KNOWLEDGE, ATTITUDE AND UTILIZATION OF RUBBER DAM AMONG DENTAL PRACTITIONERS IN NAIROBI KENYA

A COMMUNITY DENTISTRY RESEARCH PROPOSAL SUBMITTED IN PARTIAL FULFILLMENT OF THE DEGREE OF BACHELOR OF DENTAL SURGERY AT THE UNIVERSITY OF NAIROBI

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DEFINITION OF TERMS

**Abrasion cavities** - cavities arising from traumatic tooth brushing affecting the cervical margins of teeth.

**Acid-etch technique** - a technique for bonding resin-based materials to the enamel of teeth. Applying phosphoric acid for 1 minute or more creates a porous surface.


**Fissure sealants** - a material that is bonded to the enamel surface of teeth to seal the fissure, in order to prevent dental caries.

**Micro-abrasion** - a procedure carried out using acids to remove intrinsic stains from discoloured teeth.

**Pulpectomies** - a procedure in which the whole pulp damaged by trauma or caries (commonly necrotic) is removed and the canal filled with an appropriate root filling material.

**Pulpotomies** - a procedure in which part of the pulp of a tooth damaged by trauma or caries is cut back and then covered with a medicament and restoration.

**Root canal treatment** - the procedure of removing the remnants of the pulp of a tooth, cleaning and shaping the canal inside the tooth and filling the tooth canal.
SUMMARY

Rubber dam is a thin sheet of rubber used for isolation of area of operation during dental procedures. Rubber dam usage has many advantages and dentists not using it risk suffering serious consequences. Some dental practitioners have inadequate knowledge on rubber dam and do not use it in their clinical practice. The aim of the study is to determine the knowledge, attitude and utilization of rubber dam among dental practitioners in Nairobi, Kenya.

It is expected that the knowledge the dentists possess rubber dam inadequate and the usage is low. The study will be carried out in Nairobi, Kenya. Among dental practitioners in both public and private practices. Socio-demographic characteristics being age, sex and duration of practice, independent variables being type of practice, year of graduation and school of practice and the dependent variables being knowledge, attitude towards and that use of rubber dam in clinical practice. It will be a descriptive cross-sectional study, which will involve 81 dental practitioners from both the public and private sector. Self administered semi structured questionnaires will be used to collect the data and the results will be analyzed using Statistical Package for Social Sciences (SPSS) and presented in forms of tables and graphs.

These results can be used by policy makers to arrange for continuing dental education programmes to enlighten dental practitioners on rubber dam and for the university to pay more attention to the teaching and emphasize rubber dam usage in clinical practice to ensure high quality dentistry is practiced. It is recommended that further studies be carried out involving larger samples and among dentists in other parts of the country.
1.0 INTRODUCTION

Rubber dam is a thin sheet of rubber that is placed over the teeth during dental treatment. It was discovered by Dr. Sanford Christe Barnum in Monticello, New York, USA, in 1864. The principle of rubber dam is that crowns of one or more teeth project through a sheet of rubber so that the dentist may work on them in isolation from the rest of the mouth.

Rubber dam comes in various colours, flavours and sizes. The sizes may be 5" by 5" or 6" by 6". Material used may be latex or latex free rubber and may be dark or light coloured. The dark colored rubber gives a better contrast while the light colored one provides illumination to the area of operation. Clamps used in the placement of rubber dam may be winged, wingless of different sizes and the latest development being the endo-illuminator clamp that illuminates the area of operation hence improving visibility.

The rubber dam is the most effective technique for moisture control and has revolutionized the control of moisture in restorative dentistry and it is rated as one of the most useful and essential tools we have in dentistry along with local anaesthetics. Since it provides effective isolation and also improves access to the operating site, it is indicated where moisture control and airway protection is essential for example root canal treatment and the acid-etch technique. It is also recommended where aseptic technique is important. Rubber dam is mainly used for composite restorations both anterior and posterior, endodontic treatment, fissure sealants, abrasion cavities and cervical lesions (glass ionomer cements, compomers) and it also plays a big role in pediatric dentistry with varied applications ranging from behaviour management to restorative treatment including pulpotomies, pulpectomies, adhesive restorations and micro-abrasion.
However, rubber dam is contraindicated in patients who are allergic to latex, patients who are mouth breathers and in children who are suffering from upper respiratory tract obstruction. Modifications can be made in cases where its use is absolutely indicated for example creating a window in the rubber dam to enable them to breathe.

Despite the ready availability of the rubber dam armamentarium, many dentists do not use it and risk serious consequences\(^4\). Several studies have been carried out worldwide to find out the percentage of dentists using the rubber dam and also to find out the reasons why some of them do not use it routinely. In UK it has been seen that less than one fifth of dentists always or frequently used rubber dam, whilst 60\% never used it. Major disincentives to the use of rubber dam included the perception that patients did not like it, that the National Health Service (NHS) fee was inadequate to justify its use, the fact that it took too long to apply and that dentists received inadequate training\(^5\). However, in Kenya the literature on this subject is very scarce.

Three commonly held misconceptions preventing widespread usage of rubber dam by dentists are; that the technique is both difficult, time consuming and that the patient may find the procedure uncomfortable\(^6,7\).

The aim of the study is therefore to find out the knowledge, attitude towards, and the utilization of rubber dam among the dental practitioners and more so to find out exactly why some of them do not use it in this era of increased emphasis on patient comfort and satisfaction, increased office productivity and for medico-legal purposes. The findings will also form part of the baseline data for future large-scale studies among Kenyan dentists.
LITERATURE REVIEW

Rubber dam use has many advantages, it provides effective isolation of the operating field, improves access to the operating site, is indicated where moisture control and airway protection is essential. It is also recommended where aseptic technique is extremely important. Rubber dam is mainly used for composite restorations both anterior and posterior, endodontic treatment, fissure sealants, abrasion cavities and cervical lesions (glass ionomer cements, compomers) and it also plays a big role in pediatric dentistry with varied applications ranging from behaviour management to restorative treatment including pulpotomies, pulpectomies, adhesive restorations and micro-abrasion.

Rubber dam application is important for endodontic therapy as it reduces contamination of pulpal tissue by microorganisms in saliva. Studies have been carried out worldwide to find out the percentage of dental practitioners using the rubber dam. Studies conducted in the UK revealed that in 1975, 5.3% of National Health Service (NHS) dentists used rubber dam always or frequently for endodontic procedure a figure that rose to 18.3% by 1990. This shows that there is an increase in the number of dental practitioners using the rubber dam. Apart from infection control issues, the practice of endodontics without a rubber dam is potentially dangerous, and legally indefensible. Regardless of age and qualifying school, less than one-fifth of dentists always or frequently used rubber dam, whilst 60% never used it. Major disincentives to the use of rubber dam included the perception that patients do not like it, that the NHS fee was inadequate to justify its use, the fact that it took too long to apply, and that dentists had received inadequate training. Hence it was found that the majority of UK Health Service dentists never used rubber dam isolation for endodontic treatment. 
Another study done in the US showed that 36% of dentists were performing endodontic therapy without first applying the rubber dam.

The use of rubber dam for endodontic treatment in New Zealand was analysed by a national survey of general dental practitioners. It was found that rubber dam was used routinely by 57% with its use increasing among practitioners graduating since 1969. A greater percentage of practitioners with less than 10 years experience used rubber dam than did more experienced practitioners.

Rubber dam increases the efficiency of the dentist and the quality of restorative work. A study done by Christensen et al showed that the use of the rubber dam not only boosts quality of restorations but also increases quantity of the restorative services because patients are unable to talk or expectorate when the rubber dam is in place. The study further showed that the operating field can only be maintained free of saliva and other contaminants with the dam in place, and the field is more accessible, airborne debris is reduced and patients feel more comfortable.

There is also convincing evidence of the importance of rubber dam use during resin bonding procedures. A study done by Bragi et al showed this. They used cotton wool isolation or rubber dam isolation in bonding resin composite buttons to facial enamel surfaces of teeth that were to be extracted. They found shear bond strengths to be significantly greater when rubber dam isolation was used. The same group using similar techniques showed that rubber dam isolation significantly reduced micro-leakage of the resin composite buttons bonded to etched enamel, and that salivary contamination may affect the bond strength provided by some dentine bonding systems.
Rubber dam reduces air contamination from the sprays of moisture and saliva and its use would significantly minimize the inhalation of infective aerosols by dental personnel. A study was done to ascertain the efficacy of rubber dam isolation in controlling atmospheric bacterial contamination when conservative pedodontic procedures were performed. There was significant reduction in bacterial contamination of the atmosphere in the clinic when rubber dam isolation was used.\textsuperscript{14}

Rubber dam significantly reduces the chances of the patient inhaling or swallowing dental instruments. A situation which if it occurs may lead to a legal suit being filed against the dentist. A case study showed an incidence whereby a patient swallowed a file during an endodontic procedure being carried out on her. She complained of abdominal pain, constipation, elevated temperature and signs of peritoneal irritation. In addition she complained of emotional trauma. A complaint was made to the Ministry of Health by the patient and the matter is still under investigation. What is known is that the dentist did not use the rubber dam during the endodontic procedure.\textsuperscript{4}
3.1 STATEMENT OF THE PROBLEM

Usage of rubber dam has many advantages and it enables high quality dentistry to be carried out. Dentists not using the rubber dam risk suffering serious consequences, as not using it is legally indefensible. In addition not using it increases the risk of cross infection through aerosols and risk of injury to the patient by swallowing or aspiration of endodontic instruments. Knowledge on the importance and advantages of rubber dam use is minimal, thus dentists have a negative attitude towards it and so the number of dentists using the rubber dam for conservative and pediatric dentistry is low.

3.2 JUSTIFICATION OF THE STUDY

Various studies have been carried out worldwide to find out the usage of rubber dam among dental practitioners, however, in Kenya data on the subject is scarce. This study will be useful in dentist education on the advantages of rubber dam use and may thus enable them to change their attitude towards it. The results may also be used by policy makers to arrange for continuing dental education programmes to enlighten the dentists on the importance of rubber dam use in their clinical practice. It may also form a baseline for future studies.
3.3 OBJECTIVES

Main objective
To determine the knowledge, attitude and utilization of rubber dam among dental practitioners in Nairobi, Kenya.

Specific objectives
1) To determine the knowledge of dentists on the rubber dam
2) To determine attitude of dentists towards the usage of rubber dam
3) To determine the utilization of rubber dam among the dentists

3.4 VARIABLES

Sociodemographic variables
1) Age
2) Sex
3) Years of practice

Independent variables
1) Type of practice
2) Year of graduation
3) School of study
4) Additional training on use of rubber dam

Dependent variables
1) Knowledge on the rubber dam
2) Attitude towards the usage of rubber dam
3) Utilization of the rubber dam in conservative and pediatric dentistry
3.5 HYPOTHESIS OF THE STUDY

The dental practitioner in Nairobi, Kenya has poor knowledge on rubber dam, has a negative attitude towards it and thus does not utilize it in his practice of conservative and pediatric dentistry.
MATERIALS AND METHODS

4.1 STUDY AREA

Nairobi is the capital city of Kenya, situated at an elevation of 1660m above sea level (5450ft) in the highlands of southern part of Kenya. Nairobi is Kenya’s principal economic, administrative and cultural center and is one of Africa’s fastest growing cities. Oral health services are provided in the public and private hospitals including dental clinics. The main hospitals include: University of Nairobi Dental Hospital and Kenyatta National Hospital Dental Unit.

4.2 STUDY POPULATON

All practicing dentists in Nairobi, Kenya.

4.3 INCLUSION CRITERIA

1) Practicing dentists
2) Co-operative dentists who give an informed consent

4.4 EXCLUSION CRITERIA

1) Un co-operative dentists who will not give consent
2) Non-practicing dentists

4.5 STUDY DESIGN

The study will be a descriptive cross-sectional study.
4.6 SAMPLE SIZE DETERMINATION

\[ N = Z^2 p(1-p)/c^2 \]

\[ N = 1.96^2 \times 0.183 \times (1-0.183)/(1-0.95)^2 \]

\[ N = 229.74 \text{ an approximate value 230 dentists} \]

\[ N = \text{sample population} \]

\[ Z = \text{significant value of 95%} \]

\[ P = \text{prevalence } p=18.3\% \]

\[ C = \text{1-confidence level (95%)} \]

But since population size is less than 1000, use sampling formula

\[ 1+n/N = n/f \]

\[ 230/1+230/125 = 81 \text{ dentists} \]

The actual sample size will be chosen as a convenient sample subject to established lists of contacts and location of dentists available.

4.7 DATA COLLECTION TECHNIQUE

Self-administered semi-structured questionnaires with data related to knowledge, attitude and utilization of rubber dam among dental practitioners will be distributed and collected manually by the researcher. The questions will be self designed, structured with both closed and open ends. The questionnaires will feature on personal details, knowledge, use and attitude towards rubber dam. The questionnaires will be pre-tested and necessary adjustments done.
4.8 DATA ANALYSIS

The questionnaires will be coded and processed using the statistical package for social sciences (SPSS). Descriptive analysis will be used to describe the data.

4.9 ETHICAL CONSIDERATIONS

The proposal will be submitted to the Kenyatta National Hospital ethical committee for approval. Permission will be sought from relevant authorities. Consent and approval will be sought and respondents treated anonymously. All information will be treated with utmost confidentiality and accuracy.

4.10 ANTICIPATED PROBLEMS

1. Unco-operative dentists
2. Time constraints
3. Financial constraints

4.11 PERCEIVED BENEFITS OF THE STUDY

1) Gained knowledge on the reasons why dentists in Nairobi do not use rubber dam in their clinical practice. Information will be passed on to dentists to motivate them to use the rubber dam in their clinical practice.

2) Results of the study will be useful for further research on the utilization of rubber dam among dental practitioners.

3) The results will be used as a guide for dental schools to make arrangements and changes in the curriculum so as to enhance the usage of rubber dam in clinical practice.

4) Results of the study will be of use to policy makers to arrange for continuing dental education programmes on rubber dam.

5) Partial fulfillment of the Bachelors Degree in Dental Surgery at the University of Nairobi.
REFERENCES


2) Gerland. Control of the operative field Fundamentals of operative dentistry. 109


5) J M Withworth, G V Seccombe, K Shoker and J G Steele. Use of rubber dam and irrigant selection in UK general dental practice.


## APPENDIX I

### BUDGET

#### PROPOSAL DEVELOPMENT

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#### PROJECT DEVELOPMENT

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APPENDIX II

QUESTIONNAIRE
PLEASE PLACE A TICK ON THE APPROPRIATE ANSWER.

SECTION A

1) Sex
   i) Female
   ii) Male

2) Level of training
   i) BDS
   ii) Others (please specify) ..................

3) Specialization
   i) Paediatrics
   ii) Periodontology
   iii) Conservative
   iv) Oral and maxillofacial surgery
   v) Prosthetics
   vi) Orthodontics
   vii) Oral pathology
   viii) Public health
   ix) Others (Please specify) .................

4) Institute of undergraduate training
   i) University of Nairobi, Kenya
   ii) Others (Please specify) .................

5) Number of years of clinical practice.
   i) 1-5 yrs
   ii) 5-10 yrs
   iii) 10+ yrs

6) Institute of practice
   i) Public hospital
   ii) Private hospital
   iii) Teaching hospital
   iv) Others (Please specify) .................
SECTION B

1) Where did you learn about rubber dam?
   i) Undergraduate level
   ii) Postgraduate level
   iii) In a continuing dental education (C.D.E)
   iv) In a conference

2) What is your current source of information on the Rubber Dam?
   i) Journals
   ii) Text books
   iii) Continuing dental education (C.D.E)
   iv) None
   v) Others specify

3) How many sizes of Rubber Dam do you know of?

4) What are the components of the Rubber Dam armamentarium?

5) In your opinion, what are the advantages of using Rubber Dam for restorative procedures?

6) Do you use rubber dam in your clinical practice?
   i) Yes
   ii) No

   If yes... go to 7
   If no... go to 16

7) How often do you use Rubber Dam in your clinical practice?
   i) Occasionally
   ii) Routinely/ Regularly
   iii) Always
8) For which age groups do you use Rubber Dam?
   i) 3-12 yr old
   ii) 12-18 yr old
   iii) 18 yrs and above
   iv) All age groups

9) For what procedures do you use rubber dam in your clinical practice?
   i) Composite Restorations
   ii) Endodontic Treatment
   iii) Fissure sealing
   iv) Class V restorations
   v) Pulpotomies
   vi) Pulpectomies
   vii) Restorative treatment for paediatric patients
   Others (please specify)..................

(may tick more then one reason)

10) Approximately how long does it take for you to apply the Rubber Dam?...............

11) Would you consider the application of rubber dam as time consuming?
   i) Yes
   ii) No

12) How would you rate the ease of placement of rubber dam?
   i) Very difficult
   ii) Difficult
   iii) Easy
   iv) Very easy

13) How would you rate your patient's acceptance of the usage of Rubber Dam?
   i) Good
   ii) Average
   iii) Poor

14) Comment on the cost of Rubber Dam
   i) Very expensive
   ii) Moderately expensive
   iii) Not expensive
15) Do you find any difficulty in procuring rubber dam and other rubber dam accessories?
   i) Yes
   ii) No

Go to............Q17

16) Why don’t you use Rubber Dam in your clinical practise
   i) Time consuming when applying
   ii) Difficulty of placement
   iii) Patient rejection
   iv) Difficult to procure and unavailability
   v) Expensive
   vi) Others (please specify).....................

(May tick more than one reason)

17) There is a reason for the profession to enhance the use of Rubber Dam in clinical practice. I
   i) Agree
   ii) Disagree

18) There need for more education on Rubber Dam. I
   i) Agree
   ii) Disagree

Thank you.