KNOWLEDGE AND ATTITUDE TOWARDS MOUTHWASHES AND THEIR USES AMONG DENTAL PRACTITIONERS IN NAIROBI AND MOMBASA

A COMMUNITY DENTISTRY RESEARCH PROPOSAL SUBMITTED IN PARTIAL FULFILMENT OF THE DEGREE OF BACHELOR OF DENTAL SURGERY, UNIVERSITY OF NAIROBI.

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ABBREVIATIONS

1. ADA  American Dental Association
2. ANUG  Acute Necrotizing Ulcerative Gingivitis
3. U.K  United Kingdom
4. WHO  World Health Organisation
5. KDA  Kenya Dental Association
SUMMARY

Mouthwashes are chemical formulations that are mainly used as adjuncts to mechanical methods of plaque control and also in the treatment of various dental and medical conditions. Dentists have a major role to play in the maintenance of good oral hygiene in the country. Although several studies carried out in several countries have shown the role of mouthwashes in plaque control, there is an overall scarcity of information regarding the dentists’ knowledge and attitude towards mouthwashes as agents of plaque control.

The main objectives of the study will be to establish the dentists’ knowledge of mouthwashes in terms of their constituent ingredients, their short and long term side effects; their attitude towards the use of mouthwashes as plaque control agents and their use during treatment of various dental conditions.

A descriptive cross-sectional study will be conducted among dentists’ in Nairobi and Mombasa. A total of 120 dentists will be included in the study. A self-administered questionnaire will be used to collect data. The variables sought by the questionnaire will include knowledge of the various brands of mouthwashes and active ingredients in those mouthwashes; attitude of dentists towards mouthwashes as agents of plaque control; specialty of dentists and gender of the dentists.

The findings from the study may be used to formulate continuing dental health education programmes for dentists and this will eventually help improve patient education on the use of mouthwashes.
INTRODUCTION

Periodontal disease refers to a group of diseases that affect the tissues that support and anchor the teeth. Periodontal diseases have afflicted humans since the dawn of history and studies have indicated that destructive periodontal disease as evidenced by bone loss, affected early humans in such diverse cultures as ancient Egypt and pre-Columbian America. Almost all the preserved early writings have chapters dealing with oral disease and periodontal problems take up a significant amount of space in these writings. (1)

The prevalence of periodontal disease among adults in the world has been the subject of several studies. The WHO’s compilation of more than 100 studies measuring the Community Periodontal Index of Treatment (CPITIN) indicated that most adults present with calculus or gingival bleeding or both and that 5-20% of person’s 40 years of age suffer from severe periodontal disease. (2)

A Canadian National Survey, done in 1972 showed that 26% of Canadians aged 19 years and over suffered from serious gingivitis and that 15% had periodontal pockets. Among the subjects aged 30-39 years, 41% of men and 23.6% of women suffered from severe gingivitis while 13.2% of men and 7.2% of women had periodontal pockets. (3)

Periodontal disease is a major health concern affecting most of the populations in the world and studies have also shown that prevalence of severe periodontitis is greater in developing countries like Kenya, than in industrialized countries. (1)

Epidemiological studies confirm a strong correlation between dental plaque and the initiation of periodontal disease. Bacterial plaque is an adherent deposit on the teeth and its adherence is such as to resist the friction of food during mastication. It forms when tooth brushing is stopped for 12-24 hours. Plaque forms thick creamy deposits in the stagnation areas e.g. occlusal fissures of posterior teeth; gingival margin of teeth and inter-proximal areas of teeth. It has been firmly established that dental plaque is the main etiological agent of periodontal disease. (4)

Plaque control is the removal of microbial plaque and the prevention of its accumulation on the teeth and the adjacent gingival surface. It plays an important role in prevention of periodontal disease, dental caries and other oral lesions caused by micro-organisms in dental plaque. There are two main methods of plaque removal:

1. Mechanical methods which involve tooth-brushing, inter-dental cleaning e.g. flossing, use of toothpicks, inter dental brushes etc

2. Chemical methods which involve use of Mouthwashes; Antibiotics e.g. penicillin, vancomycin, erythromycin; Phenols like thymol and triclosan; Quaternary ammonium compounds; Herbal extracts etc
Mouthwashes are chemical formulations that are used in the inhibition of plaque formation. Most people brush and floss inadequately and constant reinforcement is often required. Plaque is usually left behind with mechanical methods and therefore chemotherapeutic agents have a key role as adjuncts to mechanical methods for preventing and treating periodontal disease. They should be recommended after the patient has brushed and cleaned interdentally. (6)

Dentists have a major role to play in the maintenance of good oral hygiene among the Kenyan population. A study among dentists will provide us with information that can be used to establish the adequacy of their knowledge on mouthwashes and their attitude towards mouthwashes in maintenance of good oral hygiene. The findings can also be used in the formulation of dental health education programmes for dentists.
Periodontal health can be considered to be a state of balance in which the bacterial population coexists with the host and no irreparable damage occurs to either the bacteria or the host tissue. Disruption of this balance causes alterations in both the host and the bacteria in the biofilm. Studies have shown that periodontal diseases are an important cause of tooth mortality among adults more than 40 years old (1). The main forms of periodontal disease are gingivitis and periodontitis. Gingivitis is an inflammation of the marginal gingiva while periodontitis is characterized by destruction of the periodontal ligament and alveolar bone and ultimately leads to loss of teeth. The tissues that are mainly involved in periodontal disease are gingiva, periodontal ligament and alveolar bone. The most common symptoms of periodontal disease are red swollen gums; bleeding gums; halitosis; gum recession; mobile teeth and abscesses. (5)

The aetio-pathogenic role of bacterial plaque in periodontal disease is now widely demonstrated. Dental plaque is a mixed microbial biofilm growing on the tooth surface. It consists of an organic matrix containing a dense concentration of bacteria, together with their extra cellular polysaccharide matrices. Plaque formation begins by deposition of a structureless cell-free pellicle, which is derived by deposition of salivary mucinous substances such as glycoproteins. Within 24 hours, this cell free layer becomes colonized by micro-organisms mainly Streptococci mutans and S. sanguis. As the plaque matures, Filamentous organisms proliferate and form. Other bacterial species e.g. Lactobacilli, Actinomycetes, Diptheroids, Gram negative anaerobes also join the plaque population. (6)

Plaque control is an effective way of preventing periodontal disease. The importance of oral hygiene in primary and secondary prevention of periodontal disease is no longer disputed. To date, the most dependable mode of plaque control is mechanical cleaning. Chemical inhibitors of plaque incorporated in mouthwashes or dentrifices act as adjunctive agents to mechanical techniques. (13)

Mouthwashes are formulated solutions that have been used widely in various dental and medical conditions that include post-oral surgery patients, patients with dental implants and orthodontic appliances, periodontal patients, denture patients, patients with ANUG, dry sockets, pregnancy and puberty gingivitis, diabetics, cardiac patients and patients undergoing chemotherapy and radiation treatment (7). Due to their many uses, mouthwashes are starting to assume an important role in daily oral care routine. A study done in the United Kingdom (UK) shows that 24% of the population used mouthwashes and 68% of the dentists in the U.K actively encourage patients to use a mouthwash at least once a day (8).

In the market today, a wide range of mouthwashes is available. A number of antimicrobial agents have been studied in the control of plaque and are divided into;

1. Bisbiguanides like chlorhexidine; Alexidine; Octedine
2. Quarternary Ammonium compounds like Cetypyridinium chloride
3. Phenolic Antiseptics like Listerine
4. Hexetidine like Oraline
5. Povidone Iodine like Betadine
6. Antiseptics like Triclosan; Salifluor
7. Metal ions like Zinc; Copper
8. Natural Products like Sanguinarine; Propolis
9. Oxygenating agents like Hydrogen peroxide

The American Dental Association (ADA) council on Dental Therapeutics has adopted a program for acceptance of plaque control agents. The agents must be evaluated in placebo controlled clinical trials for six months or longer and demonstrate significantly improved gingival health compared with the controls. To date, two agents have been accepted by the ADA-Chlorhexidine and Listerine mouthwashes.

The major components of mouth-rinses are water, flavoring, humectant, surfactant, alcohol and the active ingredients. The active ingredients vary considerably among the various mouthwashes; Listerine employs the well-established therapeutic effects of phenol related essential oils, thymol and eucalyptol, in an alcohol base. A study was done in the UK, Germany and Belgium to evaluate the benefits of Listerine mouth rinse in improving the oral health status. During the study, each dentist received materials and instructions on how to assess gingival health and plaque scores. The subjects were invited to use Listerine twice a day for 3 months as an adjunct. After 3 months, significant improvements were measured with both gingival health and plaque control improving by 50%. Most practitioners confirmed that the use of Listerine as an adjunct to normal oral hygiene was very beneficial in control of plaque among their patients.

The use of mouth-washes as adjuncts in the management of gingivitis has received increased attention – A three double blind, placebo controlled clinical study conforming to the ADA programmed guidelines was done among 337 adults aged between 18-60 years. All subjects had plaque and mild to moderate gingivitis at the beginning of the study. The placebo solution was a hydro alcohol solution that mimicked Listerine. The subjects rinsed twice daily as an adjunct to their usual oral hygiene for six months. At the end of the study, Listerine was found to reduce plaque by 19-34% as compared to the placebo.

Chlorhexidine is a bisbiguanide with broad-spectrum antibacterial activity. Studies done in the department of Periodontontology, University of Wales, showed that Chlorhexidine achieves plaque inhibition as a result of immediate bactericidal action during the time of application and a prolonged bacteriostatic action as a result of adsorption to the pellicle coated enamel surface. In a study done in the University of Berne Switzerland, patients who had undergone flap surgery were to rinse daily for 1 minute with 0.1% Chlorhexidine for 4 weeks. In addition to Chlorhexidine rinsing, the patients were also supposed to apply Chlorhexidine locally using a
soft surgical toothbrush twice daily. All areas healed without complications. It was concluded that daily rinsing with Chlorhexidine leads to lower degrees of inflammation resulting in improved healing. \(^{(13)}\)

Povidine iodine is an iodine complex that has been shown to be active sub-gingivally. A study done by the ADA showed that subgingival irrigation with povidone iodine was recommended to reduce pathogenic bacteria and to decrease bacteremia after dental procedures. \(^{(14)}\)

Quarternary ammonium compounds are a group of surface -active agents that have a tendency to bind to oral tissues, due largely to their strong positive charge. The most commonly used member of this group is ceptlypyridinium chloride. A series of studies have shown significant plaque reductions of 25 to 35\% and 24\% reduction in gingivitis. The quarternary ammonium compounds exhibit some of the same side effects as chlorhexidine, and these include staining and enhanced calculus formation. \(^{(15)}\)

Sanguinarine is currently used in both a mouth-rinse and toothpaste as an antiplaque/gingivitis agent. It is a benzophenanthridine alkaloid extract from the root of Sanguinaria Canadensis that has broad spectrum antibacterial activity. It is available in the United States as Viadent mouthrinse and toothpaste. Studies have shown plaque reductions of 17-42\% and reduction in gingivitis of 18-57 \%. \(^{(15)}\)

A number of short-term studies have shown that stannous fluoride is an effective anti-plaque agent. Several studies have reported significant reductions in plaque and/or gingival inflammation. \(^{(15)}\)

The ADA proposed using dilute sodium hypochlorous solution as a topical antiseptic for irrigation of wounds and as a mouth rinse. \(^{(7)}\)

The value of mouthwashes is however controversial because most of the mouthwashes have temporary antibacterial value and many disadvantages; Chlorhexidine is an essential component in many available preparations because of its marked antiseptic qualities. One of the most frequent side effects is the appearance of stains on the teeth and mucous membranes. However, a new mouthwash containing Chlorhexidine with an anti discoloration system is available. A comparative study was carried out on a sample of 15 patients treated with two mouthwashes both containing 0.2\% chlorhexidine but one lacked the anti discoloration agent. The results obtained showed that in the 15 patients treated, there was no statistically significant difference in the ability of the mouthwash to prevent bacterial plaque, however evidence of the stain was much less with the new mouthwash. \(^{(16)}\) It has also been shown to cause build up of supra-gingival calculus and altering taste perception after use.
Listerine on the other hand, has been shown to cause drying out of the mucous membranes, bitter taste and a burning sensation. (7)

Most of the mouthwashes contain alcohol. Chronic use of alcohol has been associated with development of oral cancer. In view of the association between excessive ingestion of alcoholic beverages and oral cancer, concerns have been raised about health risks associated with use of alcohol containing mouthwash. It is recognized, however, that the risk of oral cancer associated with alcoholic beverages is related to certain carcinogens found in the beverage e.g. urethane rather than the alcohol. The findings from various studies are inconsistent but the most recent study among 342 people using mouthwashes in Puerto Rico found no overall risk of oral cancer. (17)

Although several studies have shown the role of mouthwashes in plaque control, there is overall scarcity of information regarding the dentists' knowledge of mouthwashes as agents of plaque control. Although dentists have a major role in the maintenance of good oral health, it is evident that they rarely educate their patients on the role of mouthwashes in oral health. This has been demonstrated by the knowledge gap that exists in the community. This study will be aimed at establishing the dentists' knowledge and attitude towards mouthwashes and their uses.
PROBLEM STATEMENT

Periodontal disease refers to any pathological process affecting the periodontal tissues. They are some of the most prevalent oral diseases in Kenya and the world over. Microorganisms in dental plaque are the main aetiological factors of periodontal disease.

Mouthwashes are used as adjuncts to mechanical methods in the removal of dental plaque. Out of the researchers own observation and literature review, it has been noted that most dentists have little knowledge on the important role of mouthwashes. This is because most dentists do not attend continuing dental education programmes and in this way they are not able to keep in touch with the latest developments in the field of dentistry regarding the use of mouthwashes. This has led to a knowledge gap among dentists which has been eventually passed on to the community. This is because for dentists to educate the community on use of mouthwashes, they have to have adequate knowledge and a positive attitude towards mouthwashes and their uses.

There is, therefore a need to establish the dentists’ current knowledge and attitude towards mouthwashes and their uses.

JUSTIFICATION OF STUDY

Many studies have been done worldwide to establish the role of mouthwashes in plaque control, however very little has been done in Kenya. Dentists have a major role to play in the maintenance of good oral hygiene in this country and by doing a study among them will enable the researcher to investigate, analyze and establish the overall knowledge and attitude towards mouthwashes and their uses.

The findings from the study may be used to formulate continuing dental health education programmes for the dentists. Improved awareness among dentists will eventually enhance patient education on the role of mouthwashes as agents of plaque control. This will lead to an overall improvement of the oral hygiene. The research will also fulfill part of the requirements for my degree in Dental Surgery.
STUDY OBJECTIVES

MAIN OBJECTIVE:

To determine the knowledge of and attitude towards mouthwashes and their uses among dental practitioners in Nairobi and Mombasa.

SPECIFIC OBJECTIVES:

1. To determine the knowledge on mouthwashes among dental practitioners
2. To determine the attitude of dental practitioners towards the use of mouthwashes
3. To describe the practices regarding mouthwash prescription.

HYPOTHESIS

1. All the dental practitioners in Nairobi know the active ingredients in the Listerine and Chlorhexidine mouthwashes.
2. All the dental practitioners prescribe mouthwashes to more than 50% of their patients.
3. More than 90% of the dentists prescribe Listerine to their patients for routine use.
4. Less than 30% of the dentists will recommend long-term use of mouthwashes.
5. 70% of the dental practitioners prescribe mouthwashes for gingivitis.
6. All the dentists advice their patients to use mouthwashes twice a day.

STUDY VARIABLES

Independent variables: -Gender of the dentists
-TYPE of practice
-The number of years in practice
-Specialty of the dentist

Dependent variables: -Knowledge of the active ingredients of mouthwashes
-Knowledge of the various brands of mouthwashes
-Attitude of dentists’ towards mouthwashes as agents of plaque control
MATERIALS AND METHODS

Study area
The study will be conducted in Nairobi and Mombasa.

Nairobi is the capital city of Kenya and also the largest commercial center in the country. It is a home to many industries and institutions. The city holds the largest number of dentists both in the private and public sector including Kenyatta National Hospital and University of Nairobi dental hospital, which are the major teaching, and referral hospitals in Kenya.

Mombasa is a coastal town located approximately 500kms from Nairobi. It is a portal town along the Indian Ocean. It is a major tourist, commercial and industrial center. The Coast Provincial hospital is located in this town.

Study population
It will include dentists practicing in Nairobi and Mombasa, both in the private and public sectors.

Study design
This will be a descriptive cross-sectional study among dentists practicing in Nairobi and Mombasa.

Sample size determination
The sample size will be computed from the formula:

1. \( n = \frac{z^2 \times p(1-p)}{c^2} \) where: \( n = \) sample size before use of second formula
   \( z = \) value
   \( p = \) prevalence
   \( q = 1-p \)
   \( c = 1 - \text{confidence level (0.05)} \)
   \( N = \text{Final sample size} \)

2. \( np = \frac{n}{1+n} \)

\( n = 1.96^2 \times 0.24 \times 0.76 \times 0.05 \times 0.05 = 280 \)
\( N = 280 \times 0.24 = 280 \)
\( N = 120 \)
Sampling methods
A list of the location of dentists will be obtained from the Medical Practitioners and Dentists board and owing to the small number of dentists; all the dentists practicing in Nairobi and Mombasa will be interviewed.

Inclusion criteria
1. All dental practitioners, both in private and public practice.

Exclusion criteria
1. Dental practitioners who are not willing to participate in the study
2. Dentists who are not based in either Nairobi or Mombasa
3. Recent migrants to the study areas
4. Dentists employed in other industries and therefore not engaged in clinical practice.

DATA COLLECTION INSTRUMENTS AND TECHNIQUES

Data collection instruments
A self-administered questionnaire will be used to collect information on the knowledge and attitude towards mouthwashes and their uses among the dental practitioners.

Data collection Techniques
The researcher will distribute the questionnaires among the dentists in Nairobi and collect them after one week while questionnaires to Mombasa will be distributed by an assistant then they will be collected and mailed back.

Ethical considerations
1. The names of the dentists’ will not be sought or recorded and the information in the questionnaires will be treated with utmost confidentiality.
2. The researcher will get approval from the Kenyatta National Hospital ethical committee to collect data.

Expected problems:
1. Misplacement of questionnaires by dentists
2. Lack of time to distribute the questionnaires
3. Identifying the location of various private clinics
Perceived benefits

1. Partial fulfillment of the degree of dental surgery
2. Assist the relevant authorities to establish the level of awareness of dentists on the use of mouthwashes as agents of plaque control and the data can be used in the formulation of dental health education programmes
3. This recent research information can be used to form the basis for future research on mouthwashes

Data analysis and Presentation

Data will be grouped according to the various variables and analyzed using the SPSS programme. The results will be presented in form of graphs, tables and charts.
## BUDGET

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QUESTIONNAIRE

This is an anonymous study to find out the knowledge and attitudes towards the use of mouthwashes among dental practitioners.

Please tick the appropriate answer or fill in the spaces provided with appropriate answers.

I wish to thank you in advance for taking time to complete this questionnaire.

DATE .................... LOCATION:

AGE ..................... SEX .....................

TYPE OF PRACTICE: a) Government hospital
                   b) Private practice
                   c) Learning institution

QUALIFICATION: 1. BDS only
                2. Specialist a) Oral maxillofacial surgery
                                 b) Periodontologist
                                 c) Paediatric dentist
                                 d) Prosthodontist
                                 e) Conservative dentistry
                                 f) Dental radiologist
                                 g) Others (specify)

1. How many years have passed since you qualified as a dentist?
   a) 1 -3 years
   b) 4-6 years
   c) 7-10 years
   d) More than 10 years

2. Have you heard about mouthwashes?
   a) Yes
   b) No
3. If yes what brands of mouthwashes are you aware of?
   a) Listerine
   b) Remidin
   c) Betadine
   d) Plax
   e) Oraldene
   f) Sonatec
   g) Others (specify)

4. Which of the following is the active ingredient in
   A) Remidin mouthwash
      a) Chlorhexidine digluconate
      b) Calcium hydroxide
      c) Essential oils
      d) Hydrogen peroxide
   B) Listerine mouthwash
      a) Stannous fluoride
      b) Povidine iodine
      c) Essential oils e.g. thymol
      d) Normal saline

5. Do you prescribe mouthwashes to your patients?
   a) Yes
   b) No

6. Approximately what percent of your patients on a given day would you prescribe
   mouthwashes to?
   a) Less than 10%
   b) 10%-30%
   c) 30%-50%
   d) More than 50%

7. For what conditions do you prescribe mouthwashes?
   a) Gingivitis
   b) Periodontitis
   c) Dental caries
   d) Bad breath
   e) Abscesses
   f) Mouth ulcers
   g) Stomatitis (viral, fungal)
   h) Any other (specify)
8. Do you have a particular brand that you prescribe to your patients?
   a) Yes
   b) No

   If yes, which one do you commonly prescribe?
   a) Listerine
   b) Remidin
   c) Betadine
   d) Oraldene
   e) Sonatec
   f) Plax
   g) Others (specify)..........................

9. Why do you prefer that particular brand?
   a) It has pleasant taste
   b) It has been shown by clinical trials to be effective
   c) It is cheap
   d) It is easily available
   e) Others (specify).........................

10. Do you prescribe mouthwashes to all the patients with
    a) Gingivitis     Yes     No
    b) Bad breath    Yes     No
    c) Peridontitis  Yes     No
    d) Dental caries Yes     No
    e) Mouth ulcers  Yes     No
    f) Stomatitis (viral, fungal) Yes     No
    g) Others (specify) ........................

11. In your opinion, do you think mouthwashes have a role to play
    a) In the inhibition of plaque formation
    b) In the inhibition of gingival inflammation
    c) In the inhibition of chronic periodontitis
    d) To aid healing of mouth ulcers
    e) In the relief of discomfort from stomatitis conditions
    g) All the above..............

12. How many times per day do you advise your patients to use the mouthwash?
    a) Once
    b) Twice
    c) Thrice
    d) Others (specify)......................
13. When do you advise your patients to use a mouthwash?
   a) Before brushing
   b) During brushing
   c) After brushing
   d) Others (specify) ....................
14. Do you think mouthwashes should be used routinely?
   a) Yes
   b) No

If no, why not?
   a) They have side effects
   b) They change taste perception
   c) They cause cancer
   d) They cause allergic reactions
   e) All the above
   f) Others (specify) ....................

15. Is long-term use of mouthwashes safe?
   a) Yes
   b) No

A) If yes, which mouthwash would you recommend for long-term use?
   a) Listerine
   b) Remidin
   c) Betadine
   d) Oraldene
   e) Plax
   f) Sonatec
   g) Others (specify) ....................

B) If no, why not?
   a) They cause oral cancer
   b) They leave extrinsic stains on the tooth surface
   c) They cause supragingival calculus
   d) All the above
   e) Others (specify) ....................