ORAL HYGIENE KNOWLEDGE, ATTITUDE, PRACTICES AND CARIES EXPERIENCE AMONG FEMALE STUDENTS IN MAKUENI DISTRICT.


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ABBREVIATIONS

BDS-Bachelor of Dental Surgery
SDS-School of dental sciences
UON-University of Nairobi
WHO-World Health Organization
Dr.-Doctor
D-Decay
M-Missing
F-Filled
T-Teeth
Kshs.-Kenyan Shillings
KAP- Knowledge, Attitude & Oral hygiene practices
FADI – Fellow of the Academy of Dentistry International
PFA – Fellow of Pierre Fauchard Academy
SUMMARY

Background
Dental Caries is a major global concern due to its high prevalence and contribution to tooth loss in both children and adults. There is still inadequate information on caries experience and oral hygiene practices among the people from developing countries and Kenya in particular.

Objective
To describe the level of knowledge, attitude, oral hygiene practices and caries experience among female secondary school students.

Study design
This will be a descriptive cross sectional study using school based study groups.

Setting
The study will be conducted in Makueni girls' high school, located in the remote parts of Makueni district.

Material and Methods
A sample of two hundred and seventeen randomly selected students will be interviewed on their knowledge of oral hygiene, attitude towards oral hygiene and oral hygiene practices using self-administered questionnaires. They will then be examined for the presence of dental caries and teeth filled or extracted due to caries and the findings recorded in a WHO clinical examination form.

Data analysis
All collected data will be analyzed using SPSS whereby caries experience will be computed. The results will be presented in form of tables, pie charts and bar graphs.

Benefits of the study.
The results obtained will be used to make the necessary recommendations, aimed at enhancing the level of knowledge, attitude and oral health practices among this group of students, in order to decrease their caries experience. It will also be Partial fulfillment of the requirement for the degree of BDS.
INTRODUCTION

Dental caries is a progressive bacterial damage to teeth exposed to oral fluids (1). It may also be defined as an infection caused by specific bacteria or as a reversible multifactorial process of tooth demineralization & remineralization (2). Demineralization occurs when a critical level of pH is reached and remineralization occurs simultaneously. Dental caries occurs if there is repeated demineralization with insufficient time for recovery.

The development of dental caries is interplay between four key factors that is micro-flora (cariogenic/acidogenic bacteria) substrate (cariogenic diet), susceptible tooth surfaces & time factor. These four factors must be present for dental caries to occur & preventive measures are aimed at upsetting this ecosystem. Sucrose is the most important substrate for bacterial metabolism especially refined fermentable carbohydrates. Susceptible tooth surfaces include occlusal surfaces due to pits, fissures & grooves, proximal surfaces due to non-cleansable areas below contact points.

In 1976, Loesch postulated that dental caries is a specific and treatable bacterial infection primarily due to mutant's streptococcus and Lactobacillus in later stages. Other acidogenic bacteria are also involved but these two are the main ones. (3)

Caries is a major global concern due to the problems it causes. It usually affects children and young adults but can affect any person. It impairs quality of life by causing pain and/or discomfort. Its unfavorable sequel include, spread of infection to underlying tissue for example resulting into pulpal inflammation, periapical tissue involvement, tooth sensitivity, and other potentially acute fatal conditions like Ludwig's Angina, bacteraemia and septicemia.

Dental caries has been greatly studied by virtue of it being one of the most prevalent infectious diseases in the world. The WHO target was by year 2000 three or fewer decayed, missing or filled teeth at age twelve. This however hasn't been met totally due to a host of factors. Discrete studies done worldwide have come up with uneven/different results but it is generally accepted that caries is on the increase especially in the developing nations. Increase has been seen especially in the last 2-3 decades (4).

A study done in Mexico on 12 year olds found out that. Dental caries and treatment needs were considerably higher on children of low socio-economic status. The DMFT for private and public schools was 2.78 & 4.6 respectively. (5).
The knowledge, attitude and oral health practices are the key factors in maintaining a healthy oral state. The parameters mentioned eventually will present as oral diseases, mostly periodontitis and dental caries. Oral diseases are progressive and cumulative and become more complex over time, affecting ability to eat, how one looks and the way we communicate. This in turn affects economy, productivity and compromises ability to work at home, school and job.

Knowledge on the types of foods that are cariogenic is important in prevention of dental caries. Majority of the population are normally aware that high sugar intake is a source of dental caries, but most people don't know that it's the timing and frequency that influences development of caries more than the amount of sugar intake and as a result most people especially of low socio-economic status still experience a high prevalence of dental caries.

Various practices influence caries experience. These practices are usually direct manifestation of the Knowledge and attitudes of the individual towards oral health and include regular tooth brushing, material used and method used. Thorough daily removal of dental plaque and other debris on tooth surfaces and gums, by brushing and flossing; Mouth rinsing and use of auxiliary aids are also included.

Professional care is also very necessary in preventing caries. This involves regular check ups (at least every 6 months). X-rays may be taken yearly to detect possible cavity development in high-risk areas of the mouth. Minimizing snacks which create a constant supply of acid in the mouth and avoiding constant sipping of sugary drinks or frequent sucking on candy and mints are all practices that aid in preventing dental caries.

Fissure sealants can prevent cavities. These are thin plastic—like coating applied to the pits and fissures of molars. Sealants are usually applied on teeth of children, shortly after the molars erupt.

Barriers to proper oral health includes lack of access to services may be because of limited income, lack of insurance, transport or even time. Sometimes too the public, policy makers and providers may consider oral health and need for care to be less important than general health needs, pointing to the need to raise awareness and improve oral health literacy.
With the provision of dental services being a very expensive venture, more emphasis should be put in creating awareness on methods of maintaining good oral hygiene, which in turn reduces the incidences of dental diseases.

This study will be aimed at establishing the relationship between KAP and caries experience among the students since no documented study has been done at the region. This would be a stepping-stone for helping them, emphasizing on oral health instructions and motivating the students. Since most rural parts are associated with poverty and low standards of living and poor infrastructure, with subsequent unavailability of dental services, messages of oral health promotion and prevention of diseases would be of great value to the students and public at large. This study will also provide useful information for planning and organizing clinical and community oral health education programs, as well as provide basic data useful for intervention measures. It also forms a basis for further research.
LITERATURE REVIEW

Dental caries is a localized progressive demineralization of the hard tissues of the crown and root surfaces of the tooth. It results from interplay of dietary carbohydrates, cariogenic bacteria within dental plaque and susceptible hard tooth surfaces over time. Data suggests that caries incidence peaks in three different ages. 7yrs, for coronal decay of primary dentition, age 14, for coronal decay for permanent dentition and root surface decay beginning as from age 30-40 with steady increase thereafter. (6)

Although all age groups are subjected to dental related problems different age groups have different standards of knowledge on the same. It therefore follows that these age groups approach dental problems differently.

A study done in 2002 showed that adolescents know the importance of tooth brushing and dental services utilization for dental caries prevention. However their knowledge about dental sealants and fluoride is inadequate. Teenagers believe that they have a significant role to play in the prevention of dental caries although many adolescents consider tooth loss to be a normal consequence of age. The desire to attain and maintain dental aesthetics among adolescent leads to good oral health among them. (7)

An individual’s oral health status depends on their previous dental history. Those adolescents who had a history of attending routine oral diagnosis and treatment measures had less caries experience and non-attendance and late cancellation are partial risk factors to developing caries (8).

Another study investigating the association between sugar consumption and dental caries concluded that consumption of sugary food and drinks both between meals and at meal times is associated with a large caries increment hence the concern about the KAP of the students in relation to cariogenic foods and its effects on their caries experience. (9)

Tinanoff, N et al 1997 did a study that showed that dental caries very often appears as a chalky white area on the enamel. It later softens and then the tooth structure breaks down. If not treated in the early stages, it progresses towards pulp and necessitates extensive treatment to save the tooth at a much higher cost. Children from poor socio-economic groups have nearly 12 times more restricted activity days because of dental related illnesses than children from higher income families. (10)
A study done in Michigan found out that the oral health status was directly positively related to the level of knowledge and frequency of dental check ups and negatively to age, ethnicity and smoking (11).

Studies from Canada show that caries experience of immigrants and their general oral health status is worse than that of their native born counterparts and that they make less use of dental services. (7)

In a study done in Romania, the dental awareness (knowledge) among the population was very poor and that despite the availability of dental services only 24% of the population had attended the clinic and this was due to pain mostly caused by extensively carious teeth. (12)

In Harare, Zimbabwe a study carried out to determine the oral health status among secondary school students found out that 89.5% had calculus though the mean DMFS AND DMF (T) were 1.4 and 1.1 respectively using Green and Vermillion index, the mean plaque score was 5.6 they concluded that these students lacked preventive and curative oral care. (13)

Other studies have shown that as socio-economic status deteriorates, caries experience increases (industrialized countries). However this relationship seems to be reversed in developing countries. (14)

In China, a study done to determine the oral health status and behavior among 12-year-olds urban school children revealed a mean DMFT of 0.77 about 65% had CPITN maximum score "2" only 40% brushed their teeth twice daily and 46% had seen a dentist within the past year. (15)

All the above studies show that high caries experience was as a result of either unavailability of dental services, poor or lack of knowledge on good oral hygiene practices or underutilization of the available services.

This study is aimed at establishing the relationship between KAP and caries experience of the students since no documented study has been done in the region.
PROBLEM STATEMENT
The caries experience of students has been shown to be high. This may be due to a direct outcome of poor knowledge, negative attitude and improper oral hygiene practices. The unavailability of dental services and financial constraints add on to the barriers of maintaining good oral health in the region of the study.

JUSTIFICATION OF THE STUDY.
Dental caries is the most common oral disease and a cause of tooth sensitivity, dental pain, tooth mobility, periapical infections and dento-alveolar abscesses onto emergencies like Ludwig's Angina. There is an evidence of a rise in the prevalence of dental caries in developing countries Kenya included. This rise places a further burden on the resources available for oral health management. There is therefore a need to study and understand the factors influencing caries experience especially among teenagers in rural areas where dental services are inadequate and financial constraints in addition to other barriers exist. Evaluation of the KAP and caries experience will enable provision of necessary intervention measures to enhance the students' oral health and the public at large.

OBJECTIVES
Main objectives
To determine dental caries experience among female secondary school students & describe their level of oral health knowledge, attitude and oral hygiene practices.

Specific objectives
1. To establish the students level of knowledge on oral hygiene
2. To describe the students attitude towards oral hygiene
3. To describe the students oral hygiene practices
4. To determine the dental caries experience of the students
HYPOTHESIS
The caries experience of the students is high, due to inadequate knowledge, negative attitude, and poor oral hygiene practices

VARIABLES
Socio demographic characteristics
(a) Age

Independent variables
(a) Knowledge
(b) Attitude
(c) Oral hygiene practices – Frequency of brushing
   - Use of toothpastes
   - Flossing habits
   - Frequency & amount of sugary food intake

Dependent variables
Dental caries experience: Number of decayed teeth
: Number of teeth missing due to caries
: Number of teeth filled due to caries
MATERIALS AND METHODS

Study area
The study will be conducted in Makueni Girls High school, a school with a population of approximately 500 students. It's located in Makueni District in the Eastern Province of Kenya, about 400KM from Nairobi and 20KM from Wote town, the district headquarters. The school is one of the best girl's provincial schools in Kenya. It draws its students from all over the country. The majority of students however come from Makueni District. It's said that the quota system is strictly used in form one selection and assuming that this is true, then the majority of the districts in the country are represented. Because of this, it will also follow that the schools population represents a metropolitan society in terms of ethnicity, which to a great deal influences human attitude and behavior.

Study population.
The population to be studied will be drawn from the bonafide students of the school. All levels from form 1 to Form 4 will be represented.

Study Design.
This will be a descriptive cross-section study using school based study groups

Sample Size.
Step 1
For a population of more than 10,000
\[ n = \frac{z^2 \cdot (p) \cdot (1-p)}{c^2} \]

Where
\[ n = \text{sample size} \]
\[ z = \text{z-value} \]
\[ p = \text{prevalence of dental caries of 50\%} \]
\[ C=1\text{-confidence level} \]
Confidence level chosen is 95%
Hence c=5%
Corresponding z value for 95% confidence level is 1.96

Computation of the above formula:
\[ n = \left( \frac{1.96}{5} \right)^2 \times 50 \times 50 \]
\[ = \frac{3.8416 \times 2500}{25} \]
\[ = 384 \]

Since the population is less than 10,000:

**Step 2**
\[ n_f = \frac{n}{1 + \left( \frac{n}{N} \right)} \]
\[ = \frac{384}{1 + \frac{384}{500}} \]
\[ = \frac{384}{217} \]

**Inclusion criteria**
(1). All current bonafide students of the school.
(2). Only students who give informed consent to this study will be included

**Exclusion criteria**
(1). Students who do not consent to this study
(2) Any student who will not be available for the exercise due to some illnesses or commitments will be excluded.
(3). Any subject who will consent but doesn’t respond to the provided questionnaire will not be considered in data analysis.
Data collection instruments and techniques

Data on the subjects KAP will be collected by means of self-administered questionnaires. (Appendix I) A clinical examination of their caries experience will be done outdoors using natural light. Mouth mirrors will be used to aid in direct and indirect vision & retracting tissues, explorers will be used to detect carious teeth and tongue depressors to aid in access. Subjects will be asked to rinse their mouths thoroughly prior to the examination & their teeth dried with cotton rolls to aid caries detection. A positive diagnosis of decayed teeth will be on the basis of the explorer sticking, catching or obvious cavitations or chalky white spots. These will be recorded as D. Missing or Filled teeth that subjects can quantify, as secondary to caries will be denoted as M& F respectively. Every tooth will be counted only once hence a filled tooth with secondary caries on another surface will be recorded as carious. Teeth excluded from DMFT include unerupted permanent teeth, which ought to have erupted, and teeth restored due to other reasons other than caries.

The information will be recorded in the clinical examination data sheet (Appendix II). Examiners will be recruited from among fellow students to aid in distribution and collection of questionnaires.

Data analysis and presentation

The data to be collected will be analyzed using SPSS and presented in form of tables, pie charts and Bar graphs. Computations will include DMFT index, percentage of students with particular oral hygiene practices, knowledge and attitude.

LOGISTICS

1. Financial constraints
2. Delay due to transport problems since public means will be used.
3. Because of distance accommodation will be a challenge
4. Storage of collected data
Ethical consideration

1. Ethical approval will be obtained from the Kenyatta National Hospital/University of Nairobi Ethics &standards committee.
2. Permission to carry out the study will be obtained from the principal of Makueni girl's high school.
3. Voluntary consent from students will be obtained.
4. Information given by student will be kept confidential. No names will be written on questionnaires.
5. Those found to have any oral pathology would be advised accordingly and subsequently referred for further management.

Perceived Benefits

- Professional advice will be offered to the subjects, as their oral health will dictate.
- Recommendations will be done with the aim of developing a higher level of knowledge on the ways of maintaining good oral hygiene.
- Results will help in implementing dental services for schools in rural parts of Kenya.
- Partial fulfillment of the bachelor of dental surgery (BDS) degree of the UON.
## BUDGET

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**GRAND TOTAL** 6770
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4. Sheiham A; Dental caries in under developing countries cariology today: 1983; vol 8; 68-72
5. M.E Irigoyen, GS and acupuncture Hinojosa-Changes in Dental caries prevalence in 12 yr old students in the state of Mexico after 9 yrs of salt fluoridation. - Caries Research, 2000; 34:303-307
   International Dental Journal 1981 31; 29-38

APPENDIX I

ORAL HYGIENE KNOWLEDGE, ATTITUDE, PRACTICES AND CARIES EXPERIENCE AMONG FEMALE STUDENTS IN MAKUENI DISTRICT

QUESTIONNAIRE
This is a study to establish the Oral hygiene Knowledge, attitudes, practices and caries experience among female students in Makueni District.
Participation is voluntary and information filled here will be treated with utmost confidentiality.
(Please answer the following questions to the best of your ability according to instructions given)

Age (yrs)
Secondary level

(Tick against the correct answer(s))
1. Do you brush your teeth?
   Yes  No
(If yes go to Q2, if no, go to Q13 below)
2. How often do you brush your teeth?
   i). Daily
   ii) Weekly
   iii) Monthly
   iv) Others-(specify) -------------------
3.) How many times do you brush your teeth in a day?
   i). Once
   ii) Twice
   iii). Thrice
   iv.) More than thrice
   v.) Others... (specify)
4). In relation to meals, when do you brush your teeth
   i) After meals
   ii) Before meals
   iii) In between meals
   iv) Before and after meals
   v.) Others... (Specify)
5. What do you use for brushing your teeth?
   i) Chewing stick only
   ii) Commercial toothbrush only
   iii) Both chewing sticks &commercial toothbrush
   iv). Others-(specify)----------------------
6. What other substances do you use when brushing your teeth?
   i) None
   ii) Toothpaste
iii). Plain water
iv.) Salty water
v.) Charcoal ash
7. Why do you brush your teeth?
   i). To avoid bad breath
   ii). To avoid tooth decay
   iii). To have whiter teeth
   iv). Because I see my friends doing so
   v). All the above
8. Do you use toothpaste when brushing your teeth?
   Yes  No
   (If yes, go to Q9; if no, go to Q10)
9. What do you think is the role of the toothpaste in brushing your teeth?
   i). It kills germs
   ii). It tastes good
   iii) It removes the dirt from my teeth
   iv). All the above
   v.) Others... (Specify)
10. How often do you change your toothbrush?
    i). Once per year
    ii) After every three months
    iii). After every six months
    iii). When it gets lost or spoiled
    v.) Others... (Specify)
11. Do you clean in between the teeth?
    Yes  No
    (if yes go to Q13; if no go to Q15)
12. What do you use? Below
    i) Tooth picks
    ii) Match stick
    iii) Dental floss
    iv) Interdental brush
    v) Others-(specify) -----------
13. Why don’t you brush your teeth?
    i) It hurts
    ii). It causes bleeding
    iii). I don’t have time
    iv). I don’t have a brush
    v). It is not necessary
    vi) Others-(specify) -----------
14. Is it necessary to go for a dental check-up?
    Yes  No
15. Who is a dentist?
    i) One who removes teeth?
ii) One who gives people false teeth (dentures?)
iii). One who treats diseases of the mouth
iv). One who cleans peoples teeth
v). Others-(specify)  

16. When should one visit a Dentist?
i) When in pain?
ii). When the gums are bleeding
iii) When there is dirt/tartar on teeth only
iv) At least once a year
v). After every three months

17. What causes cavities on teeth?
i). Eating sugary foods
ii). Germs
iii). Both i) and ii) above
iv) I don’t know
v). Hard foods

18. The best way to prevent dental caries/cavities is by
i) Brushing teeth after meals
ii). Regular dental check-ups
iii). Avoiding sugary foods
iv). All the above

19. Which of the following cause black or brown stains on teeth?
i) Tobacco chewing
ii). Miraa chewing
iii). Cigarette smoking
iv). Tea consumption
v). All the above

20. Untreated holes/cavities lead to
i). Pain in the teeth
ii). Swellings in the mouth
iii). Broken teeth
iv). I don’t know
v). Other- (specify) 

21. If you had dental caries (cavities) on your teeth, what treatment would you prefer?
i). Permanent fillings
ii). Extraction of the affected tooth
ii) Artificial teeth
iv). I don’t know
v). Other-(specify)  

APPENDIX II

ORAL HYGIENE KNOWLEDGE, ATTITUDE, PRACTICES AND CARIES EXPERIENCE AMONG FEMALE STUDENTS IN MAKUENI DISTRICT

CLINICAL EXAMINATION FORM

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KEY: D-Decayed, M-Missing, F-Filled
APPENDIX III

ORAL HYGIENE KNOWLEDGE, ATTITUDES, PRACTICES AND CARIES EXPERIENCE AMONG FEMALE STUDENTS IN MAKUENI DISTRICT.

CONSENT FORM

I am an undergraduate student at the University of Nairobi Dental School. I wish to request for your participation in a study that will form part of my degree course work. The study involves filling out a questionnaire and examination of your teeth. The examination will cause no pain or discomfort. My classmates and I will carry out the examination. Results will be recorded and analyzed for research purposes only. No invasive procedure will be undertaken on you. If any other dental problems are detected during the examination you will be advised accordingly. Your participation in the study will be highly appreciated.

Thank you.
Sumbi Everlyne Mbingya

I do hereby freely consent to participate in the mentioned study.
Student ..............................................has explained the procedure to be carried out. I understand that no harm will be caused and I can withdraw at any time without any adverse consequences to me. I am also informed and understand that all information I give will be treated with utmost confidence.

Signed

..........................................................
Participant