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**Knowledge and experience of oral health among secondary
school students in Zambia**
- a questionnaire study

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Empirical study

070528

Abstract

The aim of the study was to investigate the knowledge about oral health and the experience of personal and professional oral care among secondary school students. The study consisted of 201 students in eleventh grade from one urban and one rural school in Livingstone and Sesheke, Zambia. A questionnaire with 34 questions was handed out and collected by the authors. The study showed a higher knowledge among the students from the urban area compared to the rural. Most students had received information about oral diseases and oral care, but a lower number was seen at the rural school. Parents and teachers were the principal informants. A majority of the students used toothbrush and toothpaste on a daily basis, but only a minor part of the group brushed at bedtime which is commonly recommended. Many students had a daily intake of one to five meals, the study showed that females and urban students had more frequent intakes compared to males and rural students. Almost half of the students had visited a dentist, but a large number had experienced problems without seeking care. The most common oral problem among the study population was toothache. Overall, though the students had good oral habits and rather good knowledge a need for further information was seen.

Keywords: Africa, developing, experience, knowledge, oral health

Kunskap och erfarenhet av oral hälsa bland gymnasieelever i Zambia

- en enkätstudie

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Empirisk studie

070528

Sammanfattning

Syftet med studien var att undersöka gymnasieelevers kunskap om oral hälsa och erfarenhet av både egen och professionell munvård. I studien ingick 201 elever i årskurs elva fördelade på två skolor, en stadsskola och en landsbygdsskola, i och i närheten av Livingstone, Zambia. Undersökningsinstrumentet, en enkät med 34 frågor, delades ut och samlades in av författarna i elevernas normala skolmiljö. Studien visade att kunskapen var högre bland eleverna i staden än på landsbygden. En stor del av eleverna hade fått information om munvård och munsjukdomar, antalet var något lägre på landsbygden. Föräldrar och lärare var de främsta informatörerna. Majoriteten av eleverna använde dagligen tandborste och tandkräm, men endast en mindre del av gruppen borstade vid den allmänt rekommenderade tiden innan sänggående. De flesta eleverna åt en till fem gånger om dagen, det visade sig dock att elever från staden och flickor hade mer frekventa intag än pojkar och landsbygdselever. Nästan hälften av eleverna hade någon gång besökt tandläkare, men ett stort antal hade haft problem utan att uppsöka vård. Det vanligaste orala problemet bland eleverna var tandvärk. Sammanfattningsvis hade eleverna bra munhygienvanor och någorlunda goda kunskaper men ett behov av mer information kan ändå ses.

Nyckelord: Afrika, erfarenhet, kunskap, oral hälsa, utvecklingsland

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INTRODUCTION

Oral health worldwide

Oral diseases are major public health problems worldwide, particularly among underprivileged groups in both developing and developed countries. Despite the great improvements of oral health in several populations, problems still persist. Dental caries and periodontal diseases are the two leading oral afflictions, but also other diseases occur worldwide (Petersen, 2003). The concept of oral health contains more than healthy teeth, it is a standard of health of both the oral and dental tissues. The standard enables an individual to speak and socialize without embarrassment or active disease, pain and discomfort in the mouth. A good oral health contributes to general well-being and quality of life (Gift & Redford, 1992; Kay & Locker, 1997).

Caries affects nearly 100% of the population in the majority of countries worldwide (Petersen et al., 2005). The disease is resulting in demineralization of the tissues in the tooth. It is caused by the interaction between microorganisms and fermentable carbohydrates in the diet (Kidd & Joyston-Bechal, 1997). The prevalence of caries has declined in developed countries during the last two decades, but still caries affects over 60% of schoolchildren and a majority of adults (Ismail et al., 1997; Petersen, 2003). Globally most children and adolescents also have signs of gingivitis, a periodontal disease characterized by inflammation of the gum (Petersen, 2003). Periodontitis is an infectious disease resulting in inflammation of the supportive tissues, attachment loss and bone loss (The Swedish Council on Technology Assessment in Health Care [SBU], 2004). The initial stages of periodontitis are prevalent among adults and severe periodontal disease is reported in 5-20% of most adult populations (Petersen, 2003).

To avoid inflammation of the gums and the risk of periodontitis daily cleaning of the oral cavity is important in order to avoid bacteria from colonizing. The removal of plaque and bacteria is also the fundamental mean for preventing caries (Løe, 2000). Fluorides have been proven effective to lessen the development of caries and toothbrushing with fluoride toothpaste is a powerful tool in self-administered care (Selwitz et al., 2007).

Factors affecting oral health in African countries

People in developing countries are often malnourished and live under unsanitary conditions. A vast majority of Africans have little or no access to safe water. The lack of safe water affects the possibilities of good general and oral hygiene. These people are vulnerable to oral diseases that are not known in developed nations and most have little access to quality health care (Petersen, 2003; Enwonwu et al., 2004; Auluck, 2005).

In African countries the oral health system is generally limited to pain relief and emergency care and there is a shortage of oral health personnel. The overall dentist to population ratio in Africa is 1:150 000 compared to approximately 1:2000 in developed countries (Petersen, 2003). Traditional treatment of oral diseases is very costly. In addition, long distances and costs related to transportation are barriers to seeking care (Baelum & Scheutz, 2002). If treatment were given to children in low income countries the cost of dental caries alone would exceed the total health care budget for children (Petersen et al., 2005).

In developing countries the sugar consumption is increasing, especially among urban residents from higher socio-economic background. Developing countries still have lower sugar consumption compared to developed countries but they are rapidly changing to a western lifestyle which causes an increase in oral health problems (Ismail et al., 1997; Okullo et al., 2003; Enwonwu et al., 2004; Darout et al., 2005). Since fluoride and methods of prevention are less accessible in developing countries, the sugar consumption has a significant effect on dental health (Ismail et al., 1997; Petersen, 2003).

Gender, place of residence and parents' education seems to be indicators both for prevalence of diseases and for preventive action. Being female or urban indicates a higher intake of sugar and a higher frequency of caries. Being female is also an indicator for increased preventive actions (Noar & Portnoy, 1991; Blay et al., 2000). Important predictors for frequent daily tooth cleaning are being urban and having educated parents (Blay et al., 2000).

Oral health in Africa

In most parts of Africa, as well as in other developing countries, the prevalence of caries is increasing, but the disease level is still relatively low (Petersen, 2003; Enwonwu et al., 2004). A shift towards higher caries prevalence have often been seen parallel with improved socio-

economic status of a country (Lalloo et al., 1999). Females and affluent urban populations are more affected by caries than poor rural populations and males (Blay et al., 2000). A high number of people have untreated caries lesions, leading to serious consequences such as eating problems and pain (Makoni et al., 1997; Petersen, 2003).

Gingivitis is in Africa a widespread oral disease in children, adolescents and adults. Shallow periodontal pockets with clinical attachment loss are frequent findings in both adolescents and adults. However, tooth loss related to periodontitis is infrequent and is found in minor fractions of the African population (Baelum & Scheutz, 2002; Enwonwu et al., 2004).

Oral infections, especially periodontitis, may lead to a systemic spread of bacteria which can cause or aggravate infections throughout the body. People with diabetes and cardiovascular diseases are vulnerable as well as people with suppressed immune system. Oral infections can in some cases be a cause of death (Li et al., 2000).

Oral health situation in Zambia

In Zambia there are about 250 professionals working within the dental care sector, 40 of these are Dental Surgeons and the remaining are Dental Therapists (Dr Mtolo, personal communication, 2007). The professional to population ratio is approximately 1:46000 (Dr Mtolo, personal communication, 2007; CIA, 2007) Dental services are generally offered in governmental run hospitals and clinics. The cost for the service in these clinics is usually very low. A small portion of the dental service is offered by the private sector and is then more expensive (Dr Mwewa, personal communication, 2006).

Little information is known about the oral health situation in Zambia and information as well as clinical data is difficult to find. Noar and Portnoy (1991) stated that the incidence of caries has started to increase due to the availability of refined sugar and to the lack of natural fluoride. Dr Mtolo, head of the Oral Health Services at Ministry of Health (personal communication, 2007), believes that the caries prevalence has started to decrease due to the raised awareness, but it has been a big problem for a long time. Periodontal diseases are also a problem especially in rural areas where the awareness of oral care is lower. The only research made on natural fluoride in water was made due to the many cases of fluorosis in the Eastern and the Southern provinces, therefore further information is not available. Today oral health is

one of the priority areas for the Ministry of Health. When the country got trained dental professionals a great need was identified and it has been acted upon. A policy for the Oral Health Services is in the finalizing stage.

AIM

The aim of the study was to compare knowledge regarding oral health and the experience of personal and professional oral care among secondary school students, both urban and rural, in and around Livingstone, Zambia.

MATERIAL AND METHODS

The study was conducted in Livingstone, Southern Province and Sesheke, Western Province, in Zambia during January/February 2007. Contact with the schools where the study took place was handled with assistance from the staff at Livingstone School of Nursing.

A pilot study was conducted in one class of 30 students in 11th grade at Linda High School in Livingstone. This was a higher number than planned, but it was decided to let the whole class participate. The pilot study was made to ensure that the questionnaire was understood and worked as expected. Emendations were made where words and questions were misunderstood, one question was excluded and the order of the different parts of the questionnaire changed. One question was added to clarify a previous question. The questionnaire as a whole was simplified due to the many errors concerning how to fill out the form. A need for more thorough information about the questionnaire was seen. Changes were also discussed with a local supervisor and the Dental Therapists at Livingstone Hospital.

The main study was conducted among secondary school students in grade 11, the level of education was considered more important than the age, and the students were between 13 and 22 years old. The study population consisted of 201 students, 101 and 100 individuals from rural respective urban areas. One urban and one rural school were chosen. Livingstone High School (urban) consists of students from the town area and Sesheke High School (rural) has students from rural areas. Written information about the study was given to the school directors before the realization of the study (attachment 1). All students present in three classes participated at both schools. Absent students were not given a chance to participate.

Information was given orally to the students about the authors, the aim of the study and the voluntary and anonymous nature of their participation. Emphasis was laid on the importance of their participation and honest answers. Thorough information was also given on how to fill out the form. The questionnaire was handed out by the authors and collected by the same when everybody had finished answering. The participants had the possibility to ask the authors questions for clarification during answering. The questionnaires from Livingstone were marked with number 1-101 and the questionnaires from Sesheke were marked 102-201. The questionnaires were kept throughout the writing of the paper after which they were disposed.

The written questionnaire consisted of 34 questions in English about the student's knowledge and experience related to oral health (attachment 2). Four were open questions and the rest had fixed answers. The questions were divided into three parts.

1. General information about the student and his/her family.
2. Experience and habits related to both personal oral care and professional dental care.
3. Knowledge of oral health.

The statistical analyzes of the collected data have been made in SPSS 12.0 (Statistical Package of Social Sciences). The material was analyzed using descriptive statistics. Differences between the places of living and between the genders were analyzed using the Chi square test, $p < 0.05$ was considered statistically significant. When analyzing the material the questions concerning the parents' education were joined together and the parent with the highest level of education of each student was considered. The two questions about information given to the students were analyzed together, likewise with the two question connected to them about informants. This was done due to similarities of the questions. To get an overall picture of the problems that occurred the two questions concerning the experienced oral problems were analyzed together as well. For several questions more than one answer could be given.

ETHICAL CONSIDERATIONS

Ethical approval to conduct the study has been given by the ethical committee at the Department of Health, Kristianstad University (Dnr ER2006-58). A letter explaining the aim

of the study was given to the school director at respective school in Zambia, permission to conduct the study was given orally to the authors.

The ethical principles have been taken into consideration throughout the whole study. The principles applicable to this study are the principles of autonomy and justice. The principle of autonomy regards respect for persons and their own choices. The principle of justice is a principle grounded in respect fairly without discrimination or prejudice (Olsson & Sörensen, 2001).

Consideration has been given to local manners and traditions throughout the study and recommendations from local supervisors have been followed.

JUSTIFICATION OF STUDY GROUP

It was taken into consideration that only 26% of the age group in Zambia attends secondary school (The World Bank, 2006). The study group is therefore not representative for the whole age group. Despite this, the group was chosen since it consists of one of the last grades in school and the students have probably received most of the general information concerning oral health that might be given throughout the school period. The students have also started to form their own habits which may be an indicator for their future oral status.

RESULTS

General information

Altogether 201 students, between 13 and 22 years of age, participated in the study. All students attended eleventh grade in High School. Mean and median age, gender and parents' education, divided between the urban and the rural school, are seen in table 1.

Table 1. General information about the students. The total number of students answering the different questions are shown (n).

	Urban	n	Rural	n	All	n
Female	51	98	33	80	84	178
Male	47	98	47	80	94	178
Mean age (year)	16.6	99	17.3	100	16.9	199
Median age (year)	16	99	17	100	17	199
Educated parents*	96	99	79	100	175	199

* Students with at least one parent with secondary school or college/university education.

Information

Information about oral diseases and/or how to take care of the mouth has been given to 179 of the students, 98 in the urban school and 81 in the rural school (n=201). A significant difference was seen between the two schools (p=0.001). Four students did not mark from where they received the information (n=175). The information was to the largest extent given by teachers. Each student may have received information from more than one source. The different informants are listed in figure 1.

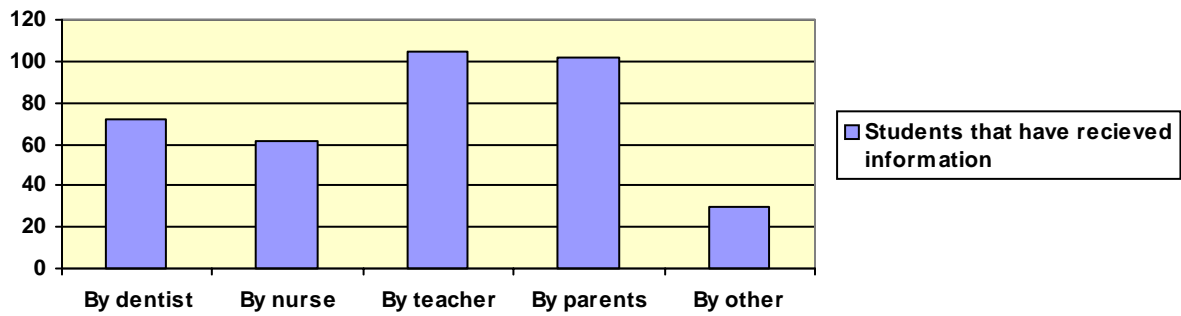


Figure 1. Data showing from whom the students have received information about oral diseases and oral care. More than one answer could be given. Data from all students (n=175).

More students in the urban school had received information from the dentist ($p=0.01$) and the parents ($p=0.014$) compared to the rural school. At the rural school more students had received information from a nurse ($p=0.037$). Female students had, compared to male students, received information more often from the dentist ($p=0.002$) and from others ($p=0.002$). Examples of other informants given were media, such as television and books, friends, family and doctor.

Knowledge

Fifty-three students knew that dental caries is a tooth cavity ($n=179$). Ninety-five gave the correct answer concerning the cause of caries, 50 were supposed to skip the question due to their answer in the preceding question ($n=129$). Seventeen marked the wrong answer and 178 the correct answer when it came to the reason for toothbrushing being performed for removal of plaque and bacteria ($n=195$). The purpose of fluorides to strengthen teeth was answered by 101 students ($n=191$). The knowledge about all questions was significantly higher in the urban area compared to the rural area ($p= 0.001 - 0.02$). Female students knew significantly more about the reason for performing toothbrushing compared to male students ($p=0.046$). No other differences between the genders were seen.

Personal habits

A majority, 193 students, cleaned their teeth daily and seven did it more seldom ($n=200$). Twenty-two students cleaned their teeth once a day while all others cleaned two times or more. A toothbrush was used by 195 students ($n=200$). A stick was used for cleaning by 33 and the finger by 11 students. Toothpaste was the most common agent for cleaning teeth used

by 179 students (n=198). Sixty-five individuals used salt and a few students mentioned soap, ashes and coal as cleaning agents. The times during the day when the students cleaned their teeth are shown in figures 2 and 3 (n=199). For these questions multiple answers could be given.

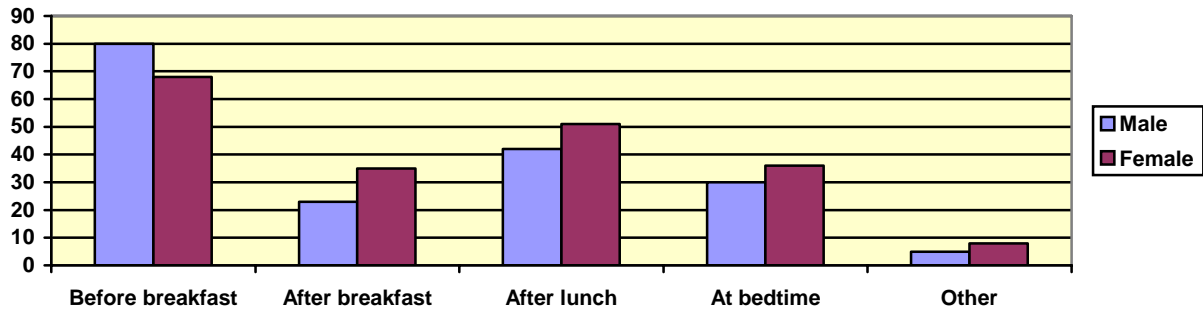


Figure 2. Point of time during the day for cleaning the teeth according to gender.

A majority of the students cleaned their teeth before breakfast. More female than male students cleaned their teeth after breakfast ($p=0.008$) and after lunch ($p=0.015$). No other significant differences were found.

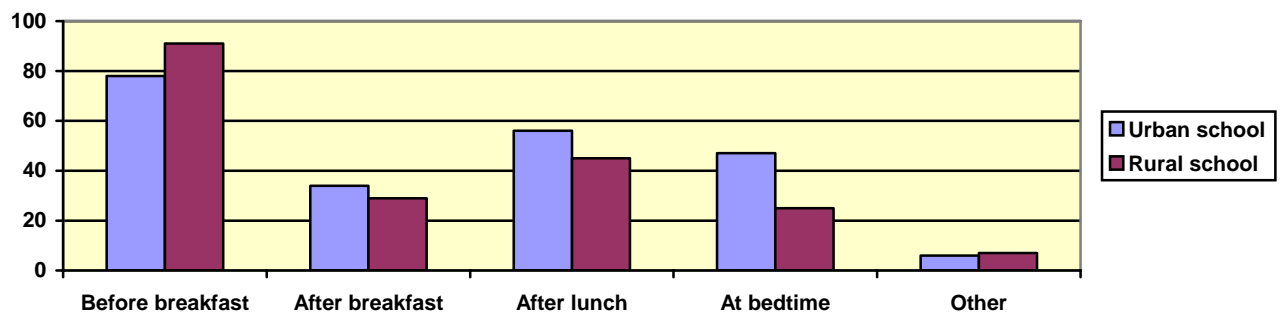


Figure 3. Point of time during the day for cleaning the teeth according to school.

More rural students cleaned their teeth before breakfast ($p=0.013$) and more urban students cleaned their teeth at bedtime ($p=0.001$). No other significant differences were found.

Eating habits

Only ten of the students ate six times or more every day while 186 ate one to five times a day (n=196). Female ($p=0.030$) and urban ($p=0.001$) students had a more frequent intake than

male and rural students. How often the students ate and consumed the different products listed in the questionnaire is described in table 2.

Table 2. The frequency of intake among the study group for specified products. Data for all students (n=196).

	Daily	Weekly/ Rarely	Never
Sweets (n=184)	44	139	1
Biscuits (n=187)	20	167	-
Sugar (n=193)	148	39	6
Sugared tea or coffee (n=186)	110	72	4
Soft drinks (n=188)	27	156	5
Juice (n=188)	49	131	8
Milk (n=184)	68	111	5
Chewinggum (n=181)	26	126	29
Groundnuts (n=185)	11	166	8

Female students were, compared to male students, found to have a more frequent intake of sugar ($p=0.022$), tea or coffee with sugar ($p=0.008$) and juice ($p=0.0001$). In the urban area more sugared tea and coffee was consumed ($p=0.0001$). Also juice ($p=0.019$) and milk ($p=0.001$) was consumed more frequently. No other significant differences were found.

Professional care and dental problems

Within the study group 95 had visited a dentist while 86 had not (n=181). Of the students that had seen a dentist nine had made a visit four times or more. Seventy-eight students had experienced problems without seeking professional dental care (n=185). No significant differences were found between the genders or place of living for either question. Of the 78 that did not seek care 61 answered the question about the reasons. Thirty-nine gave costs as a reason and 23 answered distance. Nine gave other reasons for not seeking care, such as lack of time, no pain and congestion at clinic. Distance was a more common problem in the rural

area where a statistically significant difference was seen ($p=0.015$). No other differences were found.

Fifty-six students ($n=192$) had received a filling while 41 ($n=198$) had experienced a tooth extraction. Only 12 ($n=199$) students had experienced that an x-ray was taken. In the rural school 37 had received a filling ($n=96$), a significant difference was seen compared to the urban school ($p=0.003$). No other statistical differences were found between the schools or between the genders.

One hundred and fourteen students stated that they had experienced dental problems ($n=114$). The most common problem was toothache, regarding which 62 students had been affected. Bleeding had occurred in 38 students, a loose tooth in 28 and 30 had suffered from tooth injury. Ten students answered that they had been having other problems, but examples were not given. Toothache was more common among females ($p=0.001$) and other problems, not named, among male students ($p=0.027$). No other statistically significant differences were found.

DISCUSSION

Material and methods

During the study it became clear that even though English is the official language and the language used in the schools, difficulties in understanding the questionnaire was common. The difficulties seemed to occur both due to the actual understanding of the language and to the fact that students may never have come across some of the words, for example floss and dentist. Another problem that became clear was a lack of experience in filling out forms. Students had trouble with how to mark the boxes in front of the answers and how to follow the instructions given in the questionnaire. Despite the simplifications that were made after the pilot study, a need for an even simpler form was seen. The questionnaire was printed on three papers to minimize the material in a low income setting. It might have made it more easy to grasp if fewer questions had been written on each paper. The number of students answering each question varied due to these reasons.

The questionnaire contained some inconsistency. For some questions there was a possibility to add written comments to the question and in some it was not. This was done due to an increased interest in some questions but it would have been easier for the students if it had been consistent. All mathematical characters were changed into text except one that was missed and therefore remained. When asking about their cleaning of teeth both the word clean and brush were used, it would have been better to use the same word. No students answered never regarding the question about cleaning but it should have stated that if they did the following three questions were to be skipped. In two questions different phrases was used about the same condition, dental caries and caries, but since the second question was based upon the first it did not seem to affect the answers. Changes were made in two questions concerning gingivitis, the aim to clarify the matter instead lead to an incorrect question that easily could mislead the students. These questions (33 and 34) were therefore dismissed. To conclude, it can not be put without doubt that some of these practical matters could have influenced the result.

Result

The level of education among the parents was relatively high. This might be explained by the fact that the low percentage of persons attending Secondary school need to pay for it and that educated parents might have better recourses and see a further need for education. Similar studies in other African countries (Ismail et al., 1997; Blay et al., 2000; Okullo et al., 2003) show that parents' education affects the knowledge and/or habits concerning sugar intake and oral hygiene. However the comparison could not be made in this study due to the homogeneity in the group. Education above the mandatory level, secondary school and college/university, was considered higher education.

Information has been given to the students from various informants and the number that has received information may seem high, but still a fifth of the students in the rural school had not received any information. Parents and teachers play an important role in passing on the knowledge, half of the students had been informed by their teachers and a slightly smaller number by their parents. The after all quite small group of parents that give information to their children suggests that there might be a lack of knowledge in the older generation.

A majority of the students brushed their teeth two times or more every day. A Swedish study conducted in a multicultural environment shows that all families in the study, with different

ethnic origins, performed brushing daily (Wennhall et al., 2002). Since daily cleaning is recommended (Löe, 2000) it was only taken into consideration if they brushed daily or more seldom. The most common occasions were to brush after breakfast and after lunch, but only one third brushed their teeth after breakfast and at bedtime. An interesting observation is that female students to a higher extent brush their teeth after breakfast. Small changes of habits, for example brushing at bedtime which is commonly recommended even if there is a lack of scientific background (Egelberg, 1999, Davies et al., 2003), might be one way to decrease the level of caries and consequently the high rate of toothache and extractions.

A higher intake of sugar and sugared products was seen among urban and female students compared to rural and male students, this corresponds with other African studies (Blay et al., 2000; Okullo et al., 2003). Regarding dietary intake it was hard to distinguish between weekly and rarely, therefore daily was compared to the more seldom intakes and never. Only a few students reported “never” for the different alternatives. However, it is worth noticing that a high number of students never use chewinggum, compared to the other products. To chew chewinggum is not a common habit in the area which can explain the higher number and be further explained by factors such as cost or lack of products. It is also worth noticing that a majority in the studied group consume refined sugar daily. Many of the students ate one to five meals including snacks every day, more frequent habits were seen among the urban and female students. The differences between urban and rural settings might be explained by the easier access to a variety of products in the urban area and the slightly higher prices in the rural setting. One third of the rural students were boarding at the school which gave them a more limited possibility to obtain different products. This might be another reason for the differences between the two groups.

The knowledge about the impairing effect of sugar and bacteria was higher than the actual knowledge of oral terminology. The students knew that sugar affects the teeth even if they did not know what dental caries is, and that is of greater importance. Research resulting in data of higher value could have been achieved with questions focusing on their knowledge of conditions occurring in the mouth without using a formal terminology. A majority of the students were aware of the main reason for toothbrushing. Interesting to note was that female students were slightly more knowledgeable. Even if the majority was using toothpaste only half of the students knew about the purpose of fluorides. Similar to a study made in Sudan (Ismail et al., 1997) the overall knowledge was higher among students at the urban school.

Only the correct answers has been considered, no detailed analyzes of the incorrect answers have been made.

Half of the students had once or more been to a dentist. The most common problem among the students was toothache. This is one of the most common problems seen in the dental clinics throughout the country and in a lot of cases it leads to extractions. A fourth had received a toothfilling and as many as a fifth of the students had been through an extraction. A difference was found between the areas, more rural students than urban stated that they had received a filling, this was unexpected due to the absence of a dental clinic in the area. The absence could also be an explanation for distance being slightly more of an obstacle for seeking care in the rural area, otherwise the reasons did not differ very much between the rural and urban areas.

CONCLUSION

This study shows that students in an urban area have higher knowledge about oral health compared to students in a rural area. The urban students have received more information about oral conditions, but there is a need seen in the rural area for more information to raise the awareness of oral care. Overall the students have good personal oral care habits. The study also shows that oral problems are more frequent among the students than the attendance to professional dental care.

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REFERENCES

- Auluck, A. (2005). Oral health of poor people in rural areas of developing countries. *Journal of the Canadian Dental Association*, 71, 753-755.
- Baelum, V., & Scheutz, F. (2002). Periodontal diseases in Africa. *Periodontology 2000*, 29, 79-103.
- Blay, D., Åström, A.N., & Haugejorden, O. (2000). Oral hygiene and sugar consumption among urban and rural adolescents in Ghana. *Community Dentistry and Oral Epidemiology*, 28, 443-450.
- CIA (2007). The World Fact Book. Central Intelligence Agency, Washington. URL: <https://www.cia.gov/cia/publications/factbook/index.html> [Accessed 2007, 04 19].
- Darout, I.A., Åström, A.N., & Skaug, N. (2005). Knowledge and behavior related to oral health among secondary school students in Khartoum Province, Sudan. *International Dental Journal*, 55, 224-230.
- Davies, R.M., Davies, G.M., & Ellwood, R.P. (2003). Toothbrushing: What advice should be given to patients? *British Dental Journal*, 195, 135-141.
- Egelberg, J. (1999). *Oral hygiene methods, the scientific way*. Malmö: OdontoScience.
- Enwonwu, C.O., Phillips, R.S., Ibrahim, C.D., & Danfillo, I.S. (2004). Nutrition and oral health in Africa. *International Dental Journal*, 54, 344-351.
- Gift, H., & Redford, M. (1992). Oral health and the quality of life. *Clinics in Geriatric Medicine*, 8, 673-683.
- Ismail, A.I., Tanzer, J.M., & Dingle, J.L. (1997). Current trends of sugar consumption in developing countries. *Community Dentistry and Oral Epidemiology*, 25, 438-443.

- Kay, E., & Locker, D. (1997). *Effectiveness of oral health promotion: a review*. London: Health Education Authority.
- Kidd, E.A.M., & Joystone-Bechal, S. (1997). *Essentials of dental caries* (2nd ed.). Oxford: Oxford University Press.
- Laloo, R., Myburgh, N.G., & Hobdell, M.H. (1999). Dental caries, socio-economic development and national oral health policies. *International Dental Journal*, 49, 196-202.
- Li, X., Kolltveit, K.M., Tronstad, L., & Olsen, I. (2000). Systemic diseases caused by oral infection. *Clinical Microbiology Reviews*, 13, 547-558.
- Löe, H. (2000). Oral hygiene in the prevention of caries and periodontal disease. *International Dental Journal*, 50, 129-139.
- Makoni, F., Frencken, J.E., & Sithole, W.D. (1997). Oral health status among secondary school students in Harare, Zimbabwe. *Journal of the Dental Association of South Africa*, 52, 491-494.
- Noar, J., & Portnoy, S. (1991). Dental Status of children in a primary and secondary school in rural Zambia. *International Dental Journal*, 41, 142-148.
- Okullo, I., Åström, A.N., Haugejorden, O., & Rwenyonyi, C.M. (2003). Variation in caries experience and sugar intake among secondary school students in urban and rural Uganda. *Acta Odontologica Scandinavica*, 61, 197-202.
- Olsson, H., & Sörensen, S. (2001). *Forskningsprocessen*. Stockholm: Liber AB.
- Petersen, P.E. (2003). *The world oral health report 2003: Continuous improvement of oral health in the 21st century – the approach of the WHO global oral health programme*. Geneva: World Health Organization.

Petersen, P.E., Bourgeois, D., Ogawa, H., Estupinan-Day, S., & Ndiaye, C. (2005). The global burden of oral diseases and risks to oral health. *Bulletin of the World Health Organization*, 83, 661-669.

Selwitz, R.H., Ismail, A.I., & Pitts, N.B. (2007). Dental caries. *Lancet*, 369, 51-59.

The Swedish Council on Technology Assessment in Health Care (Statens beredning för medicinsk utvärdering). (2004). *Kronisk parodontit – prevention, diagnostik och behandling*. Stockholm: Statens beredning för medicinsk utvärdering.

The World Bank (2006). The World Bank, Washington. URL:

<http://devdata.worldbank.org/external/CPProfile.asp?SelectedCountry=ZMB&CCODE=ZMB&CNAME=Zambia&PTYPE=CP> [Accessed 2006, 08 07].

Wennhall, I., Matsson, L., Schröder, U., & Twetman, S. (2002). Caries Prevalence in 3-year-old children living in a low socioeconomic multicultural urban area in southern Sweden.

Swedish Dental Journal, 26, 167-172.

Attachment 1

To whom it may concern

Questionnaire study at Secondary schools

We are two students studying to become Dental Hygienists at Kristianstad University, Sweden. As part of our Bachelors Degree we will conduct a questionnaire study in Zambia.

The aim of the study is to investigate the knowledge and experience of oral health among secondary school students in and around Livingstone. The study is a step to gain knowledge about and draw attention to the chosen field, depending on the result a possible need for more information about oral health may be seen. It may also be a step towards further studies within the subject.

The desirable number of students is 200, and these will be reached at different schools with help from tutors at Livingstone School of Nursing. The age group is 16-17 years old. This group is chosen since it consists of the last grades in school and the students have probably received all the general information concerning oral health that might be given during the school period.

Information will be given orally to the students about the aim of the study and their voluntary and anonymous participation. The questionnaire will be handed out by us and there will be a possibility to ask questions. The questionnaires will be destroyed after the study is finished.

Thank You for giving us the opportunity to conduct the study!

Linda Hagberg
Janna Sjoedahl

If any questions occur contact us at: 097709567 or 097709603

Attachment 2

Questionnaire

Mark one alternative per question if no other information is given.

General information

1. Gender

- Male/Man
- Female/Woman

2. Grade: _____

3. Age: _____ years

4. Mother's education:

- No education
- Primary school
- Secondary school
- College/University

5. Mother's profession:

6. Father's education:

- No education
- Primary school
- Secondary school
- College/University

7. Father's profession:

8. Have you received any information about how to take care of your mouth?

- No
- Yes
- I don't know

9. **If yes**, by whom? (You can mark more than one alternative)

- Dentist
- Nurse
- Teacher
- Parents
- Other: _____

10. Have you received any information about mouth diseases?

- No
- Yes
- I don't know

11. **If yes**, by whom? (You can mark more than one alternative)

- Dentist
- Nurse
- Teacher
- Parents
- Other: _____

Experience and habits

12. How many times have you been to a dentist?

- No visit (**go to question 14**)
- 1 time
- 2 times
- 3 times
- 4 times or more

13. If you have been to a dentist, what were the reason/reasons? (You can mark more than one alternative)

- Toothache
- Bleeding
- Loose tooth
- Tooth injury
- Regular check up
- Other

14. Have you ever had any of the problems above without seeking care?

- Yes
- No (**go to question 17**)

15. What kind of problem did you have? (You can mark more than one alternative)

- Toothache
- Bleeding
- Loose tooth
- Tooth injury
- Other

16. What were your reason/reasons for not seeking care? (You can mark more than one alternative)

- Distance
- Costs
- Other: _____

17. Have you received any tooth filling?

- Yes
- No
- I don't know

18. Have you had any teeth removed?

- Yes, _____ tooth/teeth
- No
- I don't know

19. Have you had an x-ray taken of your teeth?

- Yes
- No
- I don't know

20. Have you been treated by any of the following, instead of a dentist, when having mouth problem? (You can mark more than one alternative)

- I haven't got any treatment
- Hospital medication
- Traditional medicine
- Other: _____

21. How often do you clean your teeth?

- Never
- Rarely
- Weekly
- 1 time/day
- 2 times/day
- 3 times/day or more

22. When during the day do you brush your teeth? (You can mark more than one alternative)

- Before breakfast
- After breakfast
- After lunch
- At bedtime
- Other

23. What is used for cleaning your teeth? (You can mark more than one alternative)

- Toothbrush
- Stick
- Finger
- Other means

24. Do you use any of the following? (You can mark more than one alternative)

- Toothpaste
- Salt
- Other: _____

25. Do you use dental floss or picks for cleaning between teeth?

- No, never
- Yes, daily
- Yes, weekly
- Yes, monthly

26. What is the source of your water?

- Running tap at home
- Communal/shared running tap
- Well with handpump
- Ground open well
- Other

27. How often do you eat/use any of the following products?

Sweets

- Daily Weekly Rarely Never

Biscuits

- Daily Weekly Rarely Never

Sugar

- Daily Weekly Rarely Never

Sugared tea or coffee

- Daily Weekly Rarely Never

Soft drinks

- Daily Weekly Rarely Never

Juice

- Daily Weekly Rarely Never

Milk

- Daily Weekly Rarely Never

Chewing gum with sugar

- Daily Weekly Rarely Never

Groundnuts

- Daily Weekly Rarely Never

28. How many meals per day do you eat?

Including snacks.

- 1-3 times
 4-5 times
 6-7 times
 ≥ 8 times

Knowledge

29. What is dental caries?

- Tooth loss
 Discoloration of teeth
 Tooth cavity
 I don't know (**go to question 31**)

30. What causes caries?

- Sugar and bacteria
 Smoking and alcohol
 It is contagious
 I don't know

31. What is the main reason for toothbrushing?

- Whiten teeth
 Remove bacteria and plaque
 Massage the gums
 I don't know

32. What is the purpose of fluorides in toothpaste?

- Remove stains from teeth
 Strengthen teeth and prevent caries
 Prevent calculus and cleans teeth
 I don't know

33. What is gingivitis (swollen gums)?

- Inflammation
 Loose teeth
 Blisters in mouth
 I don't know (**skip question 34**)

34. What causes gingivitis?

- Grinding teeth
 Plaque
 Smoking
 I don't know

Thank you for participating!