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Household Level Sanitation Practices and Their Implication on the Occurrence of Diarrhea and Other Related Infections in Temeke Municipality, Tanzania

Hafidh S. Munissi [a] and Jilisa K. Mwalilino [b*]

[a] Department of Project Planning and Management for Community Development, Catholic University of Mbeya (CUoM), P.O. Box 2622, Mbeya, Tanzania.
[b] Department of Geography and Environmental Studies, Sokoine University of Agriculture, P.O. Box 3035, Morogoro, Tanzania.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

This study aimed at assessing households' level sanitation practices and their implication on the occurrence of diarrhoea and other related infections in Temeke Municipality. A cross-sectional study was conducted in the study area involving 220 respondents, randomly selected through simple random sampling from Azimio, Mtoni and Tandika wards. The study employed a mixed-method

**Corresponding author: Email: mwalilino@sua.ac.tz, Jilisam@yahoo.com;*

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approach involving quantitative data from the household survey and qualitative data from key informant interviews. Data were analyzed using IBM-Statistics SPSS V.20 to compute frequencies and percentages presented in tables. The findings revealed that 77.7% of all the households have latrines that can be accessed within their plot. Furthermore, 94.7% of all the households share latrines which are located near their respective compound. In addition, the majority (97.4%) of the respondents use a bowl for washing hands, while 0.9% have a tap connected to water distribution. The majority (70%) of the respondents' latrines are in bad condition, 94% have no water available inside for flushing and cleaning the facility and 17% reported that their facility leak sometimes in the past 6 months. The study concludes that there is improper management of available latrines in the study area which is attributed to factors like overuse and water scarcity among household compounds. The study recommends that the improvement of household-level sanitation practices should be embedded with behavioural change for better utilization of available facilities.

Keywords: Sanitation; hand-washing facilities; diarrhoea; improved sanitation facility; open defecation; informal settlement; Temeke municipality.

1. INTRODUCTION

The provision of safe sanitary conditions and hygiene acts as a necessary foundation of human health development and human right which is essential to everyone regardless of their race or living conditions (World Bank, 2023). Outbreaks of communicable diseases like diarrhoea, cholera, and typhoid contribute to the increase of under-five mortality rates nearly 88% especially in developing countries specifically in highly populated areas and in informal settlements (Zhang et al., 2023). They are attributed to factors such as unimproved sanitation conditions, poor hygienic measures and unsafe water supply from doubtful sources like unprotected boreholes, springs, and dug wells (Shrestha et al., 2023; Kumar et al., 2018; Oluseye, 2016). Globally, about 2.3 billion people still have inadequate basic sanitation services including toilets and 3 billion people lack basic hand-washing facilities within their respective compounds and nearly a billion people practice open-air defecation (Dickin et al., 2023; WHO and UNICEF, 2017; Chattopadhyay et al., 2019; WHO and UNICEF, 2019). It is further noticed in a study by WHO and UNICEF (2015) that open defecation is under-investigated that it has not received much attention from researchers. Diarrhoea is one of the widely spread water-borne diseases in Sub-Saharan Africa and the under-five children is the most affected group (Manetu et al., 2021). In addition, there is a link between sanitation and stunting in children through a condition called environmental enteric dysfunction causing low absorptive capacity of the digestive system (Momberg et al., 2021; Ahmed, 2020).

In Tanzania, 2 out of 10 households use improved, not shared sanitation facility which is 19% of the entire population though 86% of the rural residents use unimproved sanitation facilities and 13% still practice open defecation (MoHCDGEC et al., 2016; URT, 2016; The Citizen, 2018). In addition, among the top five leading causes of childhood illness especially under-five within the country is the use of unimproved sanitation, poor hygienic practices contributing up to 12% of mortality in that age group (THDS-MIS, 2022). The Tanzanian government in an attempt to overcome the accessibility of Water, Sanitation and Hygiene infrastructures launched The National Sanitation Campaign (NSC) in 2012 (Antwi-agyei et al., 2017). The aim was to increase sanitation services by increasing the number of household and schools with improved sanitation to end open defecation and poor hygienic conditions (Safari et al., 2019). Furthermore, other campaigns such as *Mtu ni Afya* (To be Healthy is to be Human), *Maji ni Uhai* (Water is life) have been launched to minimize WASH-associated infections. Yet Tanzania is among the East African countries that are still lagging in meeting the Sustainable Development Goal (SDG) number 6 which is about ensuring availability and management of water and sanitation for all (UN, 2015; Mshida et al., 2020). The improvement is mostly observed in urban and peri-urban areas unlike for rural residents in which more than 75% are in adverse conditions (URT, 2016).

Studies in the informal settlements of Dar es Salaam showed that the use of contaminated water and unhygienic practices such as in food preparation and disposal of excreta increase the exposure of diarrheal disease-causing agents

(URT, 2011; URT, 2010; Sakijege et al., 2012; Kyessi & Sekiete, 2015). A study done in Dar es salaam and Ifakara reported that faecal contamination levels are linked to the diminishing quality of latrine design hence an improvement in latrine design is of paramount importance in promoting sanitation (Thomas et al., 2013). Sanitation conditions in Dar es Salaam city in the informal settlements such as Temeke Municipality is still poor (Kihupi et al., 2016). About 80% of the residents reside in the informal settlements and the city sewerage system serves only about 4% of all the residents in the planned settlements (URT, 2016) like Central Business District, Kariakoo, Msasani and Ubungo Industrial area (Mwesongo et al., 2023; Rasmussen, 2012). Also, the informal settlement dwellers classified as low-medium income earners reside in such places as in Keko Maguruwe which are in Temeke District and their major types of latrines are traditional pits covering nearly half of all the households in the area (Kasala et al., 2016). These studies however have looked at the health impacts in accordance to latrine types, excreta disposal, and faecal contamination to groundwater.

The outbreak of communicable diseases in Temeke Municipality might be associated with household-level sanitation practices including the presence and conditions of such facilities. Therefore, the main objective of this study was to assess household-level sanitation practices and their implication on the occurrence of diarrhoea and other related infections in three wards of Temeke Municipality for the implementation of recommended measures against WASH-related infections. The study would help stakeholders including end-users, local government authorities, government and non-government institutions on improving health promotions regarding sanitation and hygiene. The study addresses the United Nations Sustainable Development Goals (SDGs) number 6 (UN, 2015) specifically target 6.2 whose thrust is on ending open defecation and provide access to sanitation and hygiene.

2. METHODOLOGY

2.1 Description of the Study Area

The study was conducted in Temeke Municipality, Dar es Salaam region. Temeke is the industrial District of the city where the manufacturing centres (heavy and light industries) are located and the port of the city is found on the Eastern side of the area. The area was selected as it is one among the municipalities with a high concentration of low-income residents due to industry and about 70% of the area is covered with unplanned settlements with frequent environmental pollution (Yap 2023; URT, 2019). Pollution is attributed to the use of pit latrines which are in poor conditions, not connected to a septic tank, and improper disposal of solid and liquid wastes (Sakijege et al., 2012; Kyessi & Sekiete, 2015).

2.2 Research Design

A cross-sectional design was employed whereby primary data were collected at one point in time (Neuman, 2014). Quantitative data were obtained through household interviews preferably with mothers and or caregivers with the under-five children as a top priority followed by those with children below 7 years. Qualitative data were collected through key informant interviews with streets and wards representatives, and streets health officials.

2.3 Sampling Procedure

Simple random sampling was used to select the study area and study population. The study population was mothers / caregivers with the under-five children leaving in Temeke District as they are the ones taking care of children in a family. The researcher with the help of the Temeke District Officials from the Department of Sanitation and the Environment obtained the list of 24 wards present in Temeke. A lottery method was employed in the selection of 3 wards and 9 streets. The total sample obtained for the study was 384 mothers with under-five children who were divided in three wards obtained namely Tandika, Mtoni and Azimio. The sample was divided among the three chosen wards that are Tandika 75, Mtoni 75, and Azimio 70 making a total of 220 respondents. Due to exclusion criteria, that is mothers with children above 7 years, 164 mothers were not interviewed for the study. The sample population, which involved mothers / caregivers with the under-five children, was selected with the help of street representatives appointed by the Ward Executive Officer, as they did not have a list of households with the under-five children specifically. In every street selected, one out of five households were randomly selected for interviews and observations.

Fig. 1. Map of Temeke Municipality showing selected wards
Source: *Kacholi & Sahu (2018)*

2.4 Data Collection

Observation, key informant and household interviews, and photographs were key data collection techniques employed to capture and ensure the practices on cleanliness and latrine utilization within household compounds. Quantitative data were collected on households' sanitation practices and hand hygiene facilities in both presence and conditions. Qualitative data were collected from key informants including health officials from ward and street level, and ward executive officers.

2.5 Data Analysis

The data collected were analysed using IBM-Statistics SPSS windows version 20.0. Descriptive analysis was employed to analyse the household level sanitation practices and hand washing facilities and presented in frequency tables. Content analysis was

employed to analyse qualitative data collected from key informants.

3. RESULTS

3.1 Socio Demographic Features of Respondents

Out of 220 respondents, 16% were within the age range of 18-25 years, 32.7% were within the range of 26-33 years, 26% were within the range of 34-40 years. Furthermore, 67% were married with an average family size of 4 and more people and the majority (92.3%) were having under-five children. The majority (72%) had basic education, 23% completed secondary school. The majority 87.3% were self-employed engaged in small businesses such as a kiosk, selling bites and fried fish just outside their houses, tailoring, and selling ice creams (Table 1).

3.2 Household-level Sanitation practice and Hand Hygiene Facilities

Household-level sanitation practices and hand hygiene facilities were assessed through self-reporting and the observation of proxy indicators that focus on the existence of latrine facility and hand washing points which also involved photographs. Available latrines within the interviewed households were for single household and others shared. Only 10.7% of the available latrines were owned by single households while 94.7% were shared by several households. In addition, the most common type of latrine used was pour-flush without water seal linked to a pit for both owned by single households (9.3%) and shared (57.3%) (Table 2). Furthermore, the majority (77.7%) of the households have only one accessible latrine within their compound, 20% had two latrines available for use. Out of 220 households, 6-10 households (55%) share the same latrine followed by 11-15 households (21.3%) and during the day the number of people using the latrine ranged from 6-10 (Table 3). In Table 4, 72.7% of all the latrines were observed to be in bad condition, only 26% were satisfactory. Only 6.4% of the available latrines had water for flushing inside the facility. In addition, 6.4% of all the observed latrines were not in use and the major reason suggested include the latrines were full. Some latrines' conditions were unfavourable in that 17% of the respondents reported that their latrines were leaking sometimes in the past six months. Of all the available latrines, 41.3% latrines were reported to have never been emptied.

Table 1. Socio-demographic information of respondents (n=220)

Variable	Category	Frequency	% (%)
Age (in complete years)	18 – 25	37	16
	26 - 33	75	32.7
	34 – 40	58	26.4
	41 and above	50	21.5
	Total	**220**	**100**
Marital status	Married	147	67
	Single	39	16.9
	Engaged	34	14.8
	Total	**220**	**100**
Educational level	Primary level	158	72.0
	Secondary level	53	23.0
	Tertiary level	1	0.4
	No formal education	8	3.5
	Total	**220**	**100**
Household size	< 5 years	203	92.3
	No > 5 children	17	7.0
	Total	**220**	**100**
	> 5 years and adults	220	100
	Total	**220**	**100**
Income-generating activity	Self-employed	196	87.3
	Casual labor	16	6.9
	Official employment	2	0.9
	Housewife	6	2.6
	Total	**220**	**100**

Table 2. Accessibility and latrine type for use by the household (n=220)

Category	Variable	Azimio (n = 70)		Mtoni (n = 75)		Tandika (n = 75)	
		Freq.	Per. (%)	Freq.	Per. (%)	Freq.	Per. (%)
Availability of latrine	Privately owned	6	7.5	7	9.3	8	10.7
	Shared latrines	70	100	71	94.7	71	94.7
Latrine type (non-shared)	Pour-flush toilets	2	2.5	4	5.3	7	9.3
	VIP latrine	-	-	2	2.7	-	-
	Pit latrines	4	5	-	-	1	1.3
Latrine type (shared)	Pour-flush linked to sewer	-	-	2	2.7	-	-
	Pour-flush toilets	13	16.3	9	12	5	6.7
	Dry toilets	29	36.3	49	65.3	43	57.3
	Pit latrines	38	47.6	10	13.3	1	1.3

a) **b)**

Fig. 2. Latrine types available; a) Open pit b) Dry pit

Fig. 3. Leakage in a sanitation facility

Table 3. Households' latrine utilization (n=220)

Category	Variable	Azimio (n = 70)		Mtoni (n = 75)		Tandika (n = 75)	
		Freq.	Per. (%)	Freq.	Per. (%)	Freq.	Per. (%)
No. of available latrines	1	52	77.5	60	80.0	59	78.7
	2	16	20.0	14	18.7	14	18.7
	3	1	1.3	-	-	2	2.7
	4	1	1.3	1	1.3	-	-
	Total	**70**	**100**	**75**	**100**	**75**	**100**
Household using same latrine	1-5	8	10	15	20	10	13.3
	6-10	37	58.7	41	54.7	43	57.3
	11-15	19	23.8	14	18.6	16	21.3
	>16	6	7.5	5	6.7	6	8
	Total	**70**	**100**	**75**	**100**	**75**	**100**
No. of people using the latrine daily	1-5	18	35.0	33	44.0	24	32.0
	6-10	29	36.3	26	34.7	31	41.3
	11-15	18	22.5	11	14.7	17	22.7
	>16	5	6.3	5	6.7	3	4.0
	Total	**70**	**100**	**75**	**100**	**75**	**100**

Table 4. Latrine condition and pit emptying (n=220)

		Azimio (n = 70)		Mtoni (n = 75)		Tandika (n = 75)		Total (n=220)	
Category	**Variable**	**Freq.**	**Per. (%)**	**Freq.**	**Per. (%)**	**Freq.**	**Per. (%)**	**Freq.**	**Per. (%)**
Latrine cleanliness	Clean	14	17.5	33	44	13	17.3	**60**	**26**
	Not clean	56	82.5	42	56	62	82.7	**160**	**72.7**
Water availability	Available	-	-	9	12	5	6.7	**14**	**6**
	Not available	70	100	66	88	70	93.3	**216**	**94**
Currently in use	Latrine is in use	56	82.5	75	100	75	100	**216**	**94**
	Latrine is not in use	14	17.5	-	-	-	-	**14**	**6**
Reasons for not in use	Full	14	17.5	-	-	-	-	**14**	**6**
Leakage	No, never	42	65.0	57	76.0	52	69.3	**161**	**70**
	Yes, sometimes	8	10.0	12	16.0	19	25.3	**39**	**17**
	Yes, frequently	2	2.5	1	1.3	-	-	**3**	**1.3**
	Don't know	18	22.5	5	6.7	4	5.3	**27**	**11.7**
Pit emptying	Yes, emptied	46	70	55	73.3	24	32	**135**	**58.7**
	No, never emptied	24	30	20	26.7	51	68	**95**	**41.3**

Table 5. Kind, location, functionality and soap availability for the hand-washing facility (n=220)

		Azimio (n = 70)		Mtoni (n = 75)		Tandika (n = 75)		Total (n=220)	
Variable	**Category**	**Freq.**	**Per. (%)**	**Freq.**	**Per. (%)**	**Freq.**	**Per. (%)**	**Freq.**	**Per. (%)**
Kind	Bowl of water	70	100	70	93.3	74	98.7	**214**	**97.3**
	Tap connected to water distribution	-	-	5	6.7	1	1.3	**6**	**2.6**
	Don't have a hand-washing facility	70	100	70	93.3	74	98.7	**224**	**97.3**
Location	Inside the house	-	-	3	4	1	1.3	**4**	**1.7**
	Outside the house	-	-	2	2.7	-	-	**2**	**0.9**
	Don't have a hand-washing facility	70	100	70	93.3	74	98.7	**224**	**97.3**
Functionality	Yes, right next to the latrine	-	-	3	4	1	1.3	**4**	**1.7**
	Yes, within 10m	-	-	2	2.7	-	-	**2**	**0.9**
Soap availability	Available	-	-	2	2.7	1	1.3	**3**	**1.3**
	Not available	70	100	73	97.3	74	98.7	**227**	**98.6**

3.3 Presence and Type of Hand-washing Facilities

Table 5 describes the kind, location, functionality and soap availability for the hand washing facilities owned by the respondents. Based on the results, at least the respondents from Mtoni and Tandika had a hand washing facility within their compounds. For those having actual facilities, the findings indicates that 6.7% of the respondents from Mtoni and 1.3% from Tandika were tap connected to water distribution because of how the house was designed as it was for a single household, unlike others where they were all tenants. The findings indicates that, 4% of the hand washing facilities from Mtoni were located inside the house, 2.7% were located outside the house and from Tandika 1.3% they were located inside the house. The available facilities were all functional but only 1.3% were equipped with essentials like soap.

4. DISCUSSION

The study found that, majority of the latrines were shared with more than one household. Based on Joint Monitoring Program reports from WHO and UNICEF, latrines must be used by only one household. This is in contrast with WHO reports that 19% of the population in Sub-Saharan Africa depend on shared latrines (WHO and UNICEF, 2019). Similar findings are reported in a study done in Kenya that households' sanitation facilities were pit latrines which were shared, not clean hygienically, and inadequately managed (Simiyu et al., 2017). This similarity might be attributed to the nature of the study areas selected. These findings imply that it is a common practice for the informal settlement dwellers to share latrine facilities with a significant number of households without taking into consideration the health impacts of such practice. This indicates that latrine conditions within the area might be associated with the number of households sharing them which expose the users to faecal contamination resulting in infections such as diarrhoea, typhoid through the faecal-oral route. Similarly, a study by Günther et al. (2012) and WHO (2014) found that there is a negative association between the number of households using a latrine with its cleanliness and positively associated with infections related to faecal contamination.

The most common type of latrines used in the study area were dry toilets. Similarly, a study done in Arusha reported that two-thirds of the available latrines were traditional pits (Mshida et al., 2017). This similarity might be attributed to the nature of the study areas and the socio-economic status of the study population. Financial constraints of the residents and inadequate water supply systems make them unable to afford the costs of constructing a VIP latrine hence dry latrines remain the common latrine types used in many places especially in slums. These findings imply that in Temeke Municipality more than three quarter still use unimproved pit latrines whereby the majority are in bad shape making the area more prone to the outbreak of communicable diseases, in particular diarrhoea.

In the present study, some shared latrines were not in use because they were full possibly due to the high-water table and pit emptying practices. These findings imply that pit emptying costs together with little understanding of the benefits of a well-managed sanitation facility might be contributing factors for some of the latrines around the area to be full. Some respondents said that latrine maintenance and cleanliness is not their responsibility rather that is up to their landlord. These findings can also be reflected from the study done in Dar es Salaam about pit emptying behaviours which reported that latrine facilities in landlord-tenant mixed houses were less likely to be functional and of poor quality (Jenkins et al., 2015). In informal settlements, the majorities are tenants residing in tenant-only houses or landlord-tenant mixed houses. It is a tendency that when pits are full, the landlord is responsible for finding an available pit emptying agent and incurs the costs. So, for that case, when the landlord is unaware of the danger caused by excreta to human health, the effects can be significant resulting to the outbreak of infectious diseases in particular hepatitis, cholera and others. Improper waste and excreta management have been implicated in the transmission of human excreta-transmitted diseases which predominantly affect children and the poor as one of the participants from Mtoni ward had this to say,

> *"...In our community, the majority are tenants mostly living in tenant-mixed houses with medium income levels and based on the design of tenant houses in our area, latrine facilities are to be shared by all the tenants. Regardless of the locally available pit emptying agents, some of the pits used by the residents are full for quite some times and they all depend on their landlord to do the emptying. When this condition*

prevails, it endangers children's health like the under-fives who need closer look in their daily playing..." (Key informant respondent from Mtoni ward 9th April 2021).

Most of the available latrines were observed to be in bad condition with bad smell and some with the presence of insects. These findings are in line with a study done in Dar es Salaam city that there are people who have poor toilets that are extremely risky to users and the environment in general (Kasala et al., 2016). Inadequate sanitation has been linked to several health risks such as stunting, schistosomiasis, trachoma apart from diarrhea (Crane et al., 2015). From the study findings, it is not yet clear about the intentions of cleaning shared latrines and users' satisfaction levels of such facilities. Similarly, a study done in an urban slum of Uganda reported that the cleanliness of shared latrines was dependent on users' cleaning frequency and cooperation (Tumwebaze & Mosler, 2014). Based on study findings, it is evident that shared latrine facilities are in the outbreak of future malfunctioning due to poor design, intensive use, and maintenance of the facility itself. Renting houses in Dar es Salaam seems to be more business-oriented leaving behind the well-being and health aspects of the end-users resulting in the risk of disease outbreak. In the present study, latrine cleanliness was observed to be very poor possibly because of water scarcity as the practice requires a significant amount of water and willingness of users to clean. This emphasizes the need for hygiene education and latrine management. Furthermore, studies by Sara & Graham (2014) and Jenkins et al. (2014) linked to access to improved sanitation and socio-economic statuses such as income levels and educational status. Rich and educated people living in informal settlements are more likely to have access to safe, improved and functioning sanitation facilities compared to low-income earners. Moreover, some studies reveal an association between the quality of latrine construction and its cleanliness (Diallo et al., 2007; Irish et al., 2013). This can be linked with findings in the present study that latrines were of poor quality, very old and in some places especially in Azimio and Mtoni latrines were missing a superstructure and some a door. The majority of the respondents were medium to low-income earners merely having access to only the necessities of life hence access to safe and improved sanitation is still a problem. This can be confirmed by a key informant from Azimio ward, who said,

"...Our ward (Azimio) is mixed with high- and low-income earners so even their residents differ in design and appearance. You would find a clean and well-constructed sanitation facility inside a rich house whether inside or outside the house in a single compound unlike for low-income earners. Latrines in poor families are not well constructed, managed, and are intensively shared by many households causing it to diminish early..." (Key informant respondent from Azimio ward 6th April 2021).

Furthermore, the study revealed that some latrines have never been emptied. This can be related to the economic status of the household head or the landlord. This is because emptying services are expensive and the majority are low-medium income earners which could lead to latrines being full hence not in use for a while. Similar findings were observed in a study by Mbewe (2020) that due to financial constraints and the lack of space for the adoption of other options, pit latrines in majority of the households are not in use and in bad conditions. Similar findings were seen in a study done in the slums of Dar es Salaam that the costs for pit emptying services can range from 70 000 - 110 000 TZS depending on the type of technology used. In the case of manually putting faeces in another pit, it cost between 50 000 - 70 000 TZS but emptying with a service motorcycle with a 50-litre tank costs 70 000 TZS. While, a truck with a vacuum tank of 20,000 litres would cost around 100 000 - 120 000 TZS (Mwalwega, 2010; Van Dijk et al., 2014). The respondents reported leakage or overflowing of some latrines at some points in time in their daily use. This could lead to contamination of domestic water sources and storage facilities accounting for the spread of communicable diseases. The possible explanation for that is, pit latrines lack a physical barrier, such as concrete, between stored excreta and groundwater hence when the pit is filled with too much water the excess water would find a way of escaping as the facility will no longer be able to hold it. This is in contrast with the study done in Dar es Salaam city about Faecal contamination of drinking water caused by poorly managed pits around the area (Kihupi et al., 2016).

"...In our community, the most common types of latrines are dry and open pits due to construction and pit emptying costs. That is so because majority cannot afford hiring a truck with a vacuum for emptying due to

location problems and embedded costs for the services hence forced to call for manual emptying which costs a bit lower than the trucks..." (Key informant respondent from Tandika ward 6th April 2021).

In the present study, more than three-quarters of the respondents' households (97.4%) did not have a hand-washing facility located anywhere within their compounds or near sanitation facilities. Very few possess a hand washing facility located either right next to the latrine or in a nearby location within 10 metres and they were functional. These findings reflect those from a study by Mwakitalima et al. (2018) that two-thirds (65%) of the households were found to have no specific places for hand washing with soap. A study by Thiam et al. (2019) revealed that poor hygienic measures are the predominant cause of diarrheal infections among household members specifically the under-fives. It shows that hand washing facilities is not much of a concern when it comes to hygiene and people are used to constructing latrines without considering a specific place to wash hands (a sink perhaps) during the design. The few available hand washing facilities had soap and water available indicating that hand hygiene in the surveyed area is still low. Water availability and sanitation are the most considered aspects related to WASH while forgetting that hand hygiene also impacts health when mistreated.

5. CONCLUSION AND RECOMMENDATIONS

Based on findings from the study we can conclude that generally, latrine quality and conditions was poor, far behind the 95% as promised by the government in The Tanzania Development Vision (2025). The latrines were unimproved based on the criteria provided by WHO and UNICEF concerning the safety and management of sanitation facilities within household compounds. Pit emptying behaviour is still not considered essential; the respondents think that it is not one of their responsibilities while the side effects would impact them all. From the study we can conclude that safe sanitation and hand hygiene were influenced by socio-economic and contextual factors such as educational levels (literacy) as the majority had basic education; income as the majority were low and medium-income earners, area of residence as they were residing in informal settlements. Concerning hand washing facilities, respondents are not aware that they are supposed to have a specific place to wash their hands like after visiting the toilet indicating low hand hygiene knowledge. Respondents are aware of the possible outcomes of poor sanitation and hygiene and some of the communicable diseases and their possible preventive measures.

The study recommends that sanitation and hygiene projects in the city should consider the construction of improved latrine facilities which safely and hygienically separate excreta from coming into contact with a human, a bathing place, and a specific place to wash hands near latrines.

Efforts made by the government or NGOs to improve sanitation conditions need to consider initiatives beyond the construction of improved toilets such as effective solid and liquid waste management. The application of different excreta disposal system is possible in Dar es Salaam due to the complexity of the city.

Emphasis on the importance of using environmentally friendly pit emptying services to minimize further consequences caused by unsafely handling of faecal materials.

Better strategies on understanding what influences latrine cleanliness and hand hygiene behaviours for better planning of interventions including psycho-social, contextual and behavioural change techniques and proper ways of handling the sludge and re-use the material if possible.

Emphasis on the importance of having hand washing facilities together with soap available for washing hands during critical times as this was the least considered practice. Awareness of the importance of having hand washing facilities should be of paramount importance just like having latrines. Construction of facilities should be near toilets to avoid inconveniences caused by a distant facility.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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