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# Factors associated with utilization of oral health services among adults aged 18–70 years in Lira district, Northern Uganda: a community based cross-sectional study

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## Abstract

**Background** Utilization of oral health services is a global public health challenge. Low- and middle-income countries are disproportionately affected. Uganda is one of the low- and middle-income countries where only 4% of the population has access to oral health services. Northern Uganda is one of the regions in the country with limited information about oral health utilization.

**Objective** To assess factors associated with utilization of oral health services among adults aged 18–70 years in Lira district, Northern Uganda.

**Methods** This was a quantitative cross-sectional study conducted in Lira District. Multistage sampling was used to select 576 respondents. Data was collected using a researcher-administered structured questionnaire that was adopted, modified, and pretested. Data was analyzed at three levels, including univariate, bivariate, and multivariate at 0.05 significance level.

**Results** Of the 634 respondents, 576 responded, giving a 90.9% response rate. Results show that utilization of oral health services was 20.5% (118) among adults aged 18–70 years in 6 months. Predictors of utilization of oral services among this age group are: having not attended any formal education (AOR = 0.2, 95%CI 0.06–0.62), having poor attitudes towards oral health services (AOR = 0.55, 95%CI 0.34–0.89), having cultural influence on the utilization of the oral health services (AOR = 4.84, 95% CI 2.77–8.43), accessing the services from private not-for-profit facilities (AOR = 4.67, 95% CI 1.79–12.16), being un sure of the availability of the equipment used (AOR = 0.42, 95% CI 0.18–0.9), and availability of friendly services (AOR = 2.53, 95% CI 1.12–5.50).

**Conclusions and recommendations** Utilization of oral health services is low in Lira district, with only 2 in 10 of the adults aged 18–70 years of age utilizing oral health services in 6 months. To improve utilization, targeted health education campaigns should address cultural barriers and attitudes, while ensuring that public health facilities are better equipped and provide more user-friendly services.

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**Keywords** Oral health, Utilization

## Background

Globally, the utilization of oral health services poses a prominent challenge to public health. According to Seminario et al., only 35% of individuals in low-income countries have access to basic oral healthcare, compared to 60% in middle-income countries, 75% in upper-middle-income countries, and 82% in high-income countries [1, 2]. Uganda is one of the Sub-Saharan countries with low levels of oral health service utilization [3]. According to the national health policy by Uganda's Ministry of Health, 51% of community members experience oral health problems, and only 35% of these access oral health services [4].

The global burden of oral diseases is staggering, surpassing that of the combined main non-communicable diseases (NCDs) like mental disorders, cardiovascular diseases, diabetes mellitus, chronic respiratory diseases, and cancers [5]. Notably, over two billion people worldwide contend with permanent teeth caries, while primary teeth caries affect 514 million children [1]. Within Uganda, dental caries and gum diseases are prevalent, affecting 32.5% of children and 66.7% of adults [6]. However, the World Health Organization (WHO) emphasizes that many oral diseases are preventable or manageable through early interventions, including regular oral check-ups by health professionals [1, 7]. Oral health services encompass preventive care (teeth/gum cleaning, oral X-rays, education, counseling) and restorative treatments (fillings, conservation, crown/bridge, implants, cosmetic procedures) [8]. Demand for oral health services often stems from necessity rather than meticulous planning [5], underscoring the risk of underutilization without alignment with community needs [9].

A complex mix of individual, social, and contextual factors that affect access to oral health services drives the use of oral health services. Previous studies have identified a few variables that affect the use of oral health services [10, 11]. For instance, sociodemographic characteristics including age, sex, education, and home location are associated with the usage of oral health services [12, 13]. Furthermore, clinical dental conditions and the severity of dental problems, may influence the level of treatment needed and, consequently, impact the use of oral health services. More studies about oral health service utilization and factors associated with it have been conducted in high- and low-income countries up to this point, with few studies in Uganda.

Uganda faces significant challenges that contribute to the low utilization of oral health services. These challenges include limited funding, low prioritization of oral health in the national health agenda, inadequate

planning, workforce shortages, and poor coordination between central and local governments [3]. For instance, Uganda's dentist-to-population ratio of approximately 1:43,000 far exceeds WHO's recommended 1:7,500 [1, 5] straining available dental workers and compromising service quality [7]. Notably, dental health receives inadequate attention in Uganda's health budget, resulting in limited resources and preventive awareness [3, 14].

The Northern Region of Uganda, particularly Lira district, grapples with substantial health system delivery challenges, particularly in oral health service provision, encompassing care availability and the health workforce [14]. According to the Uganda Health Facility Master List, Lira District has a total of 57 health facilities: 23 are private-for-profit, 9 are private-not-for-profit, and 25 are public health facilities. These include 8 clinics, 20 Health Center IIs, 23 Health Center IIIs, 3 Health Center IVs, 1 general hospital, 1 regional referral hospital, and 1 special clinic. Oral health services in the public sector are available from Health Center IVs to the regional referral hospital free of charge. In contrast, in the private sector, the availability and cost of oral health services vary depending on the type of facility and the specific services provided, with services generally not being free [15].

Studies in Lira district have explored oral hygiene knowledge, attitudes, and practices [16]. However, there is a need for further investigation into the determinants of oral health service utilization. The study's findings reveal existing challenges in accessing oral health services, including individual factors, cultural-related factors, and health facility-related factors. These findings can contribute to global efforts aimed at improving access to oral health services in resource-constrained regions by addressing shared barriers and facilitating knowledge exchange.

## Methods

### Study design and setting

We used a community-based cross-sectional study design to collect quantitative data from 5th March 2023 to 30th March 2023. The study was conducted in Lira district. Lira district is located in the northern part of Uganda; it is bordered by Pader District to the north, Otuke District to the northeast, Alebtong District to the east, Dokolo District to the southeast, Apac District to the southwest, and Kole District to the west, located at GPS coordinates 2.2581° N, 32.8874° E. The district has two counties, Erute South and Erute North. Erute South encompasses five sub-counties, 26 parishes, and 247 villages. The population of Lira district is estimated to be 408,043 individuals. The study was conducted in Lira district due to the

challenges the district faces with health service delivery. Remarkably, only 31.4% of the overall population resides within a 5 km radius of health facilities, potentially influencing the healthcare-seeking patterns of individuals [17, 18].

### Study population

The study was conducted among adults aged 18–70 years in Lira district.

### Sample size estimation

The sample size for the study was determined using the Leslie Kish formula [19], with a P-value of 0.5, as the level of oral health service utilization in Lira District is unknown. A P-value of 0.5 yields a recommended power of 80%. The calculation also used a precision (D) of 0.05 and a Z-score of 1.96, corresponding to a 95% confidence level. The sample size was further adjusted for a design effect of 1.5, based on similar studies [20, 21], and a non-response rate of 10%, resulting in a total sample of 634 participants.

### Sampling technique

A multi-stage cluster sampling technique was used to select the participants who participated in the study. In the first stage, three sub counties were randomly selected for the study using the lottery method. In the second stage, two parishes were selected from each of the sub counties using simple random sampling. All the parishes in the selected sub counties were listed and written on small, separate papers. The papers were then placed in a small box and mixed well. Two parishes were then selected from the papers without replacement.

In the third stage, two villages were selected from the selected parishes using simple random sampling. All the

villages within the parishes were listed on pieces of paper, and two papers were chosen for each subcounty.

At village level, the researcher met the LC. I chairpersons of each village who estimated the total number of houses held in the village. The researcher then determined the sample size from each village using proportionate by size. The household with the respondents who meet the inclusion criteria was selected using consecutive sampling. See Table 1.

### Data collection tool

The questionnaire (supplementary file 1) used to collect data was developed through a thorough review of relevant literature and adjusted for the study setting [7, 14, 20–23]. Key references that contributed to its development include Gao et al. (2020), which provided insights into factors influencing oral health service utilization and shaped the inclusion of variables related to individual perceptions and behaviours; Ocwia et al. (2021), which informed the structuring of socio-demographic variables in Section A; Shirahase et al. (2022), which guided the development of Section C focusing on health system factors; and WHO (2016), which, while not a study, offered general health promotion guidelines that were adapted to fit the specific context of oral health services in the study area.

The questionnaire is divided into three sections: Section A covers socio-demographic variables such as gender, age, education level, marital status, and income; Section B addresses individual factors including knowledge about oral health, access to information, and existing oral health conditions; and Section C examines health system factors like distance to health facilities, type of facilities, availability of supplies, and services. The full questionnaire is available as a supplementary document/appendix for further review.

**Table 1** Table showing the sampling process of the study

S/N	Sub county (Simple random sampling)	Parish (simple random sampling)	Village (Systematic Random sampling)	Number of households (N)	Number of participants (n)
1	Lira	Omito	Kasubi	94	40
			Telele A	116	50
		Bar Apwo	109	48	
2	Adyel	Lango Cental	Apil-pe	117	50
			Cuk-ibange	155	67
			Te-tugu	163	70
3	Amach	Kilombe	Kilombe North A	122	53
			Kilombe North B	85	38
		Adyaka	Abwong B	86	37
			Ebut	82	35
			Otony	94	40
Ayach	Barilwa	90	48		
	Total	1352	576		

The tool was pretested on 10% of the sample size in a neighbouring district, Kole. Based on the feedback from the pretest, several improvements were made, including clarifying ambiguous questions, rephrasing complex statements, and adding response options to better capture the respondents' experiences. The Content Validity Index (CVI) of 8.81 was calculated by having a panel of experts rate each item on the questionnaire for relevance and clarity and then averaging their scores. The reliability coefficient of 0.769 was determined using Cronbach's alpha, which measures internal consistency by evaluating how closely related a set of items are as a group in SPSS version 26. These measures confirmed the tool's validity and reliability for data collection.

### Study variables

The outcome variable of the study was the proportion of respondents who utilized any of the oral health services. Any respondent that had visited any health facility for oral-health-related services such as health education, dental checkup, extraction, tooth filling/cementing, tooth cleaning (scaling and polishing), teeth whitening, flossing, artificial teeth, teeth alignment (braces), and fracture reduction. The question asked was "Have you ever gone to any facility for oral health services?" with a binary outcome of two responses: "Yes" and "No." A follow-up question was asked to assess the period and service that was accessed.

Knowledge and attitude were assessed using composite scores. For knowledge, 4 questions were asked, each with 4 options coded 1–4, with the most correct answers assigned higher values in descending order. This yielded a maximum score of 16. Respondents scoring 9 or above were classified as having good knowledge about oral health services, while those scoring 8 or below were classified as having poor knowledge.

For attitudes, 6 questions were asked using a Likert scale, each with 5 response options: strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1). This resulted in a maximum score of 25. Respondents scoring 16 or above were considered to have positive attitudes towards oral health services, whereas those scoring 15 or below were considered to have negative attitudes.

### Data management and statistical analysis

Questionnaires were checked for completeness, errors, and consistency immediately after data collection to ensure data accuracy. The data was then securely stored and organized in a structured manner using Microsoft Excel, where it was cleaned and prepared for analysis. The cleaned data was later imported into STATA version 17 Software (Release 17, College Station, TX: StataCorp LLC) for statistical analysis. To ensure data integrity

during storage, backups were maintained on both cloud and external hard drives, with access limited to authorized personnel.

At the univariate level of analysis, categorical data was summarized as frequencies and proportions and presented in a table. At the bivariate level, cross-tabulations were performed between the dependent (utilization of oral services) and independent variables to establish associations. A bivariate logistic regression was performed at a 95% confidence level. P values were used as measures of statistical significance. Crude Odds Ratios (COR) were used as the units of measurement to quantify these associations. Significant variables identified in the bivariate analysis were included in a multivariable logistic regression analysis at a significance level of  $p=0.05$  to determine factors associated with the utilization of oral health services. Variables with p-values less than 0.05 were considered significant predictors. Adjusted Odds Ratios (AOR) were used as the units of measurement to quantify the strength of these associations.

## Results

### Demographic factors

The response rate of the study was 90.9%. The level of utilization of oral health services was 20.5% (118). Sociodemographic factors associated with utilization of oral health services include, adults aged 18–70 years, respondents that earned between 100,001 and 500,000 and more than UGX 1000,000, respondents in primary level of education, respondents with no formal education, and respondents who were employment. See Table 2.

### Knowledge and attitude

The majority of the respondents, 276 (47.92%), agreed that it is not necessary to visit a dentist if there are no tooth problems. Most respondents, 326 (56.60%), agreed that dental services are expensive. A significant portion, 245 (42.53%), disagreed with the statement that dental services are provided by unfriendly staff. Many respondents, 264 (45.83%), agreed that dental services are difficult to find. The majority, 294 (50.69%), disagreed with the notion that the best oral health services are not available in Lira District. Additionally, 353 respondents (61.28%) agreed that children should not visit dentists when they start losing teeth, as it is considered normal. Overall, most respondents, 326 (56.6%), had a poor attitude toward oral health services.

Most respondents, 358 (62.15%) identified gum disease and dental caries as common oral health challenges. Facilities Offering Dental Services: The majority of the respondents, 420 (72.92%) knew that HCIV facilities offer dental services. The majority of the respondents, 226(39.24%) knew one should visit a dental clinic when sick, while 206 (36.28%) knew that they should visit every

**Table 2** Sociodemographic factors associated with utilization of oral health services among adults aged 18–70 years in Lira district, Northern Uganda

Variables	Frequency N (%)	Utilization		COR (95% CI)	p value
		No N (%)	Yes N (%)		
<b>Utilization</b>		458 (79.5)	118(20.5%)		
<b>Gender</b>					
Male	283(49.13)	226(79.9%)	57(20.1%)	1	
Female	293(50.87)	232(79.2%)	61(20.8%)	1.042(0.69–1.56)	0.84
<b>Age group</b>					
18–24	224 (38.89)	176(78.6)	48(21.4)	1	
25–35	233(40.45)	188(80.7)	45(19.3)	0.88(0.56–1.38)	0.575
36–45	110(19.1)	91(82.7)	19(17.3)	0.77(0.42–1.38)	0.374
45–70	9(1.56)	3(33.3)	6(66.7)	7.33(1.76–30.4)	0.006**
<b>Income level</b>					
Less than 100,000	262(45.49)	223(85.11)	39(14.89)	1	
100,001–500,000	273(47.40)	207(75.82)	66(24.18)	1.82(1.18–2.82)	0.007**
500,001–1,000,000	25(4.34)	21(84)	4(16)	1.09(0.35–3.34)	0.881
More than 1,000,000	16(2.78)	7(43.75)	9(56.25)	7.35(2.58–20.89)	<0.001***
<b>Marital status</b>					
Unmarried	222(38.54)	182(80)	40(18)	1	
Married	354(61.46)	276(78)	78(22)	1.29(0.84–1.966)	0.246
<b>Education level</b>					
Tertiary	99(17.19)	69(69.7)	30(30.3)	1	
Secondary	180(31.25)	142(78.9)	38(21.1)	0.615(0.35–1.075)	0.089
Primary	221(38.37)	177(80.1)	44(19.9)	0.571(0.33–0.98)	0.043*
None	76(13.19)	70(92.1)	6(7.9)	0.197(0.08–0.50)	0.001**
<b>Residence</b>					
Urban	300(52.08)	238(79.3)	62(20.7)	1	
Rural	276(47.902)	220(79.7)	56(20.3)	0.98(0.65–1.47)	0.911
<b>Employment status</b>					
un employed	357(61.98)			1	
Employed	219(38.02)			1.63(1.09–2.46)	0.018**

six months. Most of the respondents knew that getting pain killers 247(42.88%) was the best way to manage tooth ache, followed by visiting a dentist 185 (32.12%). The majority of the respondents had poor overall knowledge about the oral health services 310 (53.82). See Table 3 below.

#### Factors associated with utilization of oral health services among adults aged 18–70 years in Lira district, Northern Uganda

The results in Table 4 show that the factors associated with utilization of oral health services were: Having access to the oral health services, lack of transport, being influence by cultural practices, poor knowledge about the oral health services, poor attitudes towards, attending care in private for-profit health facilities and private for-profit facilities, availability of equipment and oral health friendly services.

#### Factors affecting utilization of oral health services among adults aged 18–70 years in Lira district, Northern Uganda

At the multivariable level of analysis, several factors were found to be significantly associated with the utilization of oral health services. Respondents with no formal education were 0.2 times less likely to utilize oral health services compared to those with formal education (AOR 0.2, 95% CI 0.06–0.62,  $p=0.005$ ). Respondents with poor attitudes towards oral health services were 0.55 times less likely to utilise oral health services compared to those with good attitude (AOR 0.55, 95% CI 0.34–0.89,  $p=0.015$ ). Respondents who were who were influenced by culture were 4.84 times more likely to utilize the oral health services compared to their counterparts who did not face any influences (AOR 4.84, 95% CI 2.77–8.43,  $p=0.000$ ). Respondents attending care in a private not-for-profit health facility were 4.67 times more likely to utilize the oral health services compared to their counter parts who attended from other health facilities (AOR 4.67, 95% CI 1.79–12.16,  $p=0.002$ ). Respondents who were unsure about the availability of equipment decreased were less likely to utilize the oral

**Table 3** Knowledge and attitude of the respondents towards utilization of oral health services

Variables	Frequency (N)	Percentage (%)
<b>Attitudes</b>		
<b>It is not good to bother visiting a dentist when you have no tooth problems</b>		
Neutral	21	3.65
Strongly agree	124	21.53
Agree	276	47.92
Disagree	133	23.09
Strongly disagree	22	3.82
<b>Dental services are expensive</b>		
Neutral	21	36.45
Strongly agree	48	8.33
Agree	326	56.60
Disagree	28	48.61
Strongly disagree	153	26.56
<b>Dental services are offered by un friendly providers</b>		
Neutral	179	31
Strongly agree	5	0.87
Agree	72	12.50
Disagree	245	42.53
Strongly disagree	75	13.02
<b>Dental services are difficult to find</b>		
Neutral	129	22.40
Strongly agree	14	2.43
Agree	264	45.83
Disagree	165	28.65
Strongly disagree	4	0.69
<b>The best oral health services are not in Lira district</b>		
Neutral	84	14.58
Strongly agree	7	1.22
Agree	94	16.32
Disagree	294	50.69
Strongly disagree	99	17.19
<b>Children should not visit dentists when they start losing teeth because it is normal</b>		
Neutral	45	7.81
Strongly agree	141	24.48
Agree	353	61.28
Disagree	32	5.56
Strongly disagree	5	0.87
<b>Overall attitude</b>		
Good	250	43.4
Poor	326	56.6
<b>Knowledge</b>		
<b>Which of the following is a common oral health challenge you know</b>		
I don't know	166	28.82
Jaw fractures	1	0.17
Missing teeth	51	8.85
Gum disease and dental carries	358	62.15
<b>Which of the following facilities offer dental services</b>		
I don't know	119	20.66
HCII	36	6.25
HCIII	1	0.17
HCIV	420	72.92
<b>How often should one visit a dental clinic</b>		
I don't know	130	22.57

**Table 3** (continued)

Variables	Frequency (N)	Percentage (%)
<b>Attitudes</b>		
<b>It is not good to bother visiting a dentist when you have no tooth problems</b>		
When you are sick	226	39.24
1 year	11	1.91
6 months	209	36.28
<b>What should be done when a tooth is paining</b>		
I do nothing	1	0.17
Get herbal medicine	143	24.83
Get some pain killers	247	42.88
Visit a dentist	185	32.12
<b>Overall knowledge</b>		
Good	266	46.18
Poor	310	53.82

health services compared to those who were sure (AOR 0.42, 95% CI 0.18–0.98,  $p=0.044$ ). Respondents who perceived oral health services as friendly were also 2.53 times more likely to utilize the oral health services compared to those who perceived them as unfriendly (AOR 2.53, 95% CI 1.12–5.50,  $p=0.025$ ). See Table 5.

## Discussion

The level of utilization of oral health services in the past six months in Lira District is 20.5%. This low utilization rate may be attributed to several challenges affecting access to oral health services in Northern Uganda, such as lack of awareness about available services, poor attitudes towards utilizing these services, and insufficient equipment in health facilities.

The utilization rate observed in our study is lower than that reported by Gambhir et al. in India, where only 30% of respondents had never utilized oral health services [24]. It also contrasts with findings from Chikuni et al. in Western Uganda, where 36.72% of respondents had used oral health services [10]. However, our results align more closely with the Kenya National Oral Health Survey, which found that only 25% of Kenyans had visited a dentist in the past year [25]. In contrast, the National Oral Health Survey in Nigeria reported that only 12% of the population had visited a dentist within the past year [26], which is lower than the findings of our study. These variations can be attributed to differences in study settings and methodologies. For example, some studies measured utilization based on lifetime visits to oral health clinics, while others focused on visits within the past two years, one year, or six months. Our study specifically measured utilization within the past six months.

Our study revealed that respondents lacking formal education were notably less likely to utilize oral health services within the stipulated six-month timeframe. Specifically, those without formal education were 80% less likely to seek oral health services compared to those with

educational backgrounds (AOR 0.2, 95% CI 0.06–0.62,  $p=0.005$ ). This disparity can be attributed to the influence of education on oral health awareness; individuals with higher education levels generally possess greater knowledge about oral health and better financial capacity to access these services. This is consistent with numerous studies conducted globally that show that individuals who have had any form of education are able to utilize oral health services [27, 28]. This emphasizes the need for increasing awareness on oral health services through training especially for those who have not heard formal education.

Our study reveals that respondents with poor attitudes towards oral health services were significantly 45% less likely to utilize these services compared to those with positive attitudes (AOR 0.55, 95% CI 0.34–0.89,  $p=0.015$ ). This finding may be attributed to a lack of awareness and understanding of the importance of regular oral health check-ups and preventive care. This is similar to studies that also show that positive attitude towards oral health services has a positive impact to the utilization of the services [29, 30]. The role of attitude in health service utilization can be further explained using relevant theories and models. For instance, the Health Belief Model (HBM) posits that individuals are more likely to take health-related actions if they perceive a higher susceptibility to a health problem, believe the problem has serious consequences, think taking a specific action would reduce their susceptibility to or severity of the problem, and believe the benefits of taking the action outweigh the costs or barriers [31]. In the context of our study, individuals with positive attitudes towards oral health services are likely to perceive the benefits of regular dental check-ups and preventive care, thereby increasing their utilization of these services.

Our findings indicate that respondents whose decisions were influenced by cultural factors were 4.84 times more likely to utilize oral health services compared to those

**Table 4** Factors associated with utilization of oral health services among adults aged 18–70 years in Lira district, Northern Uganda

Variable	Utilization		COR (95%CI)	P-value
	No	Yes		
<b>Access to information</b>				
No	285(49.48)	266(93.3)	19(6.7)	1
Yes	291(50.52)	192(66.0)	99(34.0)	7.21(4.27–12.2) < 0.001***
<b>Lack of transport</b>				
No	318(55.21)	241(75.8)	77(24.2)	1
Yes	258(44.79)	217(84.1)	41(15.9)	0.591(0.388–0.9) 0.014**
<b>Cultural influence</b>				
No	490(85.07)	417(85.1)	73(14.9)	1
Yes	86(14.93)	41(47.7)	45(52.3)	6.26(3.83–10.24) < 0.001***
<b>Overall knowledge</b>				
Good	266(46.18)	197(74.1)	69(25.9)	1
Poor	310(53.82)	261(84.2)	49(15.8)	0.53(0.35–0.8) 0.003**
<b>Overall attitude</b>				
Good	250(43.4)	181(72.4)	69(27.6)	1
Poor	326(56.6)	277(85.0)	49(15.0)	0.46(0.30–0.7) < 0.001***
<b>Type of facility</b>				
Government	384(66.67)	320(83.3)	64(16.7)	1
I don't know	18(3.13)	16(88.9)	2(11.1)	0.62(0.14–2.78) 0.538
Private-for-profit (PFP)	148(25.69)	110(74.3)	38(25.7)	1.72(1.09–2.72) 0.019*
Private not-for-profit (PNFP)	26(4.51)	12(46.2)	14(53.8)	5.83(2.57–13.19) < 0.001***
<b>Perceived Cost of oral health services</b>				
Low	244(42.36)	203(83.2)	41(16.8)	1
High	332(57.64)	255(76.8)	77(23.2)	1.49(0.98–2.27) 0.061
<b>Availability of equipment</b>				
No	55(9.5)	34(61.8)	21(38.2)	1
Not sure	128(22.1)	106(82.8)	22(17.2)	0.33(0.164–0.684) 0.003**
Yes	395(68.4)	318(80.9)	75(19.1)	0.38(0.209–0.695) 0.002**
<b>Friendly services</b>				
No	122(21.18)	105(86.1)	17(13.9)	1
Yes	454(78.82)	353(77.8)	101(22.2)	1.76(1.01–3.08) 0.046*

**Table 5** Predictors of utilization of oral health services among adults aged 18–70 years in Lira district, Northern Uganda

Variable	Crude odds ratio	P value	Adjusted odds ratio	P Value
<b>Education level</b>				
Tertiary	1		1	
Secondary	0.615(0.35–1.075)	0.089	0.68(0.34–1.34)	0.266
Primary	0.571(0.33–0.98)	0.043	0.55(0.27–1.12)	0.101
None	0.197(0.08–0.50)	0.001	0.20(0.06–0.62)	0.005**
<b>Attitude towards utilization of oral health services</b>				
Good	1		1	
Poor	0.46(0.30–0.7)	0.000	0.55(0.34–0.89)	0.015*
<b>Cultural influence on utilization</b>				
No	1		1	
Yes	6.26(3.83–10.24)	0.000	4.84(2.77–8.43)	< 0.001***
<b>Type of facility</b>				
Government	1		1	
I don't know	0.62(0.14–2.78)	0.538	0.42(0.08–2.19)	0.304
Private	1.72(1.09–2.72)	0.019	1.53(0.85–2.74)	0.158
Private not for profit	5.83(2.57–13.19)	0.000	4.67(1.79–12.16)	0.002**
<b>Equipment availability</b>				
Un available	1		1	
Not sure	0.33(0.164–0.684)	0.003	0.42(0.18–0.98)	0.044*
Available	0.38(0.209–0.695)	0.002	0.49(0.24–1.03)	0.063
<b>Friendly services</b>				
No	1		1	
Yes	1.76(1.01–3.08)	0.046	2.53(1.12–5.50)	0.025*

not influenced by such factors (AOR=4.84, 95% CI: 2.77–8.43, P=0.000). The study found out whether participants held any cultural norms or beliefs that impacted their utilization of oral health services, revealing that cultural influences play a significant role in shaping health-seeking behaviors in this context. The association was significant and suggests that cultural beliefs and practices play a pivotal role in shaping individuals' choices regarding oral health care. The findings of our study disagree with numerous studies that show that culture hinders access to health services [32]. However, chopra et al. also reveals that culture is an intricate web of interacting components that can either facilitate or deter service utilization [33]. The difference between the studies could be due to the different beliefs, norms and practices in the different study settings. In Lango subregion, most oral health conditions are managed at home or by traditional healers with in the community. However, it is important to note



that many of these traditional treatment methods carry a high risk of infection, which may compel patients to seek biomedical treatment options. For example, the removal of tonsils, commonly referred to as “gi dwoni” (false teeth) in Lango culture, poses significant health risks. This study underscores the impact of cultural factors on access to oral health services in Lira district, it emphasizes the need to continue discouraging harmful cultural beliefs and practices to wards oral health.

The study also shows that respondents choosing private non-profit health facilities for health care were 4.67 times more likely to utilize the oral health services compared to those that attended care in other health facilities (AOR 4.67, 95% CI 1.79–12.16,  $p=0.002$ ). This could be due to the better quality of services provided in the private non-profit health facilities. This study is in agreement with a study by Ssenyonjo et al. found that clients tend to favor private non-profit facilities. This could be due to the reputation of private, not-for-profit health facilities to provide higher-quality services at affordable rates compared to government health facilities [34]. The results advocate for quality improvements in government facilities’ oral health services, while urging private health facilities to adopt equitable pricing practices.

Furthermore, the study disclosed that respondents who were unsure about equipment availability in health facilities were 0.044 times less likely to utilize oral health services compared to their counterparts (AOR=0.42, 95% CI 0.18–0.98,  $P=0.044$ ). This could be due to the fact that clients perceive superior equipment as a precondition for high-quality health care, influencing their choice of health facilities. In this context, respondents uncertain about equipment availability may have chosen centers with equipment within their financial reach. The results of this study are in line with Nyamuryekung’e et al.’s study in Tanzanian which found equipment availability, practitioner expertise, and service costs as pivotal factors in comprehensive oral care provision and utilization [35]. Thus, the study accentuates the need for enhanced promotion of oral health services among various health providers in Lira district.

This study also reveals that respondents perceiving oral health services as friendly exhibited were 2.53 times more likely to utilize the oral health services compared to those perceiving them as unfriendly (AOR 2.53, 95% CI 1.12–5.50,  $p=0.025$ ). This is because friendly service can heighten client satisfaction and promote service utilization. This finding concurs with several studies conducted in Africa [14, 36, 37]. This insight underscores the imperative of user-friendly oral health services to augment utilization rates.

### Study limitations

The study has several limitations. First, it relied on self-reported data, which may have introduced bias due to social desirability and recall issues, though this was mitigated by cross-validating some questions. Furthermore, the findings are limited in generalizability, as the study was conducted in a single district, and the timeframe may not capture seasonal variations in service utilization. No distinction was made between public and private oral health services, which could affect access disparities, and no actual health records were reviewed, relying solely on participants’ reports. Additionally, independent data on the availability and accessibility of oral health services was lacking. Comparisons with similar studies in Lira District were not possible due to a lack of data. Finally, the six-month period used to assess utilization may have introduced bias, as oral health service use typically ranges from 6 to 24 months, potentially underestimating the needs of participants without immediate oral health issues.

### Conclusions and recommendations

The study reveals that oral health service utilization among adults aged 18–70 in Lira district, Northern Uganda, stands at 20.5%. Key predictors include lack of formal education, negative attitudes toward oral health services, cultural influences, type of facility, uncertainty about equipment availability, and perceptions of service friendliness. The results suggest that there should be targeted education for the less educated, attitude-change campaigns, culturally sensitive approaches for oral health, support for private and government healthcare facilities, ensuring equipment availability for oral health, and promoting patient-centered care.

### Ethical considerations

The study was performed in accordance to the declaration of Helsinki and obtained Research Ethics Committee (REC) approval from Gulu University Research Ethics Committee (GUREC-2022-292). Permission to conduct the study was sought from the relevant authorities where the study was conducted. More so, before data collection written informed consent was obtained from the participants. The participants were informed about the purpose of the study, the benefits, risks and that they were free to withdraw from the study at any time without any consequences. Participants data was highly kept confidential and therefore identifiers like names were not used. To ensure respect and privacy for the participants, the interviews were conducted in private and convenient locations chosen by the participants to ensure their comfort.

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12903-024-05082-z>.

Supplementary Material 1

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### Author contributions

S. O conceptualized and designed the study, planned, interpreted results and he is the principle investigator of the study. M. M supervised, interpreted the results and wrote the manuscript. E. K and A. K reviewed the manuscript. A. R. A designed the study and reviewed the manuscript, M. S. O conducted the analysis and wrote the main manuscript text. N. O planned, supervised the research, interpreted results and reviewed the manuscript.

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### Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### Declarations

#### Consent for publication

Not applicable.

#### Competing interests

The authors declare no competing interests.

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### References

- WHO. Oral health [Internet]. 2022 [cited 2023 May 2]. <https://www.who.int/news-room/fact-sheets/detail/oral-health>
- Seminario AL, DeRouen T, Cholera M, Liu J, Phantumvanit P, Kemoli A et al. Mitigating Global Oral Health Inequalities: Research Training Programs in Low- and Middle-Income Countries. *Ann Glob Health* [Internet]. 2020 [cited 2024 Apr 18];86(1). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7646278/>
- Mwesigwa CL, Okumu BA, Kirabo-Nagemi C, Ejuu E, Kruger E, Tennant M. Mapping the geographic availability of public dental services in Uganda relative to ruralization and poverty of the population. *J Glob Oral Health* [Internet]. 2020 Feb 29 [cited 2023 May 2];2(2):86–92. <https://jglobaloral-health.org/mapping-the-geographic-availability-of-public-dental-services-in-uganda-relative-to-ruralization-and-poverty-of-the-population/>
- MOH. National Oral Health Policy [Internet]. Ministry of Health | Government of Uganda. 2007 [cited 2023 Oct 16]. <https://www.health.go.ug/cause/national-oral-health-policy/>
- WHO. Global oral health status report: towards universal health coverage for oral health by 2030 [Internet]. 2022 [cited 2023 May 2]. <https://www.who.int/publications-detail-redirect/9789240061484>
- Kutesa A, Kasangaki A, Nkamba M, Muwazi L, Okullo I, Rwenyonyi CM. Prevalence and factors associated with dental caries among children and adults in selected districts in Uganda. *Afr Health Sci* [Internet]. 2015 Dec [cited 2024 Apr 29];15(4):1302–7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4765403/>
- WHO. Promoting Oral Health in Africa: Prevention and control of oral diseases and noma as part of essential noncommunicable disease interventions [Internet]. 2016. <http://apps.who.int/iris/bitstream/10665/205886/1/9789290232971.pdf>
- Khusanovich KBRCF, TYPES AND APPLICATIONS OF DENTAL COMPLIMENTS. *J Mod Educ Achiev* [Internet]. 2023 Apr 6 [cited 2023 May 2];5(5):95–9. <https://scopusacademia.org/index.php/jmea/article/view/157>
- Effect of Oral Health on the Community. Overall Well-Being, and the Economy. In: *Oral Health in America: Advances and Challenges* [Internet] [Internet]. National Institute of Dental and Craniofacial Research(US); 2021 [cited 2023 May 2]. <https://www.ncbi.nlm.nih.gov/books/NBK578297/>
- Chikuni W, Amalimeh BE, Agholor CN. Utilisation of oral health services and associated factors in a sub-urban population in Western Uganda. *International Journal of Medical Sciences and Pharma Research*. 2023;9(2):2023;1–12. <https://doi.org/10.22270/ijmspr.v9i2.71>.
- Arineitwe S. Factors Affecting Utilization of Oral and Dental Services among Patients attending Dental Clinic at Katate Health Center IV, Kanungu District. A Cross-sectional study. *Stud J Health Res Afr* [Internet]. 2023 [cited 2024 Apr 29];4(3):17–17. <https://www.sjhresearchafrica.org/index.php/public-html/article/view/302>
- Vieira ACF, Alves CMC, Rodrigues VP, Ribeiro CCC, Gomes-Filho IS, Lopes FF. Oral, systemic and socioeconomic factors associated with preterm birth. *Women Birth* [Internet]. 2019 Feb 1 [cited 2023 Oct 26];32(1):e12–6. <https://www.sciencedirect.com/science/article/pii/S1871519217306005>
- Jordão LMR, Malta DC, Freire M. do CM. Simultaneous oral health risk behaviors among adolescents: evidence from the National School-based Student Health Survey. *Rev Bras Epidemiol* [Internet]. 2018 [cited 2023 Oct 26];21. <https://www.scielo.br/j/rbepid/a/jxjvwbk3HTc4HKY4ZZGdmsf/?lang=en>
- Ocwia J, Olum R, Atim P, Laker F, Okot J, Sereke SG et al. Oral health seeking behaviors of adults in Nebbi District, Uganda: a community-based survey. *BMC Oral Health* [Internet]. 2021 Sep 17 [cited 2023 May 2];21(1):453. <https://doi.org/10.1186/s12903-021-01824-5>
- DHI. National Health Facility Master List [Internet]. uganda. 2017. <http://library.health.go.ug>
- Okello H, Kalungi VC, Knowledge. Attitude and Practices towards Oral Hygiene among Adults (18–45yrs) in Lira Regional Referral Hospital, Lira City. A Cross-sectional Study. *Stud J Health Res Afr* [Internet]. 2022 Jun 30 [cited 2023 May 2];3(6):15–15. <https://sjhresearchafrica.org/index.php/public-html/article/view/160>
- LDLG. Health [Internet]. Lira District. 2011 [cited 2024 Jul 22]. <https://liradistrict.com/health/>
- Auma B, Musinguzi M, Ojuka E, Kigongo E, Tumwesigye R, Acup W et al. Prevalence of diarrhea and water sanitation and hygiene (WASH) associated factors among children under five years in Lira City Northern Uganda: Community based study. *Plos One* [Internet]. 2024 [cited 2024 Jun 18];19(6):e0305054. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0305054>
- Kish L. Sampling organizations and groups of unequal sizes. *Am Sociol Rev*. 1965;30(4):564–72. <https://doi.org/10.2307/2091346>.
- WHO. Preparing the sample [Internet]. 2017. [https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/steps/part2-section2.pdf?sfvrsn=9c33a896\\_2#:~:text=Note%3A%20The%20value%20is,previous%20estimates%20for%20design%20effect](https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/steps/part2-section2.pdf?sfvrsn=9c33a896_2#:~:text=Note%3A%20The%20value%20is,previous%20estimates%20for%20design%20effect)
- Araujo MEA, Silva MT, Galvao TF, Pereira MG. Prevalence of health services usage and associated factors in the Amazon region of Brazil: a population-based cross-sectional study. *BMJ Open* [Internet]. 2017 Nov 1 [cited 2024 Jul 22];7(11):e017966. <https://bmjopen.bmj.com/content/7/11/e017966>
- Gao X, Ding M, Xu M, Wu H, Zhang C, Wang X, et al. Utilization of dental services and associated factors among preschool children in China. *BMC Oral Health*. 2020;20:1–10.
- Shirahase R, Watanabe Y, Saito T, Sunakawa Y, Matsushita Y, Tsugayasu H et al. A Cross-Sectional Study on the Relationship between Oral Function and Sarcopenia in Japanese Patients with Regular Dental Maintenance. *Int J Environ Res Public Health* [Internet]. 2022 Apr 24 [cited 2023 May 7];19(9):5178. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9099729/>

24. Gambhir RS, Brar P, Singh G, Sofat A, Kakar H. Utilization of dental care: An Indian outlook. *J Nat Sci Biol Med* [Internet]. 2013 [cited 2024 Jul 24];4(2):292–7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3783767/>
25. Ministry of Health. Kenya National Oral Health Survey Report [Internet]. 2015. [https://profiles.uonbi.ac.ke/gathece/files/kenya\\_national\\_oral\\_health\\_survey\\_report\\_2015.pdf](https://profiles.uonbi.ac.ke/gathece/files/kenya_national_oral_health_survey_report_2015.pdf)
26. Okoye L, Ekwueme O. Prevalence of Dental Caries in a Nigerian Rural Community: A Preliminary Local Survey. *Ann Med Health Sci Res* [Internet]. 2011 [cited 2023 May 7];1(2):187–95. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3507107/>
27. Ghanbarzadegan A, Mittinty M, Brennan DS, Jamieson LM. The effect of education on dental service utilization patterns in different sectors: A multiple mediation analysis. *Community Dent Oral Epidemiol* [Internet]. 2023 [cited 2024 Jul 24];51(6):1093–9. <https://onlinelibrary.wiley.com/doi/abs/https://doi.org/10.1111/cdoe.12838>
28. Sidharthan S, Ramanarayanan V, Karuveettil V, Ravindran GC. Utilization of dental health services and its associated factors among adult population in Ernakulam district, Kerala, India: A mixed-method analysis. *J Oral Biol Craniofacial Res* [Internet]. 2024 [cited 2024 Jul 24];14(2):133–42. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10862006/>
29. Nagdev P, Iyer MR, Naik S, Khanagar SB, Awawdeh M, Al Kheraif AA et al. Andersen health care utilization model: A survey on factors affecting the utilization of dental health services among school children. *PLOS ONE* [Internet]. 2023 Jun 15 [cited 2024 Jul 24];18(6):e0286945. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10270576/>
30. Okoroafor CC, Okobi OE, Owodeha-ashaka M, Okobi E, Oluseye B, Ekpang OB et al. Dental Health Knowledge Attitude and Practice Among University of Calabar Students. *Cureus* [Internet]. 2023 Jun [cited 2024 Jul 24];15(6). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10325694/>
31. Becker MH. The Health Belief Model and Sick Role Behavior\*. *Health Educ Monogr* [Internet]. 1974 Dec 1 [cited 2023 Jul 25]; <https://journals.sagepub.com/doi/10.1177/109019817400200407>
32. Marcus K, Balasubramanian M, Short S, Sohn W. Barriers and facilitators to dental care among culturally and linguistically diverse carers: A mixed-methods systematic review. *Community Dent Oral Epidemiol* [Internet]. 2023 [cited 2023 Apr 8];51(2):327–44. <https://onlinelibrary.wiley.com/doi/abs/https://doi.org/10.1111/cdoe.12745>
33. Chopra M, Mohan Marya C, Nagpal R. Culture and Oral Health [Internet]. 2015 [cited 2023 Apr 8]. <https://www.grin.com/document/295206>
34. Ssenyonjo A, Namakula J, Kasyaba R, Orach S, Bennett S, Ssenigooba F. Government resource contributions to the private-not-for-profit sector in Uganda: evolution, adaptations and implications for universal health coverage. *Int J Equity Health* [Internet]. 2018 Oct 5 [cited 2023 Apr 8];17(1):130. <https://doi.org/10.1186/s12939-018-0843-8>
35. Nyamuryekunge KK, Lahti SM, Tuominen RJ. The relative patient costs and availability of dental services, materials and equipment in public oral care facilities in Tanzania. *BMC Oral Health* [Internet]. 2015 Jul 1 [cited 2023 Apr 8];15(1):74. <https://doi.org/10.1186/s12903-015-0061-3>
36. Gao X, Ding M, Xu M, Wu H, Zhang C, Wang X et al. Utilization of dental services and associated factors among preschool children in China. *BMC Oral Health* [Internet]. 2020 Jan 8 [cited 2023 Apr 8];20(1):9. <https://doi.org/10.1186/s12903-019-0996-x>
37. Hu X, Fan X, Tian J, Zhang B, Huang R. Utilization of dental care service and associated factors among pre-school children in northwest China over the past decade. *BMC Oral Health* [Internet]. 2023 Jan 30 [cited 2023 Apr 8];23(1):54. <https://doi.org/10.1186/s12903-023-02736-2>

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