
Water and Sanitation Services in Informal Urban Settlements and their Implications to Peoples Health in Tandale, Dar es Salaam Tanzania

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ABSTRACT

The alarming growth of informal settlements in Tanzania is bringing with it multifaceted impacts. Health problems are the most felt among others. The study aimed at establishing how residences in informal settlement access sanitation and water service, and the prevalence of water borne diseases due to informal settlement and the public health consequences of this. The study employed both qualitative and quantitative approaches informed by case study design in which Tandale ward from Dar es Salaam Region were used. The study administered closed and open ended questionnaires were administered whereas interview was employed to the selected key informants. The study found that residents do not access clean water and sanitation in which poverty were attested to a major cause for the problem. Also, disposal and collection of wastes is seldom undertaken due to high cost of the service. Moreover, households lack permanent areas for the collection of wastes materials due to overpopulation. It was found that Tandale is worst hit with diseases caused by unsanitary environment and poor water provision. Respondents mentioned diseases like diarrhea, cholera, worms, malaria, schistosomiasis and typhoid that have even led to incidences of death especially among children under 5 years. The study concluded that health problems affecting people living in informal settlements are real and that people are really suffering. However, such situation can be averted if the government works together with all stakeholders to get rid of the problem.

Keywords: Water and Sanitation, Informal urban settlement, people's health.

BACKGROUND

Developing countries have, in recent decades been characterized by escalating burden of diseases. Communicable diseases that are associated with unprecedented growth of informal settlements are on the lead. Sub Saharan Africa, for instance accounts for 70% of the burden of ill health in contrast to 10% in industrialized countries (WHO, 2002). While nearly one billion people worldwide live in poor and overcrowded informal settlements (Barten, 2011), Sub Saharan Africa account for 75% of the world's urban poverty with the highest estimated percentage (71.9%) of the urban population classified as informal settlers (David *et al*, 2007). Living in inadequate shelter and poor environment which features informal settlements is known to be a major cause of ill health (Sakijege *et al*, 2012). Most of common diseases afflicting living in informal settlement include diarrhea, malaria, acute respiratory infections such as pneumonia, cholera, dysentery, intestinal worms and tuberculosis and bilharzias (Wokekoro and Inyang, 2014).

Proliferation of informal settlements in developing countries is a result of rapid urbanization. In Africa, for instance, Jakhanwal (2001) contends that urbanization occurred amidst economic liberalization, structural adjustment programs, and abolition of subsidies, retrenchment and cost-recovery plans that were necessitated by poor economic performance. Demographic and Health Surveys (DHS) indicate that the urban poor in sub-Saharan Africa have less access to health services,

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and consequently exhibit higher mortality rates than residents from other population sub-groups including rural residents (Essential, *et al*, 2009). In Tanzania, the urban population grows at an average of 6 % per annum, twice that of the national average (WB, 2002). Due to increasing levels of poverty, population growth and lack of sustainable housing policy, urban growth is absorbed into informal settlements (Young and Flacke, 2010).

Compared with rural areas, informal settlement is more pronounced in urban areas where the rate of urbanization is very high (Cohen, 2006; Roy, 2005). In Kigali, for instance, much of the urban growth has taken place in unplanned settlements that now accommodate 62% of the population (Tsinda *et al*, 2013). In Kenya, by the year 2000 one-third of the population (33.4%) was living in the country's towns and cities making Nairobi home to 2.2 million in 2000, a figure which was likely to grow to 3.5 million by 2010 (Kuria, 2005). According to the World Bank (2006) over two-thirds of the population of Lagos in Nigeria lives in the informal settlements or slums that are scattered around the city. The Lagos Master Plan 1980-2000 identified and classified 42 slums or informal settlements in the city. Tanzania exhibits similar characteristics when it comes to urbanization and informal settlements. It is posited that the proportion of those urban population living in informal settlement ranges from 50% - 80% (Kombe, 2005). In Dar es Salaam, estimates show that approximately 70% of the population lives in informally developed settlements (Kombe and Kreibich, 2006; Lupala, 2002). Again by 2010, when the city of Dar es Salaam was estimated to be inhabited by four million people nearly 3.2 million of the population lived in informal settlements which have limited access to basic infrastructure services such as water supply, sewerage and storm water drainage systems (Sakijege *et al*, 2012).

Common features that accompany informal settlement according to Sakijege *et al* (2012) include lack of access to improved water, access to sanitation, durable housing, and sufficient living area and secure tenure. Keiser *et al*, (2004) add that unplanned settlements are characterized by a lack of sanitation and drinking water, precarious housing, overcrowding, unpaved roads, inexistence of solid waste disposal and ditches with stagnant water. Thus, people living in such unhygienic environment suffer high levels of morbidity and mortality (Nyamongo and Taffa, 2004). Poor sanitation and hygiene that breeds diarrhea is said to be the leading cause of child morbidity and mortality in the world resulting in the death of 1.5 million children a year (Bartram and Cairncross 2010). This is not to speak millions of children who are left physically and mentally impaired, underweight and vulnerable to diseases as a result of poor health and sanitation (Bartlett 2003). Nyamongo and Taffa (2004) identified respiratory infections (pneumonia, coughing and flue), Diarrhea (including vomiting and stomach problems, Malaria, Malnutrition (including kwashiorkor and marasmus, and skin problems (including scabies and ringworms) as five most common childhood illnesses among children living in Nairobi informal settlements.

Worryingly, over the past two decades, provision of improved sanitation has barely kept pace with increasing populations while most other social services, including water supply, have outpaced population growth (Mara, *et al*, 2010). Political, economic, ecological and social instabilities are said to hamper effective solution to informal settlement problems. International efforts are not well targeted. For example' from 2000 to 2005 only 6% of the World Bank sanitation related commitment went to slums, while formal urban areas received 65% (Kolsky, 2005). The same story surfaces national governments in developing countries, whose efforts to ensure better infrastructure in informal settlement is highly questionable (Sincak *et al*, 2014).

While failure to control health risks caused by informal settlement by developing countries is reaffirmed, the most pressing problems is for some areas in the urban areas like Tandale in Dar es Salaam that exhibit the worst hit over the health risk caused by informal settlements. This paper attempts therefore to unveil, among others, the level of sanitation and water services provision and the challenges thereof for urban residents Tandale. Again the paper underscores the health effects of informal settlement at Tandale and the coping strategies that Tandale residents have put in place so as to stay safe from the health hazard of water borne diseases.

MATERIALS AND METHOD

Mixed method approach that integrated qualitative and quantitative data was used in this study. This approach were employed as allowed the researchers to view problems from a multiple perspectives, contextualize information, develops a more complete understanding of a problem, triangulates results along with outcome and enabled capturing a macro picture of a system (Creswell and Plano Clark, 2010). Two streets i.e. Tandale Uzuri and Chakula Bora from tandale ward in Kinondoni district were selected purposively since it is one of the areas that face high proliferation of high population density and high informal settlement. Tandale is an administrative ward in Kinondoni Municipality that encompasses a large number of unplanned settlements (Dodman *et al*, 2011). The spatial population distribution (based on 2002 census data report) shows that in the city of Dar es Salaam, the unplanned settlement is concentrated mainly in the Kinondoni district where Tandale ward (in the Kindoni district) has the highest inland population density of more than 42,000 people (Kibede & Nicholls, 2011). The Tanzania census of 2012 also indicates that the population density at Tandale is 54,781 (URT, 2013). Given its location and man-made activities Tandale ward is said to have large flood prone to flood areas such that some houses have been abandoned due to flood (Dodman *et al*, 2011)

Data Collection Technique

For the sake of triangulation and complementary purpose, a combination of methods was used to collect data, thus secondary and primary data were gathered. Primary data were obtained using questionnaires and interview. Questionnaire technique employed logical and systematic questions containing both open ended and closed-ended questions that ensured that correct quantifiable numerical information is obtained. A sample of 100 respondents were obtained through random sampling in which closed ended questions needed the respondents to answer from the pre-determined answers given hence chose the best answers while the open ended questions required the respondents to answer in any length as they wished. Qualitative data were collected through interview in which key informants were identified including Hamlet chairs of the two streets and from ward development committee. Three members were selected and interviewed. The researcher met face to face with respondents at their working stations or at their residential areas. This method guaranteed both the interviewer and interviewee an opportunity to talk freely in the breadth and depth of the subject for 45 minutes to 1 hour

Data Analysis

Processing and analysis of data was done in accordance with the nature of the collected data. Hence qualitative and quantitative data analysis was employed. Computer data analysis software was used to analyze quantitative data through Statistical Package for Social Sciences (SPSS). Microsoft excel was used to make graphical and figure presentation of the analysis for illustrations while tables were constructed using Microsoft word. Data that were analysed qualitatively included those from interview, documentary review were subjected to content analysis. These were organized into manageable units which were coded, summarized and placed into key themes in form of statements. Those themes were arranged in accordance with informant’s responses and across set objectives.

RESULT AND DISCUSSION

Sanitation Services and the Availability of Toilets among Residents at Tandale Ward

In many informal urban settlements pit latrines and buckets are still in use, often shared by many families. People commonly defecate and urinate in the open or in nearby bushes, hence food and water can be easily contaminated from exposure to human waste (Nwaka, 2005). The findings obtained from Tandale findings revealed that there were three different categories of toilets, namely water closets, improved pit latrines and pit latrines. The findings show that 40% had improved pit latrines, 53% had pit latrines and 7% had water closets in their homes. The different toilet types owned by these respondents shows the differences in economic levels since building and maintaining an improved toilet demands money that most cannot afford. Most of the respondents cannot own

Said Nuhu & Chakupewa Joseph Mpambije “Water and Sanitation Services in Informal Urban Settlements and their Implications to Peoples Health in Tandale, Dar es Salaam Tanzania”

water closets since they are too expensive and require a sewerage system that is connected to the respondents' households that are planned. Informants confirmed that they could not afford water and sanitation services that were provided. They cited poverty as the reason for failure to afford such services like buying charcoal for treatment of water. Wegelin-Schuringa and Kodo (1997) argued that tenants are poor, to a large extent, transient and not willing to make investments in latrine construction. The sustainability of the public latrines depends on the technical system selected but their success is more critically determined by the approach taken for managing their operation and maintenance.

Accessibility to Water Services Provision at Tandale Ward

There are two providers of water services in Tandale Ward: the government and private sectors. The government is supposed to be the main provider of water to the community. The study found that there were taps that were built in the households but only gave out water once or twice a week. Few households had working taps. These households are the ones that have turned into a business where they sell water to the other neighbors. The amounts usually range from Tsh 200 (\$12 cent) for a 20 litre bucket and 100 (\$6 cent) shillings for a 10 bucket. However these taps do not give out water daily but it is below 4 days in a week. Hence if a household has no water they have to resort to other means of getting water for their families. In the low income communities, living in the peri urban areas the communities used to get water from various unreliable, contaminated open water sources; others from vendors at very high costs (UNCHS, 2008). Table1 shows different sources used by Tandale ward residents to get water.

Table1. Sources of Drinking Water for the people in Tandale Ward

Sources of Drinking Water	Distribution of Percentage
buying from neighbor	49
tapes outside the house	31
lorries that supply water	8
rain water	6
Well	3
taps inside the house	2
buying from street vendors	1
Total	100

Source: Field Data, 2013

Table (1) above shows that in Tandale ward, the major source of drinking water to most of the households (49%) is buying from the neighbors. This is due to the fact that most of the taps that the household own are dry. About 31% of the respondents reported that they get drinking water from taps that are outside their houses and that though reduces costs but sometimes they get very dirty water. The study also found that 8% depends on lorries that supply drinking water but the problem with this source is that it is costly. Whereas 6% of the residents depend on rain water; to them when it rains it becomes a celebration as they get free water. The remaining 2% of the residents depend on taps inside their houses, wells and buying from street vendors. Many residents, however, are not comfortable with street vendors since places where they get water is not known such that possibility of supplying contaminated water is high. In most cases, vendors supplied water get colored and if left for a long period of time black tiny worms that can be seen in the water hence can be hazardous to human health. Batram (2002) argues that, colored water indicates the presence of contaminants, which could be potentially fatal if consumed by human beings.

Capacity of Disposal and Collection of Solid Wastes in the Informal Settlement

The study found that the government has a responsibility to collect and disposal of wastes. When asked how frequent these wastes were collected and disposed 51% reported that they were seldom collected, 42% respondents said that the government always gives high priority in collecting and disposing wastes and 7% of respondents indicated that payments were done to the private providers to

Said Nuhu & Chakupewa Joseph Mpambije “Water and Sanitation Services in Informal Urban Settlements and their Implications to Peoples Health in Tandale, Dar es Salaam Tanzania”

collect and dispose the solid wastes. This means that most of the community members depend on the government to take care of the solid waste disposal since to them it is cheaper than to pay the private dealers. When asked if the town council is responsible for the collection of solid wastes, 76% of respondents confirmed that it was playing its vital role while 24% of them reported that the town councils are not responsible for the collection of solid wastes. The system is almost always overloaded, and large volumes of rubbish are left to litter the streets, or to accumulate in open dumps where flies, rats and other disease-carrying insects and rodents proliferate (Ambaye, 2011). Table 1 below depicts the distribution of collection and disposal of solid wastes in percentages.

Table2. *Collection and Disposal of Solid Wastes in Percentages*

Disposal of Waste	Distribution of Percentage
often collected by government	36
seldom collected by government	51
payment of lorries to collect	13
Total	108%

Source: *Data Field, 2013*

Table 2 shows that the government is not fully responsible for the collection of these wastes. About 51% of the respondents reported that the government seldom collects the wastes and about 7% of respondents said that private providers are the ones who provide for these services that hence added up it is 58% of respondents that go against the responsibility of the government to these areas. The researcher also witnessed a lot of garbage being piled up in the households and the roadsides because of the inadequate collection of solid wastes; hence the sanitary conditions become poor.

Challenges in Accessing Water and Sanitation Services

The study wanted to find out about the challenges that people face when it comes to water and sanitation services in their areas. The respondents were seen to be very agitated because this seemed to be a big problem for them. The respondents were angry, unhappy and remorseful about the subject. The campaign for waste minimization and recycling has not advanced beyond the dangerous practice of picking and sorting through heaps of rubbish or moving from house to house to collect tin cans, plastics, empty bottles, paper, and discarded materials for possible recycling (Nwaka, 2005). Many answers were given but in general there were five main answers that took headlines in this objective. Table 3 below show these challenges.

Table3. *Collection and Disposal of Solid Wastes in Percentages*

Disposal of Waste	Distribution of Percentage
rare waste collection in compounds	45
prohibitive prices for waste collection services	35
there are no services given	12
Size of areas for garbage collection	3
not known	5
Total	100

Source: *Field Data, 2013.*

Table 2 indicates that the biggest challenge was rare waste collection in their households. The reason given was that the government which is responsible for waste collection do not make this as a number priority. Waste collection trucks that are rarely seen. Prohibitive prices of the waste collection services were also mentioned as a challenge by respondent. They argued that the waste collection services provided by both the government are too expensive for them to afford. Most of the services required money every time they came to collect the garbage in their communities. For every household one has to pay Tsh 2,000 (\$1) for every pick up to the garbage collectors. When the community leaders were asked about this claim they confirmed that it is very true that not everyone could afford the amount of money that has been set for payments.

Water and sanitation services were mentioned as a debilitating challenge facing people at Tandale ward. The service was found to be unsatisfactory in comparison to other areas. They showed their

annoyance that the government either deserted them or gave them the least priority. They termed their areas as squatters that are full of poor people. They compared Tandale with areas such as Masaki, Mikocheni, and Osterbay¹. The small number or the size of place to collect garbage was also pointed as a challenge in Tandale ward. This meant that there was a few number of areas formally positioned to be a garbage dump. It was also explained that because of the small number of places or areas for collecting garbage the residents had to keep garbage in their compounds and wait for the trucks to pass and collect their garbage. When the lorry passes they carry and set the garbage on the sides of the road so that it can be collected.

Furthermore, it was observed that there were no permanent areas for the collection of waste materials for the whole community. An inquiry into this revealed that most of these areas are overcrowded with houses that are much nucleated with no spacing hence hard to set up areas for garbage collection. This seems to be a challenge for many of the people since they say that their households become congested with a lot of garbage so much that they become unattractive and in the end it endangers their health because of unpleasant smell and disease transmitting houseflies. The study found that few residences had no idea and did not know of any challenges. To the study, it was surprising that they had no answer to this since they live in these areas but this may be because of a number of reasons. Some people that were asked did not take much interest in the topic because they were tired of talking about the same thing repeatedly with no changes seen while they were promised changes.

The Health Effects of Informal Settlements at Tandale Ward

It is generally agreed that water and sanitation services can be interlinked with health problem in any society especially those living in informal settlements. This is because most informal settlements are highly crowded, with distant or no communal water taps and poor streams of water (Nwaka, 2005). To substantiate this, the following sections examine the infection of waterborne disease at the household at Tandale, its causes and find out if there has been any death which is associated with waterborne disease.

Infection of Waterborne Diseases in Household

About 64% of the respondents said that waterborne diseases have already affected their families and the remaining 36% said that there have been no cases of infection in their families. The respondents who confirmed to have been infected were mostly those who said they do not boil their drinking water and those who said sometimes they did. Those who denied to have been infected in their families are largely those who take appropriate precaution in ensuring that they boil water before drinking. Interestingly, some respondents showed their happiness and stated clearly that their stomachs are used to un-boiled water so it is very hard for them to get sick. They stated further that the only people who get sick are those with weak stomachs, who are not used to the way of life in the informal settlements.

Causes of Waterborne Diseases

Table 3 illustrates the main causes of waterborne diseases as perceived by the community members. A larger number of respondents (70%) were keen to point out that unsafe water is the main cause of waterborne diseases in the areas. Boiling water is not a priority to most people in Tandale. Therefore the water becomes unsafe thus, creating waterborne diseases once used by the members of the community. About 14% of the respondents said that uncollected wastes are the main source of waterborne diseases in the study area. When wastes piles up during the rain it causes pollution and houseflies which are diseases vectors accumulate. The other 12% of the respondents explained that waterborne diseases are caused by poor water supply. This is because there is no dominant and sufficient source of water to the communities; not getting enough water results in using unsafe water hence leading to risks of further contamination. Lastly, the remaining 4% of respondents pointed out that the waterborne diseases are caused by poor waste collection. This is more or less the same as the second reason where the government does not give priority in investing in waste collection which in the end causes pathways for waterborne diseases to spread in the communities.

¹ Masaki, Mikocheni and Osterbay- are areas in Dar Es Salaam City that are lived by affluent people, mostly highly civil servants, influential politician and business men. Are areas that are believed to be highly prioritized in terms of social service provision

Table4. *Causes of Waterborne Diseases*

Causes of Waterborne Diseases	Distribution of Percentages
unsafe water	70
uncollected wastes	14
poor water supply	12
poor waste collection	4
Total	100

Source: *Field Data, 2013*

Common Waterborne Diseases

From the study, it seems that most respondents are aware of the most common waterborne diseases that have been experienced by the community. Here 31% mentioned diarrhea, 16% of respondents mentioned cholera, 10% respondents complained on worms being a problem, 18% of them mentioned malaria to be a common problem, 6% respondents pointed out Schistosomiasis and 19% mentioned typhoid being a common problem in their areas. In general it seemed that diarrhea was the biggest and most common disease that most of them suffered from time to time in their lives. In urban area, the disease ratio was: typhoid 20%, cholera 7%, hepatitis 13%, worm infestation 7%, diarrhea 27%, skin infection 23%, eye infection 13%, stomach problems 53% and allergies 33% as shown in table 4 below

Table5. *Common Waterborne Diseases in Percentages*

Waterborne Diseases	Percentages
Diarrhoea	31
Cholera	16
worms	10
Malaria	18
Schistosomiasis	6
typhoid	19
Total	100

Source: *Field Data, 2013*

Table 4 above proves that residents from informal settlements like Tandale are highly susceptible to many kinds of such disease like diarrhea, worms, malaria, schistomiasis and typhoid among others. The risk of diseases in the informal sector is exacerbated by amongst others, lack of adequate sanitation structure, as well as poor households in the informal setting failures to use purified and fresh water as well as poor storage of accessed water (Capstone, 2009)

Death Occurrence from Diseases

There are many instances where people become chronic and end up dying due to waterborne and sanitary related diseases. The most hit are children under 5 years of age who die due to diarrheal diseases. The study sought to know if there have been any deaths that have occurred due to these diseases in the past around two years in their areas. When asked about it 41% of respondents said that there have been deaths. These deaths were caused by the fact that some people had been hospitalized late hence disease had become chronic while some others did not have the finances for paying health services. The other remaining 59% said that there have not been any deaths because people are somewhat conscious of taking precautions against getting sick and mostly get early medical attention when suffering from any disease. Pruss-Ustun *et al* (2005) argues that poor sanitation causes one in ten of the world’s illnesses with faecal contaminated water killing a child in every 20 seconds. Table 7 shows the relationship between the number of deaths and age group prone to diseases in percentages.

Table7. *Occurrence of Deaths by Age Groups Prone to Diseases*

Age Groups Prone to Diseases	Yes	No
Children	30	36
Youth	0	3
Adults	1	0
All Groups	10	20
Total	41	59

Source: *Field Data, 2013.*

When it comes to occurrences of deaths due to infectious diseases, children are the ones that have high mortality rate. Many of the respondents confirmed that children are highly infected and at times are more prone to die from these diseases compared to the other age groups. In countries with the poorest sanitation, child mortality is nearly 7 times higher than in countries with the best access to sanitation. More than four billion cases of diarrhoea cause 2.2 million deaths which are mostly children under the age of five. As immune systems are progressively compromised with each bout of diarrhoea, related illnesses indirectly kill millions more each year (Godana and Mengste, 2013).

Coping Strategies on Averting Waterborne Diseases Eruption

The Tandale residents are not contented with the problem they face. They have developed several coping strategies to ease the problem, ranging from the household level, community level and institutional level mainly the municipal council. For instance, at the household level, respondents mentioned boiling of drinking water as well as general cleanness at their home areas as immediate coping strategies made. Again, they mentioned that when building their houses. they consider drainage pattern at their houses and so build barriers across the front door and the platform of the floor is made higher. Explaining on this matter, one respondent argued:

...To stay in areas like this and given state of our poverty needs other personal measures to be taken otherwise you and your family will all perish. Normally, we have our building style that resists poor drainage system, we also work together to collect and dispose waste products. Above all, to stay safe from malaria particularly during hot season we sometimes sleep outside. Mosquitoes are as fierce as leopard inside our buildings.

This revelation proves that at household level, family members are not contented with living in informal settlements and so they developed mechanisms to lessen the debilitating situation.

At the community level, by-laws that are to be abided by all members have been developed. These include financial contribution for each household for the collection and disposal of wastes. Each family contributes an agreed amount so that wastes are collected. Also for the sake of ensuring safe drainage system, sometimes hamlet chair organise his/ her people and work on any disturbing drainage system. Respondents also stated crystal clear that the Municipal council has its hand on their life or else the situation could have been more terrible than it is. They stated the effort of the municipal council to cooperate with them in waste disposal and ensure clean and safe water is distributed at least once a month. They also mentioned the role of municipal council in distributing mosquito nets to each household member. They, however, aired their dissatisfaction with the way the municipal council handles their matters in comparison to those who live in formal settlements which are well structured and passable throughout the year.

CONCLUSION AND RECOMMENDATION

The study has confirmed that indeed people living at Tandale ward suffer greatly from health related problems caused by poor accessing clean water and sanitation. The study revealed that access to clean water and sanitation poses a threat to residences from Tandale, and of course in most parts of Dar es Salaam city that is invigorated by informal settlement. The finding revealed further the problem of poor disposal and collection of wastes among the Tandale residence. The heaping of wastes coupled with poor access to clean water aggravated water borne diseases to make their home stay among Tandale dwellers. Tandale suffers from fatal diseases such as diarrhea, cholera, worms, malaria, schistomiasis and typhoid. Such mentioned diseases resulted into occurrences of death mainly due to financial problems among residences and so fail to send their children for curative measure. Others die due to late access of medical care. It was also revealed that Tandale residencies are not as passive as one may think and so they do not take any coping strategies to lessen the problem caused by informal settlement they live in. It was proved that Tandale dwellers take several coping strategies measures so as to lessen the intensity of effects caused by informal settlement. Such strategies are from household level, community level and institutional level. For instance, at household level coping

Said Nuhu & Chakupewa Joseph Mpambije “Water and Sanitation Services in Informal Urban Settlements and their Implications to Peoples Health in Tandale, Dar es Salaam Tanzania”

strategies includes boiling of drinking water, general cleanness; at the community level by-laws are made to ensure household collection of waste disposal. On the other hand, the municipal level does invest in clean water distribution as well as save the community through drainage and sanitation systems.

This study revealed a disturbing fact that the people of Tandale are living life which they do not deserve as human beings. Findings exposed that if concerted efforts are not taken the problem may be intensified resulting in more hazards. There is still hope to avert the problem if households, community, local and central government work closer and in cooperation with one another to increase both preventive and impact minimizing strategies. At the first outset, heaps of wastes need to be collected and disposed as soon as they are made. Local authorities need to take even more stern by-laws that will bind households on proper ways of collecting wastes. Coupled with this, educational provision to the residents to increase awareness as well as sensitize people on the need of keeping themselves healthy is essential. In this local government, the central governments as well as civil societies and community based organizations need to serve the purpose. Above all, the central government should not refrain herself from ensuring that tapes water is close to the people and that water flows all times.

REFERENCES

- Ambaye, D. (2011). Informal Settlement in Ethiopia, the Case of two Kebeles in Bahir Dar City. Ethiopia. FIG Working Week.
- Barten, F, (2011). Reframing urban health, reconnecting public health and contextualizing HIV. Lesson from South Africa. *Global Health Action*, 4:7290 Doi:1:10.3402/gha.v4i0.7290.
- Bartlett, S (2003). Water, Sanitation and Urban Children: The need to go beyond Improved provision. *Environment and urbanization* Vol 15 No 2.
- Bartram, J. and Cairncross, S. (2010) Hygiene, Sanitation, and Water: Forgotten Foundations of Health. *PLoS Med* 7(11): e1000367.doi:10.1371/journal.pmed.1000367.
- Capstone, H (2009). Safe Water in Informal Settlements. Why it Matters and How to get it. Available at <http://aladinrc.wrlc.org/bitstream/handle/1961/9163/Banks,%20Brian%20-%20Fall%20'09.pdf?sequence=1> accessed on 17/June/2016
- Cohen, B (2006). Urbanization in developing Countries: Current trends, future projections, and key Challenges for Sustainability. *Technology in Society* 28, Pg 63-80. Elsevier Ltd.
- Creswell JW, Plano Clark VL. (2011). *Designing and Conducting Mixed Methods Research*. 2nd edn. Thousand Oaks: Sage Publications.
- Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative Approaches and Mixed Methods Approaches*, SAGE Publications, London.
- David, A.M, Mercado, S.P Becker, D, Edmundo, K and Mugisha, F, (2007). The Prevention and Control of HIV/AIDS, TB and Vector-borne Diseases in Informal Settlements: Challenges, Opportunities and Insights. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, Vol. 84, No. doi:10.1007/s11524-007-9183-5.
- Dodman, D, Kibona , E and Kiluma, L, (2011). Tomorrow is too Late: Responding to Social and Climate Vulnerability in Dar Es Salaam, Tanzania. Global report on Human Settlement 2011 available at <http://unhabitat.org/wp-content/uploads/2012/06/GRHS2011CaseStudyChapter06DaresSalaam.pdf> accessed on 16/june/2016.
- Dodman, D. Kibona, E and Linda K, (2011). Tomorrow is too Late: Responding to Social and Climate Vulnerability in Dar es Salaam, Tanzania Case study prepared for Cities and Climate Change: Global Report on Human Settlements, International Institute for Environment and Development.

- Essendi, H., Nyoavani, J.M, Kavao, M., Fosto, J.C&Mutua, M, (2009). Synergistic relationship between child morbidity and malnutrition among the urban poor. APHRC.Iussp 2009.princeton.edu/download.aspx?submissionId=02565.
- Godana, W and Mengiste, B, (2013). *Environmental Factors Associated with Acute Diarrhea among Children Under Five Years of Age in Derashe District, Southern Ethiopia*. *Science Journal of public Health*, Vol. 1, No. 3, 2013, pp. 119-124.doi: 10.11648/j.sjph.20130103.12.
- Jabeen, S, Mahmood, Q, Tariq, S, Nawab, B, Elahi, (2011). Health Impact caused by Poor Water and Sanitation in District Abbottabad. *J Ayub Med Coo Abbotabad*; 23(1) [online] available from www.ncbi.nlm.nih.gov/pubmed/22830145 accessed on 11/3/2015
- Jakhanwal, S. P. (2001). Cities without slums: Dream or Reality? *AMDA News* Oct-Dec. p6-7.
- Keiser, J, Utzinger, J, Castro, M C, Smith, T, A, Tanner, M, and Singer, B.H (2004) Urbanization in Sub Saharan Africa and Implication for Malaria Control. *Am.J Trop. Med.Hyg*, 71(Suppl 2), pp.118-127. The American Society of Tropical Medicine and Hygiene Kironde, L. J.M., 1999. *Dar es Salaam, Tanzania*. In: A.G. Onibokun (Ed.) *Managing*.
- Kibede, A.S and Nicholls, R (2011). Population and Assets Exposure to Coastal Flooding in Dar Es Salaam Tanzania: Vulnerability to Climate Extremes: Report Submitted to Global Climate Adaptation partnership Available at http://economics-of-cc-in-tanzania.org/images/Dar-es-Salaam_City-Analysis_Final-Report_1_.pdf accessed on 16/June/2016
- Kolsky, P, *et al*, (2005). Sanitation and Hygiene at the World Bank: An Analysis of current activities, Water Supply Working Notes, P 12, No 6.
- Kombe, W.; Kreibich, V. (2006). *The governance of informal urbanisation in Tanzania*. Mkuki na Nyota Publishers, Dar es Salaam.
- Kombe, W.J. (2005). Land use dynamics in peri-urban areas and their implications on the urban growth and form: the case of Dar Es Salaam, Tanzania. *Habitat International*, 29 (1) 113-13.
- Kuria, D, (2005). Livelihood and Gender in Sanitation, Hygiene water services among the urban poor. Maili Saba Research Report. UK Department for International Development (DFID).
- Lupala, J.M (2002). Urban Types in Rapidly Urbanizing Cities: Analysis of Formal and Informal Settlements in Dar es Salaam, Tanzania. Royal Institute of Technology, Stockholm.
- Mara, D, Lane, J, Scott, B and Trouba, D (2010) Sanitation and health. *PLoS Med* 7(11): 1000363.doi:10.1371/journal.pmed.1000363.
- Nwaka, G.I, (2005). *The Urban Informal Sector in Nigeria: Towards Economic Development, Environmental Health, and Social Harmony*. Global Urban Development Magazine Volume 1 Issue 1.
- Nyamongo, M and Taffa, N, (2004). The triad of poverty and child health in Nairobi informal Settlements *Journal of Health & Population in Developing Countries / URL: <http://www.jhpcd.unc.edu/>*.
- Ozawa, S and Pongpirul, K, (2013). 10 Best Resources on...Mixed Methods Research in Health Systems. *Health Policy and Planning* 2013;1–5 doi:10.1093/heapol/czt019
- Prüss-Üstün A, Bos R, Gore F, Bartram J. (2008) *Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health*. World Health Organization, Geneva.
- Sakijege, T., Lupala, J. & Sheuya, S., (2012), ‘Flooding, flood risks and coping strategies in urban informal residential areas: The case of Keko Machungwa, Dar es Salaam, Tanzania’, *Jamba*:

Said Nuhu & Chakupewa Joseph Mpambije “Water and Sanitation Services in Informal Urban Settlements and their Implications to Peoples Health in Tandale, Dar es Salaam Tanzania”

Journal of Disaster Risk Studies 4(1), Art. #46, 10 pages. <http://dx.doi.org/10.4102/jamba.v4i1.46>.

Sobsey, M.D; Handzel, T; Venczel, L, (2003). Chlorination and safe storage of household drinking water in developing countries to reduce waterborne disease. *Water Science & Technology*; Vol. 47 Issue 3, p221 the Monster: urban waste and governance in Africa. IDRC, pp 101-172.

Tsinda, A, Abbot P, Peddley, A, Charles, K, Adogo, J, Okurut, K and Chenoweth, J, (2013). Challenges to Achieving Sustainable Sanitation in Informal Settlements of Kigali, Rwanda. *International Journal of Environmental Research and Public Health* ISSN 1660-4601 www.mdpi.com/journal/ijerph.

UN- Habitat, 2010a, Citywide action plan for upgrading unplanned and un-serviced settlements in Dar es Salaam, UN-Habitat, Nairobi.

UN-HABITAT, (2009) Planning sustainable cities: global report on human settlements 2009. United Nations Human Settlement Programme

Wegelin-Schuringa, M and Kodo, T (1997) *Tenancy and sanitation provision in informal settlements in Nairobi: Revisiting the public latrine option*. *Environment and Urbanization*, Vol 9, No 2.

WHO (2002). World health report 2002, Geneva, World Health Organization, 2002

Wokokero, E and Inyang, M.P (2014) Waste Disposal Practices in Informal Settlements and its Impact on Health: The Case of Port Harcourt, Nigeria. *International Journal of Environmental Science and Toxicology* Vol. 2(2) pp. 36-42.

Young, F.G and Flacke, J, (2010). *Agent-based model of the growth of an informal settlement in Dar es Salaam, Tanzania: An empirically informed concept*. International Environmental Modeling and Software Society. Fifth Biennial meeting, Ottawa, Canada

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