

# Social-Cultural Factors Influence on Management of Shared Sanitation, in Nakuru Town West Slums

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**Abstract:-** Sustainable Development Goal (SDG) target 6.2 calls for 'adequate and equitable sanitation for all.' However, rapid urbanization in developing countries has led to the growth of slums, where access to private toilets is impractical. Evident studies showed that shared toilets are more often poorly managed with adverse harmful health risks such as diarrheal diseases, environmental pollution, and economic deprivations. The study's specific objective was to establish social-cultural factors influencing the management of shared sanitation in Nakuru Town's west slums, Nakuru County, Kenya. The study adopted a convergent parallel mixed-method design involving 288 household heads selected through a cluster and random sampling technique. Data was collected using a structured questionnaire and interview guides. Descriptive statistics and inferential statistics was computed. The study findings indicated that the majority, 74.7%, of shared sanitation was poorly managed. The study established statistically significant associations of secondary education ( $p=0.024$ ), marital status ( $p=0.025$ ), user satisfaction ( $p=0.001$ ), household sharing ( $p=0.000$ ), social norms ( $p=0.001$ ), cultural beliefs ( $p=0.002$ ), Rituals on use and cleaning toilet ( $p=0.038$ ), Privacy and modesty concerns ( $p=0.002$ ) and management of shared sanitation. In conclusion, a large proportion of households in slums used poorly managed shared sanitation due to the influence of multiple factors like users' satisfaction, Household sharing, marital status, social norms, and cultural beliefs, thus polluting the public health of the place. The study recommended that the Government and all other agencies implementing sanitation promotion interventions should understand the social-cultural practices of the target communities and articulate this knowledge to tailor sanitation initiatives effectively. Future studies should focus on implementing and assessing the effectiveness of behavioral interventions.

**Keywords:-** Households; Management of Shared Sanitation; Shared Sanitation; Slums; Social-Cultural Factors.

## **Abbreviations:-**

**MSS** : Management of Shared Sanitation

**OD** : Open Defecations

**SS** : Shared Sanitation

**SSF** : Shared Sanitation Facilities

**UN** : United Nations

**LMICs** : Low- and Middle-Income Countries

## I. INTRODUCTIONS

Access to sanitation is a fundamental need and basic human right (UN, 2015), vital to environmental preservation, public health, and economic growth. However, sanitation remains a challenge with rapid unplanned urban development, especially in developing countries, including Kenya, which are characterized by unplanned settlements, poor housing, and poor infrastructure. Inadequate sanitation is responsible for around 10% of the global burden of diseases (GBD) worldwide. This includes 1.4 million fatalities from diarrhea and an additional 1.5 million deaths from respiratory infections caused by poor hygiene practices (Amref Health Africa, 2020). Around 1.5 billion people globally have been infected with soil-transmitted helminth (STH) (WHO, 2023). Neglected tropical diseases and diarrheal infections, such as cholera and typhoid, are responsible for over 432,000 fatalities in LMICs. In Kenya, as per (MoH), 2016 poor sanitation practices are associated with about 75% of the Country's disease burden, claiming the lives of over 19,500 Kenyans annually. Inadequate sanitation has attracted interventions, including shared sanitation, widely used in low-resource contexts.

Worldwide, about 8% of the population is using Shared Sanitation, with the majority, about 12%, in Central and Southern Asia and the highest, an estimated 19% in SSA (WHO/UNICEF, 2021), positively associated with a remarkable decline in open defecation (OD) practices.

In India, nearly 165 million people are using shared restrooms (Vu *et al.*, 2022), and the Indonesian government has encouraged the utilization of upgraded shared latrines to people in "replace the filthy "helicopter" latrines that many Demaan Urban-Village of Jepara Regency" were using (Sunatri *et al.*, 2021). Studies in Informal settlements in Asia and SSA have reported that more than 70% of dwellers rely on Shared Sanitation Facilities (SSF) (Alam *et al.*, 2021; Tumwebaze *et al.*, 2022; Ssemugabo *et al.*, 2021; Ssekamatte *et al.*, 2018; Kwiringira, 2017) with the majority of these facilities on poor condition. Over 48% of Kenya's urban populace uses SS (WHO/UNICEF, 2021), and about 75% of Nakuru Town Slums (United Nations Humans Settlement Programme (UN-Habitat), (2020) characterized by a high fill-up rate, low-quality structures that are dirty, smelly, and inaccessible (Muoria & Moturi, 2019). Therefore, there is a need to understand the aspects associated with unhealthy behavior.

Despite the remarkable contributions of shared toilets to the sanitation ladder (WHO & UNICEF, 2017), it is considered a temporary solution, limiting the effort of sanitation agencies toward its promotion. Some scholars (Ramlal *et al.*, 2022; Ramlal *et al.*, 2019; Pickering *et al.*, 2015) have agreed, citing public health issues, privacy and safety concerns. Others have disagreed, commenting on the social-cultural issues, numbers of users, and space aspects (Evans *et al.*, 2017; Tidwell *et al.*, 2019; Obeng *et al.*, 2022). Thus, additional research is required to determine the clues users link to appropriate shared restroom management.

Past studies have documented that Social-Cultural factors could have an impact on the choices, use, and maintenance of toilets (Adil *et al.*, 2021; Lopez *et al.*, 2019; Desye *et al.*, 2023; Donacho *et al.*, 2022; Mubatsi *et al.*, 2021; Chikozho *et al.*, 2019; Shiras *et al.*, 2018), however less focused on SSF. In Kenya, few studies have focused on Shared Sanitation, and some concentrate on accessibility and health outcomes (Muoria & Moturi, 2019) and quality aspects of SSF (Simiyu *et al.*, 2017; Schelbert *et al.*, 2020). The elements likely to affect users' behavior and decision-making regarding the usage and upkeep of shared toilets have received little attention (Simiyu *et al.*, 2020; Antwi-Agyei *et al.*, 2022). This study aimed to comprehend how Socio-cultural factors influence the Management of shared sanitation, using a case study of Nakuru Town West slums in Nakuru County.

## II. MATERIALS AND METHODS

### A. Study Design

A convergent parallel mixed-method design was used was used to obtain both quantitative and qualitative data.

### B. Study Area

The study was conducted within Informal settlements of Nakuru Town West Sub County, Nakuru County, Kenya. The study period was January 2024 to April 2024. According to UN-Habitat (2020), the Nakuru West sub-county has three major slums: Kaptembwo, Kwa Rhonda, and Githima. Disposing of human waste is a challenge in informal settlements and costs the Nakuru County Government KES 978 million annually (CGoN,2018).

### C. Target Population

Study targeted household heads over 18 years old and living in informal settlements of Nakuru Town West Sub-County. The total number of households was 28,008 (KNBS, 2019). Also, Key informants (KIs) were included: Landlords/caretakers, public health officers, and Community health leaders of the study area.

### D. Sampling Method

The number of participants for this study was determined using the formula recommended by Yamane (1967), to obtain sample size of 389 Households Heads. Cluster sampling technique was used in categorizing study area into clusters of respective six wards (KNBS,2019). Purposive sampling was employed to selected wards with slums and proportional simple random approach to choose household heads from selected the clusters. This approach guaranteed that individuals from a not evenly distributed population had an equitable chance to participate (Creswell, 2013).

### E. Data Collection Tools

Quantitative data was collected using Structured questionnaire electronically using mWater Survey by five trained enumerators. Open-ended interview guides were employed to gather qualitative data. The questionnaire was pre-tested in Lake View informal settlement in Nakuru Town East, Nakuru County, and was selected due to its proximity and characteristics similar to those of the study area. The instrument was tested for reliability using the split-half technique, and it determined that the Spearman Brown Coefficient of 0.867 was considered reliable.

### F. Data Analysis and Presentations

The quantitative data was analyzed using the Statistical Package for Social Sciences (SPSS) software Version 25 to generate descriptive statistics in frequency and proportion and presented using tables and charts. A binary logistic regression was used to analyze the association of socio-cultural factors with management of shared sanitations. Predictors having a P value of less than 0.25 in the bivariate analysis (univariate regression) were included in the multivariable logistic regression models for further analysis. The odds ratio with a 95% confidence interval was used to identify the factors associated with the dependent variables in the final model. Variables with p-values less than 0.05 were deemed

statistically significant. The qualitative data was categorized into themes based and then presented in narrative form.

### G. Ethical Considerations

Before collecting data, we got an introduction letter from Meru University of Science and Technology and a permit from NACOSTI Licenses No. NACOSTI/P/23/30258. Moreover, the study guaranteed that participants had the option to discontinue their involvement in the study at any given moment. Furthermore, they had the option to decline to answer any of the questions if they chose. The privacy of the participants' personal information was likewise guaranteed.

## III. RESULTS

### A. Demographics

Table 1: Socio-Demographic Characteristics of the Respondents

Variable	Frequency(N=288)	Percentage (%)
<b>Gender</b>		
Female	187	64.9
Male	101	35.1
<b>Age Bracket in years</b>		
18-35	124	43.1
36-50	120	41.7
51 and above	44	15.3
<b>Religion</b>		
Christian	231	80.2
Muslim	37	12.8
Others	20	6.9
<b>Marital Status</b>		
Single/Never Married	59	20.1
Married	189	65.6
Divorced	22	7.6
Widowed	19	6.6
<b>Level of Education</b>		
No Education	37	12.8
Primary education	65	22.6
Secondary education	125	43.4
College/University	61	21.2
<b>Presence of children of under 5 years in Household</b>		
Yes	176	61.1%
No	112	38.9%

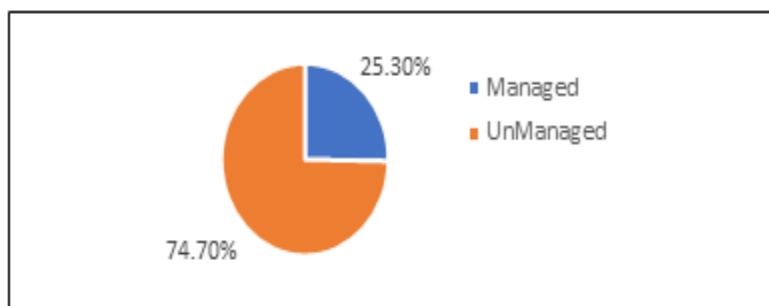
The study targeted 389 respondents with a 74% (288) response rate, an indication of adequate data for statistical analysis and interpretation (Mugenda & Mugenda, 2003). Table 1 shows that the majority, 64.9%, of the participants were females. The most, 43.1%, were within the age bracket 18-35 years, 43.4% had completed a secondary level of education, and the vast majority, 80.2%, were Christians. Over half, 65.6% of respondents were married, and 61.1% of households had at least one kid under the age of five years. Participants had an average of 3.95~4 members (SD = 1.575), the lowest being one and the highest being eight persons.

*B. Management of Shared Sanitation*

**Table 2 Cleanliness of Shared Sanitation**

Level of cleanliness of Shared Sanitation	Frequency(N=288)	Percentage (%)
very clean	13	4.5
clean	60	20.8
Somewhat clean	99	34.4
dirty	67	23.3
very dirty	49	17.0

**Table 2** shows that the majority 34.4% indicated to be somewhat clean, 23.3% indicated dirty, and 17.0% reported to be very dirty. On other hand, 20.8% reported to be clean and 4.5% to be very clean. The study considered Shared Sanitation Facilities (SSF) that were clean and very clean 25.3% as Managed Shared Sanitation, as presented in Figure 1. At the same time, SFF was reported to be somewhat clean, dirty, and very dirty at 74.7% (95% CI 69.6-79.7) as Unmanaged Shared Sanitation.



**Fig 1 Management of Shared Sanitation**

**Table 3 Cleaning Frequency of the Shared Sanitation**

Variable	Total (N =288) n (%)	Management of Shared Sanitation		p-Value
		Managed N = 73 n (%)	Unmanaged N = 215 n (%)	
<b>Cleaning Frequency</b>				<0.000
Daily	117 (40.6)	61 (21.2)	56(19.4)	
Once in 3 days	68 (23.6)	6(2.1)	62(21.5)	
When Dirty	48 (16.7)	3 (1)	45(15.6)	
Others	55(19.1)	3(1)	52(18.1)	

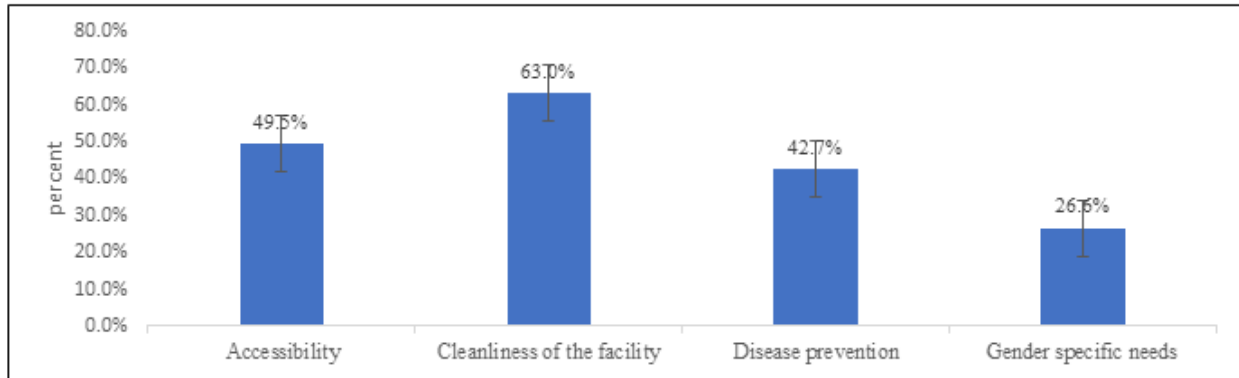
**Table 3** shows that 40.6% of respondents identified that the shared toilets in their compound were cleaned every day, while 23.6% reported that this happened once every three days, 16.7% reported that they were cleaned only when they were dirty, and 19.1% said that other frequencies were used. Additional chi-square test revealed substantial associations between cleaning frequency and MSS ( $\chi^2 = 74.940$ ,  $df = 3$ ,  $p = 0.000$ ).

**Table 4 Respondents' Satisfaction Management on Shared Toilets**

Variable	Frequency (N= 288)	Percent (100%)	p-Value
<b>Users Satisfaction</b>			<0.000
Very Satisfied	18	6.2	
Satisfied	86	29.9	
Neutral	88	30.6	
Dissatisfied	46	16.0	
Very Dissatisfied	50	17.4	

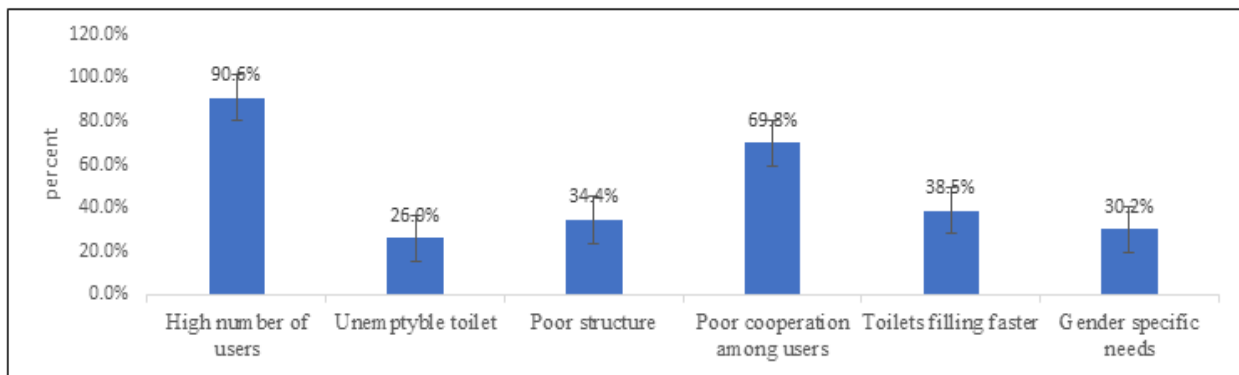
*Chi-squared or Fisher exact test used when appropriate*

The survey participants were tasked to rate their degree of satisfaction with shared toilet in the community using a five-point Likert scale. As seen in **Table 4** the majority 30.6% were not sure (neutral), 29.9% satisfied, and 6.2% very satisfied. In contrast, 16% were dissatisfied, and 17.4% were very dissatisfied. A mean score of 3.08 (SD = 1.184) was obtained, suggesting that the level of satisfaction had a substantial effect on Shared Sanitation Management.



**Fig 2 Users Satisfactions**

**Figure 2** shows aspects of user’s satisfactions, the majority 63% asserted the cleanliness of the facilities, 53.1% users’ cooperation, 49.5% accessibility/ only option available, 31.2% privacy aspect, and only 26,6%) recorded gender needs.



**Fig 3 Users Dissatisfactions**

The study further inquired reason for users’ dissatisfaction., as in Figure 3 most of the participants 90.6% identified high number of users, 69.8% poor cooperation among users, 38.5% shared toilets filling faster, 34.4% poor structure, 30.2% gender specific needs, and only 26% recorded Unempty shared toilets.

**Table 5 Influence of Households sharing on Management of Shared Sanitation**

Variable	Total (N =288) n (%)	Management of Shared Sanitation		p-Value
		Managed N = 73 n (%)	Unmanaged N = 215 n (%)	
<b>Households Sharing</b>				<0.000
2-4	103 (35.8)	48(16.7)	55(19.1)	
5-8	71(24.7)	9(3.1)	62(21.5)	
9 and above	114(39.6)	16(5.6)	98(34.0)	

**Table 5** showed that the majority of respondents, 39.6% were using toilet facilities by 9 and above households, 35.8% by 2-4 households, and 24.7% by 5-8 households The study noted a higher number of users of shared toilets from interviews. “*In my compound (plot) we have only four (4) facilities shared by 50 households*” [Female caretaker].

**Table 6 Influences of Traditional Roles on Management of Shared Sanitation**

Variable	Frequency (N =288) n (100%)	Management of Shared Sanitation		p-Value
		Managed N = 73 n (%)	Unmanaged N = 215 n (%)	
<b>Traditional roles</b>				<0.004
No	111(38.5%)	40(13.9%)	71(24.7%)	
Yes	171(59.4%)	32(11.1%)	139(48.3%)	
Don't know	6(2.1%)	1(0.3%)	5(1.7%)	
<b>Cleaning Duties</b>				0.022
Landlord/Caretaker	84(29.2%)	29(10.1%)	55(19.1%)	
Female Household members	119(41.3%)	21(7.3%)	98(34%)	
Volunteers	85(29.5%)	23(25.3%)	62(21.5%)	
Male household members	0	0	0	

When respondents were asked if the traditional distribution of roles and responsibilities within their community impacts the operation and maintenance of toilets., more than half, 59.4% of respondents, recorded that traditional role had an impact. The study inquired who cleaned the shared toilets in selected compounds/plots. The majority, 41.3%, of respondents reported that female household members were cleaning shared toilets in their compound. From interviews, the study found varied patterns of cleaning shared toilets. A predetermined timetable was established, assigning every household a set day for latrine cleaning. *"Toilets are cleaned daily by female members of assigned households. They are done in a specific order, and if households have no female members or are sick, they pay (KES100) one of them (female) to do the task."* [Male landlord].

**Table 7: Influence of Religious Beliefs on Management of Shared Sanitation**

Variable	Frequency (N=288) n%	Management of Shared Sanitation		p-Value
		Managed (N = 73) n (%)	Unmanaged (N = 215) n (%)	
<b>Religious beliefs</b>				<0.000
Does not Influence	52(18.1%)	21(7.3%)	31(10.8%)	
Slightly influence	32(11.1%)	11(3.8%)	21(7.3%)	
Moderately influence	101(35.1%)	10(3.5%)	91(31.6%)	
Strongly Influence	103(35.8%)	31(10.8%)	72(25.0%)	

The study revealed that 35.8% of the participants believed religion strongly influenced how sanitation facilities are managed, 35.1% moderately influenced, and only 18.1% reported that it does not influence. The findings revealed a mean value of 2.98(SD= 1.07), signifying that respondents perceive religion's moderate to strong influence on managing shared sanitation. The study further noted from interviews that religious affiliations, such as Christians, believed in cleanliness as holiness, encouraging them to promote sanctions access. *".. it is forbidden according to religious teaching (Christian) to use dirty toilet; the cleanliness is equally to holiness...."* [Female Community health leader]

**Table 8 Influence of Cultural Beliefs on Management of Shared Sanitation**

Variable	Total	Percent	Management of Shared Sanitation		p-Value
			Managed (N = 73) n (%)	Unmanaged (N =215) n (%)	
<b>Culture</b>					<0.001
Does not Influence	57	19.8%	26(9%)	31(10.8%)	
Slightly influence	62	21.5%	10(3.5%)	52(18.1%)	
Moderately influence	87	30.2%	19(6.6%)	68(23.6%)	
Strongly Influence	82	28.5%	18(6.2%)	64(22.2%)	
<b>Total</b>	<b>288</b>	<b>100%</b>	<b>73(25.3%)</b>	<b>215(74.7%)</b>	
<b>Cultural practices affecting management of SS</b>					
Taboo for males to clean toilet	115	39.9%	25(21.7%)	90(78.3%)	0.251
Child faeces not harmful	82	28.5%	19(23.2%)	63(76.8%)	0.592
Privacy and modesty concerns	151	52.4%	55(36.4%)	96(63.6%)	0.000
Rituals on use and cleaning toilet	176	61.1%	30(17%)	146(83.0%)	0.000

When asked how cultural beliefs influence the management of sanitation facilities, 30.2% of the participants reported moderate influence, 28.5% strong influence, and 19.8% indicated that culture does not influence. A mean score of 2.67 (SD = 1.09) was recorded, showing that participants observed cultural influence as a predictor of the management of shared sanitation. The findings were confirmed from interviews that some community members believed that using dirty Shared toilets was causing sickness due to curses, and some believed that children's faeces were not harmful. "One can feel sick with the dirty shared toilets due to bad spirits" [Male Landlord]

**Table 9 Influence of Social Norms on Management of Shared Sanitation**

Variable	Frequency n (100%)	Management of Shared Sanitations		Mean	SD	p-Value
		Managed N = 73 n (%)	Unmanaged N = 215 n (%)			
<b>Social Norm</b>				2.19	1.130	<0.000
Strongly Agree	94(32.6%)	23(8%)	71(24.7%)			
Agree	97(33.7%)	41(14.2%)	56(19.4%)			
Neutral	60(20.8%)	4(1.4%)	56(19.4%)			
Disagree	22(7.6%)	4(1.4%)	18(6.2)			
Strongly Disagree	15(5.2%)	1(0.3%)	14(4.9%)			
<b>Total</b>	<b>288(100%)</b>	<b>73(25.3%)</b>	<b>215(74.7%)</b>			
<b>Management measures</b>						
Collective Responsibilities	215(75.4%)	61(21.2)	157(54.5)			<0.070
Shame	82(28.5%)	19(6.6)	63(21.9)			<.0577
Sanction/Penalties	74(25.7%)	15(5.2)	59(20.5)			< 0.236
Boundary Definitions	155(53.8%)	29(10.1)	126(43.8)			< 0.005

As in **Table 9**, about a third 33.7% of respondents agreed, and 32.6% strongly agreed that social norms had impact on sanitation. Moreover, a small percentage of respondents were neutral (20.8%), disagreed (7.6%), or strongly disagreed (5.2%) with the idea that social norms impact the management of shared Sanitation. Regarding the measures guiding the management of shared Sanitation, most respondents (75.7%) reported collective responsibilities as a guiding factor. Additionally, over half of the respondents (53.8%) indicated the importance of boundary definitions. A smaller percentage (28.5%) identified shame and (25.7%) sanction/penalties as guiding measures for managing Shared Sanitation. The study noted some plots had defined boundaries, including locking toilets with padlocks to prevent intruders and ensure used by specific households. "... Toilets are locked with padlock, and keys shared among households sharing" [Male Landlord].

## C. Logistic Regression Analysis

**Table 10: Logistic Regression for Social-Demographic Factors Influencing Management of Shared Sanitation**

Social- Demographic	Management of Shared Sanitation		Crude Odds Ratio (95% CI)	p-value	Adjusted Odds Ratio (95% CI)	p-Value
	Managed	Unmanaged				
<b>Gender</b>						
Male	24(8.3%)	77(26.7%)				
Female	49(17.0%)	138(47.9%)	1.139 (0.649-1.999)	0.650		
<b>Age in years</b>				0.067		.185
18-35	40(13.9%)	84(29.2%)	Ref		1	
36-50	24(8.3%)	96(33.3%)	0.525 (0.239-0.942)	<b>0.031*</b>	0.548 (0.29-1.04)	0.066
51 and above	9(3.1%)	35(12.2%)	0.540 (0.237-1.231)	0.143	0.736 (0.29-1.935)	0.535
<b>Level of education</b>				<b>0.028*</b>		
No education	6(2.1%)	31(10.8%)	Ref		1	
Primary education	9(3.1%)	56(19.4%)	0.830 (0.270-2.551)	0.745		
Secondary education	39(13.5%)	86(29.9%)	2.343 (0.904-6.074)	0.080	2.305 (1.117-4.575)	<b>0.024*</b>
Tertiary	19(6.6%)	42(14.6%)	2.337 (0.836-6.537)	0.106	2.407 (0.939-5.377)	0.069
<b>Marital status</b>						
Single	21(7.3%)	78(27.1%)	Ref		1	
Married	52(18.1%)	137(47.6%)	1.410 (0.791-2.513)	0.244	2.168 (1.104 -4.255)	<b>0.025*</b>
<b>Household size</b>	215(74.7%)	73(25.3%)	0.865 (0.729-1.028)	0.100	0.911 0.761-1.138	0.481
<b>Presence of Child under 5 years</b>						
No	36 (12.5%)	76(26.4%)	Ref			1
Yes	37(12.8%)	139(48.3%)	0.526 (0.328-0.926)	<b>0.036*</b>	0.500 (0.271-0.922)	<b>0.027*</b>
*= $P < .05$ , OR- Odds Ratio, aOR- Adjusted Odds Ratio CI -Confidence Interval, Ref (1)-Reference, Single- never married /divorced/widowed						

**Table 10** revealed that there was a statistically significant relationship between level of education ( $p=0.024$ ), marital status ( $p=0.025$ ), and presence of child under five years ( $p=0.027$ ) and management of Shared Sanitation. There were no statistical associations between gender, age, household size, or management of shared sanitation. In univariate model as seen in Table 10, female-headed households had a slightly increased but statistically insignificant unadjusted odds ratio of 1.139 times (OR=1.139, 95% CI = 0.649-1.999  $P=0.650$ ) for managing shared sanitation compared to male-headed households. Participants aged 36-50 showed a significant association with reduced odds of 0.525 (OR= 0.525, 95% CI = 0.239-0.942,  $p=0.031$ ) of managing shared sanitation compared to those aged 18-35. As compared with respondents with no education, those with secondary and tertiary had increased crude odds of 2.43 (OR= 2.434, 95% CI: 0.239-0.942,  $p=0.080$ ) and 2.34 (OR= 2.337, 95% CL:0.836-6.537,  $p=0.106$ ) respectively, with no significant associations with the Management of Shared Sanitation. The married household head had increased statistically insignificant crude odds of 1.410 (OR= 1.410, 95% CI:0.791-2.513,  $p=0.244$ ) of managing Shared Sanitation compared to single respondents. The study found that with an increase in household size, the likelihood of shared management was reduced by 0.865 units (OR= 0.865, 95% CI:0.729-1.028,  $p=0.100$ ), although not statistically significant. The households with children under 5 years had a statistically significant impact on managing Shared Sanitation with reduced odds of 0.526 (OR= 0.526, 95% CI: 0.328-0.926,  $p=0.36$ ). From multivariate, the associations of married household heads with increased odds of 2.168 (aOR= 2.168, 95% CI = 1.104 -



4.255,  $p < 0.05$ ) and households with children under 5 years with reduced odds of 0.500 (aOR= 0.500, 95% CI = 0.271-0.9225,  $p < 0.05$ ), remained statistically significant with management of SS after adjusting other covariates. The Household Heads with secondary education recorded statistically significant higher odds of 2.305 (aOR= 2.305, 95% CI = 1.117-4.575,  $p < 0.05$ ) of management of Shared Sanitation (**Table 10**)

**Table 11: Logistic Regression for Social-Cultural Factors Influencing Management of Shared Sanitation**

Social factors	Management of Shared Sanitation		Crude Odds Ratio (95% CI)	p-value	Adjusted Odds Ratio (95% CI)	p-Value
	Managed N(n%)	Unmanaged N(n%)				
<b>Users' satisfaction</b>						
Dissatisfied	6(2.1%)	90(31.2%)	Ref		1	
Satisfied	67(23.3%)	125(43.4%)	8.040(3.341-19.346)	<b>0.000*</b>	5.84(5.804,1.94)	<b>0.002*</b>
<b>Households sharing</b>				<b>0.000*</b>		
2-4	48(16.7)	55(19.1)	ref		1	
5-8	9(3.1)	62(21.5)	0.187 (0.097-0.360)	<b>0.000*</b>	0.261(0.117-.58)	<b>0.001*</b>
9 and above	16(5.6)	98(34.0)	0.166 (0.075-0.370)	<b>0.000*</b>	0.146 (.052 -.406)	<b>0.000*</b>
<b>Traditional roles</b>						
No	41(14.2%)	76(26.4%)	Ref		1	
Yes	32(11.1%)	139(48.3%)	0.427 (0.249-0.733)	<b>0.002*</b>	0.595(0.258-1.37)	0.224
<b>Religious beliefs</b>				<b>0.000*</b>		<b>0.004</b>
Does not Influence/	21(7.3%)	31(10.8%)	Ref		1	
Slightly influence	11(3.8%)	21(7.3%)	0.763 (0.309-1.932)	0.182	3.476(.779-15.50)	0.103
Moderately influence	10(3.5%)	91(31.6%)	0.162 (0.069-0.382)	<b>0.000*</b>	0.617(0.158-2.40)	<b>0.486</b>
Strongly Influence	31(10.8%)	72(25.0%)	0.677 (0.317-1.275)	0.202	3.33(.934-11.89)	0.064
<b>Social norm</b>				<b>0.000*</b>		<b>0.001*</b>
Disagree	5(1.7%)	70(24.3%)	Ref		1	
Neutral	4(1.4%)	18(6.2%)	3.11 (0.757-12.783)	0.115	1.936(.335-11.19)	0.461
Agree	64(22.2%)	127(44.1%)	7.055 (2.713-18.348)	<b>0.000*</b>	6.60(.2.12-20.592)	<b>0.001*</b>
<b>Management measures</b>						
Shame	19(6.6)	63(21.9)	0.830 (0.456,1.511)	0.542		
Collective Responsibilities	61(21.2)	157(54.5)	1.755 (0.851-3.622)	0.128	0.50(0.191-1.31)	0.159
Sanctions	15(5.2)	59(20.5)	0.659 (0.331-1.311)	0.254	2.20(0.902-5.37)	<b>0.083</b>
Boundary definitions	29(10.1)	126(43.8)	0.426 (0.245-0.743)	<b>0.003*</b>	0.58(.252-1.338)	0.202
<b>Cultural beliefs</b>				0.002*		
Doesn't influence	26(9)	31(10.8)	Ref	1		
Slightly influence	10(3.5)	52(18.1)	0.229 (.098-0.539)	0.001*	0.265(.073-.959)	<b>0.043*</b>
Moderately influence	19(6.6)	68(23.6)	0.333(0.161-0.690)	0.003*	0.461(.147-1.449)	0.185
Strongly influence	18(6.2)	64(22.2)	0.335(0.160-0.702)	0.004*	0.845(.273-2.613)	0.770
<b>Cultural practices</b>						
Taboo for males to clean	25(21.7%)	90(78.3%)	0.72(0.416,1.259)	0.255		
Child faeces not harmful	19(23.2%)	63(76.8%)	1.273 (0.645-2.51)	0.487		
Toilet rituals	30(17%)	146(83.0%)	0.487(0.267-0.868)	0.015*	0.685(.289-1.624)	0.390
Privacy concerns	55(36.4%)	96(63.6%)	3.172(1.609-6.254)	0.001*	3.4(1.515-7.63)	<b>0.003*</b>

\*= $P \leq .05$ , OR- Odds Ratio, aOR- Adjusted Odds Ratio CI -Confidence Interval, Ref (1)-Reference

**Table 11** shows that there were statistically significant associations between user satisfaction ( $p=0.002$ ), household sharing ( $p=0.000$ ), religious belief ( $p=0.000$ ), social norms ( $p=0.000$ ), cultural beliefs ( $p=0.002$ ), privacy concerns ( $p=0.003$ ), and management of Shared Sanitation. From univariable analysis; User satisfaction was found to be a strong predictor, with satisfied users having significantly higher crude odds of 8.040 (OR= 8.040, 95% CI: 0.341-19.346,  $p=0.000$ ) of managing shared sanitation compared to dissatisfied users. In contrast, the number of households sharing sanitation facilities showed a statistically significant negative association with sanitation management ( $p = 0.000$ ). Shared Sanitation Facilities shared by 5–8 households had lower unadjusted odds of being well-managed (OR = 0.187, 95% CI: 0.097–0.360,  $p = 0.000$ ) compared to those shared by 2–4 households. Similarly, facilities shared by 9 or more households exhibited even lower odds of being managed effectively (OR = 0.166, 95% CI: 0.075–0.370,  $p = 0.000$ ). The study also revealed that participants adhering to traditional gender roles were 0.427 times less likely to manage shared sanitation effectively (OR = 0.427, 95% CI: 0.249–0.733,  $p = 0.002$ ) compared to those who did not adhere to such roles. Furthermore, participants whose behaviors were moderately influenced by religious beliefs were 0.162 times less likely to manage shared sanitation effectively (OR = 0.162, 95% CI: 0.069–0.382,  $p < 0.001$ ) compared to those whose sanitation behaviors were not influenced by religion, social norms showed statistically significantly positive relationship with the management of shared sanitation facilities ( $p = 0.000$ ). Agreement with social norms regarding sanitation behaviour was associated with increased unadjusted odds of 7.055 (OR= 7.055, 95% CI: 2.713-18.348,  $p=0.000$ ) of managing Shared Sanitation. On the management measures, boundary definitions were statistically significant with a reduced crude odds ratio of 0.426 (OR= 0.426, 95% CI: 0.245-0.743,  $p=0.003$ ) of managing Shared Sanitation. Household heads whose sanitation behaviors were strongly or moderately influenced by cultural beliefs exhibited reduced unadjusted odds of managing shared sanitation effectively, with odds ratios of 0.335 (OR = 0.335, 95% CI: 0.160–0.702,  $p = 0.004$ ) and 0.333 (OR = 0.333, 95% CI: 0.161–0.690,  $p = 0.003$ ), respectively, compared to those whose sanitation behaviors were not influenced by cultural beliefs. The study also found that, Participants who practiced specific toilet rituals had significantly reduced unadjusted odds 0.487 of managing shared sanitation (OR = 0.487, 95% CI: 0.267–0.868,  $p = 0.015$ ). Privacy concerns were strongly associated with better management of shared sanitation facilities. Participants that expressed concerns about privacy had significantly higher odds of 3.172 (95% CI: 1.609–6.254,  $p = 0.001$ ) of effective management shared toilet. In multivariable analysis, as shown in Table 4-11, user satisfaction (aOR = 5.84, 95% CI: 1.94–17.53,  $p = 0.002$ ), a facility shared by 5-8 households (aOR = 0.261, 95% CI: 0.117–0.580,  $p = 0.001$ ), a facility shared by 9 or more households, (aOR = 0.146, 95% CI: 0.052–0.406,  $p = 0.000$ ) agreement with social norms (aOR = 6.60, 95% CI:

2.12–20.592,  $p = 0.001$ , slight cultural influence (aOR = 0.265, 95% CI: 0.073–0.959,  $p = 0.043$ ) and privacy concerns (aOR = 3.40, 95% CI: 1.515–7.63,  $p = 0.003$ ) remained statistically significant after adjusting other factors

#### IV. DISCUSSIONS

The study identified social-cultural factors related to management of shared toilets in slums of Nakuru Town West, Kenya. The factors include, secondary educations, users' satisfaction, Household sharing, marital status, social norms, and cultural beliefs. The significant association between education and the management of shared toilets can be explained by the fact that education directly influences informed choices regarding health and proper sanitation measures inside families. Findings support research that have demonstrated educational impact Sanitation practices; higher levels of education are associated with the adoption of healthy behaviors (Donacho *et al.*, 2022; Desye *et al.*, 2023; Keffeni & Yallev, 2018; Osumanu *et al.*, 2019). The results disagree with Mubatsi *et al.* (2021) study in the informal settlement of Kampala, Uganda. They found that households who have completed their basic education were shown to have a lower probability of possessing long-lasting toilet facilities, commenting that education provided them jobs and, hence, less time to manage toilets.

The study found a statistically significant association between marital status and the management of Shared Sanitation. The association can be explained by social support and local customs emphasizing household cleanliness and hygiene as part of marital responsibilities, leading to a greater focus on properly managing shared sanitation facilities among married individuals. The significant association between the presence of children under 5 years in households and the management of shared toilets is attributed to the motive to protect children from unhygienic facilities and health risks that align with common expectations. However, the study found a negative association, possibly due to unhealthy behaviors by children and lack of supervision. Studies have collectively suggested that while the presence of children under 5 years may not directly impact the management of shared toilets, it does play a role in the overall sanitation and hygiene practices, which can have significant health implications (Fuller *et al.*, 2014; Ramlal *et al.*, 2019). The findings reported by Fuller *et al.* (2014), in a study using Demographic and Health Survey data covering 51 countries between 2001 and 2011, found that sharing sanitation facilities was a protective factor against diarrhea among under-five children. An indication that shared sanitation facilities may present challenges in management and hygiene; however, they still contribute to reducing health risks compared to having no sanitation facilities. This study found significant associations between the number of households sharing and the management of shared toilets, possibly because of conflict, poor cooperation, and indiscriminate disposal of solid waste. The findings support

Studies have documented that the quality of SSF decreases substantially as the number of users increases (Chikozho *et al.*, 2019; Shiras *et al.*, 2018; Simiyu *et al.*, 2020).

This study found a statistically significant relationship between social norms and the management of shared Sanitation. The relationship is likely due to effective coordination, cooperation, and good user relations. The study found that those who agreed with social norms were about 6.6 times more likely to manage shared toilets. The results agreed with the findings in a study by Adil *et al.* (2021) in Pakistan and Lopez *et al.* (2019) in Ecuador; they claimed that social norms impacted improving Sanitation. The study further noted compound with measures such as sanctions and boundary definitions, including restrictions, toilets were about 2 times more likely to be managed. Similar findings were reported by Simiyu *et al.* (2020), Chipungu *et al.* (2019) and Shiras *et al.* (2018) alluding that social cohesion, user cooperation, boundary definitions, proper communication, and conflict resolution impact Shared Sanitation cleanliness.

The culture showed statistically significant relationship with the management of shared Sanitation. Those with moderate and slight cultural beliefs were less likely to manage shared toilets than those who did not believe. This is attributed to cultural elements, including taboos and values that tend to influence behaviors, attitudes, and decision-making processes related to hygiene, cleanliness, and shared space maintenance. The cultural practices, including superstitions or rituals on using and cleaning shared toilets, and privacy and modesty concerns were positively associated with the management of shared Sanitation. This is possible due to values related to cleanliness. These findings were consistent with the study by Dwipayanti *et al.* (2019) in rural India and Aiemjoy *et al.* (2017) in rural Ethiopia. They argued that community values related to harmony and purity and taboos tend to influence priorities for resources and commitment to toilet use and maintenance activities.

## V. CONCLUSIONS

The study concludes that the majority of the households in the slums utilize inadequately regulated shared sanitation facilities despite sanitation stakeholders' efforts to promote sanitation access, and may endanger public and environmental health. Poor management was significantly influenced by the level of education (secondary education), marital status, households with children under 5 years, user satisfaction, number of households sharing, religious beliefs, social norms, and cultural beliefs.

## RECOMMENDATION

A multitude of social and cultural factors influenced the effective management of shared sanitation facilities. Therefore, we recommend that the government and all other agencies implementing sanitation promotion interventions properly understand the social-cultural practices of the target communities and use this knowledge to tailor sanitation initiatives effectively. Additionally, sanitation stakeholders should conduct more awareness campaigns tailored to specific social and cultural contexts, which will be crucial in fostering positive behavioral change. Prospective studies should focus on implementing and assessing the effectiveness of behavioral interventions.

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