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Perceptions, acceptability and determinants of sharing sanitation facilities among households in urban and rural areas in Mainland Tanzania: Evidence from three regions

Khalid Massa[1], Godfrey M. Mubyazi[2], Anyitike Mwakitalima[1], Amour Seleman[1], Fadhili Kilamile[1], Telemu Kassile[3], Jonas G. Balengayabo[4], Nyangi Chacha[4]*

[1]Ministry of Health, [2]National Institute for Medical Research, Department of Health Systems and Policy Research, 3 Barack Obama Drive, P. O. Box 9653, 11101 Dar es Salaam, Tanzania, [3]Tanzania Commission for Universities, P. O. Box 2600, 1 JKT Street, 41104 Tambukareli, Dodoma, Tanzania, [4]School of Engineering and Environmental Studies, Ardhi University, P. O. Box 35176, Dar es Salaam, Tanzania

Abstract

Introduction: WHO and UNICEF classify shared sanitation facilities as unimproved regardless of their structural design or technology used. This classification is based on the argument that shared sanitation facilities are poorly maintained.

Objectives: This study explored perceptions, acceptability, and determinants of sanitation facility-sharing habits among households in three regions of Tanzania. In 2014, this cross-sectional study employed a structured questionnaire for data collection to interview 1,751 heads of households or their representatives using Open Data Kit software.

Methods: Data analysis involved estimating descriptive statistics and bivariate and multivariate logistic regression.

Results: The proportion of households sharing sanitation facilities was 14.6%, a significantly higher proportion being from urban settings. Most households sharing sanitation facilities did not like to continue sharing based on health risks. However, those who would like to continue sharing indicated that a maximum of five households could be tolerated—Additionally, those who shared sanitation facilities preferred to share with their relatives rather than neighbours. Factors significantly associated with sharing sanitation facilities include sex, location, and facility condition. Shared sanitation facilities can be necessary in some circumstances, such as when land space limits the construction of toilets and in multi-habited rental houses.

Conclusion: In such situations, information on proper management of sanitation facilities is necessary for better health outcomes.

Keywords: Hygiene; infectious diseases; poverty; shared sanitation facilities, Tanzania

Introduction

Target 6.2 of the Sustainable Development Goals (SDGs), which were endorsed towards the end of 2015, aims at achieving "access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations." The Joint Monitoring Program (JMP) for water supply and sanitation of the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) defines a shared sanitation facility as one used by two or more households (Kabange & Nkansah, 2015; WHO & UNICEF, 2015). As per the JMP definition, as long as a sanitation facility is found to be shared, no matter how well-designed and properly constructed, it is not included in the category of 'improved' sanitation facilities (WHO & UNICEF, 2015; Exley *et al*., 2015). Whether to share a facility may depend on diverse factors in different

* **Corresponding author**: E-mail address: telemuk@yahoo.com

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community settings. For instance, experience has shown that in some communities, residents may see the act of sharing a latrine as acceptable since it represents a public good that is available for everyone to use when needed (Kabange & Nkansah, 2015; Heijnen *et al*., 2014a). Further, it is common for households with family ties to share a latrine to keep a friendly neighborhood (Kabange & Nkansah, 2015). Limited access to improved sanitation facilities, more often than not, prompts people to opt for open defecation, therefore increasing the chances for the spread of diseases, especially diarrhea, cholera, Soil-Transmitted Helminths, schistosomiasis and other parasitic infections (Heijnen *et al*., 2014a).

Evidence shows that while in most highly crowded towns or cities, people sometimes have no option to avoid using shared sanitation facilities, their counterparts in rural settings commonly use shared sanitation facilities by preserving traditional values or norms, including that of the neighborhood. Moreover, it is evident that in both urban and rural settings, people find it better to share a sanitation facility than not have one at all, a condition that would force them to resort to open defecation behaviors (Heijnen *et al*., 2014a). Other determinants of sharing a sanitation facility include sex and age, as well as cultural relationships between parents and their daughter or son-in-law when associated with certain taboos (WHO & UNICEF, 2015; Tumwebaze & Mosler, 2014; Simiyu *et al*., 2017; Routray *et al*., 2015).

In Tanzania, the lack of improved sanitation facilities is reported to have affected people living in both rural and urban settings, albeit with variations between regions and localities within the same areas. Rural-based households are reported as mostly reliant on simple latrines that do not separate humans from excreta (Montgomery *et al*., 2009). Statistics show that access to sanitation facilities of any kind in Tanzania is estimated to be more than 90% (Roma *et al*., 2010), with 34.1% being improved (including both shared and non-shared, according to the National Bureau of Statistics and Office of Chief Government Statistician (NBS & OCGS, 2015). However, using the definition of JMP, the coverage of improved sanitation facilities is only 14% (UNICEF & WHO, 2015).

To find out whether community members in different social contexts share the same view as JMP, critics propose further studies to examine factors and community perceptions of sharing of sanitation facilities and how such perceptions influence them to opt for shared or private sanitation facilities in different socio-economic settings (Heijnen *et al*., 2014b). This is because end users play a key role in sanitation provision, for they present a community with their perspective and approach to sanitation needs based on cultural and religious beliefs, among other aspects (Exley *et al*., 2015).

The present paper reports part of the findings from a study conducted with the primary objective of exploring community utilization of shared sanitation facilities and their perceptions on the acceptability of sharing sanitation facilities in selected rural and urban settings of Tanzania. The paper aims to answer three key research questions: i) What is the extent of sharing sanitation facilities in the study areas? ii) How do households perceive the sharing of sanitation facilities, and how do these perceptions differ between geographical locations? iii) What determines the sharing of sanitation facilities in different communities in Tanzania?

Methods

Study design and areas

This cross-sectional study was implemented in July 2014 in rural and urban settings of three regions in Tanzania Mainland, namely Pwani, Morogoro, and Tanga. The first two regions are administratively situated in the coastal belt of Eastern Tanzania. The third is in the northern zone, although it is still part of the eastern coast along the Indian Ocean.

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Study population and sampling strategies

Urban settings were represented by Tanga City Council (Tanga Region), Kibaha Town Council (Pwani Region), and Morogoro Municipal Council (Morogoro Region). Rural ones were represented by the following district councils (DCs): Bagamoyo (Pwani region), Morogoro (Morogoro region), and Lushoto (Tanga region). The regions were selected using a simple random sampling (SRS) approach. The same procedure was adopted for determining the DCs. However, in each of the selected study regions, urban-based councils were chosen purposefully, as they were the only major towns and regional capitals available simultaneously. As for the households, a list of all households that had a sanitation facility was obtained from the National Sanitation Campaign registers. Based on that list, a systematic random sampling method was used to select the representative households in each study area, as Massa et al. (2017) described further.

Sample size

To estimate the number of households, n for interviews in each region, the formula used was defined as $n = \frac{z^2 \pi(1-\pi)}{d^2} f$ (Cochran, 1997).

Where: z = represents the desired level of confidence; π = proportion of households with access to a private sanitation facility; f = design effect; and d = margin of error, which the study aimed to attain in the estimates. The values for the above parameters were taken as z =1.96 (for 95% confidence level), 1.68 design effect, 0.05 margin of error at 95% confidence interval, and the proportion of households with access to a private sanitation facility accounting for 70.6% (NBS & ICF Macro, 2011). Using these parameters, a total sample size of 536 households was obtained, and by adding 10% of it to compensate for the non-response rate, we arrived at a sample size of 589 households per region. this gave an overall sample size of 1,767 households for the three areas. The sample was further distributed proportionally based on the differences in the population proportions available between urban and rural settings, accounting for 30% and 70%, respectively. Thus, the ultimate sample allocations were 177 and 412 households in each region for urban and rural settings, respectively. Of the 1,767 sampled households, 1,751 were successfully covered for interviews, whereby one member from each household was interviewed (including 5 extra respondents in urban settings also interviewed after showing interest in participating in the study). The final response rate accounted for 99.1%.

Data collection

The data collection was executed by the study investigators, who nine trained enumerators assisted. Three enumerators were assigned for each region. Data collection approaches involved structured questionnaire-based interviews with heads of households or their representatives and direct personal observation. The data were collected using an Open Data Kit software installed on smartphones, which the enumerators used to interview the respondents. Collected data were transferred to a saver hosted at Amani Centre Muheza district in Tanga region. The questionnaire was designed to collect information covering several aspects, including respondents' socio-demographic and economic characteristics and respondents' perceptions of the acceptability of sharing a sanitation facility. The interviewees were probed on how they felt about tolerating sharing a sanitation facility with other households and why.

Data management and analysis

The database was exported to Epi Info.6 (Epi Info™ version 7.1.4.0) for cleaning preceding the analysis. Statistical data analysis involved estimating numerical summary measures and tests of associations

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using the chi-square test. Bivariate and multivariate logistic regression analyses (LRA) were also performed. Unadjusted odds ratios (UORs) and adjusted odds ratios (AORs), as well as 95% confidence intervals (CIs), were computed for bivariate and multivariate logistic regression, respectively.
This paper presents results from the questionnaire-based interviews only. More results containing qualitative data have been presented by Massa *et al*. (2017). Presentation of results in two separate papers was found indispensable as the data collected seemed too immense to be presented in one manuscript only.

Ethical considerations

The Medical Research Coordinating Committee in Tanzania issued ethical clearance for this study. Official permission to implement the study at the local level was sought from the respective Regional and Local Government Authorities. At household levels, respondents were requested to consent to participate in the study and have their sanitation facilities visited for observation.

Results

Characteristics of the study participants

More than ninety-nine per cent (*n*=1,751) of all the 1,767 respondents took part in the study, among whom 584 (33.4%), 582 (33.2%) and 585 (33.4%) came from Morogoro, Pwani and Tanga regions, respectively. The majority of the 1,751 respondents from the three areas were females, accounting for 71.6%, although three-fifths of all households were reported as being headed by men (60.0%). Further, the majority (62.5%) of the respondents had acquired only a primary level of education. A simple majority of the respondents were employed in farming. The overall mean family size was six people and did not vary between regions. The mean age of all the respondents from the three areas was 39.5 (SD=14.8) years, ranging from 15 to 120 years, although the relative majority (32%) of them were in the age group of 25-44 years (Table 1).

Table 1 | Socio-demographic characteristics of respondents, categorised by regions

Attribute	Total	Region			*p-value*
	N (%)	Morogoro (*n*=584)	Pwani (*n*=582)	Tanga (*n*=585)	
		n (%)	*n* (%)	*n* (%)	
Age					
15 – 24	235 (13.4)	84 (14.4)	74 (12.7)	77 (13.2)	
25 – 34	521 (29.7)	162 (27.7)	172 (29.6)	187 (32.0)	
35 – 44	441 (25.2)	156 (26.7)	147 (25.3)	138 (23.6)	
45 – 54	272 (15.5)	109 (18.7)	94 (16.2)	69 (11.8)	
≥ 55	282 (16.1)	73 (12.5)	95 (16.3)	114 (19.5)	0.006
Sex					
Female	1,253 (71.6)	391 (66.9)	432 (74.2)	430 (73.5)	
Male	498 (28.4)	193 (33.1)	150 (25.8)	155 (26.5)	0.01
Education level					
No formal education	271 (15.5)	80 (13.7)	115 (19.8)	76 (12.9)	
Primary	1,095 (62.5)	345 (59.1)	343 (58.9)	407 (69.6)	
Secondary	288 (16.5)	103 (17.6)	105 (18.0)	80 (13.7)	
More than secondary	97 (5.5)	56 (9.6)	19 (3.3)	22 (3.8)	< 0.01

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Occupations					
Business	514 (29.4)	141 (24.1)	227 (39.0)	146 (24.9)	
Agriculture	804 (46.0)	284 (48.6)	235 (40.4)	285 (48.7)	
Employed	166 (9.5)	75 (12.8)	59 (10.1)	32 (15.5)	
Self-employed	81 (4.6)	19 (3.2)	17 (2.9)	45 (7.7)	
Not employed	186 (10.6)	65 (11.1)	44 (7.56)	77 (13.2)	< 0.01
Family size					
Average no. of people per Household	6	7	5	6	< 0.01

Households reporting the use of shared sanitation facilities

Of the total respondents in the study, 256 (14.6%) reported sharing sanitation facilities with their neighbors. The Pwani region seemed to have a more significant proportion of shared sanitation facilities than the rest (p=0.04) (Table 2). Among councils, Tanga City Council had the highest proportion (24.7%) of households using shared sanitation facilities, while Lushoto DC (rural) had the lowest (10.3%), and the differences were highly significant (p<0.001). Using shared sanitation facilities was prominent in urban compared to rural areas, and the difference was statistically significant (p=0.009).

Table 2 | Proportions of households reporting the use shared sanitation facilities in each region and their respective district councils

Variable	Total	Sharing a sanitation facility *n* (%)		χ^2 (p-value)
	N	Yes	No	
Region of study				
Morogoro	584	70 (12.0)	514 (88.0)	6.3 (0.04)
Tanga	585	86 (14.7)	499 (85.3)	
Pwani	582	100 (17.2)	482 (82.8)	
Councils in the study				
Bagamoyo DC	410	74 (18.0)	336 (82)	
Kibaha TC	172	26 (15.1)	146 (84.9)	
Lushoto DC	407	42 (10.3)	365 (89.6)	
Morogoro MC	186	26 (14.0)	160 (86.0)	28.6 (< 0.001)
Morogoro DC	398	44 (11.1)	354 (88.9)	
Tanga CC	178	44 (24.7)	134 (75.3)	
Geographical Location				
Rural	1215	160 (13.2)	1055 (86.8)	6.7 (0.009)
Urban	536	96 (17.9)	440 (82.1)	
Education (literacy) level				
No formal education	271	22 (8.1)	249 (91.9)	
Primary	1095	177 (16.2)	918 (83.8)	11.6 (0.009)
Secondary	288	41 (14.2)	247 (85.8)	

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More than secondary	97	16 (16.5)	81 (83.5)	
Household Ownership				
Tenant	371	143 (38.5)	228 (61.5)	215.8 (< 0.001)
Owner	1380	113 (8.2)	1267 (91.8)	

Moreover, of the 256 respondents who reported sharing their sanitation facilities, the majority (*n*=206, 80.5%) reported sharing with less than five households in the neighbourhood. In contrast, the remaining 50 (19.5%) reported sharing a latrine with at least five households.

Determinants of using shared sanitation facilities

The data show that the most (57%) pronounced reason for sharing sanitation facilities was tenancy in a multi-habited house with a single sanitation facility. Other reported reasons include sharing the construction cost, maintaining social cohesion, and limited land space for each household to construct its own facility (Figure 2).

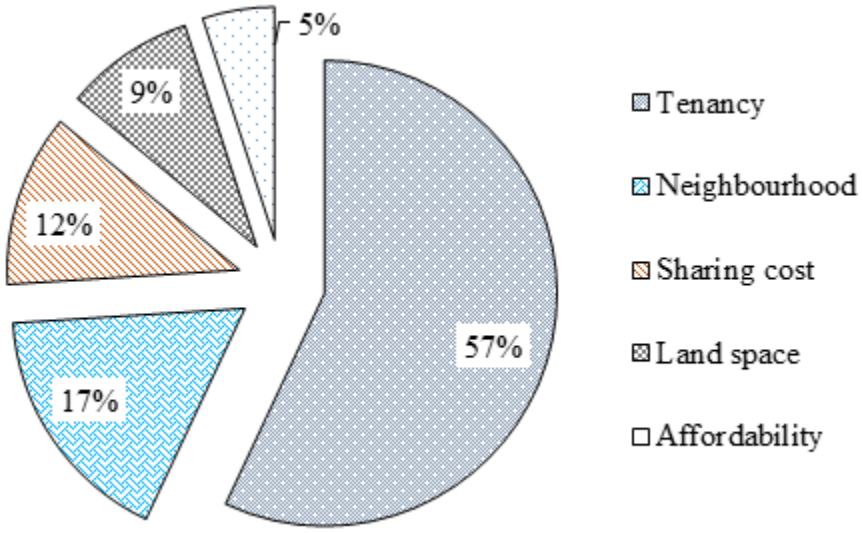

Figure 2 | Frequency distribution of factors stated as reasons for sharing a sanitation facility among the households studied (*n* = 256)

Bivariate analysis

Table 3 indicates the results of the association of certain factors with the practice of using shared sanitation facilities. As the results show, females were 1.58 more likely to use shared sanitation facilities than their male counterparts (UOR=1.58; 95% CI: 1.14, 2.18). Urban residents were 1.43 more likely to share sanitation facilities than their rural counterparts (UOR=1.43; 95% CI: 1.09, 1.89). Respondents from the households headed by individuals who had acquired education higher than Ordinary Secondary Education were 2.23 times more likely to report sharing sanitation facilities with neighbours than those who never went to school at all (UOR=2.23; 95% CI: 1.12, 4.46). Similarly, respondents from households headed by individuals who attained primary education or below were 2.18 times more likely to report using shared sanitation facilities than those who never acquired any formal education (UOR=2.18; 95% CI: 1.37, 3.47). Furthermore, households headed by business persons seemed to be nearly two times more likely to report using shared sanitation facilities than those headed by unemployed people (UOR=1.88; 95% CI: 1.17, 3.03). As for the type of sanitation facilities observed, the odds of sharing were higher among the households found with toilets of improved type (UOR= 1.4; 95% CI: 1.07, 1.95).

Table 3 | Bivariate analysis results indicating factors associated with the practice of using shared sanitation facilities among households in the study

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Variable	Total N	Sharing sanitation facility		OR (95%CI)
		Yes *n* (%)	No *n* (%)	
Sex				
Male	498	54 (10.8)	444 (89.2)	1
Female	1253	202 (16.1)	1051 (83.9)	1.58 (1.14,2.18)
Age				
15 – 24	235	45 (19.2)	190 (80.8)	1
25 – 34	521	95 (18.2)	426 (81.8)	0.94 (0.63, 1.39)
35 – 44	441	59 (13.4)	382 (86.6)	0.65 (0.42, 1.00)
45 – 54	272	29 (10.7)	243 (89.3)	0.50 (0.30, 0.83)
≥55	282	28 (9.9)	254 (90.1)	0.46 (0.28, 0.77)
Location				
Rural	1215	160 (13.2)	1055 (86.8)	1
Urban	536	96 (17.9)	440 (82.1)	1.43 (1.09, 1.89)
Education level				
No formal education	271	22 (8.1)	249 (91.9)	1
Primary	1095	177 (16.2)	918 (83.8)	2.18 (1.37, 3.47)
Secondary	288	41 (14.2)	247 (85.8)	1.87 (1.08, 3.25)
Above secondary	97	16 (16.5)	81 (83.5)	2.23 (1.12,4.46)
Occupations				
Unemployed	186	24 (12.9)	162 (87.1)	1
Business	514	112 (21.8)	402 (78.2)	1.88 (1.17, 3.03)
Farming	804	84 (10.4)	720 (89.6)	0.78 (0.48, 1.27)
Employed	166	22 (13.2)	144 (86.8)	0.86 (0.52,1.80)
Self-employed	81	14 (17.3)	67 (82.7)	1.41 (0.69, 2.89)
Improvement status of the toilet				
Unimproved	581	68 (11.7)	513 (88.3)	1
Improved	1170	188 (16.1)	982 (83.9)	1.4 (1.07, 1.95)

Perceptions of respondents on the behaviour of sharing a sanitation facility

On the issue of whether the respondents felt comfortable sharing a sanitation facility with other households, the results were mixed. Only 43 (2.5%) out of 1,751 interviewed affirmed their readiness to tolerate sharing a sanitation facility subject to certain conditions being fulfilled. Of the 43 respondents who reported being ready to tolerate sharing, 22 were those who are currently sharing. Furthermore, of the 43 respondents, 25 (58.1%) claimed that they would tolerate sharing with their relatives, 16 (37.2%) with any other persons, and a few remaining ones (4.6%) stated that they could tolerate sharing with neighbours only. The results show further that, among the 43 respondents who expressed readiness to tolerate sharing sanitation facilities, 22 (51.2%) expressed their willingness to share a facility with less than five households; 21 (48.8%) claimed their readiness to share a facility with five or more households. As for the type of sanitation facility seeming reasonable to be shared, the majority, 37 (86.0%) of the respondents preferred squatting for hygiene reasons, the argument being that such type of facility seems much easier to clean and maintain than the pedestal type (Table 4).

Regarding the sex of respondents, the results show that of the 43 respondents who expressed readiness to tolerate sharing sanitation facilities with other households, females accounted for 33 (76.7%). However, the difference was not significant ($p>0.05$). A similar finding ($p>0.05$) was observed when considering the respondents falling in different age groups. Considering places of residence (rural or urban), the data showed that rural residents perceived to be ready to tolerate the practice of sharing a sanitation facility accounted for 51.2%; the rest were urban residents. Further, bivariate

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regression analysis showed that the likelihood of being ready to tolerate sharing sanitation facilities with neighbouring households or other people was 2.2 higher among the rural respondents than those found in urban areas (UOR=2.2; 95% CI: 1.20, 4.05). When comparing the data from each region separately, it was found that 18 (41.9%) among the 43 respondents being ready to tolerate the practice of sharing came from the Morogoro region, followed by those from the Tanga region, 16 (37.2%) and 9 (25.4%) came from Pwani region. However, the chi-square test indicated no significant difference (χ^2 = 3.1, df= 2, *p*= 0.21) (data not shown in the table).

Reasons for or against willingness to tolerate sharing a sanitation facility

The 43 respondents who reported being ready to share a sanitation facility were asked to state the reasons for their expressed readiness (Table 4). The reasons given include easy to maintain and clean (*n*=14; 32.5%), land space (*n*=9; 20.9%), and sharing the cost of construction (*n*=8; 18.6%). Other reasons stated were tenancy, physical disabilities and maintaining brotherhood (*n*=19; 44.1%). On the other hand, the overwhelming majority of the respondents (*n*=1,708; 97.5%) did not support sharing of sanitation facilities due to various reasons, including hygiene and safety issues, queues when the facility is occupied, and location of the facility that some of the shared facilities were located away from the residential houses (Table 4).

Table 4 | Perceptions of respondents concerning the practice of using shared sanitation facilities

Perception	***n* (%)**
Do you like/dislike sharing a sanitation facility? (*n* = 1,751)	
Like (Yes)	43 (2.5)
Dislike (No)	1708 (97.5)
Why do you find acceptable to use a shared sanitation facility (*n* = 43)	
Cost sharing – building one latrine cooperatively reduces cost of building it alone)	8 (18.6)
Easy to maintain	14 (32.5)
Reduce land space	9 (20.9)
Others (Tenancy & disabled)	19 (44.1)
Preferred design/model of sanitation facility to share (*n* = 43)	
Pedestal	6 (13.9%)
Squatting	37 (86.0%)
Reasons for disliking to use a shared sanitation facility (*n* = 1,708)	
Staying in queue while urgently in deed for relieving yourself	136 (8.0)
Dirtiness of multiple users - as some users are unhygienic in nature	1310 (76.9)
Lack of privacy – everyone knows you are using/in need of using a latrine	204 (11.9)
Location of the sanitation facility – some latrines not in user convenient places	24 (1.4)
Limited size of the sanitation facility pit – *some users drop excreta on floor*	67 (3.9)
Do not have any open reason (not ready to disclose the reason.	99 (5.8)
About the health advantages of using shared sanitation facilities? (*n* = 43)	
Users from different households having a cleaning roster)	6 (14.0)
About the disadvantages of using shared sanitation facilities? (*n* = 43)	
Disease transmission – possible contract of infectious disease pathogens	30 (69.8)

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When asked about the perceived nuisance regarding the use of shared sanitation facilities, the reasons include: unpleasant smell (*n*=305; 17.4%), the presence of flies (n=246; 14.0%), and the presence of faecal matter on the surface (*n*=152; 8.6%). Others were queue (*n*=13; 0.74%), lack of privacy (n=163; 9.3%), and water and urine on the floor (*n*=38; 2.2%). As regards the issue of the presence of faeces on the surfaces, the data showed that the respondents who habitually shared sanitation facilities were significantly 2.0 times more likely to report the presence of faeces on the surfaces than was reported by those who were using private sanitation facilities (UOR=2.0; 95% CI 1.36, 3.01).

Moreover, individuals using shared sanitation facilities seemed to be 1.6 times more likely to report the presence of an unpleasant smell than those using private sanitation facilities (UOR=1.6; 95% CI: 1.17, 2.20). Similar findings were observed with respect to the presence of flies (UOR=1.6; 95% CI: 1.10, 2.20), the existence of queue (UOR=7.0; 95% CI: 2.32, 20.9), and lack of privacy (UOR=3.4; 95% CI: 2.38, 4.86) as Table 5 shows.

Table 5 | Nuisance in shared and non-shared sanitation facilities as perceived by the respondents in the study

Perceived nuisance	Sanitation facility		OR (95% CI)
	Shared N=256 *n* (%)	Non-shared N=1495 *n* (%)	
Unpleasant smell			
No unpleasant smell	195 (76.2)	1251 (83.7)	1
Unpleasant smell	61 (23.8)	244 (16.3)	1.6 (1.17, 2.20)
Presence of flies			
No flies	207 (80.9)	1298 (86.8)	1
Flies present	49 (19.1)	197 (13.2)	1.6 (1.10, 2.20)
Faecal matter on the floor			
No faecal matter	219 (85.5)	1380 (92.3)	1
Faecal matter present	37 (14.4)	115 (7.7)	2.0 (1.36, 3.01)
Queue			
No queue	249 (97.3)	1489 (99.6)	1
Queue present	7 (2.7)	6 (0.4)	7.0 (2.32, 20.9)
Lack of privacy			
No privacy	202 (78.9)	1386 (92.7)	1
Privacy	54 (21.1)	109 (7.3)	3.4 (2.38, 4.86)
Water and urine on the floor			
No	247 (96.5)	1466 (98.1)	1
Yes	9 (3.5)	29 (1.9)	1.8 (0.86, 3.94)

Multivariate regression analysis

The results were obtained from multivariate logistic regression analysis using the data for the same variables as those highlighted above, the outcome variable being the habit of using shared sanitation facilities (i.e. *having been sharing a latrine*). The dependent variable was controlled for several independent variables. Specifically, the selected independent variables include the respondent's age, sex, rural or urban, main occupation, and education level attained. The findings show that the respondents who fell in the age group of 15-34 years were about 38% less likely to report sharing sanitation facilities than those aged 35 years or above (AOR=0.62; 95% CI: 0.47, 0.81). Respondents categorised as 'employed' were 0.60 times less likely to report using shared sanitation facilities than 'unemployed' ones (AOR=0.60; 95% CI: 0.46, 0.80). Similarly, the individuals who had accessed and acquired any formal education (primary or secondary or higher) were 1.56 more likely to have used

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shared sanitation facilities than those from the 'uneducated group', although the observed difference was not statistically significant (AOR=1.56; 95% CI: 0.96, 2.5).

Discussion

This study provides results augmenting findings reported from other studies carried out before indicating that the behaviour of households sharing sanitation facilities in Tanzania is standard since it is a cultural or traditional phenomenon as in the rest parts of the developing world (Mara & Alabaster, 2008; Katukiza *et al.*, 2010). The results presented in this study show that nearly 15% of the households surveyed have been sharing sanitation facilities.

This rate is slightly higher than the one (i.e., 10%) WHO & UNICEF (2014) reported in the same period. On the one hand, one may regard the figure on households sharing sanitation facilities reported from this study as impressive compared to the regional average for sub-Saharan Africa (SSA), which has been reported to be as high as 19.0% (WHO & UNICEF, 2015). It is interesting to note that even some of those who were sharing such facilities did not feel comfortable with the practice as they feared the chances of contracting infectious diseases. These and those who claimed to use or prefer shared sanitation facilities simply because they could share the construction cost imply that poverty-related conditions force people from different households to share latrines.

The observed difference between rural and urban residents in sharing sanitation facilities is not unexpected. It is not uncommon to find the practice of households using shared sanitation facilities in multi-habited houses, especially in overcrowded urban settings (Yetunderonke, 2015). The observed rural-urban differences in the reports on sanitation facility sharing habits are supported by research/program evaluation reports from other parts of SSA, which show that most urban households have been sharing sanitation facilities (WHO & UNICEF, 2015). One of the contributing factors is higher tenancy rates in those areas. Some evidence documented in the literature suggests that rural settings where large families, such as those with extended family linkages, face a similar sanitation-sharing practice as their urban counterparts (Yetunderonke, 2015).

One of the studies carried out in Dar es Salaam in 2014 revealed that the majority of urban rented residential houses had shared latrines, and the landlords used this opportunity to save the cost they would incur if they were to construct a sanitation facility for each tenant in the same multi-habited house (Jenkins *et al.*, 2014). Meanwhile, current records show that the national population growth in urban centres in Tanzania has been increasing rapidly - from nearly 6% in 1967 to about 30% in 2012 (Wenban-smith, 2015) while global estimates show that by 2050, nearly 70% of the population will be living in urban areas. The increased demand for sanitation infrastructure and associated facilities will likely continue to burden governments significantly (UNICEF, 2012).

From the gender point of view, females were more likely to report sharing sanitation facilities than their male counterparts. This could be because females interviewed might have been more honest than their male counterparts when asked to tell the truth about the habit of their households to share sanitation facilities with members belonging to other households. It is possible for the male heads of households to shy away when asked to testify that their families have been living by sharing latrines with neighbours to avoid losing their dignity or respect before the researcher. As experience from developing countries shows, possessing a sanitation facility symbolises social dignity among household members (Wenban-smith, 2015).

The results show that respondents with higher levels of education were significantly more likely to share a sanitation facility than those with less. This is contrary to our prior expectations. Intuitively, it was expected that literate people are more likely to avoid sharing sanitation facilities because of better knowledge than the illiterate about the associated health risks or because of being in a better

position to live in decent houses than their counterparts. This brings us to the observation that sometimes there is no correlation between people's knowledge about health risks, income levels, and health behaviours. Yetunderonke (2015) reported that people may not be uninformed of the dangers of sharing sanitation facilities but are sometimes forced to share facilities because they do not have an alternative, especially when they live in overcrowded centres. Furthermore, socio-ecological factors may influence an individual's behaviour, such as living conditions, genetic connections, social relationships, neighbourhoods, socio-economic policies, and, generally, the external environment (Wenban-smith, 2015).

The present study found that rural respondents were 2.2 times more likely to express readiness to tolerate the habit of sharing sanitation facilities than their urban counterparts. The possible explanation for why this has been the case is the one mentioned above regarding the social-ecological factors such as tradition or cultural values tending to influence people in a given community to live in certain kinds of social bondages (Wenban-Smith, 2015). This includes sharing certain beliefs and behaviours, among which is sharing sanitation facilities (Tumwebaze & Mosler, 2014).

If sharing a sanitation facility was optional, most people, including those interviewed in this study, could not opt for it. This perception is validated by testimonies from those living in rental houses and sharing a sanitation facility with other households living in the same house or compound. The respondents perceived sharing of sanitation facilities as disadvantageous or risky and was associated with certain nuisances, including dirtiness, inconveniences and queues. These results are similar to those found in studies carried out in other countries. For instance, Katukiza *et al*. (2010) found that respondents in rural Bangladesh preferred non-shared sanitation facilities to shared ones on hygienic grounds. However, the recently conducted study in Tanzania (Kabange & Nkansah, 2015) showed that, shared sanitation facilities were less contaminated than non-shared.

Conclusion

This study adds to the available evidence that sharing sanitation facilities is common in both urban and rural settings in Tanzania, as elsewhere in developing countries. The study has shown that most respondents perceived sharing a sanitation facility as unacceptable, particularly when more than five households share the facility. They indicated that shared sanitation facilities can be essential in some circumstances, such as when land space is limited and multi-habited rental houses are available. The drivers for sharing sanitation facilities are real, and based on the findings, shared sanitation facilities of up to five households are socially accepted. Therefore, the bottom line is to ensure the maintenance and cleanliness of the facility despite the sharing or non-sharing statuses.

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Authors contributions

Khalid Massa, Anyitike Mwakitalima, Amour Seleman, and Fadhili Kilamile conceived and investigated the study. Khalid Massa, Fadhili Kilamile, Amour Seleman, Anyitike Mwakitalima, Telemu Kassile, and Godfrey M. Mubyazi conducted the analysis. Khalid Massa, Fadhili Kilamile, Amour Seleman, Anyitike Mwakitalima, Jonas G. Balengayabo, Telemu Kassile, and Godfrey M. Mubyazi drafted the manuscript.

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Conflict of interest
None.

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