

# Factors Influencing Dental Care Utilization among Pregnant Women with Oral Disease Symptoms Attending Antenatal Care in Kampala, Uganda

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## Abstract

**Background:** Oral health during pregnancy is often neglected despite the physiological and hormonal changes that predispose women to oral diseases. Untreated oral health problems during pregnancy can affect both maternal and fetal outcomes. However, utilization of dental care services among pregnant women remains low in many low- and middle-income countries, including Uganda.

**Objective:** To determine the factors influencing dental care utilization among pregnant women with oral disease symptoms attending antenatal care clinics in Kampala, Uganda.

**Methods:** A cross-sectional study was conducted among pregnant women attending antenatal care at selected health facilities in Kampala. Data were collected using a structured interviewer-administered questionnaire covering socio-demographic characteristics, oral disease symptoms, knowledge, and access-related factors. Descriptive statistics and multivariable logistic regression were used to identify factors associated with dental care utilization.

**Results:** Out of the 695 participants, 21.7% indicated that they used dental services while pregnant. In multivariable logistic regression analysis (n=691), four factors were independently associated with dental care utilization. Toothache was the strongest predictor (AOR = 10.97, 95% CI: 4.82-24.93, p<0.001), followed by having visited a dental health facility previously (AOR = 8.82, 95% CI: 1.78-43.66, p=0.008), experiencing dry mouth (AOR = 2.40, 95% CI: 1.04-5.54, p=0.040), and positive opinion on cost of care (AOR = 1.82, 95% CI: 1.22-2.73, p=0.003). Conversely, barriers to utilization included a lack of

knowledge about the safety of dental procedures during pregnancy and the perceived high cost of dental care.

**Conclusion:** Dental visits among pregnant women in Kampala are infrequent and primarily driven by acute pain rather than preventive motives. Having an established relationship with a dental facility significantly enhances utilization. Strengthening oral health education within antenatal programs, establishing dental homes before pregnancy, and addressing financial and informational barriers could improve dental care utilization among pregnant women.

**Keywords:** Dental Care Utilization, Pregnancy, Oral Health, Andersen's Model, Antenatal Care, Uganda

## 1. Introduction

Oral health is an essential component of general health and well-being. Physiological and hormonal changes during pregnancy make women more likely to get oral diseases like gingivitis, periodontitis, and dental caries (1). Despite its importance, oral health care is often neglected during pregnancy, particularly in low- and middle-income countries (LMICs), where access and awareness remain limited (2). Poor maternal oral health is associated with pain, infection, and adverse pregnancy outcomes such as preterm birth and low birth weight (3, 4)

Globally, utilization of dental care services among pregnant women remains low, with reported rates ranging between 13% and 35%, depending on socioeconomic context (5, 6) In LMICs, barriers to utilization include inadequate awareness, cultural beliefs, financial constraints, and misconceptions about the safety of dental procedures during pregnancy (7, 8). The World Health Organization (WHO) recommends integrating oral health promotion into maternal and child health services to improve outcomes (9, 10)

In Uganda, maternal health programs have made significant progress in increasing antenatal care (ANC) attendance; however, oral health remains largely excluded from routine maternal care. Studies indicate that while many women experience oral health problems during pregnancy, few seek professional care, often resorting to self-medication or traditional remedies (11). Barriers such as limited availability of dental services, high costs, lack of information, and perceived risks of dental treatment contribute to poor service uptake (12)

Understanding the determinants of dental care utilization among pregnant women is crucial for informing maternal health policy and improving service delivery. This study therefore aimed to determine the factors influencing dental care utilization among pregnant women with oral disease symptoms attending antenatal care in Kampala, Uganda.

## 2. Methods

### Study Design and Setting

A cross-sectional study was conducted over a period of four months, from January to April 2021. Participant recruitment took place from January 4th to April 27th, 2021, across five Kampala Capital City Authority (KCCA) public health centers: Komamboga HC III, Kawaala HC III, Kisugu HC III, Kitebi HC III, and Kisenyi HC IV. These facilities were purposely selected because they offer both antenatal and

dental care services. Kampala is an urban district in central Uganda with an estimated population of approximately 1.5 million residents as of 2022, with residents of a mixed socioeconomic profile.

### **Study Population and Eligibility Criteria**

The study included pregnant women in their third trimester attending ANC clinics who self-reported symptoms of oral disease, such as toothache, bleeding gums, or jaw pain. Women with obstetric emergencies or those who were critically ill were excluded.

### **Sample Size Determination and Sampling Procedures**

The sample size of 695 participants was calculated using the Kish and Leslie (1965) (13) formula for cross-sectional studies, assuming a 29% prevalence of dental care utilization from a previous Ugandan study (14) a 95% confidence level, a 5% margin of error, a design effect of 2, and a 10% non-response rate. A systematic sampling technique was applied to ANC attendance registers at each facility. The total number of expected ANC attendees during the study period was divided by the required sample size to determine the sampling interval. Every 2nd eligible woman was approached until the target sample per facility was reached.

### **Data Collection and Instruments**

Data were collected by trained research assistants using pretested, structured electronic questionnaires administered using the Open Data Kit (ODK) platform. The questionnaire was guided by Andersen's Behavioral Model of Health Service Use (15), covering three domains:

- Predisposing factors: age, education, marital status, and employment status
- Enabling factors: income, health insurance, proximity to dental facilities, consultation with a healthcare worker for dental pain, and the reason for choosing a facility
- Need factors: self-reported oral symptoms such as toothache, tooth sensitivity, jaw pain, and bleeding gums

The tool was pretested at a similar health facility in Kampala and refined for clarity and content validity.

### **Variable Definition**

The dependent variable was dental care utilization, assessed by the question: "Have you visited a dental care worker for your oral health during the current pregnancy?" (Yes/No).

For those who did not utilize formal dental services and yet had symptoms of dental disease during pregnancy, a follow up question was used to evaluate what they use to alleviate pain " Did you seek care from a conventional dental health facility or you used none conventional methods (yes/NO)

Where conventional facility referred to seeking care from a trained certified dental health care professional and none conventional referred to self-medication, seeking care from spiritualists, use of herbs and concoctions and any other sort of care received from a none trained and none certified person

Independent variables were categorized according to Andersen's framework as described above.

### **Data Management and Statistical Analysis**

Data were cross-checked daily for validation and accuracy, and all completed data were exported from ODK into Microsoft Excel, where they were further cleaned. The cleaned data was then exported to IBM SPSS Statistics Version 22 for analysis. Descriptive statistics were computed as frequencies and percentages for categorical variables and means ( $\pm$ SD) for continuous variables.

Associations between independent variables and dental care utilization were examined using chi-square or Fisher's exact tests at the bivariate level. Variables with  $p < 0.2$  and those of theoretical relevance were entered into a multivariable logistic regression model to identify independent predictors of dental care utilization.

Binary logistic regression was used to estimate adjusted odds ratios (AORs) and 95% confidence intervals for factors associated with dental care utilization. All variables with  $p < 0.20$  in bivariate analysis and those considered theoretically important under Andersen's framework were entered simultaneously into the model. Model fit was evaluated using the Hosmer-Lemeshow goodness-of-fit test, and explanatory power was assessed using Nagelkerke  $R^2$ . The final model included 691 women with complete data for all covariates (0.6% excluded due to missing data). Statistical significance was set at  $p < 0.05$ .

### **Ethical Considerations**

Ethical approval was obtained from the Makerere University School of Public Health Higher Degrees, Research and Ethics Committee (MakSPH-HDREC) (Master Student, 2015/HD07/1507U) and the KCCA Directorate of Public Health Services. Prior to the initiation of the interviews, written informed consent was meticulously obtained from all participants (in either the local language or English). This consent also covered the aspect of using the collected data in scientific journals and reports to be presented at conferences as means of dissemination of the study findings. Anonymity and confidentiality of data were maintained throughout the research process. To ensure the strictest confidentiality, the names of the participants were substituted with numbers in order to avoid the association of individual participants with the data obtained.

### **3. Results**

A total of 695 pregnant women participated in the study. The ( $n=356$ , 51.2%) were between 14 and 24 years old and had attained secondary education. ( $n=548$ , 78.8%), were married or cohabiting ( $n=362$ , 52.1%), and were unemployed. Despite all participants reporting symptoms of oral disease, only 21.7% (151/695) reported utilizing dental care services during their current pregnancy. This reflects a significant gap between the need for oral health care and its actual utilization among pregnant women in Kampala.

Among pregnant women who utilized dental care ( $n=151$ ), the most common treatment received was non-conventional treatment (56.8%), followed by extraction (30.1%), indicating that dental visits were mostly symptom-driven and often sought at late stages. Preventive visits were rare, reinforcing a trend of reactive rather than proactive dental care-seeking behavior.

### **Bivariate Analysis**

Bivariate analysis revealed no significant associations (at  $p < 0.05$ ) between most of the predisposing factors (age, education) and utilization, though marital status showed a marginal association ( $p=0.080$ ). In contrast, enabling and need-related factors showed stronger relationships: women who had a specific dental facility to visit and those who experienced toothache, tooth sensitivity, or jaw pain were more likely to utilize dental care (all  $p<0.001$ ).

### **Multivariable Analysis**

In multivariable logistic regression analysis (Table 3), the model was highly significant ( $\chi^2=126.717$ ,  $DF=11$ ,  $p<0.001$ ) and explained 39% of variance in dental care utilization (Nagelkerke  $R^2=0.389$ ). Four factors remained independently associated with utilization after adjustment.

Toothache emerged as the strongest predictor, with women experiencing toothache having nearly 11-fold higher odds of utilizing dental care (AOR=10.97, 95% CI: 4.82-24.93,  $p<0.001$ ). Having previously visited a dental health facility was also strongly associated with utilization (AOR=8.82, 95% CI: 1.78-43.66,  $p=0.008$ ).

Additional significant predictors included dry mouth (AOR=2.40, 95% CI: 1.04-5.54,  $p=0.040$ ) and positive opinion on cost of care (AOR=1.82, 95% CI: 1.22-2.73,  $p=0.003$ ). After adjustment, tooth sensitivity ( $p=0.341$ ), jaw pain ( $p=0.434$ ), halitosis ( $p=0.523$ ), proximity to facility ( $p=0.869$ ), and challenges with facility ( $p=0.230$ ) were not significantly associated with utilization. Dental health facility type ( $p=0.080$ ) and reason for facility choice ( $p=0.067$ ) showed marginally non-significant associations.

## **4. Discussion**

This study demonstrated a critically low level of dental care utilization among pregnant women with oral disease symptoms in Kampala. Despite the widespread presence of oral health problems, only one in five women reported seeking professional dental care during pregnancy. This pattern of low utilization aligns with findings from other sub-Saharan African studies, which similarly indicate that the oral health needs of pregnant women frequently remain unaddressed (6, 16). The findings highlight a major gap between need and service uptake and emphasize that, for many women, dental visits are prompted by pain rather than preventive motivation.

The results align with Andersen's Behavioral Model of Health Service Use, which asserts that enabling and need-related factors exert greater influence on care-seeking behavior than predisposing factors such as age, education, or marital status.

### **Key Findings and Interpretation**

**Toothache as the Dominant Driver:** This study found that dental care utilization among pregnant women in Kampala is primarily driven by acute symptoms rather than preventive intent. Toothache was the strongest predictor (AOR=10.97), consistent with previous studies showing that pain is the main motivator for dental visits during pregnancy [16]. This reactive pattern suggests that opportunities for early intervention and preventive care are being missed. Pain remains the primary driver of dental visits during pregnancy, indicating reactive rather than preventive care-seeking behavior.

**Importance of Established Dental Home:** The strong association between having a dental health facility to visit and actual utilization (AOR=8.82) underscores the importance of establishing care relationships before pregnancy. Women with an established dental home were nearly 9 times more likely to seek care, highlighting a potential intervention target for preconception and early antenatal counseling. Similar studies have reported that having a regular source of care increases women's confidence to seek dental services during pregnancy (17-19)

**Dry Mouth as a Pregnancy-Specific Driver:** Women experiencing dry mouth had 2.4-fold higher odds of utilizing dental care compared to those without dry mouth. Dry mouth (xerostomia) is a recognized pregnancy symptom that prompts care-seeking, though the effect is smaller than toothache. This suggests women are responsive to oral health changes during pregnancy.

**Cost Perceptions as Persistent Barrier:** The finding that positive opinions about cost of care increased utilization (AOR=1.82) emphasizes the persistent role of financial barriers. Even when services are available, perceived costs significantly influence whether women seek care. Addressing affordability through insurance schemes or subsidized services could improve access.

**Non-Significant Factors:** Notably, after adjusting for other factors, proximity to dental facilities and challenges with facilities were not independently associated with utilization. This contrasts with studies in lower-resource rural settings, where cost and access are major barriers to care (20). The relatively high accessibility of public facilities in Kampala may explain this difference. The findings indicate that the obstacles to utilization in urban Uganda are predominantly informational and systemic, rather than solely economic or geographical.

### **Implications for Practice and Policy**

The finding that many women delayed seeking care until after delivery or relied on self-medication suggests a normalization of oral discomfort during pregnancy. This behavior, frequently referred to as "tolerated morbidity," illustrates cultural perspectives that downplay oral symptoms during pregnancy (21). These misconceptions—such as the belief that dental treatment is unsafe during pregnancy—can discourage women from seeking timely care. Addressing these cultural and informational barriers will require tailored oral health education and awareness campaigns that target both women and healthcare workers.

Overall, the findings of this study point to a need for stronger integration of oral health within maternal health systems. Training ANC providers to deliver oral health messages, screen for oral diseases, and refer high-risk women could enhance access to preventive dental care. Similar integration strategies have demonstrated efficacy in other maternal health programs, resulting in enhanced awareness and care-seeking behavior (22) Ugandan context, such integration could be achieved by embedding oral health modules within ANC guidelines and strengthening collaboration between dental and maternal health departments at both policy and facility levels.

Programmatically, the uptake of services could be enhanced by strengthening provider training, embedding oral health messages within ANC education, and clarifying the safety and timing of dental procedures during pregnancy. Community-level health promotion should also be the primary focus of public health initiatives to promote preventive care and dispel myths. To inform national strategies for

integrating oral health, future research should investigate the efficacy of ANC-based oral health interventions and evaluate the obstacles in private and rural settings.

## 5. Limitations

This study is subject to recall and social desirability bias, although trained interviewers used standardized prompts to improve accuracy. The analysis depended on a binary outcome of utilization; although multivariable modeling accounted for significant confounders, unmeasured variables (e.g., quality of previous dental experiences) may persist. The model correctly classified 92.9% of cases overall, but only 23.2% of actual dental care users were correctly identified, suggesting the model is better at predicting non-utilization than utilization. Facilities were purposively selected because they offer both ANC and dental services, participants were third-trimester ANC attendees with self-reported oral symptoms which likely limits generalizability to women without symptoms, to women in the first and second trimesters, to women who do not utilize ANC services and to ANC facilities without dental units. Finally, findings from public facilities in an urban setting may not generalize to private clinics or rural areas.

## 6. Conclusion

Dental care utilization among pregnant women in Kampala with oral disease symptoms is critically low and primarily driven by acute pain rather than preventive intent. Four independent predictors emerged: toothache (11-fold increase in odds), having an established dental facility (9-fold increase), dry mouth (2.4-fold increase), and positive cost perceptions (1.8-fold increase). This pattern represents a reactive rather than proactive approach to oral health during pregnancy, with missed opportunities for early intervention.

The findings highlight the need for stronger integration of oral health into routine antenatal care through screening, counseling, and clear referral pathways. Programmatically, strengthening provider training, embedding oral health messages within ANC education, establishing dental homes before pregnancy, and clarifying the safety and timing of dental procedures during pregnancy could improve service uptake. Public health efforts should also focus on community-level health promotion to dispel myths and encourage preventive care.

Future research should explore the effectiveness of ANC-based oral health interventions and assess barriers within private and rural settings to inform national strategies for integrating oral health into maternal healthcare. Ultimately, improving oral health access and utilization during pregnancy will contribute to better maternal and neonatal outcomes in Uganda and similar low-resource settings.

## 7. Declarations

**Funding:** This study received no external funding.

**Competing Interests:** The authors declare that they have no competing interests.

**Authors' Contributions:** EOE conceptualized the study, mobilized resources, supervised data collection, performed analysis, and drafted the manuscript. MIN collected data and contributed to drafting and editing. MGN validated results, performed analysis, and edited the manuscript. CLM and MMI contributed

to methodology, result validation, analysis, and manuscript review. All authors read and approved the final manuscript.

### **Declaration of Generative AI and AI-assisted technologies in the writing process:**

The authors used Perplexity AI to improve the language, refine the grammar, and assist with the structural formatting of tables. After using this tool, the authors reviewed and edited the content to ensure correctness and take full responsibility for the accuracy and integrity of the final manuscript.

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### **Tables**

**Table 1: Socio-demographic Characteristics of Participants (n=695)**

<b>Characteristic</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Age</b>		
14-24 years	333	47.9%
25-34 years	312	44.9%
≥35 years	50	7.2%
<b>Education Level</b>		
No formal education	16	2.3%
Primary	202	29.1%
Secondary	356	51.2%
Tertiary	121	17.4%
<b>Marital Status</b>		
Single	147	21.2%
Married/Cohabiting	548	78.8%

**Employment Status**

Unemployed	362	52.1%
Self-employed	200	28.8%
Employed	133	19.1%

**Table 2: Bivariate Analysis of Factors Associated with Dental Care Utilization (N=695)**

Variable	Total N (%)	Did Not Visit N (%)	Did Visit N (%)	p-value
<b>PREDISPOSING FACTORS</b>				
<b>Age group (years)</b>				
14-24	333 (47.9)	307 (92.2)	26 (7.8)	0.095
25-34	312 (44.9)	290 (92.9)	22 (7.1)	
≥35	50 (7.2)	42 (84.0)	8 (16.0)	
<b>Education status</b>				
Primary or less	218 (31.4)	201 (92.2)	17 (7.8)	0.865
Secondary or more	477 (68.6)	439 (92.0)	38 (8.0)	
<b>Marital Status</b>				
Single	147 (21.2)	130 (88.4)	17 (11.6)	0.080
Married/Cohabiting	548 (78.8)	509 (92.9)	39 (7.1)	
<b>ENABLING FACTORS</b>				
<b>Had a specific facility</b>				
No	500 (71.9)	485 (97.0)	15 (3.0)	< 0.001
Yes	195 (28.1)	154 (79.0)	41 (21.0)	
<b>Proximity (Distance)*</b>				
≤2 km	140 (20.1)	116 (82.9)	24 (17.1)	< 0.001**
3-5 km	21 (3.0)	15 (71.4)	6 (28.6)	

> 5 km	8 (1.2)	5 (62.5)	3 (37.5)	
<b>Health Insurance</b>				
No	669 (96.3)	614 (91.8)	55 (8.2)	0.859
Yes	20 (2.9)	19 (95.0)	1 (5.0)	
<b>NEED FACTORS</b>				
<b>Toothache</b>				
No	474 (68.2)	465 (98.1)	9 (1.9)	< 0.001
Yes	221 (31.8)	174 (78.7)	47 (21.3)	
<b>Tooth Sensitivity</b>				
No	532 (76.6)	499 (93.8)	33 (6.2)	0.001
Yes	163 (23.4)	140 (85.9)	23 (14.1)	
<b>Jaw Pain</b>				
No	562 (81.3)	526 (93.6)	36 (6.4)	0.001
Yes	130 (18.7)	110 (84.6)	20 (15.4)	
<b>Bleeding Gums</b>				
No	487 (70.1)	449 (92.2)	38 (7.8)	0.730
Yes	208 (29.9)	190 (91.3)	18 (8.7)	

\*Only 169 participants responded to the question on proximity

\*\*Fisher's exact test used

**Table 3: Multivariable Logistic Regression Analysis of Factors Associated with Dental Care Utilization (N=691)**

Variable	Comparison	AOR	95% CI	p-value
<b>NEED FACTORS</b>				
Toothache	Yes vs No	<b>10.97</b>	4.82-24.93	<b>&lt; 0.001</b>
Tooth sensitivity	Yes vs No	1.41	0.69-2.88	0.341
Jaw pain	Yes vs No	0.75	0.36-1.55	0.434
Dry mouth	Yes vs No	<b>2.40</b>	1.04-5.54	<b>0.040</b>
Halitosis	Yes vs No	0.60	0.12-2.90	0.523

**ENABLING FACTORS**

Visited dental health facility	Yes vs No	<b>8.82</b>	1.78-43.66	<b>0.008</b>
Dental health facility type	Category comparison	0.43	0.17-1.11	0.080
Reason for facility choice	Category comparison	1.97	0.95-4.07	0.067
Proximity of dental facility	Category comparison	1.06	0.56-2.00	0.869
Challenges with facility	Category comparison	0.69	0.38-1.27	0.230
Opinion on cost of care	Continuous/Ordinal	<b>1.82</b>	1.22-2.73	<b>0.003</b>

AOR = Adjusted Odds Ratio; CI = Confidence Interval. Model adjusted for all variables listed in table. Nagelkerke R<sup>2</sup> = 0.389; Model  $\chi^2 = 126.717$  (df=11, p<0.001). Overall model classification accuracy = 92.9%. Significant associations (p<0.05) shown in bold.

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