

ORIGINAL ARTICLE

An examination of factors influencing open defecation among households in Lukaya town council, Kalungu District, Uganda

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ABSTRACT

Background: Open defecation has been established to be an international health challenge especially so in developing economies like Uganda. This study was carried out in Lukaya Town Council in Kalungu District, Uganda. It aimed at establishing factors associated with open defecation among households in this Town Council.

Methods: The study used cross-sectional design, with quantitative and qualitative approaches. The study sample was 370 primary respondents in households and 7 Key informants. Systematic random sampling technique was used to select the primary respondents, and purposive sampling was used to select the key informants. Both open and close ended structured questionnaires were used to collect the quantitative data, while a key informant interview guide was used to collect the qualitative data.

Results: The study established that the prevalence of open defecation among households in this Town Council was 23.2%. Multivariate data analysis showed that having positive cultural beliefs significantly decreased the likelihoods of occurrence of open defecation (AOR=0.477; CI: 0.224 - 1.015; P=0.035), while having traditional type of toilet facility significantly increased the likelihood of occurrence of open defecation among the households (AOR=5.839; CI: 1.533 - 22.242; P=0.010).

Conclusions: Addressing open defecation in this Town Council requires among others a comprehensive approach that includes improving toilet infrastructure and reducing negative cultural beliefs. It is recommended that effort be placed towards improving toilet infrastructure and prioritizing education and awareness.

Keywords: Open defecation, Toilet facilities in households, factors associated with open defecation

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INTRODUCTION

The number of individuals involved in open defecation between 2000 and 2022 has been reported to have dropped from 1.3 billion to 419 million by UNICEF and WHO's Joint Monitoring Program (JMP). However this dangerous practice is still a major challenge and a significant health hazard in developing economies hence also mentioned as an important global Sustainable Development Goal 6 [1].

WHO describes open defecation as “The proportion of the population who usually don't use any kind of toilet facility for defecation. Those using unimproved toilet facilities like pit latrines without slab, open pit, or hanging latrines, are not counted as practicing open defecation” [1, 2].

Developing economies have been reported to be significantly affected by open defecation [3,4]. Reports further show that by 2019, about 2 billion people around the world did not have access to sanitary facilities. Among these, open defecation was more common in homestead areas [5]. Around the world, about 673 million people practice open defecation, with higher incidences in developing economies (1). Open defecation contributes heavily to the spread of fecal-borne pathogens and enhances the spread of diarrhea diseases, especially among infants (2).

Open defecation has been directly linked to a number of individual factors like low incomes, inadequate facilities, and low of education and awareness regarding public health practices. One of the goals set by the United Nations for achieving Sustainable Development (SDGs) is to eliminate open defecation by 2030 (SDG 6.2) [6]. However, the global efforts have been relatively slow especially in rural areas. Recent reports indicate that countries with high rates of open defecation also show many cases of poor nutrition and stunted growth in children which results in poor cognitive development [7, 8]. Recent reports have also highlighted that females face higher risks of sexual violence when they lack access to secure sanitary facilities [8].

Africa is globally more exposed to challenges of open defecation. In Sub-Sahara Africa, about 23%

of the population practice open defecation. Reports further indicate that the highest levels have been reported in the following countries: Nigeria, Ethiopia, Niger, the Democratic Republic of Congo, Burkina Faso, and Chad [9]. The increasing urban population and lack of sanitary facilities coupled with cultural norms has contributed to high rates of open defecation in Africa. Several regional policies have been launched by regional bodies like the African Union to address this challenge. For example the African Sanitation Policy Guidelines which provides a framework for member states to develop effective sanitation policies [10, 11]. The Sanitation and Water for All partnership program has been working at supporting developing economies to achieve sanitation targets of the SDG. But despite these and several other efforts, the progress towards reducing open defecation in Africa has been generally low [12].

However, some African countries have made major steps in reducing open defecation by intensifying community involvement in sanitation programs and increasing financial support to sanitation facilities. However, many other African countries still struggle due to economic hardships, political instability and very poor access to water [13, 14].

In East Africa, open defecation is reported to be high especially in rural areas, where infrastructure is poor. To address this challenge, the East Africa Community developed a Sanitation and Hygiene Strategy. This strategy aims at promoting sustainable sanitation practices and enhancing cross-border cooperation in water and sanitation management [10]. This is in addition to national policies and programs designed to improve sanitation facilities and behavioral change through education and awareness campaigns [4, 11].

In Uganda, an East African country, it has been reported that nearly 23% of the population practiced open defecation. It is further reported that the major factors contributing to this high rate include socioeconomic disparities, lack of awareness on toilet use, and limited water availability (3). The Uganda government has developed several initiatives which include the National Hygiene and Sanitation Policy and the Water, Hygiene and Sanitation awareness program. The above approaches aim at improving and effective use of toilet facilities in schools and communities [15]. However despite these government

initiatives, several challenges like limited resources and cultural beliefs has made it relatively difficult to achieve expected results in Uganda [3, 15].

Further studies in Uganda have revealed that open defecation is influenced by many factors which include income status, knowledge and exposure levels, and availability of water and sanitation facilities [16]. Homes having better income levels and education reported being more likely to construct and use sanitary facilities. However, less privileged households often lack the resources to build sanitation facilities resulting in higher open defecation prevalence [3, 15, 16].

Hence the need to explore the various factors (individual and institutional playing a leading role in existing open defecation practices in this Town Council.

Objectives

The objectives of this study were therefore to:

Determine the socio-demographic factors influencing open defecation among households in Lukaya Town Council.

Assess the environmental and sanitation-related factors contributing to open defecation in the community.

Establish which socio-demographic and environmental- sanitation related factors are most significantly associated with open defecation among households.

Identify barriers to the adoption and consistent use of improved sanitation facilities in Lukaya Town Council.

The findings of this study are therefore important in informing the development of relevant interventions that will contribute towards resolving the major causes of open defecation, hence contribute to the reduction of this practice.

MATERIALS AND METHODS

This was a cross sectional study based on the positivism philosophy [17] and hence used both quantitative and qualitative strategies of data collection design as described by Cherry in 2024 [18] and Nardi in 2018 [19] which is a convergent parallel research approach. This enabled the qualitative data explain and reinforce the data and results from quantitative data collected.

The target households

Lukaya town council is found in Lukaya District about 60 km south west of Uganda. It has 5,702 house holds [20]. These are homes where individuals or families stay / live. Other types of residential or business premises were excluded from the study.

The Sample Population

From the target households of 5,702 households a sample was calculated using the Kothari formula [21] and was determined to be 372 households. The sampling interval was determined by dividing the total number of households in the sampling frame by the sample size. This was established to be 14. So the selection of 372 households was from every after 14 households the next was selected till the final number of 372 was arrived at. The systematic random sampling method ensured that every household in the sampling frame had an equal chance of being selected, thereby enabling the effective representation of the sample.

Data Collection

Research assistants who were trained and oriented by the researcher collected the data.

The researcher conducted household visits and directly engaged with an adult (above 18 years) in each household. In the event of finding no adult present the researcher moved to the next household. Data collection in each household took 30 to 45 minutes.

For quantitative data, a questionnaire was the tool used in data collection. This questionnaire had a total of 17 questions in 3 sections. Section A collected individual factors data of the household head and had 12 questions. Section B collected data on community factors and had 4 questions. Section C collected data on household open defecation and had only one question.

The questions were aligned to the study variables as follows: the first variables was individual characteristics of respondents that included sex, age, marital status, religion, cultural beliefs, education level, knowledge, attitudes, perception, employment status, and income. The second set of variables were related to community factors that included availability of toilet, type of toilet, availability of water source and type of water source; while the outcome variable was

occurrence of open defecation among households. For qualitative data, 7 key informants were targeted and a Key Informant guide was used (Akhter, 2022 (22)). The Key Informants were: the Town Clerk, the Town Council Medical Officer, the Town Council Health Inspector, the LC 3 Chairperson, the LC 1 Chairpersons (2). one cultural leader.

Both these tools were translated into the local language to enable effective data collection.

Validity and Reliability

The Content Validity Index (CVI) was used and calculated to be 0.81. which was found to be within the acceptable range (23).

To establish the reliability of the instruments, a pilot study of 10 households from a nearby Town Council (away from the target Town Council) was undertaken using the SPSS Statistics and as described by Collins in 2007 (24). The final CVI was established to be 0.886 indicating that the questions were suitable for the study.

Data Analysis

The data collected was sorted, edited, and cleaned before being loaded into the computer. The questionnaires were thoroughly reviewed for completeness, correcting errors such as misplaced information, numerical mistakes, and incorrect responses by cross-checking the required details. The cleaned data was then input into Microsoft Excel and subsequently exported to Statistical Packages for Social Scientists (SPSS) version 27.0 for Windows for further analysis.

In SPSS, data cleaning was refined using frequencies and percentages to remove outliers, and continuous variables like age were transformed and categorized. Statistical analysis was performed at various levels which included univariate, bivariate, and multivariate. Descriptive statistics was conducted by generating frequency tables and proportions. The Pearson chi-square test was used to identify individual and community factors linked to open defecation among households. Crude odds ratios were calculated at a 95% confidence level. In order to identify factors independently and statistically associated with open defecation among households and to adjust for confounding variables, binary logistic

regression analysis was undertaken at the multivariate level. The factors with a p-value below 0.05 were recorded to be independently and statistically associated with open defecation.

The study was a cross sectional by nature, where data was collected at one point in time. To reduce temporal association and yet draw predictive conclusions based on these differences, a high number of respondents was involved and this enabled the right conclusion of the study findings to be made.

Ethical Considerations

To maintain confidentiality, the participants were assigned unique codes to ensure anonymity, and all data was stored in secured, password-protected digital files and locked physical cabinets. Access to this data was restricted to the research team only.. Participants were assured that their data would not be shared with third parties without their explicit consent. The research team adhered to strict confidentiality protocols to ensure that personal identifiers were not disclosed in any research outputs.

All participants were fully informed of their rights and signed off following a detailed description of the study. It was also clarified that participation in this study was entirely voluntary. All participants who agreed to participate signed a form of consent which also indicated that they are free to opt out at any stage as they wish.

The research received authorization from the Bugema University Research Ethics Committee BU-REC 2024-74.

RESULTS

A total of 372 respondents were sampled and responses from 370 respondents were received giving a response rate of 99.5%.

It was established that 86 of the 370 households (23.2%) practice open defecation in Lukaya Town Council. This indicates that a considerable portion of the population still engages in open defecation practices. A key informant (KI 1) confirms this:

“There is a high prevalence rate of open defecation in our Town Council and it is related to poor access to proper sanitation facilities” (KI 1)

The first objective was to establish the socio-demographic factors affecting open defecation of the 370 respondents and these are given in Table 1 below. The results show that 50.3% were females and a bigger proportion (46%) were above 34 years. The results further show that 62.4% were married and 69.7% are Christians. However a very high proportion (90.8%) had post-primary level of education (See Table 1).

The results in Table 1 further show that a higher (84.3%) proportion of respondents had positive cultural beliefs and are highly (87.3%) knowledgeable about open defecation, An equally high percentage (88.4%) have a positive attitude and a positive perception (86.2%). The households having a size of 5 and above members are 75.1% and also have moderate (76.2%) household income levels.

On the above results, two key informants (KI 3 and KI 6) observed that:

“Though most of our people here are educated they still do not want to use toilets and think that the Government should be the one to provide toilets to them” (KI 3)

“The residents here earn enough money to build good water system toilets but they think it is not very important” (KI 6).

The second objective established the environmental and sanitation related factors to open defecation in this Town Council, and the results are given in Table 2.

The results in Table 2 on sanitation related factors shows that the majority (94%) of the participants had a toilet facility though only 74% had the improved pit latrines. On environmental related factors, most (94.3%) of the households had a water source available but only 33.2% had piped water facility.

On the above environmental and sanitation related factors, two key Informants (KI 2, KI 5) reported that:

“The community here strongly believes that in a Town Council it is the central government to provide toilet facilities to everybody” (KI 2).

“Our Lukaya Town Council does not have resources to provide adequate public toilets to its residents, but even if it had it cannot provide private toilets in peoples homes” (KI 5).

The third objective established which socio-demographic and environmental-sanitation related factors are most statistically significantly associated with open defecation among households.

This significance was established using binary regression analysis and the results are given in Tables 3 and 4 respectively.

Among the socio-demographic factors (Table 3), the results showed that only three factors, that is, cultural beliefs ($\chi^2 = 6.479$, $p = 0.011$), household income ($\chi^2 = 9.468$, $p = 0.009$) and household size ($\chi^2 = 4.704$, $p = 0.030$) had significant association with open defecation among households ($p < 0.05$).

A similar test was undertaken for the environmental-Sanitation related factors and the results (Table 4) clearly show that only two among these factors, only the type of toilet ($\chi^2 = 46.297$, $p = 0.000$) and type of water source ($\chi^2 = 14.849$, $p = 0.005$) showed significant association with open defecation among households ($p < 0.05$).

Finally having established the socio-demographic and the environmental-sanitation related factors which are most significantly associated with open defecation among households in this Town Council the researchers had to identify barriers to the adoption and consistent use of improved sanitation facilities in this Town Council which is the fourth objective of this study. In order to establish this a multivariate analysis was conducted and the results are given in Table 5.

The results (Table 5) show that cultural beliefs were found to be strongly statistically associated with open defecation among households in Lukaya TC, (COR=0.464(95% CI: 0.254 - 0.846), $P=0.012$). This indicated that the odds of occurrence of open defecation among households that had positive cultural beliefs were about twice lower compared to those households with negative cultural beliefs. At adjusted odds ratio (AOR=0.477(95% CI: 0.224 - 1.015), $P=0.035$) the results showed that the odds of occurrence of open defecation among households that had positive cultural beliefs were still about twice lower compared to those households with negative

cultural beliefs.

The results further show that among the environmental-sanitation related factors (Table 5) the type of toilet used at home or lack of it, was statistically associated with open defecation among households in Lukaya TC, (COR=3.937;(95% CI: 1.324 - 11.70), P=0.014). This indicated that the odds of occurrence of open defecation among households that did not have a toilet facility were about 4 times higher compared those households who had. Even after controlling for confounding, the type of toilet or lack of it was found to be statistically significantly associated with open defecation (AOR=5.839; (95%CI: 1.533 - 22.242); P=0.010). This showed that the odds of occurrence of open defecation among households that did not have any toilet facility increased to about 6 times compared those households who had.

These two (Cultural beliefs and absence of toilet facilities) were identified to be major barriers to the adoption and consistent use of improved sanitation facilities in Lukaya Town Council.

This was further confirmed and elaborated by Key Informants (KI 1, KI 4, KI 7):

“Some members of our communities still believe in culture of not using toilets because they think it causes infertility in women and women producing only girls and not boys” (KI 1)

“If a household does not have a toilet facility then most likely it will practice open defecation. (KI 4)

“There are two major issues causing open defecation in this town Council - the absence of adequate toilets and poor community mobilization” (KI 7)

DISCUSSION

The results indicated a notable prevalence of open defecation at 23.2% among households in Lukaya Town Council. This is a significant public health concern, indicating that a considerable portion of the population still engages in open defecation and requires urgent attention.

This prevalence has also been reported in some other developing economies like Bangladesh (25). There is urgent need to address this issue as earlier reported (7, 14).

This study further established that cultural beliefs were statistically associated with open defecation among households in Lukaya TC. The households with positive cultural beliefs to sanitation and hygiene were about twice as likely to avoid open defecation compared to households with negative or indifferent cultural beliefs. This implied that cultural attitudes play a significant role in shaping this sanitation practice. Therefore, efforts to reduce open defecation in this Town Council should focus on changing cultural perceptions.

Several earlier researchers (26, 27, 28, 29) have also reported that cultural beliefs have a very strong influence on the use of toilets by local communities especially in developing economies. They further strongly recommended education and awareness of the local communities using the existing cultural institutions. Several authors (25, 27 and 29) have strongly recommended that provision of appropriate free public toilet facilities focusing on poor and rural communities may easily and quickly lead to change in behaviour resulting in decreased open defecation.

Among institutional factors, the results showed that the type of toilet used at home or lack of it, was statistically associated with open defecation among households in Lukaya TC. The results further showed that households with a latrine / toilet facility are less likely to engage in open defecation compared to those without any such facility. This suggested that people tend to revert to open defecation when toilets or latrine facilities become unavailable and / or are not easily accessible (2).

In agreement with the findings of this study, Ngabo et.al., (30) had earlier demonstrated that in Rwanda there was a significant decrease in open defecation following an increased latrine coverage, highlighting the importance of access to toilets in promoting safer sanitation practices. But it has also been reported that simply having latrines available is not sufficient enough to reduce and or eliminate open defecation, as highlighted by Adem et.al., (31) and Ismaila (32). In tandem with the above researchers, this study also clearly shows that it is having both accessibility to latrines and positive cultural beliefs.

CONCLUSION

The study findings revealed that the prevalence of open defecation among households in Lukaya Town Council (Lukaya TC), Kalungu District, is 23.2%. This indicates that nearly one in four households still engage in open defecation despite the availability of sanitation facilities for most of the population. The multivariate analysis identified two key factors significantly associated with the practice of open defecation: cultural beliefs and the type of toilet or lack of it. Households with traditional toilets were significantly more likely to practice open defecation, while households with positive cultural beliefs about sanitation were significantly less likely to engage in this practice. These findings suggest that both infrastructural and cultural factors play a big role in determining sanitation behavior in the community.

RECOMMENDATIONS

This study therefore recommends that in order to reduce open defecation in this town Council there is need to examine other factors not included in this study like education and awareness on sanitation in general and its impact on health of vulnerable populations like children and pregnant mothers. However it is fully recommend that there is need to use the existing cultural institutions to sensitize the communities on the significance of stopping open defecation and for the council authorities to set up public toilets accessible by the local communities.

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TABLES

Table 1: Socio-Demographic Factors Influencing Open Defecation among Households in Lukaya TC, Kalungu District, Uganda

Variable	Categories	Frequency	Percentage
Sex of the respondent	Male	184	49.7
	Female	186	50.3
Age group 36.2±13.8	<25years	76	20.5
	25-34years	124	33.5
	>34years	170	46.0
Marital Status	Unmarried	139	37.6
	Married	231	62.4
Religion Affiliation	Christians	258	69.7
	Non-Christians	112	30.3
Education level	At most Primary	34	9.2
	Post Primary	336	90.8
Cultural Beliefs	Negative	58	15.7
	Positive	312	84.3
Knowledge	Low	47	12.7
	High	323	87.3
Attitude	Negative	43	11.6
	Positive	327	88.4
Perceptions	Negative	51	13.8
	Positive	319	86.2
Employment Status	Employed	283	76.5
	Unemployed	87	23.5
Household income 204,324 ± 196, 948	<100,000UGX	70	18.9
	100,000-500,000UGX	282	76.2
	>500,000UGX	18	4.9
Household Size 4.1 ± 2.2	≤5people	278	75.1
	>5people	92	24.9

Table 2: Environmental and Sanitation-related Factors Associated with Open Defecation

Variable	Categories	Frequency	Percentage
Availability of toilet	No	22	6.0
	Yes	348	94.0
Type of toilet	None	22	6.0
	Traditional	52	14.0
	Improved Pit Latrine	274	74.0
	Flush Toilet	22	6.0
Availability of Water Source	Yes	349	94.3
	No	21	5.7
Type of water source	None	21	5.7
	Spring Well	76	20.5
	Piped	123	33.2
	Borehole	119	32.2
	Others	31	8.4

Table 3: Bivariate Analysis on Social & Demographic Factors Associated With Open Defecation among Households in Lukaya TC, Kalungu District, Uganda

Variable	Categories	Open Defecation %		χ^2	df	p-value
Sex of respondent	Male	No 76.6	Yes 23.4	0.003	1	0.954
	Female	76.9	23.1			
Age group 36.2±13.8	<25years	77.6	22.4	1.229	2	0.541
	25-34years	73.4	26.6			
	>34years	78.8	21.2			
Marital Status	Unmarried	75.5	24.5	0.185	1	0.667
	Married	77.5	22.5			
Religion Affiliation	Christians	77.5	22.5	0.278	1	0.598
	Non-Christians	75.0	25.0			
Education level	At most Primary	82.4	17.6	0.657	1	0.418
	Post Primary	76.2	23.8			
Cultural Beliefs	Negative	63.8	36.2	6.479	1	0.011*
	Positive	79.2	20.8			
Knowledge	Low	65.9	34.1	3.520	1	0.061
	High	78.3	21.7			
Attitude	Negative	69.8	30.2	1.332	1	0.248
	Positive	77.7	22.3			
Perceptions	Negative	66.7	33.3	3.376	1	0.066
	Positive	78.4	21.6			
Employment Status	Employed	78.8	21.2	2.813	1	0.094
	Unemployed	70.1	29.9			
Household income 204,324 ± 196,948	<100,000UGX	62.9	37.1	9.468	2	0.009**
	100,000-500,000UGX	79.8	20.2			
	>500,000UGX	83.3	16.7			
Household Size 4.1 ± 2.2	≤5people	79.5	20.5	4.704	1	0.030*
	>5people	68.5	31.5			

Table 4: Bivariate Analysis on Environment-Sanitation Related Factors Associated With Open Defecation among Households in Lukaya TC, Kalunga District, Uganda

Variable	Categories	Open Defecation %		χ^2	df	p-value
		No	Yes			
Availability of toilet	No	72.7	27.3	0.213	1	0.645
	Yes	77.0	23.0			
Type of toilet	None	72.7	27.3	46.297	1	0.000* *
	Traditional	40.4	59.6			
	Improved Pit	83.2	16.8			
	Latrine Flush Toilet	86.4	13.6			
Availability of Water Source	Yes	76.8	23.2	0.004	1	0.950
	No	76.2	23.8			
Type of water source	None	76.2	23.8	14.849	1	0.005* *
	Spring Well	71.1	28.1			
	Piped	87.8	12.2			
	Borehole	73.1	26.9			
	Others	61.3	38.7			

Table 5: Multivariate Analysis of Factors Associated with Open Defecation among Households in Lukaya TC, Kalungu District, Uganda

Variables	Open Defecation%		CoR [CI]	AoR[CI]
	No	Yes		
Social Factors				
Economic				
Cultural Beliefs				
Positive	63.8	36.2	0.464[0.254-0.846]**	0.477[0.224-1.015] **
Negative	79.2	20.8	1	1
Household income				
<100,000UGX	62.9	37.1	0.429[0.244-0.755] **	0.902[0.454-1.793]
100,000-500,000UGX	79.8	20.2	0.338[0.089-1.281]	0.442[0.099-1.980]
>500,000UGX	83.3	16.7	1	1
Household Size (4.1±2.2)				
≤5people	79.5	20.5	1.785[1.053-3.024]**	1.516[0.785-2.929]
>5people	68.5	31.5	1	1
Environment - related Sanitation Factors				
Type of toilet				
None	72.7	27.3	3.937[1.324-11.70]**	5.839[1.53-22.242]**
Traditional	40.4	59.6	0.538[0.200-1.448]	0.803[0.234-2.757]
Improved Pit Latrine	83.2	16.8	0.421[0.091-1.959]	0.605[0.107-3.415]
Flush Toilet	86.4	13.6	1	1
Type of water source				
None	76.2	23.8	1.304[0.425-3.995]**	1.664[0.450-6.152]
Spring Well	71.1	28.1	0.444[0.142-1.390]	0.800[0.207-3.085]
Piped	87.8	12.2	1.177[0.399-3.476]	1.261[0.356-4.469]
Borehole	73.1	26.9	2.021[0.586-6.965]	2.322[0.156-0.858]
Others	61.3	38.7	1	1

**Significant at 0.05 level