

ORIGINAL ARTICLE

Oral Health Knowledge, Attitude and Practices among Adolescents in Choma District of Zambia

Bright Mukanga, Kupuzo Sakala, Tato H Nyirenda, Victor Daka, David Mulenga

¹The Copperbelt University, Michael Chilufya Sata School of Medicine, P.O Box 71769, Ndola, Zambia,

ABSTRACT

Introduction: Dental caries and periodontal diseases are the most common oral diseases globally. Early control of oral health behaviours is important because lifestyles acquired during adolescence are powerful predictors of adult health. We conducted a study to determine knowledge, attitude and practices on oral hygiene among school-going adolescents in Choma district of Zambia.

Methodology: A cross-sectional study was conducted among school-going adolescents in randomly selected schools in Choma District. A total of 335 participants were included in the study. Data were collected using a closed-end self-administered questionnaire. The sample size was distributed among the six schools in the ratio of their population. The study included anyone from grades 8-12. Data were analysed using IBM software for SPSS. We employed the Chi-Square test to investigate the association between variables. A p-value less than 0.05 was considered statistically significant.

Corresponding Author:

Bright Mukanga: Lecturer, Department of Public Health, Copperbelt University, Michael Chilufya Sata School of Medicine, P.O Box 71769, Ndola, Zambia: Phone: +260971815362; Email: kunda265@gmail.com

Results: The study had 173 males and 162 females in the age range of 12-19 years. The majority (87.8%) had good knowledge, 69.4% had good attitude and 87.5% had good practice on oral - hygiene. Practice was influenced by sex with females having good oral hygiene as compared to their male counterparts. About 97.2% thought that dental health education is essential in schools. 34% indicated that they had visited the dentist when they experienced a toothache. However, parental advice to regularly visit the dentist was low (n=39). The majority 49.9% (n=167) indicated that they had not visited the dentist due to fear of the dental equipment set up.

Conclusion and recommendation: Despite the majority having good knowledge and attitude on oral hygiene, there is a need to acquaint children with milling and dental units found in most dental offices. This may instil confidence in children to seek specialist dental treatment whenever they develop any dental disease. Further, parents need to be incorporated as partners in promoting oral health hygiene among school-going adolescents.

INTRODUCTION

Dental caries and periodontal diseases are the most common oral diseases affecting humankind of all

Keyword: Attitude, Knowledge, Practice, Oral health, Adolescents, Periodontal, Dental, Caries

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age groups including adolescents.¹ Risk factors for dental caries and periodontal diseases include poor health hygiene and regular consumption of sugars.² Global trends show that dental and periodontal diseases are decreasing in the privileged and increasing in the under-privileged populations.^{3,4} Treatment of oral health conditions is expensive and usually not part of universal health coverage in most low-income countries. However, In most high-income countries, dental treatment averages 5% of total health expenditure and 20% of out-of-pocket health expenditure.² Hence, most low and middle-income countries are unable to provide services to prevent and treat oral health conditions.⁵ Severe periodontal disease which may result in tooth loss, is also very common, with almost 10% of the global population affected.²

Adolescents comprise nearly 20% of the global population and more than half of them suffer from some form of common oral disease.⁴ Most oral health conditions are largely preventable and can be treated in their early stages.² Similarly, early control of the behaviours is important due to the fact that lifestyles acquired during childhood and adolescence are powerful predictors of adult health.⁸ Furthermore, a school setting is an advisable platform for educating and promoting oral health care⁹, this is because school-going children spend their entire day in the school and are exposed to various sugar-containing foods and beverages that are sold in tuckshops and vending machines.²

Evidence exists, showing that strong knowledge on oral health demonstrates better oral care practice¹⁰, and positive attitude on oral health is influenced by better knowledge.^{10,11} Therefore, assessing oral hygiene knowledge, attitude and practice during this age group is important for planning evidence-based preventive oral health interventions. Tooth brushing is a principal method of maintaining good oral hygiene, other adjunctive methods include flossing and the use of mouthwashes. Tooth brushing, if done at an appropriate frequency of twice a day, is a simple and effective way of reducing plaque and

gingivitis.⁹ Whilst, brushing with fluoridated toothpaste significantly prevents dental caries, knowledge of oral hygiene is key to proper performance as it helps to empower an individual on improvement of personal oral health care.¹² Similarly, attitude towards oral health predict practice and therefore assessing attitude is key to planning interventions that enhance positive change towards oral health hygiene.¹³

Zambia being among the developing countries is not an exception. Clinical observation during routine patients has revealed a number of adolescents with dental caries.¹⁴ Both dental caries and periodontal diseases are related to oral hygiene, hence understanding the level of knowledge, attitude and practice in the population is key in the prevention of oral diseases. Whilst oral health preventive strategies are key in reducing dental caries and periodontal diseases among adolescents, most oral health services in Zambia are mainly centred on curative and emergency procedures, such as tooth extraction and restorative treatment.¹⁴ There is a paucity of studies on oral health knowledge, and attitudes in Zambia, with only a few studies showing a general fair knowledge levels and attitudes regarding oral health oral hygiene.^{6,14} A recent study conducted in Lusaka, Zambia, however, revealed that over 80% of Zambians are still affected by oral health problems, which include dental caries, periodontal disease and malocclusion.¹⁵ The impact of oral health is further compounded by the prevailing high prevalence of HIV in Zambia. Despite oral diseases being common in Zambia, there has been insufficient focus on preventative measures.¹⁶ Whilst evidence suggests the need for early control of oral health behaviours in school going children⁹, Few studies have assessed knowledge, attitude and practice among school-going adolescents in Zambia. Therefore, this study was aimed at assessing oral hygiene knowledge, attitude, and practice among school-going adolescents in Choma district of Zambia.

METHODS

Research Design

A descriptive cross-sectional study was conducted in Choma District of Zambia between January 2018 and October 2018.

Population and Sampling

The sampling frame comprised of school-going adolescents between the ages of 12-19 years. The study was done at six(6) secondary schools located in urban and peri-urban areas of Choma district of Zambia., these include;ChomaSecondary School, BatokaSecondary School,SikalongoSecondary School, Swan Day Secondary School, ChomaDay Secondary School and ChuunduDay Secondary School. School going adolescents aged 12-19 years who gave consent were allowed to participate in the study.The study employed a probability cluster sampling technique in which schools were randomly selected as clusters. Probability proportionate to size sampling was employed in each cluster to come up with a sample size of about 335 participants.

Sample Size

The formula adopted for sample size calculation was Z^2PQ/d^2 . This was at a level of confidence interval of 1.69 (At 95% confidence interval) and with a marginal error of 5% and prevalence of 50%.

Validity of the data collection tool

A pilot study using a standard WHO validated questionnaire on oral health was done on 30 pupils in order to assess the feasibility and to estimate the sample size. This was necessary to identify flaws in the questionnaire and also to enhance its content validity.

Ethical Consideration

The study proposal was approved by the Tropical Diseases Research Ethics Committee (TDR Ethics Committee approval no: 00002911). Standard procedures of informed consent were used inclusive

of anonymity and confidentiality. Permission to conduct a study was obtained from respective school authorities. Consent was obtained from parents of adolescents who were below the age of 16 years. Participants were free to withdraw from the study if they so wished. The permission to enter and collect data in various schools was obtained from the Provincial Education Offices in Southern Province.

Data collection

Questionnaires were given to the pupils during their class hours and then collected within 15 min. The questionnaire measured attitude, practice and knowledge on periodontal diseases, dental caries, oral hygiene, and oral hygiene practice. The questionnaire had four basic parts, that is, demography which had an emphasis on age and sex, knowledge on periodontal diseases and dental caries, attitude on oral hygiene and oral hygiene practice. Age was grouped in two groups from 12-15 years and 16-19 years. The knowledge, attitude and practice parts were scored by awarding the right response 1 and the wrong ones 0, thereafter the scores were summed up which gave a total of 7. The scores 3 and below were considered poor while 4 and above as good scores. Data were entered and analysed using Statistical Package for Social Sciences (SPSS) software version 20.0 (IBM Chicago, SPSS Inc.) and presented as frequency distributions in tables and graphs. The Association of variables was analysed using cross-tabulations, and the Chi-square test. All tests were set at a 0.05 significance level.

RESULTS

Distribution by age group and sex of respondents (n=335)

The response rate was 100% and out of the 335 participants, 335 pupils indicated their age and sex. Table 1 summarises the age and sex of the respondents and shows that males were slightly more than the females. (Table 1)

Table 1: Distribution by age group and sex of respondents (n=335)

		Sex		Total
		Male	Female	
Age group	12-15 years	62(49.6%)	63(50.4%)	125(100%)
	16-19 years	111(52.9%)	99(47.1%)	210(100%)
Total		173(51.6%)	162(48.4%)	335(100%)*

Frequency distribution of participants according to knowledge on periodontal diseases and dental caries questions (n=335)

The majority of the respondents (77.5%) knew that tooth brushing and flossing prevent plaque. Over three quarters (76.3%) knew that not brushing at all or improper brushing causes bleeding gums and 82.4 % (n=294) knew that brushing and flossing prevents bleeding gums. The majority (96.1%) knew that frequent eating of sugary foods and sweetened not brushing with fluoride toothpaste causes tooth decay, more than half knew that cavity on tooth, pain and sometimes swelling as symptoms of dental caries. A majority (85.9%) knew that dental caries can be prevented by avoiding sweet and brushing with fluoridated toothpaste and less than a quarter (18.1%) knew that filling of the decayed part was the best treatment of tooth decay. (Table 2)

Table 2: Frequency distribution of participants according to knowledge on periodontal diseases and dental caries questions [n=335]

Knowledge on periodontal diseases			
Questions	Responses	Frequency	%
Plaque can be prevented by: ^a	Brushing and flossing	269	78
	Will disappear on its own	7	2
	Medicines in stores	22	6.3
	I don't Know	49	14

Bleeding gums is cause by:

Eating sweet food	43	12
Not brushing at all/ improper brushing	271	76
Eating hard fruits/ food	26	7.3
I don't know	15	4.2

Bleeding gums can be prevented by: ^b

Brushing and flossing	294	82
Use of medicines from drug stores	52	15
I don't know	11	3.1

Knowledge on dental caries

Tooth decay is caused by: ^c

Frequent eating of sweat food staff and not brushing with fluoride toothpaste	344	96
Eating fruits	6	2.2
I don't know	8	1.7

Dental caries is associated with: ^d

Cavity on tooth, pain, sometimes swelling	249	70
Bleeding gums	72	20
I don't know	33	9.3

Dental caries can be prevented by: ^e

Avoiding sweets and brushing with fluoridated toothpaste	304	86
Medicines from drug stores	40	11
It cannot be prevented	10	2.8

What is the best treatment of decay: ^f

Tooth extraction (removing tooth)	222	63
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Frequency distribution of participants according to attitude on oral health (n=335).

Less than half of the respondents (39.4%) strongly agreed that treatment of toothache is as important as any other body organ and 7% disagreed. 35.2%

agreed to visit the dentist regularly and quite a handful 15.1% never visited a dentist, compared to the 74.9% that said regular visits are necessary. Close to half (45.6%) of the respondents reported visiting a dentist due to a toothache. respondents (49.9%) didn't visit due to fear of the dentist's instruments. The majority 98.1% and 97.2% agreed that tooth brushing has been done well and think dental health educational lessons are important at their schools. 49.9% didn't visit due to fear of the dentist's instruments. However, parental advice to adolescents to regularly visit a dentist was low 11% (n=39) (Table 3)

Table 3: Frequency distribution of participants according to attitude on oral health (n=335).

Questions	Response	Frequency	%
Treatment of toothache is as important as any other organ of the body. ^a	Strongly agree	140	39
	Agree	157	44
	Neutral	33	9.3
	Disagree	20	5.6
	Strongly disagree	5	1.4
How often do you visit the dentist? ^b	Regularly	126	35
	Occasionally	56	16
	When in pain	122	34
	Never	54	15
Are regular visits to the dentist necessary? ^c	Yes	266	75
	No	65	18
	I don't know	25	7
Reason for visiting the dentist the last time.	Toothache	162	46
	Parent advise	39	11
	Friend advise	17	4.8
	Dentist advise	137	39
Reasons for not visiting the dentist. ^d	Fear of dentist's instruments	167	50
	No clinic nearby	99	30
	I just don't want	61	18
	Others reasons	8	2.4
What do you think about tooth brushing	It's good	353	98
	Boring	2	0.6
	Time consuming	5	1.4
Do you think dental health educational lessons are important at your school?	Yes	350	97
	No	5	1.4
	I don't know	5	1.4

Frequency distribution of participants according to oral hygiene practice (n=360).

The majority(85%) reported brushing at least two times and 0.6% (n=2) didn't brush, with 94.7% of the respondents using a toothbrush with fluoridated toothpaste. More than half, 69.9% reported brushing in the morning and before going to bed. On the approximated duration that they spent brushing their teeth, 44.4% said to brush for more than two minutes. 86.1% reported brushing their tongue when brushing their teeth. The majority 91.3%(n=326), respondents indicated that they rinse their mouth after a meal with 70.9% of them using just plain water. (Table 4)

Table 4: Oral hygiene practices among respondents (n=335).

Questions	Response	Frequency	%
How often do you brush your teeth?	Non	2	0.6
	Occasionally	18	5
	Once per day	34	9.4
	Twice or more per day	304	85
What do you use for cleaning your teeth?	Brush + toothpaste	341	95
	Dental floss	3	0.8
	Mouthwash	5	1.4
	Toothpicks	10	2.8
	Chewing stick (mswaki)	1	0.3
When do you brush your teeth ^a	Morning	51	15
	Noon (after lunch)	4	1.1
	Before going to bed	1	0.3
	Morning and before going to bed	246	70
	Other times	50	14

Assessing associations of knowledge to Age and Sex of the pupils

Chi-square findings revealed that there was no significant association between the age of pupils and level of oral hygiene knowledge. There was also no significant association between sex and knowledge score. (Table 5)

Table 5: Knowledge characteristics by age group and sex (N=335).

		Total Knowledge Score		Total	Statistics
		Poor knowledge	Good Knowledge		
Age group	12-15 yrs	9 (7.1%)	118 (92.9%)	127 (100.0%)	$X^2 = 3.416$ $P = 0.065$
	16-19 yrs	29 (13.6%)	184 (86.4%)	213 (100.0%)	
	Total	38 (11.2%)	302 (88.8%)	340 [*] (100%)	
Sex	Male	17 (9.8%)	157 (90.2%)	174 (100.0%)	$X^2 = 1.227$ $P = 0.268$
	Female	23 (13.6%)	146 (86.4%)	169 (100.0%)	
	Total	40 (11.7%)	303 (88.3%)	343 [#] (100%)	

* only those were valid respondents of 335.

Attitude of participants by age group and sex(n=335)

There was a significant association between age and attitude. More than three-quarters of the younger age group (77.2%) had good attitude. However, sex did not influence attitude. (Table 6)

Table 6: Attitude of participants by age group and sex (N=335)

		Total Attitude Score		Total	Statistics
		Poor Attitude	Good Attitude		
Age	12-15	29 (22.8%)	98 (77.2%)	127 (100.0%)	$X^2 = 3.877$ $P = 0.049$
	16-19 yrs.	70 (32.9%)	143 (67.1%)	213 (100.0%)	
	Total	99 (29.1%)	241 (70.9%)	340 [*] (100%)	
Sex	Male	53 (30.5%)	121 (69.5%)	174 (100.0%)	$X^2 = 0.088$ $P = 0.767$
	Female	49 (29.0%)	120 (71.0%)	169 (100.0%)	
	Total	99.4 (29.7%)	235.5 (70.3%)	335 (100%)	

* only those were valid respondents of 335

Age/Sex*Practice Score Cross tabulation (N=335)

Findings revealed that age did not affect oral hygiene practice, though it was affected by sex with more females (92.3%) having good practice than males (84.5%). (Table 7)

Table 7: Age/Sex*Practice Score Cross tabulation (N=335).

		Total Practice Score		Total	Statistics
		Poor Practice	Good Practice		
Age Group	12-15	11 (8.7%)	116 (91.3%)	127 (100%)	$X^2 = 1.881$ $P = 0.170$
	16-19 yrs.	29 (13.6%)	184 (86.4%)	213 (100%)	
	Total	40 (11.8%)	300 (88.2%)	340 [*] (100%)	
Sex	Male	27 (15.5%)	147 (84.5%)	174 (100%)	$X^2 = 5.096$ $P = 0.024$
	Female	13 (7.7%)	156 (92.3%)	169 (100%)	
	Total	39.19 (11.7%)	295.8 (88.3%)	335 (100%)	

DISCUSSION

The study aimed to assess knowledge, attitude and practice on oral hygiene among school-going adolescents in Choma District. The study revealed that the majority (86.7%), of the respondents had more knowledge on the causes and prevention of periodontal diseases. Similar results were observed in a study done in Tanzania where 96.8% had adequate knowledge of periodontal diseases.¹ Further, more than half (65.0%) had knowledge on dental caries, however, this is low compared to the findings reported elsewhere.^{1,2}

Only less than a quarter (19.2%) knew that the best treatment for dental caries was filling of the tooth rather than extraction. This could be due to the fact that there is not enough sensitisation regarding the restorative treatment of dental caries, and most dental clinics in Zambia readily offer extraction as a sole treatment option for dental caries.¹⁴ Though most studies have shown a strong link between knowledge, age and sex⁹, our study found that knowledge was not influenced by age ($p=0.065$) and sex ($p=0.268$). This could be due to differences in social demographic factors such as education level, income, and cultural values inherent in different societies.

Regarding attitude, less than half of the participants, (39.4%), strongly agreed that treatment of a

toothache is as important as any other part of the body. This could be due to the fact that in most societies, dental problems are not perceived as life-threatening diseases among most people unless they develop into complications such as gum ulcers. Also, conventional treatment of oral conditions is not highly regarded among most people, especially those of low socioeconomic status, in most cases, they would only visit a dental clinic when symptoms become unbearable. The plausible explanation for the observed trend is that oral diseases are behavioural related and positive change is associated with the decrease in the prevalence of periodontal diseases.⁶ Similarly, a study by Al-Omiriet al.¹⁶, found that less than half (35.2%) of the patients had visited a dentist regularly while 15.1% never visited the dentist. Likewise, high numbers of respondents have been reported not to have visited the dentist elsewhere.¹⁴ This could be due to challenges in accessibility, as most health centres lack dental facilities in most low -middle-income countries which result in a delay in seeking dental services.^{2,9} Other reasons cited for the delay in seeking dental services include; lack of parental belief and practices, lack of economic resources and accessibility of dental services. Lack of parental encouragement regarding oral health hygiene has been documented as one of the reasons why some adolescents delay their visits to the dentist.⁴ This is because parents play a vital role in influencing a child's attitudes and practices regarding oral health behaviour.⁹ Similarly, in our study, parental advice to school-going adolescents to regularly visit the dentist among school-going children was low (11%). Studies done elsewhere have revealed similar findings.^{16,17}

Though the majority (74.9%) agreed that regular visits are necessary, about half (52.2%) of the respondents visited the dentist because of toothaches, these findings are similar to those reported in Malaysia.⁷ Fear of instruments used in dental procedures was another reason why most participants shunned away from dental clinics. Likewise, Kamran and colleagues, in a study

conducted in Iran, reported that out of 75%, 49.9% of school-going adolescents were scared of dental instruments.¹⁸ This is similar to the report in North Jordan which had 49%, and another which revealed that 53% of the adolescents did not visit the dentist due to fear of dental equipment set up.^{9,19} Nevertheless, attitude was found to be influenced by age, 77.2% of those aged 12-15 years had good attitude compared to 67.1% in the same age group (16-19 years), p-value 0.049. A majority (85%) brushed their teeth at least twice a day, findings similar to those reported elsewhere²⁰, where 95.7% of participants had brushed their teeth at least twice a day. Further, the majority (94.7%) were using a toothbrush and toothpaste to clean their teeth, these findings are in consonance with those reported elsewhere.^{7,14,16,18}

As expected, 0.8% reported using dental floss, and 2.8% used toothpicks, 69% reported brushing in the morning and before bedtime, these are less compared to those in Malaysia²⁰ where 80.4% were reported having brushed their teeth in the morning and before bedtime. About half (44.4%) compared to 71% in North Jordan¹⁶ reported having brushed their teeth for at least 2 minutes. Our findings are consistent with assertions from a previous study that dental floss is not widely used in most societies in Africa because it is expensive to buy and is scarcely found.¹⁴ This makes it difficult for people of low socioeconomic status and in remote places to buy and access them.

Evidence also suggests that brushing habits are influenced by sex. In our study, females, (92.3%) had better oral health practice than males (84.5%) p=0.024, similar findings have been documented elsewhere.⁷ This could be due to the fact that females adhere more to brushing their teeth regularly than their male counterparts.²¹ However, evidence as to why this is so is lacking. Further research is therefore needed to establish why school-going female adolescents have better oral health practices than males. We found no statistically significant association between knowledge and attitude on

adolescents' oral health practices. Education is an important tool in health promotion as it positively influences knowledge, attitudes and practices.⁹ Despite all schools lacking oral health education, our study found that the majority (350) 97.2% indicated that oral health education in schools would increase the knowledge levels and influence attitudes and practices towards oral health hygiene. This is in consonance with a study done by Farsi and others who found that lack of oral health education in schools contribute to poor oral hygiene.²² This calls for the need to include oral health education into the school curriculum. In countries with well-developed school oral health education programs like New Zealand and Australia, there has been evidence of a decline in dental caries among school children in the past few decades.^{9,17}

Study limitations and Strengths

Data regarding demographic information on adolescents' mothers and fathers such as education level and socioeconomic status which are strong determinants of oral health literacy were lacking. Further, since we were dealing with adolescents, the influence of parents on adolescents' responses could not be ruled out. However, sampling in different schools ensured a more representative sample suitable for inferring.

CONCLUSION

Despite the majority having good knowledge, attitude and practice on oral hygiene, more sensitisation is still needed on the best treatment methods of dental caries and periodontal disease. Further, enhanced awareness is needed regarding the dental equipment set up among school-going adolescents. Parents need to be incorporated as partners in promoting oral health hygiene among school-going adolescents.

Data Availability

The primary data used to support the findings of this study are included in the article.

Author's contribution

KS and BM conceived the study, and did data collection, **BM**, developed the conceptual framework, provided insights in methodology, discussion and introduction, **THN, BM, VD** performed the formal analysis. **VD, KS, BM, DM and THN** reviewed and edited the final copy of the manuscript

Competing interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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