International Journal of Community Medicine and Public Health
Thiora NK et al. Int J Community Med Public Health. 2025 Sep;12(9):3867-3873
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20252826

Original Research Article

Factors that affect successful attainment of open defecation free status in Tharaka North Sub County, Tharaka Nithi County

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Received: 20 May 2025
Revised: 05 August 2025
Accepted: 11 August 2025

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ABSTRACT

Background: The successful attainment of ODF status has proven to be a formidable practice in addressing the issues of open defecation and the prevalence of sanitation-related illnesses in rural areas of the nation. Nevertheless, about 66% of people in Africa in 2022 lacked access to proper sanitation, despite efforts and major investment in the sanitation industry. Further, more than 5.6 million Kenyans engage in open defecation, making it a major public health problem. Despite considerable efforts invested in promoting sanitation programs, the attainment of open defecation free status in Tharaka North Sub-County, Tharaka-Nithi County, remains a challenge as no single village in the area has ever attained this status. The objective of this study is therefore to investigate those factors that affect the attainment of Open Defecation Free Status in Tharaka North Sub County, Tharaka Nithi County.
Methods: This Mixed-Methods Research (MMR) study recruited 389 participants using random sampling and purposively selected other12 key informants for interviews. Data was collected through pretested questionnaires, interview schedules, and interview guides. Necessary research licenses and permits were adequately obtained. Data were analyzed using SPSS version 25 for descriptive statistics including frequencies and percentages. Chi-Square was used to determine the association between variables. Qualitative data were analyzed thematically and reported verbatim.
Results: Response rate yielded 86.6% (337) of which majority were males 65.0% (219).
Conclusions: The findings of the study are expected to inform decisions in enhancing the attainment of the open defecation free status as well as formulation of relevant policies.

Keywords: Community led total sanitation, Health, Open defecation, Sanitation

INTRODUCTION

Open defecation refers to the act of excreting waste outside of a designated toilet facility, such as in open areas like fields, near bodies of water, or on public streets. Access to proper sanitation is considered to be a human right. It is also one of the elements that ensures human dignity is attained besides contributing to improved productivity. According to WHO/UNICEF joint monitoring Programme report of 2022, it is estimated that 1.5 billion people globally still did not own basic services such as private toilets or latrine.[1] Accordingly, 419 million people still defecated in the open. Open defecation facilitates the transmission of pathogens that cause diarrheal diseases among others, which is the second leading contributor to the global burden of disease.[2]

According to WHO/UNICEF joint monitoring Programme report of 2021, out of the 494 million people practicing open defecation, nearly half lived in Sub-

Saharan Africa. About 66% of people in Africa in 2022 lacked access to proper sanitation, despite efforts and major investment in the sanitation industry leading Open Defecation.[3] Today, more than 5.6 million Kenyans practice open defecation, making it a major public health problem.[4]

In May 2007, with the support of Plan Kenya, Kenya launched the Community-Led Total Sanitation (CLTS) program with the goal of eliminating open defecation. This followed two workshops in Tanzania and Ethiopia.[5] The program was piloted in the coastal province of Kilifi, the northeastern province of Homa Bay, and the eastern province of Machakos.[6] July through October 2007 was the time frame for the three pilot triggering sessions. Kenya launched the Open Defecation Free (ODF) Rural Kenya Campaign in May 2011 with the goal of becoming ODF by 2020.

The largest concentration of ODF villages was found in Busia, Kisumu, and Siaya Counties, where 15% of communities had achieved ODF status by the end of 2014. To facilitate the implementation of the plan to make Kenya free of open defecation, the country has a well-organized national and regional coordination infrastructure for ODF, complete with an information/knowledge management center. Over 20,100 children under the age of five in Kenya die every year as a result of diarrhea caused by inadequate sanitation.[7]

According to a sanitation County benchmarking assessment conducted by ministry of Health in 2013, Tharaka Nithi County ranked 21 out of 47 Counties. The assessment found out that the County incurred huge losses resulting from premature deaths, access time, productivity and health costs amounting to 191 million KES. According to Muendo (2017), that unlike the national average of 15%, the incidence of diarrhea, in Tharaka Nithi County remained high, with a prevalence of 20.5% among children under the age of five.[8] Out of the 520 villages declared open defecation free in Tharaka Nithi County, none in Tharaka North has achieved this status.

Household income as a factor presents two challenges in the successful attainment of Open Defecation Free status. Firstly, it hinders house owners from constructing latrines for their households due to the financial burden associated with construction expenses. Secondly, it restricts their ability to afford the fees imposed by public toilet operators, thereby compelling them to engage in open defecation as an alternative.[4] Additionally, these households face challenges related to limited and inconsistent cash flow, which hinder their ability to make one-time investments in improved sanitation facilities.[10]

The successful attainment of ODF status approach has shown positive outcomes via the implementation of latrine subsidy policies. For instance, in Uganda, WaterAid Uganda has strategically focused its follow-up efforts on families who have received hardware support through previous subsidy programs.[7]

A separate investigation conducted in the northern region of Ghana examined the economic factors that could potentially impact the successful attainment of ODF status by households. The findings revealed that 25.4% of respondents who lacked the necessary financial means were unable to construct latrines at the level of superstructure, while 12.4% faced similar constraints at the level of roof construction. Additionally, 18.30% of respondents reported being unable to afford the costs associated with constructing latrines at the level of privacy.[10]

Research conducted in Kenya on ODF attainment included job status and daily household income among other economic factors. Due to budgetary constraints, households have a hard time moving up the sanitation ladder. Many houses in Mombasa County still utilize open defecation due to financial constraints.[11]

Education input element notably affects sanitation related outcomes. Research in Bungledesh demonstrated that education is associated to sanitary behavior modification which is key via Community Led Total Sanitation. Education was revealed to be a major regressor of access to enhanced ODF status in a multivariate study of Iraq demographic survey data. The results were in line with those of the mixed-methods research by Safari et al (2020) that examined the causes of elevated rates of open defecation.[12] Both researches found that higher-educated people, knowing more about the dangers of poor sanitation and the positive impacts it may have on community health, are more likely to advocate for funding improvements to existing systems.

Additionally, it was determined via an examination of sanitation data from the India census that educated women were essential in driving the successful attainment of ODF status process.[13] As literacy rates among household heads rose, so did the quality of their sewage systems, the research found. Cross-sectional research conducted in rural Ethiopia and Ghana found that families with members who had completed secondary education were more likely to utilize latrines than those with members who had not.[14] Riungu found that in Kisumu County, homes where the head of household had completed some kinds of formal education were 32% less likely to practice open defecation than homes where the head of family had not completed any form of formal education.[6]

The disparity in the accessibility and use of sanitation facilities among men and women in Africa may be attributed to gender roles and norms, which have an impact on households' decision-making processes on sanitation enhancement.[15] The need for sanitation among women is significant owing to their physiological features. Cultural and gender conventions make it

difficult for women to use sanitary facilities, therefore they defecate in the open.[17] Location, privacy, and safety are some of the reasons why women in Ethiopian villages without gender-specific norms make full use of sanitary facilities[18] according to the author. Women resort to open defecation when these prerequisites are not met.

The Water and Sanitation Program studied the disposal practices of child feces in Kenyan homes in 2015. Surprisingly, families with children younger than three had a tendency to dispose of waste incorrectly, regardless of the sort of sanitation facilities offered. Even in homes with better sanitary facilities, this worrying practice was evident, and it was most common among families that practiced open defecation. The 2015 WSP survey found that even among homes with superior sanitation, a sizable 64% did not utilize them to dispose of their children's waste. Surprisingly, the poll also found that 23% of homes condoned open defecation among youngsters. According to UNICEF (2015), the chances of children safely disposing of their waste rose as they got older, with the greatest percentages seen in older children. It is worth noting that the elderly reduced their use of restrooms, especially when early decisions on sanitation methods did not include issues like how easy it was to use and how close it was to the home.

METHODS

Study design and site

The study was anchored on the Mixed-Methods Research (MMR) methodology and specifically descriptive cross-sectional research design and interviews. The study was conducted in Tharaka North Sub-County, located in Tharaka-Nithi County. Tharaka North is the most extensive sub-county in Tharaka-Nithi County, with an area of 803.4 square kilometers. The area is situated in the semi-arid Tharaka-Nithi County and has an average annual precipitation ranging from 550mm to 1750mm. The sub-county accommodates around 14,200 homes, mostly composed of agro-pastoralists.

Study population

The research included individuals who are the heads of households (HH) and have lived in the study locations for more than twelve months. Moreover, the study also targeted public health personnel, Community Health Promoters Chiefs who are key community leaders in Tharaka North Sub-County as the key informants. A total of 14, 200 households heads who have lived more than one year in the study area were targeted in addition to 42 key informants.

Inclusion and exclusion criteria

The samples selected included household heads who have lived in Tharaka North Sub County for more than one year and vice versa for the exclusion criteria.

Sample size

The sample for this study was derived from Slovin's formula:

$$n = \frac{N}{1 + N(e^2)}$$

The margin error was set at 5% and N at 14,200, therefore giving a sample of 389 participants.

Sampling design

The study employed simple random sampling to probabilistically obtain 389 households heads in the study who formed the sample for quantitative study. Further, the study applied purposive sampling to select 12 key informants for interviews.

Data collection tools and procedure

Data was collected through pretested questionnaires, interview schedules, and interview guides. Strict adherence to the data collection procedures was maintained in order to mitigate the potential for errors and biases in transcription to be overlooked. The instruments for gathering information were pre-administered. Ethically, data collection licenses and permits were sought from Mount Kenya University, NACOSTI, Tharaka Nithi County, Department of Health and Ministry of interior before primary data collection exercise.

Data analysis

Data were analyzed using SPSS version 25 for descriptive statistics including frequencies and percentages. Chi-Square was used to determine the association between variables. Qualitative data were analyzed thematically and reported verbatim.

Ethical consideration

Data confidentiality and anonymity of the study participants was guaranteed throughout the study. They were also given autonomy to choose their willingness to take part in this study. Research clearance was acquired from Mount Kenya University ERC (MKU/ISERC/3919) as approval number 2911. This study also received approval from the National Commission for Science, Technology and Innovation (NACOSTI) license number NACOSTI/P/24/38252. Other authorities were sought from both County and National government departments.

RESULTS

Out of the total sample size of 389 participants, 337 responded to the survey, yielding a response rate of approximately 86.6%. This high response rate indicates a

strong level of engagement and participation from the targeted respondents, which enhances the reliability and validity of the study's findings. Mugenda and Mugenda (2003) noted that 50% response rate is adequate, 60% is good, and above 70% is excellent. This study can therefore be generalized to reflect the views of the people of Tharaka North Sub County.

Table 1: Social demographic characteristics of the respondents.

Variable	Category	Frequency	Percentage (%)
Gender of the respon-dents	Male	219	65.0
	Female	118	35.0
	Total	337	100.0
Age in years	18-27	15	4.5
	28-37	24	7.1
	38-47	152	45.1
	48-57	128	38.0
	58 +	18	5.3
	Total	337	100.0
Highest level of education	Primary	188	55.8
	Secondary	89	26.4
	Diploma	39	11.6
	Undergraduate	6	1.8
	Postgraduate	2	0.6
	None	13	3.9
	Total	337	100.0

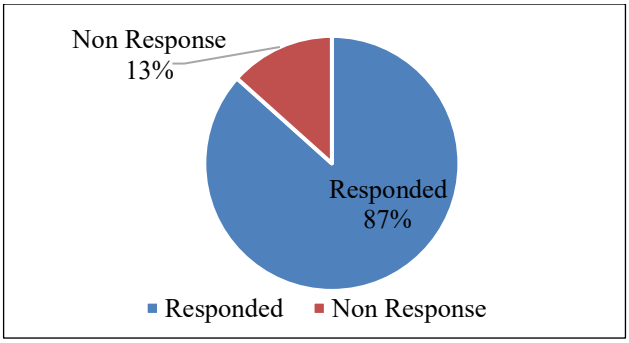

Figure 1: Response Rate.

The results obtained reveals that a majority of the 251 (74.5%) of the respondents of which 82 (24.3%) strongly agreed and 169 (50.1%) agreed that knowledge on open defecation affects successful attainment of open defecation free status.

As regards affordability on construction of a toilet/ latrine, majority 162 (48.1%) of the respondents remained neutral while only 146 (43.3%) agreed that this factor affects successful attainment of open defecation free status.

Concerning respondents participating in community sanitation activities and whether it affects successful attainment of ODF status, more than half 190 (56.4%) of the respondents were undecided while 76 (22.6%) disagreed and only 65 (19.3%) agreed that participating in community sanitation activities would affect successful attainment of ODF.

Table 2: Factors on successful attainment of ODF.

Factors for successful ODF status	Respondent's response				
	SD (%)	D (%)	N (%)	A (%)	SA (%)
Knowledge on ODF	0 (0.0)	26 (7.7)	60 (17.8)	169 (50.1)	82 (24.3)
Toilet or latrine affordability	3 (0.9)	26 (7.7)	162 (48.1)	146 (43.3)	0 (0.0)
Participate in community sanitation activities	3 (.9)	76 (22.6)	190 (56.4)	65 (19.3)	3 (0.9)
Availability of clean water for sanitation	139 (41.2)	168 (49.9)	27 (8.0)	2 (0.6)	1 (0.3)
Availability of alternative waste disposal options	13 (3.9)	28 (8.3)	160 (47.5)	110 (32.6)	26 (7.7)
Income from well-paying jobs	39 (11.6)	14 (4.2)	32 (9.5)	241 (71.5)	11 (3.3)
Education levels	37 (11.0)	11(3.3)	56 (16.6)	220 (65.3)	13 (3.9)
Advocacy for improved sanitation facilities	13 (3.9)	28 (8.3)	160 (47.5)	110 (32.6)	26 (7.7)
Migrating communities	0 (0.0)	25 (7.4)	60 (17.8)	112 (33.2)	140 (41.5)

The results also revealed that a majority of the respondents 307 (91.1%) where 139 (41.2%) Strongly disagreed and 168 (49.9%) Disagreed that availability of clean water would affect successful attainment of ODF status.

On availability of alternative waste disposal options, slightly below half 160 (49.9%) of the respondents who were the majority were undecided whether this factor would affect successful attainment of ODF status.

On income from well-paying jobs, majority 252 (74.8%) of which 241 (71.5%) agreed and 11 (3.3%) strongly agreed that it would affect the successful attainment of open defecation free status. Additionally, 220 (65.3%) of the same respondents agreed that level of education would affect successful attainment of open defecation free.

To further establish the association between factors and successful attainment of ODF status; The index of factors and successful attainment of ODF status was cross tabulated and chi-square test were used to further analyze the data in order to establish the association between the variables.

110 (32.6%) of the respondents agreed that advocating for improved sanitation would affect successful attainment of open defecation free status while a majority 160 (47.5%) were completely undecided.

However, regarding effects of migrating communities on successful attainment of ODF status, majority 252 (74.2%) of the respondents of which 140 (41.5%) strongly agreed and 112 (33.2%) agreed that migrating communities would affecting successful attainment of ODF status.

DISCUSSION

The study reveals that, addressing issues of Knowledge on ODF may lead to significant achievement in Open Defecation Free (ODF), which is in line with an examination of data from India census that revealed that educated women were essential in driving the successful attainment of open free defecation status.[13] It was also consistent with cross-sectional research conducted in rural Ethiopia and Ghana, that found that families with members who had completed secondary education were more likely to utilize latrines from those with members without.[14]

The findings revealed that addressing factors of availability of clean water for sanitation, may not necessarily address the issues of open defecation in Tharaka North Sub County.

According to the interviewee A, in regard to the question of factors affecting successful attainment of open defecation free status in Tharaka North sub county, Tharaka Nithi county:

"The workshops and community meetings have really opened people's eyes. They now understand how important it is to have proper sanitation and are more motivated to keep up with it."

The study also aligns with literature highlighting the impact of household income on sanitation practices. For example, Abalo (2021)[7] and Aluoch et al. (2022)[16] emphasize that financial limitations hinder households from building latrines and paying for improved sanitation solutions, leading to higher instances of open defecation.

The study's finding that well-paying job holders are more likely to build good sanitation facilities aligns with literature emphasizing that higher income facilitates better sanitation practices (Okumu et al., 2022; Safari et al., 2020).[11,12] Yet, a mean score indicating that highly educated individuals are more likely to advocate for improved sanitation and utilize available options highlights the role of education in promoting sanitation. Education's impact on sanitation, as noted by researchers like Yogananth & Bhatnagar (2018) and Tessema (2017),[13,14] reinforces the study's finding that educated individuals are more likely to support and implement better sanitation practices.

In contrast, the observation that migrating communities, such as pastoralists, are less likely to construct sanitation facilities reflects the challenges faced by transient populations in maintaining consistent sanitation practices.[18]

Table 3: Cross tabulation of the factors and successful attainment of ODF status.

		Factors, %				Total
		Disagree	Undecided	Agree	Strongly agree	
Successful attainment of ODF status	Strongly disagree	6.5	0	0.6	0	7.1
	Disagree	4.7	8.3	7.4	0.9	21.4
	Undecided		13.1	1.8	1.2	16.0
	Agree	0.3	3.3	19.3	1.8	24.6
	Strongly agree		2.7	3.3	24.9	30.9
Total		11.6	27.3	32.3	28.8	100.0

The results show that majority of respondents (61.1%) were of the view (Agreed + Strongly agreed) that successful attainment of ODF status is affected by the conceptualized factors which included household income, socio demographic factors and occupation.

Pearson Chi square results (X^2=312.475, df= 10, p=0.000) showed that factors significantly influence successful attainment of ODF status. The Chi-square test results determined that there was an association between factors and successful attainment of ODF status in

Tharaka North Sub-County, Tharaka Nithi County. The value of Pearson chi square p (0.000<0.05) demonstrated statistical significance at the 0.05% level. Since the p-value (0.00) was less than 0.05, we may be certain that the observed relationship between the two variables is not merely coincidental.

Table 4: Factors and successful attainment of ODF status (Chi Square).

Chi-Square Tests	Value	df	Asymptotic significance (2-sided)	Contingency coefficient value
Pearson Chi-Square	312.475	10	0.000	0.712
Likelihood ratio	258.630	10	0.000	-
Linear-by-Linear Association	142.780	1	0.000	-
No. of valid cases	337	-	-	-

This study has few limitations. Some participants exhibited reluctance to participate in the research due to apprehensions regarding potential breaches of privacy and confidentiality. To mitigate this issue, the researcher reassured all participants that the study would be used solely for academic purposes.

CONCLUSION

The study identified several key factors contributing to successful attainment of open defecation free status in Tharaka North Sub County. These include level of knowledge on the risks associated with open defecation, household income, social demographic factors such as age and gender, socio factors such as migrating communities as well as occupation. The availability of resources and support from local authorities also played a significant role in achieving sanitation improvements. Mapping existing sanitation facilities and assessing the capacity of local organizations are critical for addressing gaps and sustaining progress.

This study is however expected to inform decisions in enhancing the attainment of the open defecation free status as well as formulation of relevant policies. Furthermore, this study will serve as a foundation for future scholarly investigations particularly regarding attainment of open defecation free status.

ACKNOWLEDGEMENTS

Authors would like to thank the Mount Kenya University for providing an enabling environment to carry out this study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Thiora NK, Muchiri J, Muchangi M. Factors that affect successful attainment of open defecation free status in Tharaka North Sub County, Tharaka Nithi County. Int J Community Med Public Health 2025;12:3867-73.