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Prevalence, predictors and treatment needs of dental caries among primary school children in Buhweju district, rural South Western Uganda

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Abstract

Background An earlier study in Kampala, Uganda reported that a proportion of 0.9 children with dental caries remain untreated. A lack of comprehensive data about oral health in Uganda has been identified. However, the limited information available indicates an increasing prevalence of dental caries among adolescents. A recent survey conducted in Kampala revealed that over 75% of adolescents were affected by dental caries.

There was limited data about the oral health status among children in Buhweju District of rural Southwestern Uganda. This study sought to establish the prevalence, predictors and treatment needs of dental caries among primary school children in Buhweju district.

Methods In a descriptive cross-sectional study design, 433 primary school children aged 5-17 years were enrolled from March to April 2025. Clinical oral examinations were performed in a private room at school under natural light. Every tooth visible in the mouth was examined by use of plain disposable mouth mirror and dental probe. Carious teeth and spaces (if a tooth was removed due to caries) were scored and reported as Decayed, Missing and Filled Teeth (DMFT) due to caries for permanent or Decayed and Filled teeth (dft) for primary dentition. The dental caries treatment needs were captured during clinical examination when there was decay or missing tooth.

Results Overall, 274(63.3%) had dental caries with median DMFT of 0 (IQR=1) and median dft of 0 (IQR=2). Caries was more prevalent among females (64.7%) than males (62.1%). The prevalence of false teeth extraction among the permanent dentition was 72 (16.6%). Some 192 (44.3%) of the study participants needed Prompt treatment (including scaling, and fillings). At bivariate analysis, several variables met the inclusion criterion for multivariate analysis ($p<0.25$), including age 5–11 years, Bakiga ethnicity, belief that dental caries is not preventable, history of tooth removal, brushing after every meal, never eating cassava, previous dental clinic visits, and lack of oral health information through school career guidance. In the multivariate logistic regression model, two factors remained independently associated with dental caries. Children who had ever visited a dental clinic were twice as likely to have dental caries compared to those who had never visited a clinic (aOR=2.1, 95% CI: 1.2–3.4; p=0.005). Additionally, children who

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had never consumed cassava had 2.5 times higher odds of dental caries compared to those who consumed cassava monthly (aOR=2.5, 95% CI: 1.1–6.0; p=0.037).

Conclusion The study found a high prevalence of dental caries, mainly in permanent teeth, driven by limited dental health education, dietary factors, and unmet treatment needs.

Recommendation The study recommends strengthening school oral health programs through teacher training and three to six months oral health checkups as this ensures early detection of hygiene issues.

Keywords Dental caries, Primary school children, Treatment needs, Rural Uganda

Background

The global Oral Health Status Report approximated that oral diseases affect close to 3.5 billion people worldwide with dental caries alone affecting 2.5 billion people. According to the Global Burden of Diseases, Injuries and Risk Factors research, dental caries has traditionally been regarded as the most significant global oral health burden.

Earlier reports also showed that, in sub-Saharan Africa the prevalence of dental caries in whole populations is at 28.5% while among children in West Africa ranges from 3.4% to 96% and in East Africa, it is 45.7% [1].

A study in Rwanda found that 61.7% of children had dental caries, with averagely high proportion (51.3%) among females living in rural areas [2].

Studies in Uganda indicate a high burden of dental caries among children. In Kampala, a prevalence of 63.3% with a mean DMFT of 3.8 was reported [3] while higher DMFT scores were observed among rural children compared to urban ones, mainly due to limited access to dental care and transportation challenges as reported by [4]. Irregular tooth-brushing, dental visits and poor oral hygiene index have been significantly related to dental caries [5]. A study of school-age children in Ethiopia, reported various characteristics related to dental caries, including the mother's educational level, inadequate teeth brushing, consumption of sugared coffee, intake of sweet meals, and a lack of milk consumption [6]. The prevalence of dental caries is rising in developing countries, mostly due to increased intake of sugary foods, poor teeth cleaning, and lack of awareness about dental caries [7, 8].

Untreated dental caries is a global public health issue and poses a serious economic burden, pain and discomfort, and, if it spreads to the dental pulp, it can also cause infection, and ultimately sepsis and tooth loss, or even aggravate or induce systemic diseases [9] In many low-income countries, the cost of treating dental caries alone has the potential to overwhelm national healthcare budgets for children [10]. In Uganda, government funding for oral health care remains limited, and a study conducted in Kampala by Ndagire as well as Kutesa reported that approximately 90% of children with dental caries had not received treatment [10].

Yet, poor oral health status may influence the general health as well as several oral diseases including dental caries that have historically been named as the most important global oral health burden [4].

This study also examined infant oral mutilation in the rural district, as earlier studies in Uganda have documented its practice and consequences [8, 10]. In rural southwestern Uganda, the last related study was conducted in 2007 [11], highlighting a major research gap. Furthermore, limited data exist on the prevalence, predictors, and treatment needs of dental caries among primary school children in Buhweju District, underscoring the need for this study in a rural setting. This study aimed to determine the prevalence, predictors, and treatment needs of dental caries among primary school children in rural Buhweju District, southwestern Uganda, and to establish the prevalence of false teeth. The findings provide essential information on dental caries patterns and treatment needs that can guide efforts to improve oral health among children in this rural setting.

Methodology

Study design and setting

We carried out a descriptive cross-sectional study in Buhweju district and it employed quantitative techniques. The study took place in the selected primary schools of Buhweju district, which is situated in the Ankole sub-region of rural South Western Uganda and borders districts like Ibanda, Mbarara, Sheema, Bushenyi and Rubirizi. There is a total of 107 primary schools, 53 public, and 54 privates. All are day with a total population of 38,247 proportioned into 18,394 males and 19,853 females. The researchers used stratified multi stage cluster sampling technique to select twelve [12] primary schools from a sampling frame of 107 primary schools (Fig. 1).

Study participants

We recruited a total of 433 participants who were primary school going children aged 5–17 years and providing both written informed consent and Assent. We excluded those who were too sick to participate in the study. Participant enrolment was based on simple random sampling during the study period (March – April

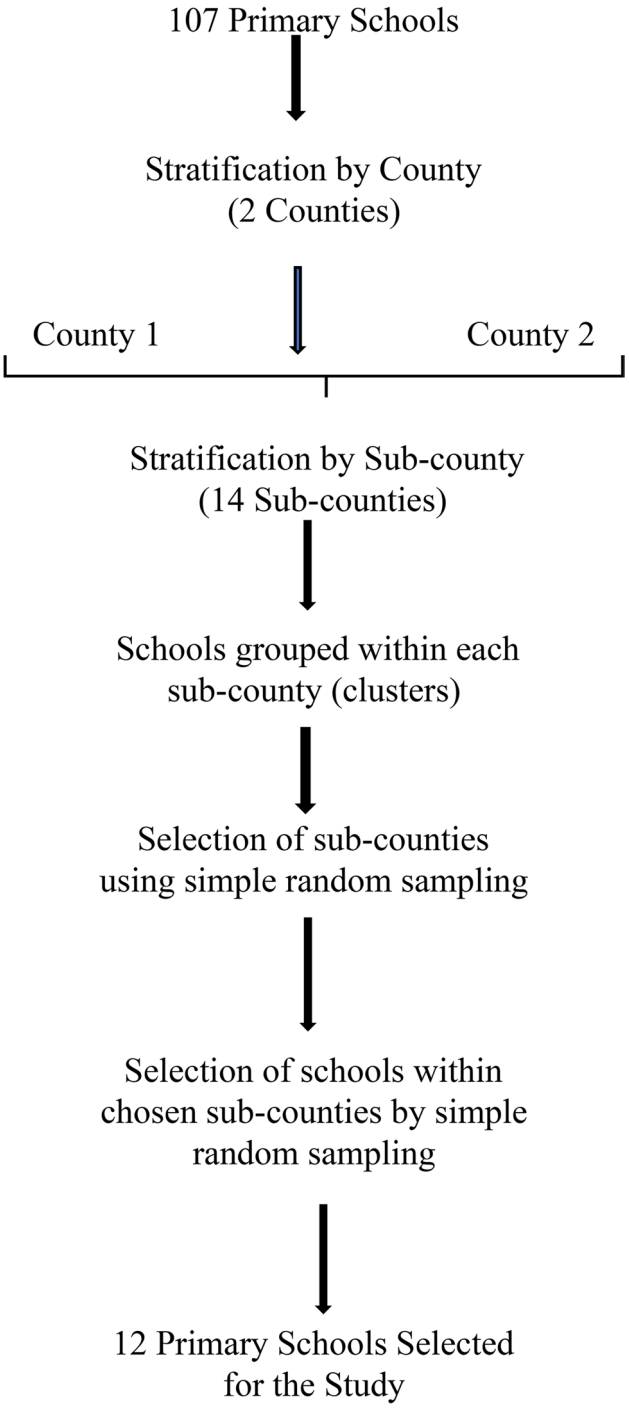

Fig. 1 Flow diagram for stratified multi stage cluster sampling of the schools included

2025). We obtained class lists from primary one up to primary seven, generated and assigned random numbers to the children on the lists. These numbers were put in a box, mixed and drawn randomly without looking, replacement and one by one. When a client declined consent or failed to meet the inclusion criteria, we considered the subsequent client.

Ethical considerations

This study received ethical approval from Mbarara University of Science and Technology-Research and ethics committee (MUST-2025-228). Administrative clearance was obtained from the office of the Chief Administrative Officer in conjunction with District Education Officer as well as the respective school administration offices. Written informed consent and assent were obtained from the parents or legal guardians of the participants and children respectively. We also confirm that all clinical examinations were performed in accordance with relevant guidelines and regulations such as the Declaration of Helsinki as this focused-on participant safety and informed consent.

Data collection

We used an interviewer-administered questionnaire with structured close-ended questions to collect data. This was developed based on literature by Batwala, Mulogo et al. 2007. Those who were unable to read and write in the English language were administered a translated version in the local language from the English version of the study by an expert of languages and then validated through pilot testing in another primary school to check for its clarity. The questions were found appropriate and therefore no adjustments were made. The questionnaire had four major sections: socio- (demographic factors, lifestyle factors, socio-cultural and environmental factors. And dental examination was guided by the modified Oral health Assessment tool for Children by World Health Organization WHO) version 2013. Dental caries was defined as a microbiologic disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth [12] Rural residence was defined according to the Uganda bureau of statistics criteria. Rural residence was defined as geographical divisions demarcated by the government for administrative purposes and outside the city. False tooth extraction was defined as a traditional practice that involves extraction of tooth buds in babies with common childhood illnesses such as fever, cough and diarrhea [13].

The questionnaire was administered by two trained research assistants and the dental examination chart was completed by two well trained Dentists with over 10 years of experience and were calibrated. The examiner consistency was assessed using the Kappa statistic and this resulted into 0.924 with p-value < 0.001 indicating that there was a statistically significant and almost perfect level of agreement between the Dentists or examiners. After completion of the questionnaire, participants were directed to the Dentists for a dental examination. Disposable dental mirrors and probe under natural light to examine the participant while seated in a reclined

position under a tree shade or a temporary shade like a tent were used.

During the examination, the Dentists recorded the number of decayed, missing and filled teeth. Teeth that were traumatized or malformed, missing naturally, or extracted due to trauma, were excluded. Dental caries was scored using the WHO 's decayed, filled and missing teeth (DMFT). Dental caries was scored by surface according to WHO criteria (Oral Assessment Form for Children, 2013). A numerical coding system was used for recording the status of permanent teeth and an alphabetical coding system for primary teeth. Participants were defined as to have treatment needs if they had decayed or missing teeth. Respondents with tooth ache or dental caries were referred to the dental clinic for management, while those with missing teeth were advised to have dentures if possible.

Statistical methods

Descriptive analyses on socio-demographic, oral health, dietary habits, oral health seeking behaviors and knowledge about dental caries characteristics were conducted. Crude prevalence of dental caries and the DMFT index were estimated. Using fitted logistic regression models, predictors of the presence of dental caries were identified. The predictor variables of interest included socio-demographic factors (age, sex, education and residence), ever visited a dental clinic, consuming cassava and receiving information from school career guidance. Variables with a significance of $p < 0.25$ in bivariate analysis were included in multivariable models. Data was collected using Kobo collect tool, downloaded in Excel sheet and then exported to STATA version 17 for Analysis.

Sample size

The sample size of 420 participants was used basing on the prevalence of dental caries in children in rural Uganda as 41% [14]. Five (5) children per class, from 7 classes totaling to 35 children in 12 schools making a total of 420 respondents.

A population proportion of 0.5 and a confidence interval of 95% were assumed. The study was done from March to April, 2025.

Results

Socio-demographic characteristics of the study participants

A total of 433 primary school children were enrolled and this large sample size ensured research rigor and generalizability. Their mean age in years was 11.1 ± 2.9, with slight majority being females 232 (53.6%), As expected, the Banyankole ethnic group was the majority 400 (92.4%), and rural residents were 360 (83.1%), Again, majority were Catholics 251 (58.0%). Half 223 (51.5%, of them reported brushing their teeth once daily. Within this population, 119 (27.0%), had a history of tooth extraction in the past one year. Furthermore, most participants had never visited a dental clinic 317 (73.2%), the prevalence of sweet food consumption was 338 (78.1%), as shown in Table 1.

Prevalence of dental caries among the study participants

The overall prevalence of dental caries was 273 (63.3%), being 193 (44.6%), in the permanent dentition, 185 (70.1%), in mixed dentition and 105 (24.2%), in the milk teeth. The prevalence of dental caries was higher in females 130 (64.7%), than in males 144 (62.1%), (Table 2). We found median DMFT of 0 (IQR = 1) and median dft of 0 (IQR = 2) The descriptive statistics support non-normality, with positive skewness observed across most groups (skewness = 1.278 for DFT = 0 and up to 2.693 for DFT = 2), indicating that DMFT scores were concentrated at lower values with a long right tail. A total of 264 participants were classified as being in the mixed dentition stage (6–12 years). Of these, 143 (54.2%) were females and 121 (45.8%) were males. The prevalence of dental caries was slightly higher among males (71.1%) than females (69.2%).

Determinants of dental caries among primary school going children in Buhweju district, rural southwestern Uganda

At bivariate analysis, determinants which had $p < 0.25$ were considered for multivariate logistic regression analysis.

At multivariate logistic regression analysis, three determinants remained independently associated with dental caries. Children who had ever visited a dental clinic had 2.1 times higher odds of having dental caries (aOR = 2.1, 95% CI: 1.2–3.4; $p = 0.005$) compared to those who had never visited a dental clinic. Children who had never consumed cassava had 2.5 times higher odds of having dental caries (aOR = 2.5, 95% CI: 1.1–6.0; $p = 0.037$) compared to those who had consumed it monthly. Additionally, those who did not receive information from school career guidance had 1.6 times higher odds of having dental caries (aOR = 1.6, 95% CI: 1.1–2.5; $p = 0.023$) compared to those who did (Table 3).

Dental treatment needs of children in primary schools in Buhweju district rural southwestern Uganda

Among the participants, 192 (44.3%), needed prompt treatment (including scaling and fillings), 38 (8.8%), were in need of immediate (urgent) treatment due to pain or infection of dental or oral origin, another 92 (21.2%), needed preventive dental care, finally, 111 (25.6%), of the participants showed no immediate requirements for dental treatment Fig. 2.

Table 1 Socio-demographic characteristics of the study participants

Variable	Category	Frequency(*n*/*N*) *N* = 433	Percentage (%)
Age	Middle childhood (5–11 years)	220	50.8
Mean ± SD (11.1 ± 2.9)	Adolescents (12–17 years)	213	49.2
Gender	Male	201	46.4
	Female	232	53.6
Religion	Catholic	251	58.0
	Anglican	150	34.6
	Born again/SDA	22	5.1
	Moslem	10	5.1
Level of education	Lower primary	245	56.6
	Upper primary	188	43.4
Ethnic group	Banyankole	400	92.4
	Bakiga	33	7.6
Location	Rural	360	83.1
	Peri-urban	73	16.9
Dentition	Permanent	239	55.2
	Mixed	194	44.8
What participants use to brush their teeth	Toothpaste and brush	296	68.4
	Ashes and Charcoal	24	5.5
	Traditional sticks or herbs	93	21.5
	Salty water	20	4.6
Frequency of brushing teeth	Never brush	30	6.9
	Once a day	223	51.5
	After every meal	180	41.6
Previous tooth extraction in the past year	No	316	73.0
	Yes	117	27.0
Consumption of sweet foods	No	95	21.9
	Yes	338	78.1
Ever visited a dental clinic	No	317	73.2
	Yes	116	26.8
How many times do you eat sweet foods	Not at all	29	59.2
	Daily	13	65.0
	Weekly	156	66.1
	Monthly	76	59.4

Table 2 Prevalence of dental caries among participants in primary schools in Buhweju district rural southwestern Uganda

Variable	Category	Response	Frequency (*n*/*N*) *N* = 433	Percentage (%)
Gender	Male	Yes	144	62.1
		No	88	37.9
	Female	Yes	130	64.7
		No	71	35.3
Type of teeth	Permanent	Yes	193	44.6
		No	240	55.4
	Deciduous	Yes	105	24.2
		No	328	75.8
	Mixed	Yes	185	70.1
		No	79	29.9
Overall		YES	274	63.3
		NO	159	36.7

Table 3 Bivariate and multivariate logistic regression analysis of the factors associated with dental caries among children in primary schools in Buhweju District southwestern Uganda

Variable	Category	Dental caries		cOR (95% C.I)	*p*-Value	aOR (95% C.I)	*p*-Value
		No	Yes				
Age	5–11 years	72 (32.7)	148 (67.3)	1.4 (1.0-2.1)	0.080*	1.3 (0.9–2.1)	0.185
	12–17 years	87 (40.8)	126 (59.2)	Ref		Ref	
Gender	Male	88 (37.9)	144 (62.1)	1.1 (0.8–1.7)	0.575		
	Female	71 (35.3)	130 (64.7)	Ref			
Level of education	Lower primary	85 (34.7)	160 (65.3)	1.2 (0.8–1.8)	0.318		
	Upper primary	74 (39.4)	114 (60.6)	Ref			
Ethnic group	Banyankole	151 (37.8)	249 (62.3)	Ref		Ref	
	Bakiga	8 (24.2)	25 (75.8)	1.9 (0.8–4.3)	0.127*	2.1 (0.9–4.9)	0.091
Location	Rural	136 (37.8)	224 (62.2)	Ref			
	Peri-urban	23 (31.5)	50 (68.5)	1.3 (0.8–2.3)	0.312		
Dental caries is preventable	No	29 (30.5)	66 (69.5)	1.4 (0.9–2.3)	0.157*	1.2 (0.7–2.2)	0.432
	Yes	130 (38.5)	208 (61.5)	Ref		Ref	
Tooth removal in the past year	No	123 (38.9)	193 (61.1)	Ref		Ref	
	Yes	36 (30.8)	81 (69.2)	1.4 (0.9–2.2)	0.119*	1.3 (0.6–2.6)	0.539
How often do you brush	Never	13 (43.3)	17 (56.7)	Ref		Ref	
	Daily	91 (40.8)	132 (59.2)	1.1 (0.5–2.4)	0.792	1.0 (0.5–2.3)	0.974
	After every meal	55 (30.6)	125 (69.4)	1.7 (0.8–3.8)	0.170*	2.0 (0.9–4.5)	0.104
What do you use to brush your teeth	Toothpaste and toothbrush	104 (35.1)	192 (64.9)	1.2 (0.8–1.9)	0.315		
	Other (Ash, Charcoal, herbs)	55 (40.1)	82 (59.9)	Ref			
Toothbrush change	Within 1 month	76 (35.2)	140 (64.8)	1.1 (0.8–1.7)	0.509		
	More than a month	83 (38.2)	134 (61.8)	Ref			
Ever visited a dental clinic	No	127 (40.1)	190 (59.9)	Ref		Ref	
	Yes	32 (27.6)	84 (72.4)	1.8 (1.1–2.7)	**0.018***	2.1 (1.2–3.4)	**0.005**
Number of times eating bananas	Not at all	9 (47.4)	10 (52.6)	Ref			
	Daily	120 (35.2)	221 (64.8)	1.7 (0.7–4.2)	0.286		
	Weekly	22 (38.6)	35 (61.4)	1.4 (0.5–4.1)	0.501		
	Monthly	8 (50)	8 (50)	0.9 (0.2–3.4)	0.877		
Number of times eating cassava	Not at all	9 (23.7)	29 (76.3)	2.2 (0.9–5.1)	0.069*	2.5 (1.1-6.0)	**0.037**
	Daily	20 (44.4)	25 (55.6)	0.9 (0.4–1.7)	0.668	0.7 (0.3–1.4)	0.319
	Weekly	91 (35.8)	163 (64.2)	1.2 (0.8-2.0)	0.408	1.1 (0.6–1.8)	0.802
	Monthly	39 (40.6)	57 (59.4)	Ref		Ref	
Number of times eating millet	Not at all	10 (33.3)	20 (66.7)	1.1 (0.4–2.5)	0.901		
	Daily	21 (41.2)	30 (58.8)	0.8 (0.4–1.5)	0.417		
	Weekly	90 (37.2)	152 (62.8)	0.9 (0.6–1.4)	0.633		
	Monthly	38 (34.5)	72 (65.5)	Ref			
How many times do you eat sweet foods	Not at all	20 (40.80)	29 (59.2)	0.9 (0.5–1.9)	0.982		
	Daily	7 (35.0)	13 (65.0)	1.2 (0.4–3.4)	0.633		
	Weekly	80 (33.9)	156 (66.1)	1.3 (0.8–2.1)	0.203		
	Monthly	52 (40.6)	76 (59.4)	1.4 (0.9–2.3)	0.035		
Type of water commonly drunk	Untreated water	109 (38.7)	173 (61.3)	Ref			
	Fluoride treated water	50 (33.1)	101 (66.9)	1.3 (0.8–1.9)	0.255		
Information from school career guidance	No	56 (31.5)	122 (68.5)	1.5 (1.0-2.2)	0.058*	1.6 (1.1–2.5)	**0.023**
	Yes	103 (40.4)	152 (59.6)	Ref		Ref	

*Factors selected for inclusion in multivariate logistic regression model

Prevalence of false teeth extraction among the children

We conducted a secondary analysis to identify the prevalence of false teeth extraction among the study participants. The rationale of this analysis was that it gave us a clue on other reasons for missing teeth among the study participants other than due to decay.

The prevalence of false teeth extraction in permanent teeth was found to be 72 (16.6%), while in deciduous teeth it was 36 (8.3%) (Table 4).

Meanwhile, A gender analysis showed that 42 (58.3%) of males and 30 (41.7%) of females had false teeth extracted in the permanent dentition, though this

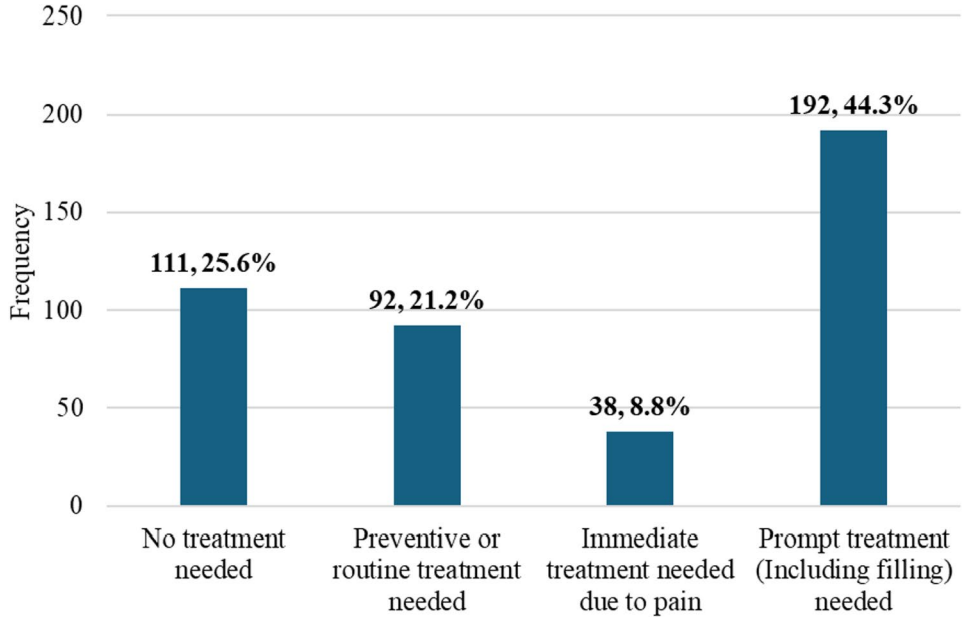

Fig. 2 The dental treatment needs of primary school children in Buhweju district, rural southwestern Uganda

Table 4 Prevalence of false teeth extraction among primary school children in Buhweju district, rural southwestern Uganda

Teeth	Category	Frequency (*N* = 433)	Percentage (%)
Permanent	No History of False teeth extraction	361	83.4
	History of False teeth extraction	72	16.6
Deciduous	No History of False teeth extraction	397	91.7
	History of False teeth extraction	36	8.3

Table 5 Gender analyses in relation to false teeth extraction among primary school children in Buhweju district rural southwestern Uganda

Teeth	Category	Gender n (%)		*p*-value
		Male	Female	
Permanent	No false teeth extracted	190 (52.6)	171 (47.4)	0.376
	False teeth extracted	42 (58.3)	30 (41.7)	
Deciduous	No false teeth extracted	214 (53.9)	183 (46.1)	0.653
	False teeth extracted	18 (50.0)	18 (50.0)	

difference was not statistically significant ($p = 0.376$). Similarly, for deciduous teeth, 50.0% of both males and females had false teeth extracted, with no significant gender difference ($p = 0.653$) as shown in Table 5.

Discussion

Prevalence of dental caries among primary school children in Buhweju district

This study reported a relatively high prevalence 274 (63.3%) of dental caries experience among school-going children in Buwheju District, and was more in permanent teeth compared to deciduous teeth. This finding is consistent with a previous study [3] that reported a prevalence of 63.3% among children with disabilities in Kampala, as well as a systematic review done in Saudi Arabia [15] that reported a prevalence of 65.6%. This relatively high prevalence may be due to the limited accessibility to dental services since the entire district has one government facility offering dental care services plus a few private dental clinics within the town councils of Nsiika, Kajani and Nyakahanga in addition to the remote nature of the area.

Females had slightly higher prevalence of dental caries 130 (64.7%) compared to males with 144 (62.1%). This finding echoes an earlier research [2] in the Republic of Rwanda that reported the dental caries prevalence of (51.3%) among females living in rural settings. This could be explained by the earlier eruption of both primary and permanent teeth in girls compared to boys [16]. This means their teeth are exposed to the oral environment and cariogenic factors like sugars and bacteria for a longer period, increasing the cumulative risk of caries

development. More so, from clinical practice, we have observed more dental caries among girls than boys.

We found a mean DMFT score of 0.82 which was lower than 3.8 previously reported among children in Kampala [3]. This could be explained by the different characteristics of the study participants in the two study settings.

The Kampala study was conducted among children with cerebral palsy, and these maybe at a higher risk of dental caries due to difficulty in brushing their teeth and hence maintenance of good oral hygiene might be a challenge compared to the school-going children in our study. Besides the rural nature of our study site could as well explain this observation.

The study also found a relatively high dental caries prevalence of 70.1% among children in the mixed dentition stage, indicating a substantial burden of oral disease. This prevalence is comparable to findings from several studies conducted in low- and middle-income countries, where dental caries remains one of the most common chronic childhood diseases.

The prevalence observed in this study is almost similar to that reported by [12] in northwest Mexico, where 77.1% of children with mixed dentition had dental caries. This could be attributed to poor oral hygiene, frequent consumption of sugary foods, and limited utilization of dental services.

Predictors of dental caries among primary school children in Buhweju district

This study reported that children who had visited a dental clinic in the past had about two times higher odds of having dental caries compared to those who had never visited a dental clinic. This is surprising and it is contrary to previous literature where visiting the dentist regularly was associated with decreased prevalence of dental caries [17]. This discrepancy could be due to the dental visits occurring after caries detection rather than for preventive care. Additionally, the few private dental clinics in the district might mean that they prioritize offering curative services over preventive education. To address this, public health efforts should integrate caregiver and patient education into routine dental visits to prevent caries in children.

Our analysis also revealed that children who rarely consume cassava had 2.5 times higher odds of having dental caries compared to those who consume it monthly. While most studies have observed that refined carbohydrates and sugars are significant risk factors for dental caries [7, 18], our results show that cassava consumption appears to be protective against dental caries in this setting. This could be due to the characteristics of the cassava consumed in the region. Cassava is largely consumed unprocessed in this setting, and most of the carbohydrates in unprocessed cassava are water insoluble. This insolubility restricts their access to dental plaque, thereby limiting their fermentation by plaque bacteria [15]. There is a need for dietary advice that is sensitive to the culture since certain traditional foods appear to be protective against dental caries.

The study also showed that children who did not receive dental health information from school career guidance had 1.6 times higher odds of having dental caries compared to those who did. This finding aligns with studies showing the role of school-based health education in promoting preventive measures, such as regular brushing and dietary modifications [19]. The absence of such guidance may reflect the gaps in oral health literacy, where schools in underserved communities lack resources to integrate dental education into career guidance programs. Additionally, the omission of dental care messaging could perpetuate misinformation or neglect of preventive practices.

Treatment needs of dental caries among primary school children in Buhweju district

Our study reports a significant unmet dental treatment need among primary school children in Buhweju District. Nearly half 192 (44.3%) required prompt restorative care, while 92 (21.2%), needed preventive interventions, and 38 (8.8%), required urgent pain management. These findings reflect global patterns of neglected dental needs in children, particularly in resource-limited settings. The high restorative care demand aligns with [17], who associated poor oral hygiene and sugary diets with increased restorative needs [17]. Similarly, the urgent pain-related cases support [14], who noted delayed care-seeking until symptoms arise due to low parental awareness [14]. The proportion of children with no immediate needs (25.6%) contrasts with studies in South Africa [20] and refugee populations [17], where over two-thirds required treatment. This highlights regional disparities in disease progression and care access. The predominance of restorative over preventive needs underscores a reactive care model, likely exacerbated by socioeconomic barriers such as inequitable clinic access. This mirrors findings from [19], who emphasized the need for daily hygiene practices and routine dental visits in similar contexts [21].

False teeth extraction

Our study also revealed a prevalence of false teeth extraction as 16.6% among the permanent dentition and 8.3% among the deciduous dentition. This was far much lower compared to a study in Gulu district northern Uganda which reported a higher prevalence of false teeth extraction 78% [22]. The prevalence of false teeth extraction among the deciduous dentition 8.3% was slightly lower compared to 14.02% in a study done in Ethiopia among the children below the age of 5 years in the same contexts [23].

Conclusions

Our study revealed a high prevalence of dental caries 274 (63.3%) among primary school children in Buhweju District, predominantly affecting permanent teeth. The key independent predictors included prior dental clinic visits (2.1 times higher odds of caries), never consuming cassava (2.5 times higher odds), and a lack of dental health information from school career guidance (1.6 times higher odds). The findings also indicated substantial unmet dental treatment needs with most children requiring restorative or urgent care. Dental caries presents a significant health burden among primary school children in Buhweju District. Addressing this requires a multi-faceted approach focusing on strengthening school-based oral health education and integrating preventive messages into clinical encounters.

Study limitations

The cross-sectional design of this study does not establish causal relationships between the identified predictors and dental caries. A longitudinal study would be required to observe the progression of caries over time and better understand causal pathways. Secondly, the reliance on self-reported data for some variables such as tooth brushing and consumption of sweet foods is susceptible to recall bias and social desirability bias and therefore the use of participant training and visual aids was paramount. The study was done among school going-children; therefore, we were constrained to generalize the findings to include children out of school who spend a lot of their time in the community.

Abbreviations

AAPD	American Academy of Pediatric Dentistry
AAP	American Academy of Periodontology
AOR	Adjusted Odds Ratio
COR	Crude Odds Ratio
DMFT	Decayed, Missed and Filled Teeth
DFT	Decayed and Filled Teeth
ECC	Early Childhood Caries
ECOHIS	Early Childhood Oral Health Impact Scale
FRC	Faculty Research Committee
HCIV	Health Centre IV
IQR	InterQuartile Range
KAP	Knowledge, Attitude and Practice
MOH	Ministry of Health
OR	Odds Ratio
REC	Research Ethics Committee
SD	Standard Deviation
UBOS	Uganda Bureau of statistics
UNHPSP	Uganda National Health Policy Strategic Plan
WHO	World Health Organization

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

AA contributed to conceptualization of the research idea, writing the proposal, raised funds, collected data, participated in data analysis, drafting the manuscript, and proof reading of the final manuscript; VB contributed to conceptualization of the research idea, writing the proposal, drafting the manuscript, and proof reading of the final manuscript; and WA contributed to conceptualization of the research idea, writing the proposal, supported in data collection, participated in data analysis, drafting the manuscript, and final proof reading of 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

Ethics approval and consent to participate

Ethics approval for this study was obtained from Mbarara University of Science and Technology Research Ethics Committee (MUST-2025-228).
Informed Consent was obtained from the parents or guardians while Informed Assent was obtained from the children at the time of interviews.

Consent for publication

Written informed consent was obtained from parents of the children for publication of result of their clinical observations.

Competing interests

The authors declare no competing interests.

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