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Research Article

Evaluation of Knowledge, Attitudes and Practices Regarding Oral Hygiene among Adults in the City of Bukavu: Case of the Kadutu Health Zone

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Abstract

Introduction: Oral diseases have been described as a major public health problem, due to their high prevalence and incidence. They more often affect disadvantaged and socially marginalised populations. The aim of this study is to help improve oral hygiene by assessing the knowledge, attitudes and practices of adults living in the Kadutu Health Zone in Bukavu.

Methodology: This is a cross-sectional, analytical study covering the period from May to September 2024. It uses descriptive and analytical statistics to identify the link between knowledge and attitudes to oral hygiene among adults in the Kadutu health zone. It was conducted on 384 adults living in the Kadutu Health Zone.

Results: The study showed that respondents with a low level of education were 2.28 times more likely not to maintain good oral hygiene. More than ¾ of respondents recognised that poor hygiene could lead to tooth loss, and there was no significant difference. More than 1 in 2 respondents with limited access to dental services brush once a day. There is a high risk of poor hygiene, although there is no significant difference. Although more than 8 out of 10 respondents identified the role of hygiene kit distribution campaigns and the training of health workers in oral hygiene, this does not translate into the maintenance of good hygiene. There was no significant difference, suggesting that simply distributing materials without education is not enough.

Conclusion: Simple interventions such as raising awareness of the importance of oral hygiene, organising free consultations and offering hygiene kits could improve the behaviour of adults in the Kadutu Health Zone, but require a more integrated approach.

Keywords: Evaluation; Knowledge; Attitudes and Practices; Adults; Oral Hygiene; Kadutu Health Zone; Republic Democratic of Congo

Introduction

Oral diseases constitute a real public health problem, given their magnitude [1]. They more often affect disadvantaged and socially marginalized populations [2]. Their repercussions on individuals are considerable in terms of functional impairments and reductions in quality of life. Yet largely preventable, oral diseases and conditions are responsible for a significant burden of morbidity in many countries and have lifelong effects, causing discomfort, pain, aesthetic impairments, and even death. It is estimated that nearly 3.5 billion people are affected by oral health conditions, with three out of four living in middle-income countries. Untreated caries of permanent teeth are the most common condition according to the 2019 Global Burden of Disease report [3].

Given urbanization and changing living conditions, the prevalence of oral health conditions continues to rise globally, primarily due to inadequate exposure to fluoride (in drinking water and oral hygiene products like toothpaste), the availability and financial accessibility of high-sugar foods, and difficulties accessing community oral health care services. The marketing of foods and beverages with high sugar content, as well as tobacco and alcohol, has led to an increase in the consumption of products that contribute to the onset of oral health conditions and other non-communicable diseases [4].

In the Democratic Republic of the Congo, studies show that 40.2 % of people are affected by oral diseases [5]. Among these pathologies, the most common are those that affect the tissues surrounding and supporting the teeth, called "periodontal diseases," particularly dental caries and jawbone trauma [6,7].

Indeed, 7 out of 10 people suffer from periodontal diseases and 5 out of 10 from dental caries. In provinces like Kwango and Kwilu, where there is a high consumption of sugary foods, 8 out of 10 people suffer from dental caries, unlike in the provinces of Haut-Katanga and Kinshasa, where 4 out of 10 people are affected. In these last two provinces, the low rate is explained by the availability of dental services and the general organization of preventive and promotional activities to combat these diseases [5].

Oral hygiene in South Kivu, Democratic Republic of Congo, is an important issue due to several socio-economic, cultural, and environmental factors. The lack of medical infrastructure and qualified professionals in rural areas limits access to dental care, and the high costs of dental care and oral hygiene products are prohibitive for a large part of the population. Many people are not sufficiently informed about the importance of oral hygiene and good practices to maintain dental health. Awareness campaigns are often insufficient or nonexistent in certain regions [4].

The issue of oral hygiene in the Health Zone of Kadutu in Bukavu is insufficiently documented. The absence of a prevention program for oral diseases deprives the province of reliable and comprehensive data specific to oral diseases. The general reports from WHO and UNICEF on the DRC hardly provide information on the specific oral health status of the Kadutu Health Zone population. Moreover, local studies focus on other regions of South Kivu, leaving a critical information gap for the Kadutu Health Zone. For example, the WHO report titled "World Health Statistics 2022" [4] provides an overview of public health in the DRC without addressing regional specifics. Similarly, the UNICEF report "The State of the World's Children 2023" [8] focuses on maternal and child health indicators at the national level, but does not provide disaggregated data for Kadutu on the issue of oral hygiene.

In the absence of specific data, despite the existence of numerous healthcare facilities in the Kadutu Health Zone [9], it is imperative to conduct a new study to assess the extent of oral health problems, identify contributing factors, and develop public health interventions tailored to the needs of the population of the Kadutu Health Zone in the Democratic Republic of Congo.

Methodology

Study environment

The present study was conducted in the South Kivu province, in the East of the Democratic Republic of Congo, in the Health Zone (HZ) of Kadutu, which is an integral part of the city of Bukavu. This health zone has an area of 15 km^2 and a density of 14,784 km^2. Its total population was 416,591 inhabitants in 2024 [10]. In the Kadutu health zone, several activities are carried out that allow its population to meet their needs. In this context, there are state officials and merchants. Commerce is very capital because it constitutes the main source of income for a large number of households [10]

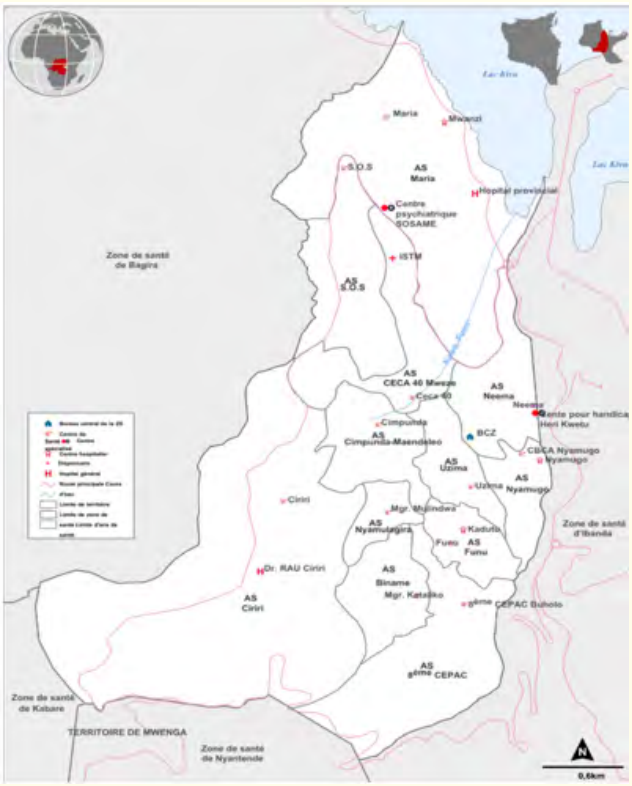

Figure 1: Map of the Kadutu Health Zone (OCHA, 2014) [11].

Type, period, and study population

The study is a cross-sectional analytical type using a survey, aiming to identify the link between knowledge, attitudes, and practices regarding oral hygiene among adult individuals in the Kadutu Health Zone. The study covers the period from May to September 2024. The population concerned by this study consists of 384 adults living in the Kadutu Health Zone.

Choice and sample size

Sample size

The size of our sample is determined using Schwartz's formula:

Legend: $\mathbf{n} = \frac{z^2 xp(1-p)}{d^2}$

n: Sample size

Z 1,96 (coefficient corresponding to the degree of precision of 95%)

p: proportion

d^2: margin of error committed (5%) = 0.05

As the prevalence of the phenomenon studied (oral hygiene) is not known in the study environment, it was estimated at 50% [12] in order to obtain reliable and representative data from the study.

This is how n = $\frac{(1,96)^2 \times 0,5(1-0,5)}{(0,05)^2}$ = 384 adults

Study variables

In this study, the variables were classified as dependent and independent variables based on their role in the analysis of knowledge, attitudes, and practices regarding oral hygiene.

Dependent variable

The dependent variable of this study is the practice of oral hygiene among adults. This variable represents the actual behaviors of adults regarding oral hygiene.

Independent variables

The independent variables of this study are: Knowledge about oral hygiene: having heard about the importance of oral hygiene, knowledge about the possible consequences of poor oral hygiene, knowledge about the main health problems caused by poor oral hygiene.

Attitudes towards oral hygiene: importance of brushing teeth regularly, opinion on regular visits to the dentist, and the ideal frequency for brushing teeth.

Socio-economic factors: level of education, economic situation.

Interventions: awareness-raising, recommendations, free consultations, offering toothpaste, remarks from a close person about oral hygiene, etc.) that can make the interviewee's practice change.

These independent variables are supposed to influence the dependent variable, which is the actual practice of oral hygiene among adults in the Health Zone of Kadutu.

Data collection

The data collection was carried out through a field survey, allowing direct interaction with the participants. It used a structured, closed questionnaire targeting data on socio-demographic characteristics, knowledge, attitudes, and practices regarding oral hygiene.

Data analysis

The data analysis used Microsoft Excel software for the creation and management of the database and SPSS 24 software for statistical data analysis. The odds ratio (OR) allowed for the assessment of the association between the variables. An OR different from 1 indicated that there was an association between the studied variables (OR < 1: protective factor and OR > 1: risk factor) and the p-value allowed for a statistical assessment of whether the association was significant. The precision was set at 95%, thus ensuring the reliability and robustness of the conclusions drawn from the study.

Ethical considerations

The investigation protocol was validated by the competent authorities (Medical Director of the Kadutu Health Zone and the Head of the Health Sciences Department at the Official University of Bukavu). Prior authorization from the authorities of the Kadutu Health Zone was obtained for data collection in the various health areas. Informed consent from each participant was sought, and rigorous measures were implemented to ensure the confidentiality and anonymity of the collected information. The participants were treated with respect and dignity throughout the study, taking into account the cultural values and norms in the Area. The participants were included in the study regardless of their age (from adulthood: 18 years), gender, level of education, or socio-economic status and had an equal opportunity to participate in the study.

Results

Socio-demographic characteristics of the respondents

Variable	n = 384	%	Median
Age			31.51 (Min 18, Max 69)
18 to 25 years	144	37.5	
26 to 35 years	126	32.6	
36 to 45 years	62	17.0	
46 to 50 years	17	4.3	
51 years and above	35	9.1	
Gender			
Male	176	45.8	
Female	208	54.2	
Education Level			
No schooling	42	10.9	
Primary level	43	11.2	
Secondary level	131	34.1	
University level	168	43.8	
Occupation			
Unemployed	125	32.6	
Farmers	115	30.0	
Drivers	17	4.4	
Traders	44	11.5	
Government employees	68	17.7	
Humanitarian organization employees	15	3.9	
Monthly Income			
Less than $500	304	79.2	
More than $500	84	20.8	
Religion			
Protestant	79	20.6	
Catholic	281	73.2	
Kimbanguist	16	4.2	
Jehovah's Witnesses	8	2.1	

Table 1

More than one out of two respondents was female. The most represented age group is that of 18 to 25 years old (37.5%). The median age is 31.51 (±11.39) with a minimum age of 18 years and a maximum age of 69 years. Regarding profession, the respondents without jobs represent 32.6%, compared to 3.9% who are employees of humanitarian organizations. The academics are the most represented with 43.8% of the respondents. Regarding monthly income, respondents with a monthly income of less than $500 represent 20.8% compared to 79.2% who have an income of more than $500. Catholicism is the most represented religion with 73.2% of respondents.

Relationship between educational attainment and oral hygiene practice

38.1% of respondents with a low level of education brush their teeth once, and 61.9% of respondents with a good level of education brush their teeth once. Those with a low level of education are 2.28 times more likely not to maintain good oral hygiene [OR = 2.28 (0.92-5.05)] than those with a high level of education, but there is

no statistically significant difference between the two groups (P > 0.05).

Variables	Brushes Once	Brushes Twice	OR (95% CI)	P-Value
Low Level	8 (38.1%)	77 (21.2%)	2.28 (0.92-5.05)	0.06 > 0.05
Good Level	13 (61.9%)	286 (78.8%)		
Total	21 (100%)	363 (100%)		

Table 2

Relationship between monthly income and oral hygiene practice

Variables	Brushes Once	Brushes Twice	OR (95% CI)	P-Value
Less than $500	5 (23.8%)	299 (82.3%)	0.06 (0.02-0.18)	0.00 < 0.05
More than $500	16 (76.2%)	64 (17.6%)		
Total	21 (100%)	363 (100%)		

Table 3

23.8% of respondents with a monthly income of less than $500 brush their teeth only once a day. The P-value = 0.00 < 0.05, which means there is a statistically significant difference between monthly income and maintaining good oral hygiene. The value of the OR (CI = 95%) = 0.06 (0.02-0.18).

Relationship between awareness of oral hygiene and oral hygiene practice

33.3% of those surveyed who have no information on oral hygiene brush once a day, and 66.7% of those who have heard about oral hygiene brush twice a day. The OR = 0.13 (0.05-0.35) implies that those who have never heard of oral hygiene run 0.13 times the risk of not maintaining good oral hygiene, and there is a statistically significant difference between the two groups (P < 0.05).

Variables	Brushes Once	Brushes Twice	OR (95% CI)	P-Value
Never Heard of It	7 (33.3%)	284 (78.2%)	0.13 (0.05-0.35)	0.000 < 0.05
Have Heard of It	14 (66.7%)	79 (21.8%)		
Total	21 (100%)	363 (100%)		

Table 4

Relationship between knowledge of major problems caused by poor oral hygiene and oral hygiene practice

Variables	Brushes Once	Brushes Twice	OR (95% CI)	P-Value
Tooth Decay, Gum Disease	5 (23.8%)	104 (28.6%)	0.77 (0.27-2.17)	0.42 > 0.05
Bad Breath, Tooth Loss	16 (76.2%)	259 (71.3%)		
Total	21 (100%)	363 (100%)		

Table 5

76.2% of respondents who brush their teeth only once a day experience bad breath and tooth loss as the main problems caused by poor oral hygiene. They are at a higher risk of not maintaining good oral hygiene compared to those who brush twice a day (OR: 0.77), but there is no statistically significant difference between the two groups (P > 0.05).

Relationship between frequency of dental visits and oral hygiene practice

Variables	Brushes Once	Brushes Twice	OR (95% CI)	P-Value
Never	10 (47.6%)	351 (96.6%)	0.03 (0.01-0.08)	0.00 < 0.05
One to Two Times per Month	11 (52.4%)	12 (3.3%)		
Total	21 (100%)	363 (100%)		

Table 6

96.6% of respondents who have never visited a dentist brush their teeth at least twice, while those who visit at least once a month represent 52.4% and brush once a day. It appears that there is a statistically significant difference between the frequency of visits and the maintenance of good oral hygiene (P < 0.05).

Relationship between the main reason for poor oral hygiene and oral hygiene practice

Variables	Brushes Once	Brushes Twice	OR (95% CI)	P-Value
Lack of Time and Information	10 (47.6%)	8 (2.2%)	40.03 (13.3-121.9)	0.00 < 0.05
Limited Access to Dental Services and Cultural Habits	11 (52.4%)	355 (97.8%)		
Total	21 (100%)	363 (100%)		

Table 7

96.6% of respondents who have never visited a dentist brush their teeth at least twice, while those who visit at least once a month represent 52.4% and brush once a day. It appears that there is a statistically significant difference between the frequency of visits and the maintenance of good oral hygiene (P < 0.05).

Discussion

Sociodemographic characteristics of the respondents: In this study, more than one out of two respondents was female. The most represented age group is that of 18 to 25 years old (37.5%). University students are the most represented, accounting for 43.8% of the respondents. The National Program for Oral Health (PNSBD) aims to specifically target low-income individuals, young adults, particularly those aged 18 to 25 who are often more open to education and awareness in health matters. They also represent a high-risk group for certain harmful habits, such as tobacco use or the consumption of sugary drinks [13]. However, despite the high level of awareness (75.8% of respondents are familiar with oral hygiene), the fact that 24.3% have never heard of it highlights a persistent gap. This calls for an intensification of awareness campaigns. The level of knowledge regarding oral hygiene indicates that there are still segments of the population that need further education on oral hygiene, as observed in other studies [14,15]. In this group, pregnant women should be more sensitized because hormonal, cardiovascular, and immunological changes make them vulnerable to periodontal diseases [16]. Awareness efforts should also primarily target individuals suffering from major chronic diseases (cardiovascular diseases, chronic respiratory conditions, diabetes, and cancers) which share several risk factors with oral diseases, including poor diet, smoking, and harmful alcohol consumption [1].

The young age of the respondents also suggests an opportunity to educate this population about oral hygiene from the beginning of their adult life [17,18]. Health education plays a crucial role in shaping health behaviors; it enables the acquisition of skills and means throughout life that allow individuals to promote their health and quality of life, as well as that of the community [19]. It is therefore evident that university students have access to educational resources on oral hygiene, which could explain their better knowledge compared to unemployed individuals. Individuals with a higher income are generally more proactive about their health [20]. This raises the issue of inequalities in access to dental care, especially for those with lower incomes. Despland (2018) discussed the link between religious beliefs and health practices, suggesting that religious traditions can encourage or discourage certain hygiene habits [21]. It might be interesting to explore how these beliefs influence oral hygiene practices within the population. Also, there is often a gap between theoretical knowledge and practical implementation [22], which suggests the need for educational interventions that do not merely inform but also encourage proactive behaviors.

Level of education and maintenance of oral hygiene: The results indicate that 38.1% of people with a low level of education brush their teeth once a day, while 61.9% of people with a good level of education do the same. The odds ratio (OR) of 2.28 shows that those with a low level of education are 2.28 times more likely not to maintain good oral hygiene. The difference is statistically significant ($p = 0.006$), confirming that education is a key determinant of oral hygiene practices [23].

Knowledge of the consequences of poor oral hygiene and maintenance of oral hygiene: Although 76.2% of respondents acknowledge that poor hygiene can lead to tooth loss, there is no significant difference ($p = 0.42$). This suggests that knowledge of the consequences does not necessarily lead to better hygiene practices. It is noteworthy that 96.6% of people who have never seen a dentist brush their teeth at least twice a day. However, there is no significant difference between the frequency of visits and the maintenance of good hygiene ($p = 0.00$), suggesting that personal habits can compensate for the lack of regular dental care, without excluding the need for education on the importance of dental visits [24].

Monthly income and maintenance of oral hygiene: The proportion of 23.8% of respondents with an income of $500 who brush only once a day ($p = 0.00$) indicates a significant relationship between income and oral hygiene. 52.4% of respondents with limited access to dental services brush once a day. The OR of 40.03 indicates a high risk of poor hygiene, although there is no significant difference ($p = 0.00$). This highlights the inequalities in access to care. Higher incomes are often associated with more responsible health behaviors [15]. Low-income individuals were also more likely to neglect their oral hygiene.

Main public health interventions and maintenance of oral hygiene: Although 80.9% of participants identified hygiene kit distribution campaigns, this does not translate into maintaining good hygiene ($p = 0.17$). This suggests that the mere distribution of materials without education is not sufficient; a strong educational component proves useful [15, 25], in addition to regular dental visits [24].

Conclusion

Despite the efforts made to maintain oral hygiene, it remains associated with the low monthly income of the household, being informed about oral hygiene, the frequency of dental visits, and the main reason for maintaining oral hygiene. The study recommends that the population make regular visits to the dentist and brush their teeth at least twice a day using oral hygiene kits. Health officials are urged to promote dental care by establishing mechanisms that allow the population access to this type of care.

Conflict of Interest

The authors declare that there is no conflict of interest in the publication of this article.

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