their costs. According to Strauss et al (2006), if one vacuum truck indiscriminately dumps faecal sludge into the environment it is comparable to 5,000 people defecating openly. The human and environmental health impacts of this are hugely dependent on the location. Another challenge that hinders effective and efficient faecal matter management in the community is finance. Though the government has well defined sanitation policy direction, this however, is not supported with adequate budgetary allocation. As a result, effective implementation and evaluation of sanitation intervention programmes are haphazardly executed. As a result, the provision of sanitation facilities by the District Assembly could not keep pace with increasing population. The same reason explains the management challenges faced in the collection, transports and disposal of community excreta. The impact of indiscriminate fecal matter disposal on the individuals and the community at large continues to mount as population increases and urbanization expanded. Having considered the issues surrounding community's fecal matter management, we turn our attention to the impacts and health implications associated with the management process.

Health implications

Diseases related to indiscriminate fecal matter disposal are some of the most common causes of illness and death among the poor of developing countries. Amongst the fecal-oral diseases are cholera, diarrhoea, typhoid fever hepatitis, and intestinal helminths (Billig et al., 1999). According to the World Health Organization (W.H.O. 2011) diarrheal disease accounts for an estimated 4.1% of the total daily global burden of

disease and is responsible for the deaths of 1.8 million people every year. An estimated 50% of cases associated with underweight or malnutrition in children are repeated diarrhoea or intestinal nematode infections (Zarocostas, 2008). Repeat bouts of diarrhoea before age one contributes to vitamin deficiency and malnutrition. Children

who suffer constant fecal-related illness carry the disadvantage into school. These disadvantages include absenteeism, attention deficits and early dropout. According to the human development report (2006), children who suffer repeated bouts of infectious disease, particularly diarrhoea are likely to reach adolescence and adulthood with reduced height and mental retardation.

Disease Profile of the Aburi Community

Table 1 annex shows the disease profile of Aburi communities. The records captured were limited to chart audit of those who sought help from the community's Health Clinics. The audit included all patients seen more than once from January 2003 through August 2007. The audit focused on common fecal-oral disease indicators: diarrhea, nausea and vomiting, gastroenteritis, intestinal or abdominal pain and bloody stools and fever, all of an unknown origin. The figures may be more because a large proportion of the population has no access to the medical facilities due to poverty and economic constraints. The information gathered from review of the social survey indicated that the income levels of the people were far below the poverty line (US\$ 1). The data indicates that the major fecal related diseases affecting the people in the community are Cholera, *Diarrhoea, Typhoid, Hepatitis and RTI. Besides these fecal related diseases, malaria is also prevalent on the clinical record of the community. Over 92% of the clinical cases reported are malaria. Typhoid fever follows with 2.3% and Respiratory Tract Infection (RTI) 2.2%. Between 2003 and 2004, malaria cases increased from 373 to 1067. In 2005, the records indicates a rise in the number of Malaria cases from 712 to 2554 in 2006 and finally increased to 2682 in 2007(Kom Clinic, 2007). This situation could be due to the persistent inability to reach all the susceptible populations in the community with the treated mosquito nets. The occurrence of these diseases is generally due to poor drinking waterquality coupled with indiscriminate fecal matter disposal. The vectors (female anopheles mosquitoes) that carry the *Plasmodium* parasite, which causes malaria, thrive in the warm climates of the tropics and increased temperatures conceivably, provide a habitat suitable for the increased distribution of these anopheles vectors

(Armelagos, 1996). Typhoid fever, also known as enteric fever, is a systemic infection by *Salmonella typhi* or by the related but less virulent *Salmonella paratyphoid*. Typhoid and paratyphoid germs are passed in infected person's feces and urine. People become infected after eating or drinking beverages that have been handled by a person who is infected or by drinking water that has been contaminated by sewage containing the bacteria (Freebase 2011; W.H.O. 2011). According to Ackers *et al.*, (2000) *Salmonella* has mechanisms against acidic environments, but a pH level of 1.5 or less kills most of the bacilli. Looking at the mean pH of the water used by the community (well: pH= 4.3; and spring: 4.4) (Adjibolosoo, 2007), *Salmonella* could survive. *Salmonella* contamination of aquatic environment induces an increased public health risk where it is used as a source of potable water. Infection results from the ingestion of fecal contaminated food or water causes the bacteria to invade the small intestine (Adams, 1995). Literature reviewed shows that over 48% of the residents use the bush, drains and refuse dumps as defecation points or places of convenience. The direct result of this is the introduction of faecal bacteria into the community drinking water sources. The public health consequences of consumption of fecal contaminated water could be severe both in relation to endemic and epidemic diseases (Pedley and Howard, 1997). The major treat at present to water quality is improper faecal matter disposal. Human faeces contaminate water supplies and trigger variety of diseases of microbial nature. These diseases are therefore endemic in areas where human excreta disposal is haphazard and forming an important part of the sanitation-related disease category. The high incidence of typhoid fever cases on clinical recorded of community is attributed to impact of indiscriminate faecal matter disposal system practiced in the community. According to Bruen *et al* (2001) human activities contribute a significant microbial load of community water resources. These observations imply that typhoid fever prevalence in Aburi community is indeed uninhibited. Cholera is caused by the bacterium *Vibrio cholerae*. People become infected after eating food or drinking water that has been contaminated with feces of infected persons. Diarrhea is a symptom of infection caused by a

host of bacterial, viral and parasitic organisms most of which can be spread by contaminated water. It is more common when there is a shortage of clean water for drinking, cooking and cleaning and basic hygiene is important in prevention. Hepatitis A and E viruses, while unrelated to one another, are both transmitted via the faecal-oral route, most often through contaminated water and from person to person. Indiscriminate disposal of fecal matter in choked gutters, pools of waste water behind detached bathhouses, accumulation of water in discarded empty cans were added factors responsible for the high incidence of malaria cases in the community. The low income level of the people could also be a contributing factor to the increased malaria cases recorded in community. As a result of the low income levels of the inhabitants might have also contributed to their inability to afford the Ministry of Health's treated mosquito nets to prevent themselves from mosquito bites.

Sustainable Faecal Matter Management in Aburi Community: The Way Forwards

Over the years, sanitation continues to pose a serious challenge to the community. Poor sanitation costs the community about GHC..... million per year according to Akuapem South District Assembly (...). Hence the policy that every household should have descent toilet facility to promote safe faecal matter containment is laudable and in the right direction. When people have adequate, appropriate and acceptable toilet facilities, sufficiently close to their households, to allow rapid, safe and secure access at all times, day and night, it does not only enhances safe disposal of human excreta and creates the first barrier to excreta-related disease but it also helps to reduce direct disease transmission. There is also the need to establish biogas production plant in the community to process the faecal matter into biogas for use as domestic energy sources. Encouraging the production and usage of biogas in the community can go a long way to curb down the faecal matter disposal management challenges currently facing the community. Since the connection between the latrines and the digester requires no contact with the faecal matter, bypassing any taboos, household biogas generators is hugely

recommended for the community. The District Assembly can assist the households to develop and embraced the technology. When the technology is accepted by the people, it will not only reduce the overdependence on electricity, but it will also cut down the persistent breakdown of the community's transformers due to overloading. It will also provide source of energy to power hair driers, sewing machines and barbering devices such as sterilizers and barbering devices. Scaling up this technology throughout the community will put value to the human faeces thus reducing indiscriminate disposal and keeping the community free of filth. Another benefit that can be realized from this technology is the reduction in the evacuation of the faecal sludge by vacuum tankers. The problems associated with the use of vacuum tankers ranging from frequent breakdown, technical limitations such as inadequate road access, to shortage of spare parts will also reduced.

Another challenge that hinders effective and efficient management of faecal matter generated in the community is finance. The sanitation unit of the district assembly, in most cases is unable to influence decision at the Assembly level in terms of budget allocation and in most cases they lack the capacity to enforce sanitation bye-laws. There is the need for the District Assembly to increase budgetary allocation for its sanitation unit. The main sources of funding for environmental sanitation services are from the national budgetary allocation in the form of District Assemblies Common Fund and bi-lateral and multilateral donor support from World Bank. The District Assembly is expected to use this fund and in addition to a sizeable portion of their locally generated revenue to manage waste generated in their areas of jurisdiction. To ensure that these funds are used for its intended purpose, there should be external independent body made up of opinion leaders and representative from regional, metropolitan and municipal Departments to supervise its disbursement and do follow-up to ensure that the fund is used well. District Assemblies have enough laws to support the environmental sanitation service delivery and enforce the compliance of sanitation rules to ensure clean, safe and healthy environment. Looking at the attitudinal characteristics of

inhabitants of Aburi community towards sanitation, particularly faecal matter disposal, the enforcement of the sanitation by-laws by the District Assembly, however, are not deterrent enough to change their attitudes. To make the District Assembly effective and efficient in its operations, there is urgent need to increase the fines and penalties pay by those who go against the sanitation by-laws. Aside this, there is also the need to establish sanitation courts in district to handle sanitation related cases. Furthermore, there is the need to resource the Environmental Sanitation Division of the District Assembly with qualified sanitary engineers, environmental health technologists, environmental health officers and environmental health assistants as well as modern logistics. Regular refresher training of these officers can also go a long way to assist them update their knowledge on innovative ways of handling not only sanitation problems but also in areas like environmental health inspections, prosecutions, excreta management, information management and report writing. Innovate ideas into the community's sanitation management process by these health officers should form an integral components of their promotion. There is also the need to form community sanitation clubs resourced by the District Assembly to lead the crude against poor environmental sanitation, particularly open defecation. Finally, there is the urgent need to effect attitudinal and behavioural change in the people through extensive educational and awareness creation programmes of maintaining healthy lifestyles and good sanitary conditions. This education should target the youth and school children in particular and the queen mothers, opinion leaders and market women/traders and traditional authorities in the community in general.

Conclusion

The review looked at the existing latrine technologies and management practices being used by the inhabitants within the Aburi community in terms of their human excreta management, evaluating the performance of these technologies and management practice identified and taking a critical look at the factors affecting the performance of these technology and management practices leading to the low level of

sanitation within the study area. The review shows that several factors are contributing to the indiscriminate disposal of fecal matter in the Aburi community. Among these are lack of adequate toilet facilities in the community; payment of latrine user fees; attitudinal problems; difficulty in accessing community toilet facility due to distance; shared latrines among households; absent of toilet in some households; lack of space within households to construct new toilet when the old one get filled. For Ghana to achieve the MDGs target 7 on sanitation, urgent steps must be taken to shift people from open defecation to hygiene latrine use in every households within the country. Even though access to improve sanitation has been increasing over the years, Ghana is unlikely to achieve the MDG 7 target for sanitation. Efforts should be accelerated by the District Assembly to quicken the pace of policy implementation rolled out to improve the situation. There is also the urgent need to effect attitudinal and behavioural change in the people through extensive educational and awareness creation programmes of maintaining healthy lifestyles and good sanitary conditions. Massive local media campaigns that borders on the benefits obtained from acceptable sanitation and hygienic practices should be embarked upon by the District Assembly.

Recommendation

In what follows, we discuss some recommendation needed to improve management of fecal matter disposal in the Aburi community to lessen any future negative health impacts on the inhabitants. First, the existing public toilet facilities in deplorable states should be renovated and put into good shape. This can attract non-latrine users to patronize the facility. There is also

the need to construct new and modern public toilet facilities to consolidate and supplement the existing ones. These toilet facilities should be strategically located to benefit all in terms of distance one has to travel to use the facility. Also, there is the need to face out the public latrine user fees to make the facilities accessible to the larger community members. A permanent attendant reduces the chances of vandalism and prevents the toilet facility becoming fouled and a health

hazards. It is recommended that the public toilets attendant be given some education on the use of the KVIP and the general populace also educated on the need for good sanitation practices. Efforts should be made to make the public latrines user friendly for the general public, particularly children, physically challenged and the . With regard to the absence of open access for the installation of more sanitation facilities within households, communal latrines should be installed and managed by private operators under the auspices of the District Assembly. Again, there is the need for the District Assembly to enforce the existing sanitation by-laws. For example the law must make it mandatory that every household in the community have decent and safe latrine which are accessible not only to the landlords and family but to all tenants. This, however, requires strong political actions from the District Assembly. The District Assembly has enough laws to support this course. Furthermore, to make the District Assembly effective and efficient in its operations, there is the need to increase the fines and penalties pay by those who go against the sanitation by-laws. Establishing sanitation court in the community to deal with sanitation related offences can also go a long way to complement the District Assembly efforts in ensuring that the community is clean and safe from fifth and diseases. This court should, however be manned by an independent adjudicator to avoid favoritism in arbitrations. Furthermore, there is the need to resource the Environmental Sanitation Division of the District Assembly with qualified sanitary engineers, environmental health technologists, environmental health officers and environmental health assistants as well as modern logistics. Regular refresher training of these officers can also go a long way to assist them update their knowledge on innovative ways of handling not only sanitation problems but also in areas like environmental health inspections, prosecutions, excreta management, information management and report writing. To encourage these officers to be proactive and innovative, their promotions should be based on ability to bring innovate ideas into the community's sanitation management process. More so, there is also the need for the district assembly to encourage collaborative and network relationship between disease surveillance professionals in the District Health

Administration and Environmental Health Officers in the districts. Through these networking they can share resources, skills and experiences on good primary practices on health issues and better working relationships. Educating the community members on the need to keep their surrounding clean and also to desist from indiscriminate fecal matter disposal must constitute an integral part of the district assembly's effort to ensure clean community. Another way to promote and encourage clean community is to form community sanitation clubs resourced by the District Assembly. The activity of these clubs is to lead the crusade against poor environmental sanitation, particularly open defecation within the community. District Assembly can also encourage formations of household sanitation vigilant groups that will help ensure adherence to appropriate sanitation codes of behaviour and practices among the youth. Regular monitoring of activities of these groups and visit to individual households to inspect environmental hygiene practices and give recommendations should form an integral part of the District Assembly's sanitation programme. Establishing community and households' sanitation fund to be run by the District Assembly can also contribute to ensuring safe sanitation practices by making funds available for sanitation purposes. From a public health perspective, however, sanitation infrastructure should in our opinion receive more attention, as the private health benefits to sanitation seem to be at least equal to the benefits of improved fecal matter disposal. The health sector has a powerful motivation for improving sanitation and much strength to contribute to achieving this goal. When doctors speak out on health issues including sanitation, politician and the general public listen to them. They should therefore be

involved in establishing clear institutional responsibility and specific budget lines for sanitation. Finally, there is the need to increase the lateral separation between fecal pollution sources in the community and sources of community water supplies to reduce the risk of faecal pollution.

Competing Interests

The authors declared that no competing interests exist.

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