

**DENTAL CARIES STATUS AND ORAL HEALTH BEHAVIOUR AMONG
UNDERGRADUATE DENTAL STUDENTS IN NIGERIAN UNIVERSITIES**

BY

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MATRICULATION NUMBER: 176559

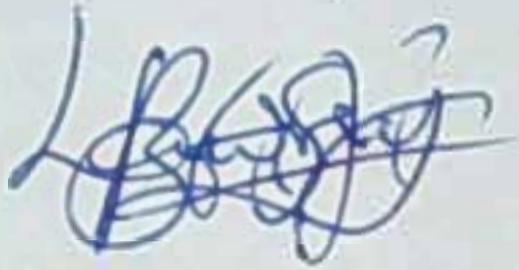
**A PROJECT SUBMITTED TO THE DEPARTMENT OF EPIDEMIOLOGY AND
MEDICAL STATISTICS, FACULTY OF PUBLIC HEALTH, COLLEGE OF
MEDICINE, UNIVERSITY OF IBADAN**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF
MASTER OF SCIENCE DEGREE IN EPIDEMIOLOGY AND MEDICAL STATISTICS**

FEBRUARY 2015

DECLARATION

I hereby declare that this work is original and has neither been presented to any other faculty for the purpose of the award of a degree nor has it been submitted elsewhere for publication.

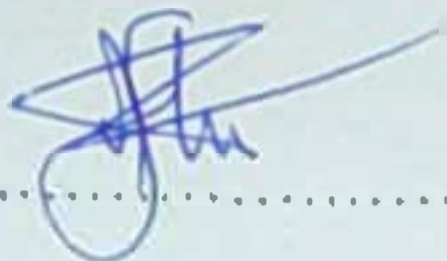


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CERTIFICATION

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DEDICATION

This work is dedicated to my dear wife, Violet and to my highly treasured children: Destiny, Divine and Diamond.

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ACKNOWLEDGEMENTS

I give glory, honour and praise to the Almighty God for His protection throughout the period of this program. I would like to wholeheartedly thank my project supervisors: Dr. Olufunmilayo I. Fawole, Dr. Oyindamola B. Yusuf and Dr. Onoja M. Akpa. Not only have they closely supervised this research project, they have provided a delightful mix of expertise, friendship and support that made this work possible. I thank Mr. Afolabi Nathaniel of the Department of Epidemiology and Medical Statistics for his contribution in the analysis of this work. I also appreciate all my teachers in the faculty of public health who contributed to broadening my horizon in Epidemiology and Medical Statistics. I acknowledge my colleagues who assisted in the data collection, notably: Dr. Bash Braimoh, Dr. Ben Akhiwu, Dr. Basil Ojukwu, Dr. Eloghosa Ogbomwan, Dr. Onisoman Oba Azah, Dr. Luke Ayewoh, Dr. B. Ogiemwonyi, Dr. (Mrs) Eniola Pemu, Dr. Uche Amaechi and Dr. Emeka Nwabuoku. I thank my research assistant, Oluwatosin Agboola for her contribution, especially for typing the major part of this work. I also remember and sincerely thank Prof. Alice Umweni (Dean, School of Dentistry, University of Benin) and Dr. E. Ogbeide (HOD, Dept. of Oral Diagnosis and Radiology, School of Dentistry, University of Benin) for their encouragement during the course of this program. My appreciation also goes to my course mates: Dr. Akinola, Dr. Soyinka, Dr. Tope, Tunde, Evelyn, Martins, Bimbo and Omosefe, for their immense contribution to the success of this program. My special thanks go to my dear wife, Violet and my lovely children: Destiny, Divine and Diamond.

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LIST OF ABBREVIATIONS

BMI	Body mass index
BUK	Bayero University, Kano
DMFS	Decayed missing and filled surfaces
DMFT	Decayed, missing and filled teeth
F/DMFT	Filled component of DMFT
FDI	Federation Dentaire Internationale (World Dental Federation)
IADR	International Association for Dental Research
NYSC	National Youth Service Corps
OAU	Obafemi Awolowo University
OHRQL	Oral Health Related Quality of Life
SPSS	Statistical Package for Social Sciences
UI	University of Ibadan
UNIBEN	University of Benin
UNILAG	University of Lagos
UNIPORT	University of Port Harcourt
WHO	World Health Organization
HOD	Head of Department

ABSTRACT

Background

Dental caries is the most common disorder affecting the teeth. Evaluation of dental caries status provides an opportunity to acknowledge the oral health status of an individual or population. Today's undergraduate dental students are providers of dental services in future and will be responsible for the public's oral health education and oral health status. Hence this study was designed to evaluate the dental caries status and oral health behaviour among undergraduate dental students in Nigerian Universities.

Methods

The study was a cross sectional survey involving the use of a multi-stage sampling technique to select 812 undergraduate dental students from six Universities namely UI, UNIBEN, UNILAG, OAU, UNIPORT and BUK. Information on socio-demographic characteristics and oral health-related knowledge, attitudes and behaviour of the students were collected using a well-structured, self-administered questionnaire. A section of the same questionnaire was interviewer-administered to collect information on the number of decayed, missing and filled teeth (DMFT) in the students' mouths. The DMFT index was used to assess the dental caries status. Data were analyzed using descriptive statistics, Chi-square test and binary logistic regression at 5% level of significance.

Results

The mean age of the respondents was 22.0 ± 3.0 years. Many of the students (57.9%) were between 20 and 24 years, 28.1% were from UNILAG and 17.7% were 300 level students. The overall prevalence of dental caries among the participants was 24% and the median DMFT score was 0.0, with a range of 0.0 – 8.0. Of the 20 questions used to assess the knowledge of oral health of the students, the mean knowledge score was 15.0 ± 3.6 . Of the 13 questions used to assess the students' attitudes toward oral health, the mean attitude score was 10 ± 1.8 . Of the 16 questions used to assess the students' oral health practices, the mean practice score was 8.7 ± 1.9 . Oral health behaviour was influenced by age ($p=0.04$), study level ($p<0.0001$) and knowledge of oral health ($p<0.0001$) of the students. Those in 200 level were 7.2 times less likely to practice good oral health compared to the 600 level students (OR = 0.14, 95% CI = 0.06 – 0.34). The students' dental caries status was influenced by location of study ($p<0.0001$), and parents' highest educational level ($p<0.05$). OAU students were 3 times less likely to have dental caries compared to BUK students (OR = 0.34, 95% CI: 0.15 – 0.76). Participants whose fathers had no formal education were 13 times more likely to have dental caries compared to participants whose fathers had tertiary education (OR = 13.308, 95% CI: 2.25 – 78.87).

Conclusion

The knowledge of oral health and the attitudes toward oral health among the Nigerian undergraduate dental students were good, but their oral health behaviour was only just fair. Although their dental caries status was very good, bad oral health practices and dietary habits are likely to worsen the status. As part of their curriculum therefore, dental students should start learning about preventive aspects of oral health as early as their first year in the university.

Key words: Dental caries status, Oral health behaviour, Undergraduate dental students, Nigeria.

Word count: 480

CHAPTER ONE

INTRODUCTION

1.1 Background

Oral health has been defined as the 'standard of health of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general well-being (Dept. of Health, 2005). Diseases of the mouth therefore could be dental or non-dental; Dental diseases are exemplified by dental caries while non-dental diseases are exemplified by periodontal diseases which include gingivitis and periodontitis. Some other dental diseases are orthodontic problems, traumatized teeth and tooth discoloration. Other non-dental diseases include oral tumours, signs of nutritional diseases and manifestations of systemic diseases.

Dental caries and periodontal disease are the two major oral health problems in Nigeria (Sheiham, 2005), while others include malocclusion, traumatized anterior teeth, dental fluorosis and cancrum oris (noma). In this study, oral health related knowledge, attitudes and behaviour (practices) were based on dental caries and periodontal diseases, being the major oral health problems and in keeping with international standards, as recommended by World Health Organization (Petersen, 2009). The dental caries status was assessed using the decayed, missing and filled teeth (DMFT) index, which is the universally employed index for measuring dental caries status (World Health Organization, 1997; Bratthall, 2000; Hiremath, 2011). The DMFT index measures the total lifetime caries status. It is used to denote the decayed, missing and filled teeth. Therefore DMFT index quantifies the dental caries status in terms of the number of decayed teeth with untreated caries lesion, i.e. (D) component of DMFT and the number of teeth,

which have been lost due to caries, i.e. (M) component of DMFT as well as the number of filled teeth present, i.e. (F) component of DMFT (Hiremath, 2011). The DMFT values were interpreted according to DMFT scoring scale. According to this scale, a DMFT value in the range 0-4 is considered low caries status, the value in the range of 5-9 is moderate caries status and value greater than 9 is high caries status (Farsi, 2008).

Dental students are generally motivated to maintain good oral health. Researchers have found the oral health attitudes and behavior of students to be different in preclinical and clinical years (Dagli et al, 2008). Therefore, evaluation of their caries status will provide an opportunity to acknowledge their oral health status. A study of their dental caries status and oral health-related knowledge, attitudes and behaviour during their training could be of great value, since they are the ones who will apply their knowledge to patients and improve the treatment process during their own practices (Nadeem et al, 2011). Hence this study was designed to evaluate the dental caries status and oral health behaviour (practices) among undergraduate dental students in Nigerian universities. Through this study, I have tried to update the accumulating data worldwide in keeping with the international trend on the impact of knowledge, attitudes and other determinants on dental students' own oral health status and behaviour.

1.2 Problem statement

It is a well-known and established fact in dental literature that dental caries is the most common disorder affecting the teeth (Petersen, 2009; Akpabio, 1996; Ogundele & Ogunsile, 2008). Periodontal disease, including gingivitis and periodontitis, is considered to be one of the most common diseases among population and, if left untreated, can lead to tooth loss (Williams, 2008).

Oral diseases are clearly related to behaviour (Yildiz and Dogan, 2011) and the prevalence of dental caries and periodontal diseases has decreased with improvements in oral hygiene and a decrease in the consumption of sugar products (Yildiz and Dogan, 2011). This general favorable trend in reducing dental caries, however, has not been seen in many developing countries like Nigeria. Instead, the prevalence of oral diseases is on the increase in Nigeria (Umesi & Savage 2002, Kwan & Petersen, 2004).

Oral diseases and related treatment experience were found to measurably affect the oral health related quality of life (OHRQL) of children and their families (Kalsbee et al, 2000). Numerous measures have been developed in recent years to assess the effect of oral health problems on individual's physical, mental and social well-being (Taani, 2002). The health of the teeth and mouth is linked to overall health and well-being in a number of ways (Taani and Alhaija, 2003). The ability to chew and swallow food is essential for obtaining the nutrients needed for good health. Apart from the impact on nutritional status, poor dental health can also adversely affect speech and self-esteem. Dental diseases impose both financial and social burdens as treatment is costly and both children and adults may miss school or work because of dental pain and time spent on treatment. Thus untreated tooth decay can cause pain and infection that can lead to problems with nutrition, growth, school attendance and speech problems (Bjarnason, 1998).

Good oral health is the responsibility of individuals, communities and governments although their relative contributions vary. For example in some European countries and most African countries, like Nigeria, public water fluoridation is not yet implemented and so responsibility of preventing tooth decay lies largely with the individual (Bjarnason, 1998). Dental professionals play an essential role in monitoring oral health, treating and preventing oral diseases. Access to good care, including regular check-ups is vital. For some people, especially those from lower

socio-economic group, access to dental professionals may be limited. This group is an important target for oral health education programs. In developed countries, schools also play an important role in educating children on the importance of good oral hygiene and diet.

The realization of this basic fact was the reason why recommendations were made by the World Health Organization, at the Ottawa chapter, for oral health promotion. Oral health promotion is any planned effort to build healthy public policies, create supportive environments, strengthen community action, develop personal skills or reorient health services in the pursuit of oral health goals (WHO, 1986).

1.3 Justification

Dental health is a very individualized concept, the perception of which is very much affected by individual's culture and socioeconomic status (Dagli et al, 2008). The attitudes of people toward their own teeth, and attitudes of dentists who provide dental care, play an important role in determining the oral health condition of the population. Dental health professionals have an important role to play in the improvement of the public's oral health status. Today's undergraduate dental students are providers of dental services in future and will be responsible for the public's oral health education and oral health status (Dagli et al, 2008). Evaluation of their dental caries status will provide an opportunity to acknowledge their oral health status (Dagli et al, 2008).

The dental student becomes a role model for better dental health status to their families, patients and friends by choosing a dental curriculum at undergraduate level (Dagli et al, 2008). One of the main objectives of dental education is to train students who can motivate patients to adopt

good oral hygiene (Cortes et al, 2002). They are more likely to be able to do this if they themselves are motivated (Cortes et al, 2002). Moreover, dental students should be able to apply this knowledge and attitudes to their own dental care (Yorty, 1999). Their training would require knowledge of their oral health behaviour and dental health status. A study of dental students' own dental caries status and oral health-related knowledge, attitudes and behaviour during their training could be of great value, since they are the ones who will apply their knowledge to patients and improve the treatment process during their own practices (Nadeem et al, 2011). There is scarcity of reported studies on dental caries status and oral health behaviour among undergraduate dental students in Nigeria. Hence this study was designed to evaluate the oral health behaviour and dental caries status among undergraduate dental students in Nigerian Universities.

To evaluate the dental caries status among students, DMFT index is used. This is the universally employed index for measuring dental caries status (World Health Organization, 1997; Bratthall, 2000; Hiremath, 2011).

1.4 Research Questions

1. What is the prevalence of dental caries among dental students in Nigerian Universities?
2. What is the experience of dental caries (mean DMFT score) among the students?
3. What is the grade of knowledge of oral health among the students?
4. What is the grade of attitudes toward oral health among the students?
5. What is the oral health practice grade among the students?
6. What factors influence oral health behaviour and dental caries status among the students?

7. What is the relative importance of each factor in determining oral health behaviour and dental caries status among the students?

1.5 Broad Objective

To assess the determinants of preventive oral health behaviour and dental caries status among dental students in Nigerian Universities

1.6 Specific Objectives

1. To determine the dental caries status among dental students in Nigerian Universities
2. To assess the knowledge of oral health among the students
3. To assess the students' attitudes toward oral health
4. To describe the students' oral health related behaviour or practices
5. To identify the factors influencing oral health behaviour among the student
6. To identify the factors influencing dental caries status among the students

CHAPTER TWO

LITERATURE REVIEW

The FDI and WHO jointly established the first global oral health goals in 1981 which were to be achieved by the year 2000 (Thorsten, 1983). A review of these goals, carried out just before the end of the deadline, established that many countries achieved or exceeded the goals but for a significant proportion of the world's population, it remained only a remote aspiration (Nurelhuda et al, 2009). One of the goals set was that by the year 2000, the global average for dental caries should be no more than 3 DMFT (decayed, missing, and filled teeth) at 12 years of age (Thorsten, 1983). Thereafter, global oral health goals were also established in 2003 by FDI, WHO and IADR, to be achieved by the year 2020. One of the target oral diseases is dental caries in which the objectives were to increase the proportion of caries free 6-year-olds by X%, to reduce the DMFT particularly the D component at age 12 years by X%, with special attention to high-risk groups within populations, utilizing both distributions and means, and to reduce the number of teeth extracted due to dental caries at age 18, 35-44 and 65-74 years by X% (IDJ, 2003)

The statistics available in Nigeria show that there is a low value of DMFT (lower than expected globally) but it is gradually on the increase (Adegbembo et al, 1995). A study carried out in 2002, in Egor district, Nigeria (Okeigbemen, 2004), showed that DMFT scores at ages 12, 13, 14 and 15 were 0.51, 0.63, 0.78, and 0.66 respectively. It also showed that 8.14% of the school children had never visited a dental clinic and that 87.5% regularly consumed snacks. The study revealed poor oral health practices. It concluded that although the prevalence of caries in the

district is very low, poor dental practices and dietary habits are likely to increase this prevalence.

It stressed the need for continuous monitoring and establishment of preventive programmes.

2.1 Epidemiologic Surveys on Dental Caries Status and Knowledge, Attitudes and Practices of Oral Health among Undergraduate Dental Students

Several researchers have investigated the attitudes and behaviors of undergraduate dental students regarding their oral health habits (Neeraja et al, 2011; Motoko et al, 2002; Badovinac et al, 2013; Lavanya et al, 2012; Al- Swuailem et al, 2014; Salman et al, 2014; Dogan, 2013). Some of these studies compared the oral health attitudes and behaviours of the dental students with those of dental hygiene students (Motoko et al, 2002), nursing students (Dogan, 2013) and staff in a dental college (Lavanya et al, 2012). Sato et al investigated the effects of dental education on oral health related attitudes and behaviour among dental students (Sato et al, 2013). In the same year, Folayan et al studied the determinants of preventive oral health behaviour among senior dental students in Nigeria (Folayan et al, 2013). The relationship between dental health behaviour, oral hygiene and gingival status of dental students has been investigated (Rahman & Kawas, 2013).

Several other researchers in different countries of the world have assessed the oral health status of undergraduate dental students (Al-Mashhadani & Hashim, 2006; Mathur et al, 2008). Motoko et al looked at the relationship among eating habits, lifestyle and oral health status of students of dental and dental hygiene schools in Tokyo medical and dental university (Motoko et al, 2002). In a survey among undergraduate dental students, DMFT index was determined (Umerubab et al, 2013).

2.1.1 Dental Carries Status

In 2013, Umeribab et al investigated the dental caries status among the undergraduate dental students of Lahore medical and dental college in different professional years of dentistry (Umeribab et al, 2013). The overall mean DMFT score was 1.38 ± 0.54 with decay (D) component of 0.54 ± 0.62 , missing (M) component of 0.01 ± 0.10 and filled component of 0.83 ± 0.68 . Al- mashhadani and Hashim in a study in 2006 revealed that the overall mean DMFS among the dental students in Ajman University was 8.5 ± 6.8 (Al- mashhadani and Hashim, 2006). The mean DMFT score among undergraduate dental students in a dental institution in India was found by Mathur et al to be highest (1.70) for the first year students and lowest (1.30) for the second year students (Mathur et al, 2008).

In 2007, Ma et al observed the dental carries prevalence among undergraduate University students to be about 48% (Ma et al, 2007). The average decayed teeth were 1.29 and the female students showed significant higher caries rate than the male students. Three years later, Chang et al reported the caries experience (DMFT index) of the male and female undergraduate Japanese students to be 4.8 and 5.0 respectively (Chang et al, 2010). In the same study they also reported the DMFT index of the male and female undergraduate Taiwanese students to be 5.9 and 8.0 respectively.

2.1.2 Knowledge of Oral health

In 2011, Neeraja et al reported the overall knowledge of oral health to be good, even though there were deficits in knowledge in a few areas, among a group of dental student in Bangalore, India (Neeraja et al, 2011). One year later, Baseer et al in a comparative study, reported that doctors showed a high mean knowledge as compared with other health professionals ($P < 0.005$) (Baseer

et al, 2012). Al- Ansani et al in 2003 did a study on oral health knowledge and behavior among male health science college students in Kuwait (Al-Ansani et al, 2003). Results showed that oral health knowledge seemed to be limited and very few background factors were associated with it.

In 2013, Al- Zarea evaluated the levels of oral health knowledge of periodontal disease among dental students of Al-Jouf university, Saudi Arabia (Al-Zarea, 2013). Participants showed poor knowledge of causes, signs, symptoms, and preventive measures of gum disease. The level of study had no relationship with students' knowledge of the initiating factors of periodontal disease ($P > 0.05$), but had a significant relationship with the knowledge of periodontal diseases signs, preventive measures and relations to general health and systemic diseases ($P < 0.05$). Students from scientific disciplines had more knowledge of periodontal diseases' causes, preventive measures and relations to general health and systemic disease ($P < 0.05$) than those from humanity disciplines. The study concluded that there were significant differences in oral health knowledge regarding periodontal disease among students from different levels of studies and different disciplines. It was also found in another study among students attending the university of Dar es Salaam, Tanzania, that 58% of the participants stated that the purpose of using fluoride was prevention of caries (Dalum and Lennartsson, 2011). The majority answered that bacterial and sugar in relation to caries were significant. The study concluded that the student showed good knowledge concerning oral diseases and its prevention but gaps in knowledge concerning underlying factors.

Among diverse university students with access to free dental care (Al-Batayneh, 2014), it was found that 90.1% considered tooth brush an oral hygiene aid and 91.1% thought fluoride was beneficial to teeth and almost 80% students believed smoking has harmful effect on oral health.

Oral health knowledge among the university students was poor.

2.1.3 Attitudes toward Oral Health

Neeraja et al studied the oral health attitudes and behavior among a group of dental students in Bangalore, India (Neeraja et al, 2011). Significant differences ($P < 0.05$) were observed among students of different years in the degree of worrying about the color of the teeth, not having been to the dentist before and brushing each teeth carefully. The oral health attitudes of the dental students improved with increasing level of education. In a study among health professionals in King Fahad Medical city, Riyadh (Baseer et al, 2012), the attitude towards visit to the dentist varied; 52.7% of nurses and 50% of technicians said that they would like to visit the dentist regularly. About sixty seven percent (66.7%) of the medical students visit the dentist whenever they have pains in their teeth. About fifty five percent (54.5%) doctors and 45.8% pharmacists were likely to visit the dentist occasionally. Majority of the health professionals said that the fear of drilling was the main reason for avoiding the dentists. Overall, they showed a positive attitude towards professional dentist care.

Dogon assessed the differences in oral health attitudes between dental and nursing students (Dogon, 2013). The result of the study showed that the nursing students were significantly more concerned about the appearance of their teeth and gums compared to dental students ($P < 0.001$). The percent of agree response to worrying less about visiting dentist ($P < 0.001$), and postponing to go to dentist until they had toothache ($P < 0.001$) were higher in nursing students than in dental ones. In the same year, Sato studied the effect of dental education on Peruvian dental students' oral health related attitudes and behavior (Sato et al, 2013). The curriculum in this dental school in Peru resulted in more positive oral health related attitudes among year-5 dental students compared to year-1 students. Compared to year-1 students, year-5 dental students were more likely to agree with questions such as: "I think I can clean my teeth well without using toothpaste

(OR= 0.24, 95%CI:0.01 - 0.58); “I have used a dye to see how clean my teeth are” (OR=0.19, 95%CI: 0.10 - 0.36) and “I have had my dentist tell me that I brush very well” (OR=0.34, 95%CI: 0.17 - 0.69).

Rahman and Kawas found gender to be the major factor influencing attitudes toward oral health in a survey of dental students in the United Arab Emirates (Rahman & Kawas, 2013). Female dental students show a significantly better attitude than their male colleagues as was also reported in other studies (Al-Omari & Hamasha , 2005; Al- Washadni et al, 2004; Petersen et al, 2004; Kawamura et al, 2000).

2.1.4 Oral Health Behaviour

In 2006, Al- Mashhadani and Hashim determined the oral health habits among final year dental student in Ajman University (Al-Mashhadani and Hashim, 2006). The univariate analysis showed that 67.3% consume sugar containing food once daily, 54.4% brush their teeth twice a day, 70.3% used other methods for cleaning their teeth apart from tooth brush, 88.2% visited the dentist during the last year. In addition the bivariate analysis revealed that there were significant association between DMFS score and students nationality, frequency of eating/day, frequency of brushing, using other methods of tooth brushing and making dental visits. Rahman and Kawas in a study of the dental students in the United Arab Emirates reported that 56% mentioned that they used dental floss regularly and 86% brush twice daily or more (Rahman and Kawas, 2013). Female students had better dental care behavior than male students.

In a study among health professionals (Baseer et al, 2012), 66.7% of the medical student visit the dentist whenever they have pains in their teeth and 54.5% doctors and 45.8% pharmacists were likely to visit the dentist occasionally. Almost all the health professionals said that they

cleaned their teeth by tooth brush and tooth paste. Less than 50% of the health professionals use mouth wash and dental floss. Less than 10% used Miswak and toothpick as part of their oral hygiene aids. In another study (Al-Ansani et al 2003) among male health science college students, more than half of the student had visited a dentist during the previous 12 months, but only one third of the student were brushing twice a day or more often.

Among diverse University students with access to free dental care (Al-Batayneh et al, 2014), it was found that nearly half of the sample reported twice daily tooth brushing, one third receive regular dental checkup and half visited the dentist because of the pain or bleeding gum; fear was the main reason for not visiting. Female primarily visited the dentist for aesthetic reasons (70%) and males upon complaints (59.8%). Oral health practices among the university students were poor. It was also found in another study among students attending the University of Dar es Salaam (Dalum and Lennartsson, 2011) that tooth brush was the dominant cleaning aid and the usage of fluoride tooth paste was fairly high among the students.

Lavanya et al investigated the oral hygiene practice and habit among dental students and staff in a dental college in India (Lavanya et al, 2012). It was found that only 34.99% students and faculty member are following oral self-health habit strictly. It was also observed that the staff members were very much concerned about oral hygiene rather than students were. Dogon assessed the differences in oral health attitudes between dental and nursing students (Dogon, 2013). The results of the study showed that the nursing students were significantly more concerned about the appearance of their teeth and gums compared to dental students ($P < 0.001$).

The percent of agree response to worrying less about visiting dentist ($P < 0.001$), and postponing to go to dentist until they had toothache ($P < 0.001$) were higher in nursing students than in dental ones. More dental students compared to nursing students used a tooth brush with hard bristles

($P= 0.004$), child- sized tooth brushes ($P<0.001$), brush each end of their teeth carefully ($P= 0.006$) and had used a dye to see how clean their teeth were ($P< 0.001$).

Udoye and Aguwa investigated the oral health related knowledge and behavior among nursing students in a Nigerian Tertiary Hospital (Udoye and Aguwa, 2008). The result showed that, from oral health knowledge variables, only level of study, knowledge of calculus and orthodontics and role of fluoride in caries aetiology were significant. However, no oral health behavior variable was significantly associated with oral health knowledge. About 11.0% of the respondents had visited the dentist within the last 12 months as against 68% that had never. About 53% brushed once daily, 43% brushed more than once a day and 2.7% brushed occasionally. In another study (Shanmugavel and Shive, 2010), it was found that 60.5% of the participant visited a dentist and 62.2% had a dental visit within the previous 6 month.

2.1.5 Factors Influencing Oral Health Behaviour

Folayan investigated the determinants of preventive oral health behaviours among senior dental students in Nigeria (Folayan, 2013). The results of the study revealed that more male respondents agreed that the use of fluoride tooth paste was more important than the tooth brushing techniques for caries prevention ($P< 0.001$). While the use of dental floss was very low (7.3%), females were more likely to report using dental floss ($P=0.03$). Older students were more likely to comply with recommended oral self-care ($P< 0.0001$). In binary regression models, respondents who were younger ($p= 0.04$) and those with higher knowledge of preventive dental care ($P = 0.008$) were more likely to consume sugary snacks less than once a day. Two years earlier, a similar study was done among a group of dental students in Bangalore, India (Nceraja et al, 2011). Marked significant differences ($p< 0.001$) were observed among students of different

years in brushing the teeth twice daily, being satisfied with the appearance of the teeth, cleaning the teeth well without toothpaste, visiting the dentist only when having toothache, taking too much time to brush their teeth, worrying about having bad breath and using mouth rinse on a regular basis. The oral health behaviour of the dental students improved with increasing level of education. Sato et al did a similar study on the effects of dental education on Peruvian dental students "Oral health related attitude and behaviour" (Sato et al, 2013). Compared to the year-1 students, the year-5 students were more likely to agree with question such as "I have used a dye to see how clean my teeth are" (OR=0.19, 95% CI: 0.10 – 0.36) and "I have had my dentist tell me that I brush very well" (OR=0.34, 95% CI: 0.17 – 0.69). Overall, the data showed that the curriculum in this dental school in Peru resulted in a better oral health-related behaviour among year-5 dental students compared to those of year-1 dental students. In another study (Badovinac et al, 2013), it was found that first year students were most likely to have a tooth brush with hard bristles and felt they had not brushed well unless done with hard strokes. Students in the sixth year were least worried about visiting a dentist until having tooth ache, indicating that rise of knowledge contributes to higher self-confidence.

Shekar et al identified social economic status as a factor influencing oral hygiene behaviour among municipal employees of Mysore city (Shekar et al, 2011). They found that oral hygiene practices were better among the subject in upper class than the lower ones. The gender differences in the oral health perception and practices among medical house officers in Benin City have been investigated (Azodo and Unamatokpa, 2012). Females in comparison to males significantly gave good attention to their oral health, use medium strength tooth brush, brush teeth more than once daily, visit dentist and choose tooth paste following dentist recommendations. There were no significant gender difference in the reason for tooth brushing

and renewal of tooth brush. It was concluded that gender played a role in the perception of general health relative to oral health, dental visit, daily tooth brushing frequency and choice of tooth brush and tooth paste for oral self-care.

Udoye and Aguwa investigated the oral health related knowledge and behaviour among nursing students in a Nigerian tertiary hospital (Udoye and Aguwa, 2008). The results showed that, from oral health knowledge variables, only level of study, knowledge of calculus and orthodontics and role of fluoride in caries aetiology were significant. However, no oral health behavior variable was significantly associated with oral health knowledge. Another study (Shanmugavel and Shive, 2010) revealed that there was a significant correlation between the behaviour of use of tobacco and the perceived susceptibility to oral cancer ($t=8.10$, $P<0.005$) and perceived severity ($t=2.22$, $P<0.05$) if a person got oral cancer. There were no significant variables which predicted oral cancer screening. Having a dental visit best predicted the scheduling of a future dental visit.

2.1.6 Factors Influencing Dental Caries Status

Umerubab et al determined the DMFT Index among undergraduates dental students of Lahore Medical and Dental College in different professional years of dentistry (Umerubab et al, 2013). The investigation revealed that there was no significance difference in mean DMFT score among the different professional years ($P = 0.192$). However, the decay component of the mean DMFT was significantly ($P= 0.001$) decreased and filled component significantly increased ($P=0.0001$), as the students passed through different professional years, reflecting positive influence of dental education on their oral health status. In a study to determine the dental caries level among the final year students in Ajman University (Al-Mashhadani and Hashim, 2006), the bivariate analysis revealed that there were significant associations between DMFS score and students

nationality, frequency of eating/day, frequency of brushing, using other methods of tooth brushing and making dental visits.

Observations in a study (Ekuni et al, 2013) revealed that having knowledge about comprehensive food education in university students correlates with low prevalence of dental caries. A non-significant association between the BMI and caries experience was observed in a study among Nigerian primary school children (Chukwumah et al, 2012). In a study among adolescents in a local government of Oyo State, (Ogundele & Ogunsile, 2008), dental caries occurrence was observed to be negatively correlated with their dental health knowledge ($r = -0.026$), attitudes ($r = -0.031$) and practices ($r = -0.060$). Percentage dental caries occurrence was 6.1% and this was found to be prevalent among females (69.2%), among those within the age bracket 14-16 years (61.5%) and those attending public schools (76.9%).

2.2 Epidemiology of Dental Caries in Nigeria

Caries experience in Nigerians varies between very low in rural areas to moderate in some urban communities. Although most studies indicate that 4-30% of Nigerians have dental caries, the prevalence of the disease appears to be on the increase, especially among certain segments of the urban communities (Adegbembo et al, 1995; Miller and Rosenstein, 1982; Barmes and Tala, 1987). These increases are most probably apparent, rather than real, as the various studies were cross-sectional, and might have utilized different sampling methods and caries diagnostic criteria. In 1968, Sheiham observed caries prevalence among dwellers in southern Nigeria to be about 33% and 3% in urban and rural areas respectively (Sheiham, 2005). A decade later, Henshaw and Adenubi reported caries prevalence among the rural population of the northern parts of Nigeria to be 32%, and 58% among the urban dwellers (Henshaw and Adenubi, 1975).

In a national study carried out by Adegbembo *et al* (1995), caries prevalence was approximately 30% and 43% among Nigerians aged 12 years, and 15 years, respectively. In a more recent study, only about 3% of 12-15-year-old Nigerians in South-South geopolitical zone had dental caries, while in the North central geopolitical zone, caries prevalence among similarly aged children was 13% (Akpata *et al*, 2003).

The mean number of decayed, missing and filled teeth (DMFT) recorded in most epidemiological studies in Nigerian children have been below 4, in children and young adults (Barnes and Tala, 1987, Akpata and Jackson, 1978). In a study of urban Nigerian children, mean DMFT varied between 1.2 and 1.3 in 12-21-year-olds (Akpata and Jackson, 1978) while, in a national survey by Adegbembo *et al* (Adegbembo *et al*, 1995) mean DMFT values recorded for Nigerians age 12 years and 15 years, were 0.7 and 1.3 respectively. In a recent study carried out in South-South geopolitical zones of Nigeria, mean DMFT values among 15-year-olds was approximately 1.0; the corresponding value for similarly aged children in North Central geopolitical zone was 2.6 (Akpata *et al*, 2003).

In most of the studies of caries experience in Nigeria, mean DMFT values have been more or less inversely proportional to the population of caries-free persons. Thus, in those with at least one tooth decayed, missing or filled in Lagos, mean DMFT was between 3 and 4, irrespective of age, sex, socio-economic class or ethnic background (Akpata, 1979). Furthermore, in recent epidemiological study in South-South and North Central geopolitical zones in Nigeria mean DMFT in those with at least one tooth decayed, missing or filled was between 2 and 3, irrespective of age (Akpata *et al*, 2003). It would, therefore, appear that the apparent community changes in caries experience in Nigeria is a reflection of the proportion of persons who develop

dental caries as distinct from those who are caries-free. This means that the higher the proportion of persons who develop dental caries, the greater the mean DMFT values.

An intriguing aspect of caries distribution in Nigeria is that caries prevalence in second permanent molars is higher than in first permanent molars, even though first permanent molars erupt six years earlier than second permanent molars (Akpata and Jackson, 1978). A similar caries distribution pattern has been reported in Uganda (Jensen et al, 1973), Tanzania (Muya et al, 1984), Zambia (Westwater, 1977), and South African blacks (Cleaton-Jones and Walker, 1980). In Lagos, Nigeria (Akpata and Jackson, 1978), this caries vulnerability difference was mainly in those with low caries experience. In a study carried out in 15-years-old in Botswana (Johnson and Gjermo, 1989), DMF values were higher in second permanent molars than first permanent molars in those who apparently were on a traditional diet during childhood. In children who grew up in a more urbanized setting, the results were opposite (Johnson and Gjermo, 1989). The observed differences were attributed to caries vulnerability difference of first permanent molars. The DMF values of second permanent molars did not vary among the two groups of children (Johnson and Gjermo, 1989). Thus, the observed caries vulnerability difference between the first and second permanent molars in Nigerians is most likely due to dietary change. If the first permanent molars have reached a high degree of maturation before being exposed to increased cariogenic challenge, caries prevalence will be lower in first than in more recently erupted second permanent molars (Johnson and Gjermo, 1989). Besides, non-cariogenic bacteria may colonize fissures of first permanent molars exposed to traditional diet in childhood (Loesche WJ, 1986), and the ecological succession of these established primary colonizers by cariogenic bacteria at a later date may not be easy. On the other hand, if the subjects are exposed to a highly cariogenic diet in childhood, mutans streptococci may then be

the primary colonizers of the fissures, rendering the tooth type vulnerable to caries. Under this condition, the prevalence of dental caries would be higher in first permanent molars that erupt six years earlier, than second permanent molars.

Caries of first permanent molars at an early age in a Nigerian may, therefore, be an indication of high caries susceptibility and such children should be selected to benefit from fissure sealants. This principle may also be applicable in other third world countries undergoing changes from traditional to a more cariogenic Western diet. In making the decision to apply fissure sealants, however, the cost effectiveness of the procedure, among other factors, should be taken into consideration.

Over 80% of carious teeth in Nigerians aged below 21 years are pit and fissures lesions, and a vast majority of the carious teeth remain unrestored and thus the restorative treatment need (F/DMFT %) in the country is over 80% (Akpata, 1979; Akpata et al, 2003; Akpata and Jackson, 1978). This is very high when compared with the restorative treatment need of 10-24% reported for USA, indicating a great need for restorative dental care in Nigeria.

Caries experience in the primary dentition in Nigerians has also been reported to be low (Akpata, 1979; Noah, 1984; Adenubi, 1984). Akpata (Akpata, 1979) reported mean DMFT of primary molars in 6-year-old Nigerians in Lagos to be approximately 1.3; the figure reported by Noah (Noah, 1984) for similarly aged children attending free Government schools in Ibadan in South-west Nigeria was much lower (approximately 0.6). In another study carried out among 8-year-olds in Lagos (Adenubi, 1984), mean DMFT of 1.3 was also recorded.

2.3 Dental Caries and Periodontal Disease

Dental caries is defined as a post-eruptive pathological process of external origin, involving the softening of the hard dental tissues and proceeding to cavity formation (Akpata, 1997). The implicated bacteria are cariogenic and they initiate a sticky film known as dental plaque on the surfaces of the teeth. The dental plaque contains bacteria which convert sugars and other carbohydrates from food and drink to acids which, in turn, dissolve minerals such as calcium and phosphate from the tooth via demineralization. Meanwhile, saliva clears food debris from the mouth, neutralizes acid produced from plaque bacteria and provides calcium and phosphate to the teeth by remineralization. Saliva also acts as a reservoir for fluoride from toothpaste or from fluoridated water. The fluoride facilitates remineralization of the teeth by inhibiting bacterial acid production. Tooth decay only occurs when the process of demineralization exceeds remineralization over a period of time.

Periodontal disease is caused by infection and inflammation of the gingiva, the periodontal connective tissues and the alveolar bone (that supports the teeth). Periodontal disease can lead to tooth loss. For most people, the disease process starts with dental plaque accumulating on the teeth which is a sticky, colorless film that is made up of more than 400 species of bacteria (Boggess, 2008). Gingivitis is the earliest form of periodontal disease that causes the gingiva to become red and bleed easily. The gingiva may even become slightly swollen but there is usually little or no discomfort, but if left untreated, gingivitis can progress to periodontitis. In the early or mild stage of periodontitis, the attachment fibres and bone that support the teeth start to deteriorate. Then, in the moderate to advanced stages, more bone and tissues are destroyed and the teeth become loose and if left untreated, periodontal disease can lead to tooth loss and may

contribute to certain health problems including cardiovascular disease, pre-term delivery and respiratory disease (Bogges, 2008).

Dental caries status literarily means dental health status and is one of the components of oral health status. There is no single "standard" measurement of oral health status for individuals or population groups. Individual oral health status may be measured by an observer, who performs an examination and rates the individual along any of several dimensions, including presence or absence of oral disease, risk factor for such disease and severity of such disease. Individual oral health status may also be assessed by asking the person to report his/her health perceptions in the domains of interest, such as physical functioning, emotional well-being, pain or discomfort, and overall perception of oral health. Although it is theoretically attractive to argue that the measurement of health should consist of the combination of both an objective component plus the individual's subjective impressions, no such measure has been developed (Sheiham, 2005). Once the definition of optimum health for the individual is agreed upon, health status can be placed along a continuum from perfect health to death (Sheiham, 2005). Oral Health Status is therefore any level of health along a continuum of health of oral and related tissues. Hence, dental caries status is any level of health along a continuum of health of the teeth.

The oral health of an entire population is determined by aggregating data collected on individuals. The health of an individual is easier to define than the health of a population. No comparable scale exists for whole populations. In the absence of comprehensive or absolute measures of the oral health of a population, the average values of oral health indicators (for example, mean DMFT), the prevalence of preventable diseases (for example, prevalence of dental caries) and availability of oral health services serve as indicators of oral health status (Sheiham, 2005). Judgments regarding the level of oral health of a particular population are

usually made by comparing one population to another, or by studying the trends in an oral health indicator within a population over time.

Oral health indicators are epidemiological tools for measuring oral health diseases. Such measurements make use of epidemiological indices. Apart from dental caries and periodontal diseases, many other problems contribute to the Oral Health Status of an individual. These include malocclusion, trauma to anterior teeth, tooth discoloration, enamel defects and oral tumours (Akpata, 1987). However, dental caries and periodontal diseases were considered in this study because they are the most common oral health problems (Gish, 1988; Zillén, 1994; Petersen, 2009), they are largely preventable (Gish, 1998; Petersen, 2009) and they will allow for objective comparisons since they were also used in most other studies carried out in many parts of the world.

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study was carried out in six accredited dental schools in Nigeria: Faculty of Dentistry, University of Ibadan; Faculty of Dentistry, University of Benin; Faculty of Dentistry, University of Lagos; Faculty of Dentistry, Obafemi Awolowo University; Faculty of Dentistry, University of Port Harcourt and Faculty of Dentistry, Bayero University, Kano.

In each of the schools, the undergraduate training program is divided into 6 years of education. The course is divided into two groups: Pre-clinical years and Clinical years. The first academic year is devoted to basic sciences, the second and the third to basic medical sciences and the fourth to basic dental sciences, pathology and pharmacology. The fifth academic year emphasizes clinical medicine, general surgery and a proportion of clinical dentistry. The final year is fully devoted to clinical dentistry.

3.2 Study Design

The study was a cross-sectional survey.

3.3 Study Population

The study population was the undergraduate dental students in Nigerian Universities.

3.3.1 Inclusion Criteria

All consenting dental students of all the six Universities accommodated by the sampling technique who completed the questionnaires appropriately.

3.4 Sample Size Determination

Sample size was determined using the formula for cross-sectional study, for quantitative outcome (Lemeshow et al, 1990):

$$n = \frac{z_{\alpha}^2 S^2}{d^2}$$

Where:

n = the desired minimum sample size

Z_{α} = the value of the standard normal deviate corresponding to specified confidence level.

$Z_{\alpha} = 1.96$, corresponding to a 95% confidence level.

$S = 0.54$ = the standard deviation of the mean DMFT score in a study of dental caries status among undergraduate dental students (Umeribab et al, 2013).

$d = 0.04$ = desired level of precision

A sample size of 700 was obtained from the above formula as shown below:

$$\begin{aligned} n &= 1.96^2 \times 0.54^2 / 0.04^2 \\ &= 700 \end{aligned}$$

However, this was adjusted to 875 to compensate for possible non-response rate of 20% (including improperly filled questionnaires and other field eventualities). This was calculated using the formula:

$$\begin{aligned} \text{Adjusted sample size } (n') &= n / 1 - r \\ &= 700 / 1 - 0.2 \\ &= 875 \end{aligned}$$

Thus an adjusted sample size of 875 was used.

3.5 Sampling Technique

A multi-stage sampling technique was used:

Stage-1: Six out of 8 Universities where dentistry is studied in Nigeria were selected through purposive sampling technique. The schools were: UI, UNIBEN, UNILAG, OAU, UNIPORT and BUK.

Stage-2: Stratified sampling technique was used to divide the selected population into six strata by the schools and the number of students required from each school was calculated as follows:

Population of students in all the six schools = $N = 1171$

Sample size = $n = 875$

Sampling ratio = $n/N = 875/1171 = 0.7472$

Population of dental students in UI = 189

Population of dental students in UNIBEN = 155

Population of dental students in UNILAG = 349

Population of dental students in OAU = 174

Population of dental students in UNIPORT = 129

Population of dental students in BUK = 175

Using equal sampling ratio (proportional allocation), the sample size in each school (n_s) was calculated from:

$n_s = n/N (N_s)$, as follows:

Where: N_s = Number of Students in each school

$$n_s = 0.7472 (N_s)$$

$$\text{The sample size in UI} = n_{UI} = 0.7472 \times 189 = 141$$

$$\text{The sample size in UNIBEN} = n_{UNIBEN} = 0.7472 \times 155 = 116$$

$$\text{The sample size in UNILAG} = n_{UNILAG} = 0.7472 \times 349 = 261$$

$$\text{The sample size in OAU} = n_{OAU} = 0.7472 \times 174 = 130$$

$$\text{The sample size in UNIPORT} = n_{UNIPORT} = 0.7472 \times 129 = 96$$

$$\text{The sample size in BUK} = n_{BUK} = 0.7472 \times 175 = 131$$

Thus making a total sample size of $n = n_{UI} + n_{UNIBEN} + n_{UNILAG} + n_{OAU} + n_{UNIPORT} + n_{BUK} = 875$ students.

Stage-3: In each of the schools, stratification was made into 6 strata by the study level and the required number of students from each study level calculated as follows:

Considering U.I:

$$N_{UI} = 189$$

$$n_{UI} = 141$$

$$\text{Sampling fraction} = 141/189 = 0.746$$

$$\text{Number of students in 100 level} = n_{100} = 28$$

$$\text{Number of students in 200 level} = 32$$

Number of students in 300 level = 33

Number of students in 400 level = 28

Number of students in 500 level = 35

Number of students in 600 level = 33

Using equal sample ratio; the number of students required from each study level was calculated from

$$n_L = n_s / N_s (N_L)$$

$$= 0.746 (N_L)$$

$$n_{100} = 0.746 \times 28 = 21$$

$$n_{200} = 0.746 \times 32 = 24$$

$$n_{300} = 0.746 \times 33 = 25$$

$$n_{400} = 0.746 \times 28 = 21$$

$$n_{500} = 0.746 \times 35 = 26$$

$$n_{600} = 0.746 \times 33 = 25$$

This was repeated for the remaining five schools and the summary of the total (N) and the required (n) number of students in each of the study levels in all the six schools is presented in appendix IV. The final selection was done using simple random sampling (balloting technique).

3.6 Data Collection

Structured questionnaires of both closed and open-ended questions were designed in five sections (A-E). Section A on socio-demographic data; section B, C and D on oral health knowledge, attitudes and practices respectively; and section E on oral examination. The oral examination made use of the decayed, missing and filled teeth (DMFT) index and was used to assess the caries experience (mean DMFT score) of the students.

Sections A, B, C and D of the questionnaire were self-administered, while section E was interviewer-administered. Section E of the questionnaire was administered by the research team members (5 members in each of the institutions), which include dental house officers, NYSC dentists and dental junior registrars.

Each student was asked to open his/her mouth by an observer after the observer had given him/her an opportunity to state the number of decayed, missing and filled teeth in his/her mouth, and the observer simply had a look and recorded his/her findings. Spatula was used to retract soft tissues to improve vision, where necessary. There were no invasive procedures.

3.6.1 Criteria for caries diagnosis

This followed the recommendations of the WHO oral health survey method. The examination for the presence of dental caries was conducted under natural light. The criteria are as follows:

3.6.1.1 Sound Crown

A crown was recorded as sound, if it shows no evidence of treated or untreated clinical caries.

The stages of caries that precede cavitation, as well as other conditions similar to early stages of the caries were excluded because they cannot be reliably diagnosed. Thus a crown with defects

such as white/chalky spots, discoloured rough spots, stained pits and fissures or abrasion like lesion in the absence of other positive criteria, was coded as sound.

3.6.1.2 Decayed Crown (D)

Caries was recorded as present when a lesion in a pit or fissure or on a smooth tooth surface, has an unmistakable cavity, undermined enamel or a detectable softened floor or wall. A tooth with a temporary filling was included in this category. Caries was not recorded when in doubt. A crown was also scored as decayed when it had one or more permanent restorations plus one or more areas that are decayed.

3.6.1.3 Filled Crown (F)

Presence of one or more permanent restorations with no evidence of caries anywhere on the crown.

3.6.1.4. Missing tooth as a result of caries (M)

Tooth extracted because of caries was scored based on the information provided by the respondent as to how tooth was lost. When in doubt, it was not recorded.

3.7 Pretest and Validation

The data collectors were trained to ensure validity by ensuring accuracy and reducing inter-examiner variation. The questionnaires were pre-tested using 20 undergraduate dental students across the different study-levels of the University of Benin, who were then excluded from the study. After the pre-test, necessary amendments were made to the questionnaire.

3.7.1 Determination of Inter-Examiner Variability

All five examiners in each institution examined the same subject and the inter-examiner variability determined based on their observations in the section of the questionnaire (section-E) that required oral examination. The oral examination measured the caries experience of the subjects. Kendall's Coefficient of Concordance, W , was used to determine the inter-examiner variability and it was given by the formula:

$$W = \frac{12\sum R_i^2 - 3b^2k(k+1)^2}{b^2k(k^2-1)}$$

Where:

W = Kendall's coefficient of concordance

b = number of examiners (number of sets of ranking)

k = number of items to be scored or ranked

R_i = the sum of scores or ranks for i th item scored.

In the case of UNIBEN, the inter-examiner variability of the 5 examiners was determined as shown in appendix V.

This was done for each of the six schools and it was found that the inter-examiner variability in each of the six sets of examiners was not statistically significant. This means that there was agreement among the examiners in each of the six schools.

3.7.2 Study Variables:

The study variables include two outcome variables and several explanatory variables for each as follows.

3.7.2.1 Outcome variables:

The outcome variables were oral health behaviour and dental caries status.

Oral Health Behaviour: Sixteen questions were used to assess their oral health behaviour or practices and their oral health behaviour graded as bad, when participant scores 0-7 of 16; and good, when participant scores 8-16 of 16.

Dental Caries Status: Oral examination based on DMFT index was used to assess the dental caries status of the students (World Health Organization, 1997; Bratthall, 2000; Hiremath, 2011). DMFT is used to denote the decayed, missing and filled teeth in the mouth. Therefore DMFT index quantifies the dental caries status in terms of the number of decayed teeth with untreated caries lesion, i.e. (D) component of DMFT and the number of teeth, which have been lost due to caries, i.e. (M) component of DMFT as well as the number of filled teeth present, i.e. (F) component of DMFT (Hiremath, 2011). The DMFT values were interpreted according to DMFT scoring scale. According to this scale, a DMFT value between 0-4 is considered low dental caries status, the value in the range of 5-9 is moderate dental caries status and value greater than 9 is high dental caries status (Farsi, 2008). In terms of occurrence of dental caries, DMFT score of zero means absence of dental caries and DMFT score of greater than zero means presence of dental caries.

3.7.2.2 Explanatory variables:

The explanatory variables for both outcome variables include socio-demographic factors (sex, age, study location, study level, parents' occupation and highest educational level of parents), knowledge of oral health and attitudes toward oral health. In addition to these, the second outcome variable (dental caries status) also had oral health behaviour as an explanatory variable.

Knowledge of Oral Health: Twenty questions were used to assess their knowledge of oral health and their knowledge graded as poor, when participant scores 0-9 of 20; fair, when participant scores 10-14 of 20; and good, when participant scores 15-20 of 20.

Attitudes toward Oral Health: Thirteen questions were used to assess their attitudes towards oral health and their attitudes graded as positive, when participant scores 8-13 of 13; and negative, when participant scores 0-7.

3.8 Data Management and Analysis

The data were entered, cleaned and analyzed using SPSS statistical package, version 16. Simple summary statistics (percentage for categorical and mean for quantitative variables) was done for all variables. The dental caries experience (mean DMFT score) and prevalence among the participants were analyzed and reported using descriptive statistics. The oral health knowledge, attitudes and practice scores were also analyzed and reported using descriptive statistics. Chi-square test of association was used to identify the factors influencing oral health behaviour and dental caries status among the students. Multivariable analysis using binary logistic regression was further used to analyze the factors influencing both outcome variables.

3.9 Ethical Considerations

Confidentiality of Data: The participants' responses were held in strict confidence. There were no identifiers on the questionnaire. Access to questionnaires was restricted.

Translation of protocol to the local language: Translation to local language was not necessary because all participants understood English Language.

Beneficence to participants: All the participants had the opportunity of getting free dental check-up. Oral hygiene instructions were given to them. All those with dental problems were referred appropriately.

Non-Maleficence to participants: The study did not pose any risk or harm to the research participants. Questionnaires were administered during students' free-lecture period. Oral examination was merely observational; there were no invasive procedures.

Voluntariness: Recruitment was based on participants' voluntariness to take part in the study. They were free to withdraw their consent at any time.

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CHAPTER FOUR

RESULTS

Out of 867 questionnaires administered, 841(97%) students responded and 812 (94%) duly completed questionnaires were analyzed.

4.1 Socio-demographic Characteristics of Respondents

Table 4.1 below shows the socio-demographic characteristics of respondents. The ratio of male to female respondents was about 3:2. The mean age of the respondents was 22.0 ± 3.0 years. Many of the students (57.9%) were between 20 and 24 years, 28.1% were from UNILAG and 17.7% were 300 level students. More than half of the respondents' fathers (56.6%) and about half of their mothers (50.6%) were senior civil servants. More than half of both fathers (77.4%) and mothers (71.4%) of respondents had tertiary education.

Table 4.1: Socio-demographic characteristics of respondents

Variable	Frequency (n = 812)	Percent (%)
Gender		
Male	471	58.0
Female	341	42.0
Age group in years		
<20	175	21.6
20-24	470	57.9
>24	167	20.5
School		
UI	162	20.0
UNIBEN	138	17.0
UNILAG	228	28.0
OAU	150	18.5
UNIPORT	73	9.0
BUK	61	7.5
Study level		
100	120	14.8
200	140	17.2
300	143	17.7
400	136	16.7
500	135	16.6
600	138	17.0
Fathers occupation		
Senior civil servant	453	56.6
Junior civil servant	49	6.1
Small scale self employed	115	14.4
Large scale self employed	156	19.5
Unemployed	27	3.4
Mother occupation		
Senior civil servant	408	50.6
Junior civil servant	76	9.5
Small scale self employed	174	21.6
Large scale self employed	109	13.5
House wife	26	3.2
Unemployed	13	1.5
Highest educational level of father		
No formal education	15	2.0
Primary school	45	5.6
Secondary school	120	15.0
Tertiary school	625	77.4
Highest educational level of mother		
No formal education	22	2.8
Primary school	55	6.8
Secondary school	153	19.0
Tertiary school	575	71.4

4.2 Dental caries status

Figure 4.1 is a pie chart showing the prevalence of dental caries among the participants. The overall prevalence of dental caries among the participants was 24%. The median DMFT score was 0.0 and the range was 0.0 – 8.0.

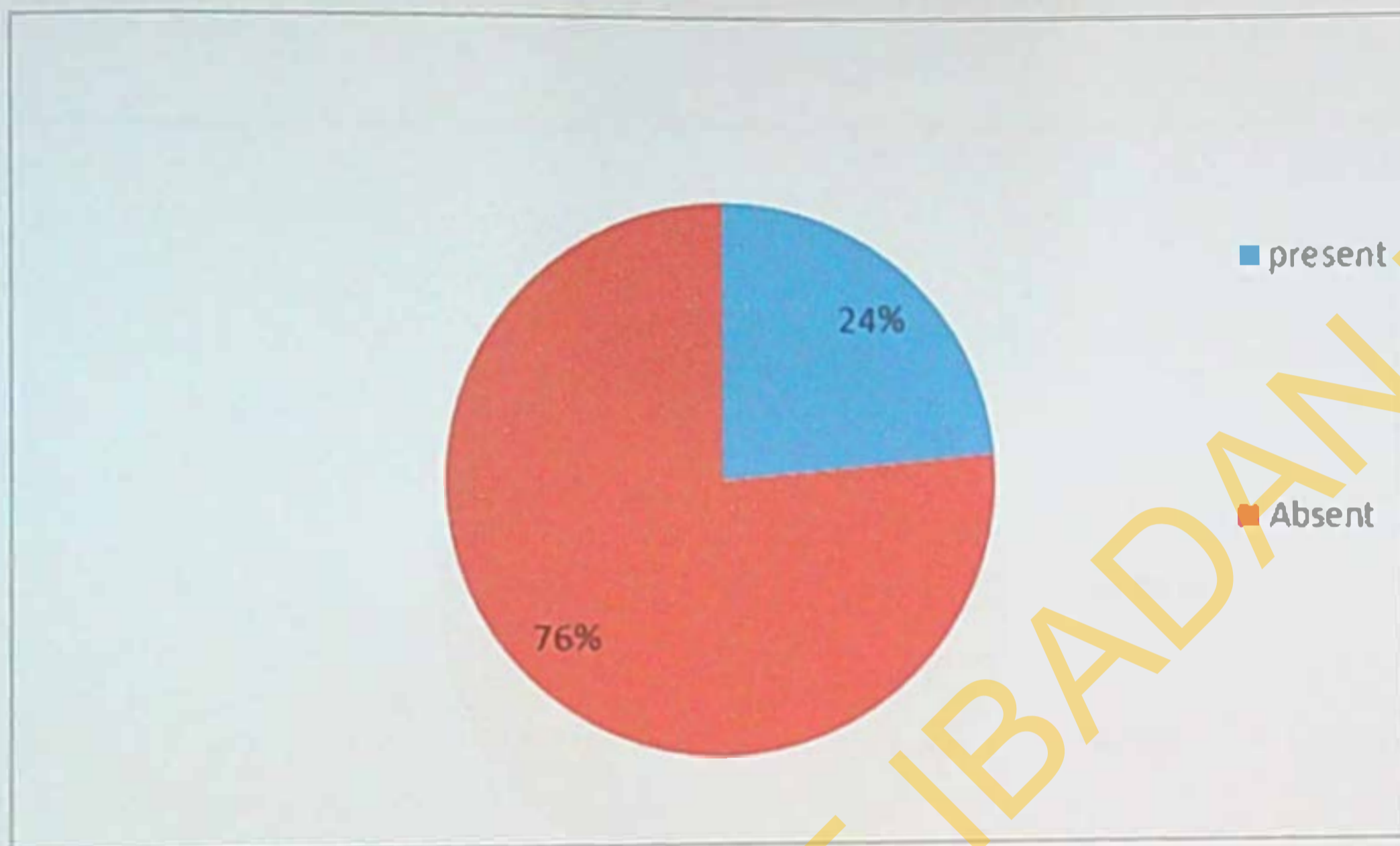


Figure 4.1 Pie chart showing the prevalence of dental caries among the participants

4.3 Knowledge of oral health

Of the 20 questions used to assess the knowledge of oral health of the students, the mean knowledge score was 15.0 ± 3.6 . Figure 4.2 shows the knowledge of oral health of the respondents. More than half (58%) of the respondents had good knowledge, 36% had fair knowledge and only 6% had poor knowledge of oral health.

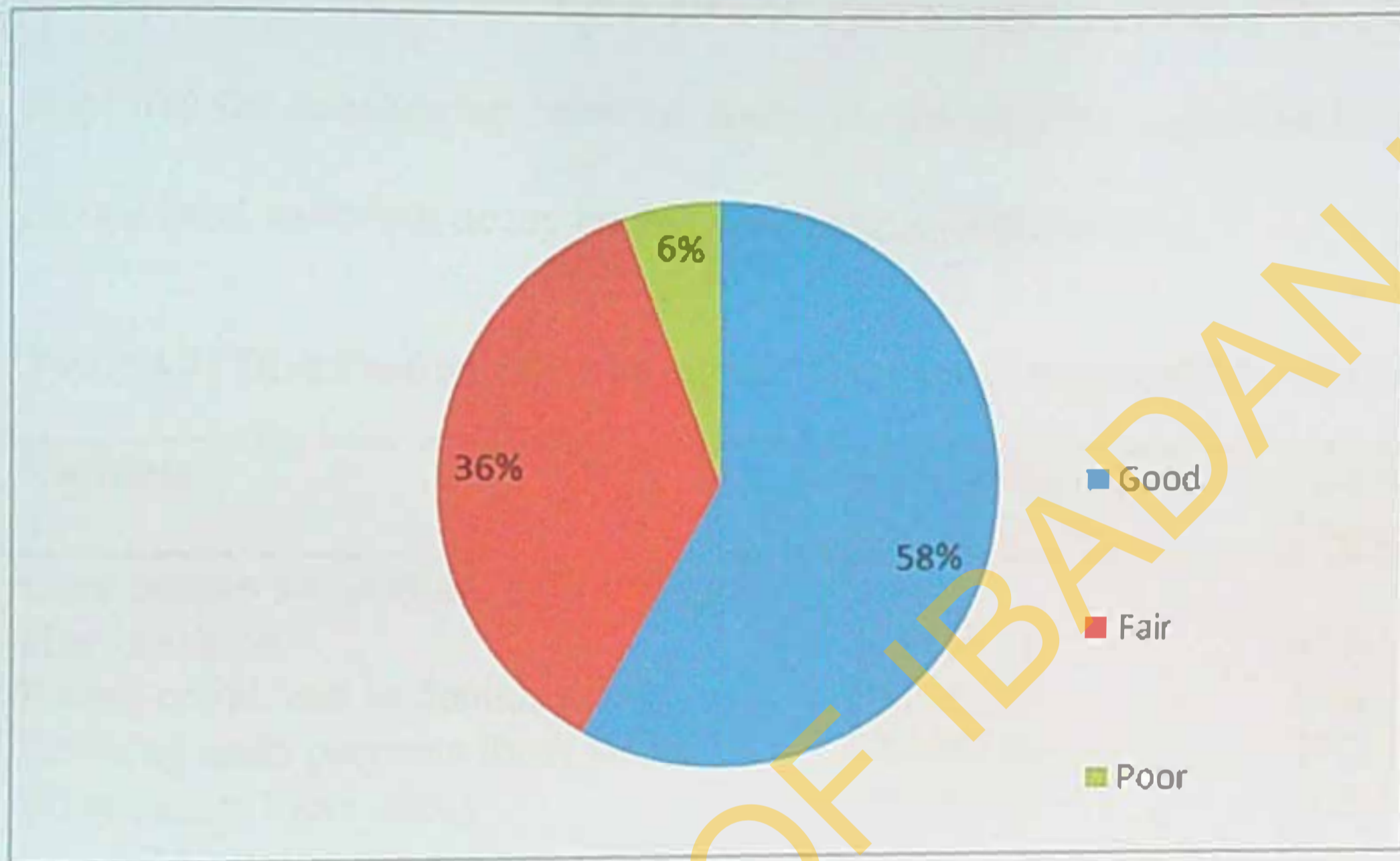


Figure 4.2 Pie chart showing the knowledge of oral health of respondents

4.3.1 Knowledge of oral health (Contd)

Table 4.2 shows the distribution of respondents' knowledge in questions related to dental caries.

Majority of the students know that brushing teeth prevent tooth decay (96.4%), that using fluoride strengthens the teeth (95.6%), that sugar is a cause of tooth decay (87.4%) and that plaque could lead to dental caries (87.1%). Less than half (46.2%) of the students know that plaque accumulate on the tooth surface after brushing. About 90% of the students correctly identified the relationship between dental plaque (89.4%), sugar (94.8%) and bacterial (95.9%) on one hand and tooth decay on the other hand as important.

Table 4.2: Distribution of respondents' knowledge in questions related to dental caries

Variable	Knowledgeable Frequency (%)	Not Knowledgeable Frequency (%)
Does plaque accumulate on tooth surface after brushing	372 (46.2)	433(53.8)
Plaque could lead to dental caries	705 (87.1)	104(12.9)
Brushing teeth prevents tooth decay	778 (96.4)	27(3.6)
What causes tooth decay	709 (87.4)	102(12.6)
Using fluoride strengthens the teeth	776 (95.6)	36(4.4)
How important is dental plaque in relation to tooth decay	725 (89.4)	86(10.6)
How important is sugar in relation to tooth decay	770 (94.8)	42(5.2)
How important is bacteria in relation to tooth decay	779 (95.9)	33(4.1)
Which of these activities is best for preventing tooth decay	583 (71.8)	229(28.2)
What is the purpose of fluoride	710 (87.4)	102(12.6)
Does sweet affect dental health	776 (95.9)	33(4.1)
Does dental caries affect aesthetics	615 (76.0)	194(24.0)

4.3.2 Knowledge of oral health(Contd)

Table 4.3 shows the distribution of respondents' knowledge in questions related to periodontal disease. About 64.6% of the participants knew that dental plaque cause inflammation of gums. About half (51.1%) of the students correctly identified the most important initiating factor of periodontal disease to be bacterial plaque. Most of the students knew that there was a relationship between smoking (83.7%) and diabetes (68.8%) on one hand and gum disease on the other hand. About half of the students (50.4%) had knowledge of the relationship between gum disease and heart disease. About the same proportion (53.3%) had knowledge of the most effective measure to prevent periodontal disease.

Table 4.3: Distribution of respondents' knowledge in questions related to periodontal disease

Variable	Knowledgeable Frequency (%)	Not Knowledgeable Frequency (%)
What is dental plaque	459 (56.5)	353(43.5)
Does dental plaque cause inflammation of gums	523 (64.6)	286(35.4)
What is the most important initiating factor of periodontal disease	413 (51.1)	395(48.9)
What is the most effective measured to prevent periodontal disease	431 (53.3)	378(46.7)
Is there any relationship between gum disease and diabetes	557 (68.8)	253(31.2)
Is there any relationship between gum disease and heart disease	408 (50.4)	402(49.6)
Is there any relationship between gum disease and smoking	678 (83.7)	132(16.3)
Periodontal disease increase the risk of which of the following medical condition	343 (42.3)	467(57.7)

4.4 Attitudes toward oral health

Of the 13 questions used to assess the students' attitudes toward oral health, the mean attitude score was 10 ± 1.8 . Figure 4.3 shows the respondents' attitudes toward oral health. Majority of the respondents (91%) had positive attitudes toward oral health and only 9% had negative attitudes toward oral health.

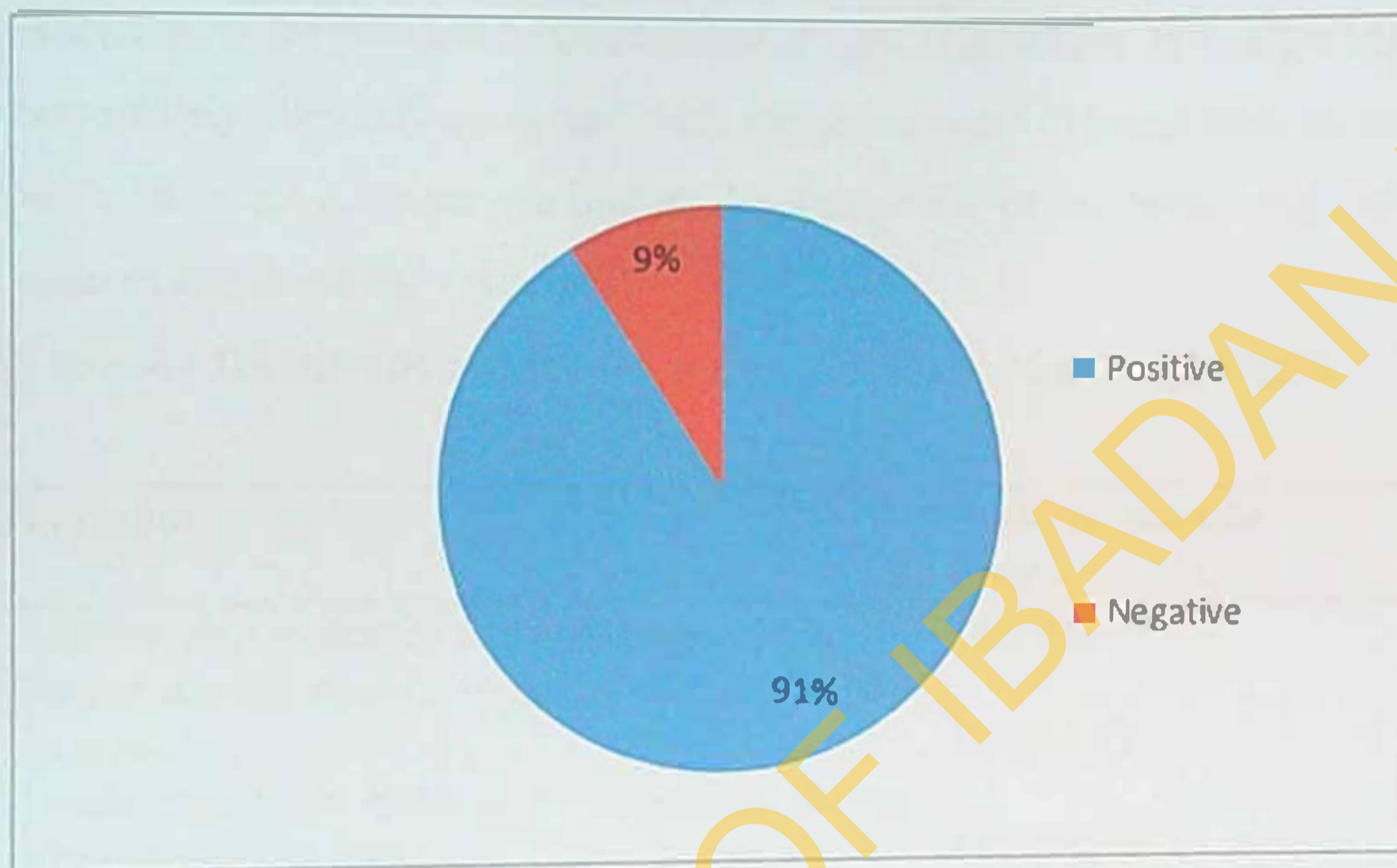


Figure 4.3 Pie chart showing respondents' attitudes toward oral health

4.4.1 Attitudes toward oral health (Contd)

Table 4.4 shows the distribution of respondents' attitudes toward oral health. Over 90% of the participants correctly agreed to the statements: "Regular visit to the dentist are necessary" (96.3%), "Treatment of the teeth is as important as any other part of the body" (98.3%), "It is important to visit the dentist whether there is pain or not" (92.4%) and "the tooth brush is an oral hygiene aid" (96.3%). About 90% of the participants correctly agreed to the statements: "Smoking has harmful effect on oral health" (91.7%) and "The dentist should explain the procedure to the patients before treatment" (89.3%). About 75%, 66% and 44.5% of the students respectively correctly disagreed with the statements: "Dental floss is not a useful oral hygiene aid", "It is not necessary to bother about the color of our teeth" and "Patient should decide the types of treatment they receive."

Table 4.4 Distribution of respondents' attitudes toward oral health

Variable	Positive attitude Frequency (%)	Negative attitude Frequency (%)
Regular visit to dentist are necessary	782 (96.3)	30 (3.7)
Patient should decide types of treatment they received	361(44.5)	451(55.5)
Treatment of the teeth is as important as any other part of the body	797 (98.3)	14(1.7)
It is important to visit the dentist whether there is pain or not	751(92.4)	61(7.6)
It is not necessary to border about the colour of our teeth	534 (65.8)	278(34.2)
The tooth brush is an oral hygiene aid	782 (96.3)	28(3.7)
Dental floss is not a useful oral hygiene aid	606 (74.6)	206(25.4)
Smoking has harmful effect on oral health	745 (91.7)	67(8.3)
Tooth ache is the main reason for visiting a dental clinic	437 (53.8)	375(46.2)
Fear of pain is the main reason for avoiding or visiting the dentist	446 (54.9)	366(45.1)
The dentist should explain the procedure to the patients before treatment	725 (89.3)	87(10.7)
I think i can clean my teeth well without using toothpaste	669 (82.4)	143(17.6)
I think it is sometime good to use a dye to see how clean the teeth are	419 (51.6)	393(48.4)

4.5 Oral health practices

Of the 16 questions used to assess the students' oral health practices, the mean practice score was 8.7 ± 1.9 . Figure 4.5 shows the oral health practices of respondents. More of the respondents (74%) had good oral health practices while 26% had bad oral health practices.

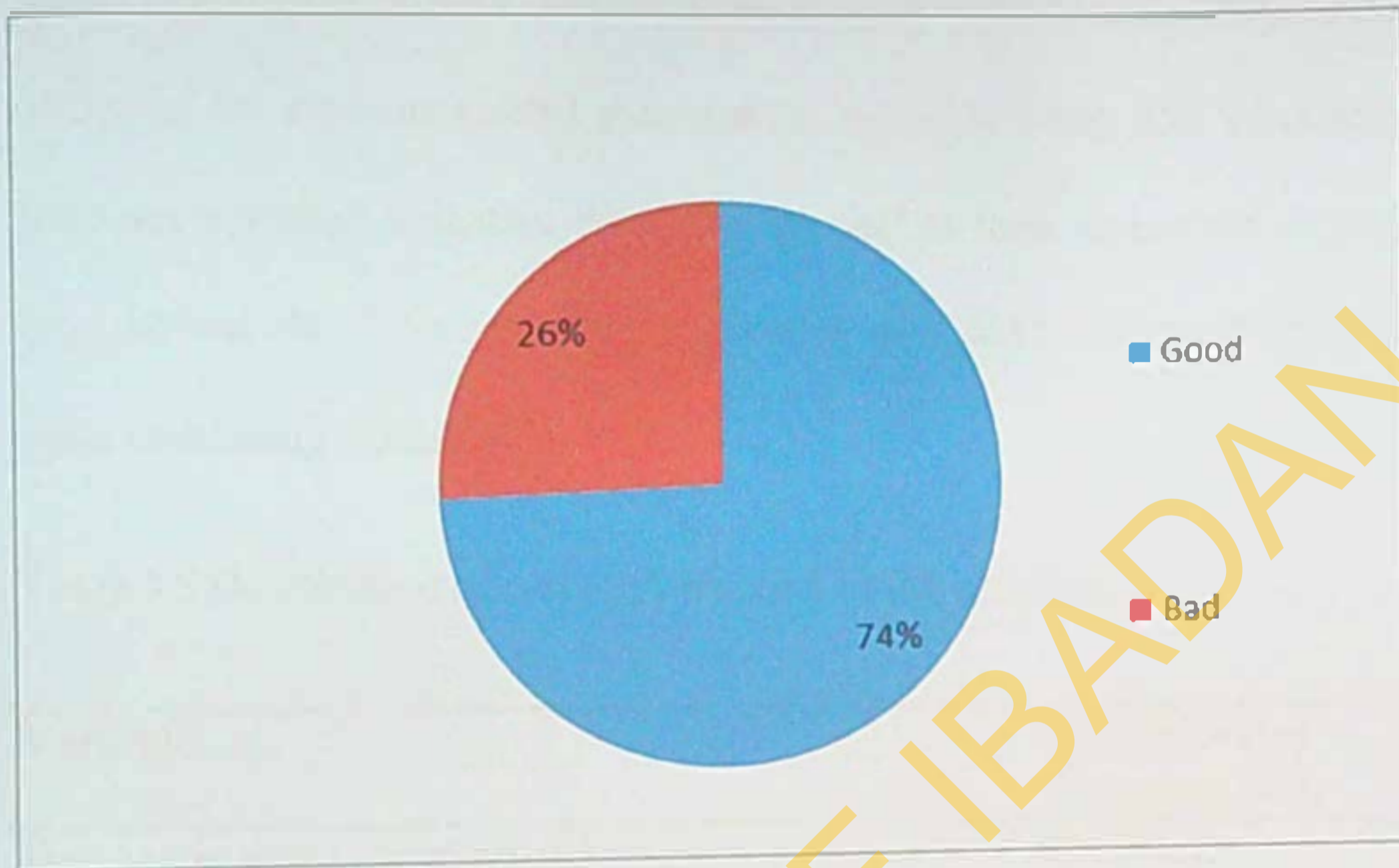


Figure 4.4 Pie chart showing the oral health practices of respondents

4.5.1 Oral health practices (Contd)

Table 4.5 shows the distribution of respondents' oral health practices. About 45% of the participants brush their teeth twice daily while about 54% do so only once daily. Fifty percent reported that their duration of brushing is more than two minutes. About 16% reported regular use of dental floss. About 90% used tooth paste with fluoride when they brush their teeth. Only 16.5% of the students visited their dentist regularly every 6 to 12 months. About 43% of them have never visited a dentist. Sixty two percent of them consumed sugary snacks at least once a day. Almost all of the respondents brushed their teeth with toothbrush (99.6%) and used tooth paste containing fluoride (96.4%).

Table 4.5 Distribution of respondents' oral health practices

Variable	Good practice Frequency (%)	Bad practice Frequency (%)
How many times do you brush your teeth in a day	366 (45.2)	444(54.8)
When do you brush your teeth	181 (22.4)	627(77.6)
For how long do you brush your teeth	405 (49.9)	406(50.1)
Do you use dental floss regularly	132 (16.3)	679(83.7)
Do you use toothpaste with fluoride when you brush your teeth	723 (89.4)	86(10.6)
How often do you visit your dentist	134 (16.5)	677(83.5)
How often do you consumed sugary snacks	307 (37.9)	502(62.1)
Do you use mouth rinse on a regular basis	636 (78.5)	174(21.5)
Do you brush each tooth carefully while cleaning your teeth	626 (77.7)	180(22.3)
Tooth brush	807 (99.6)	3(0.4)
Toothpaste containing fluoride	782 (96.4)	29(3.6)
Any toothpaste (fluoride or no fluoride)	608 (75.2)	200(24.8)
Dental floss	211 (26.0)	599(7.4)
Chewing stick	709 (87.5)	101(12.5)
Toothpick	480 (59.3)	330(40.7)
Mouth wash	553 (68.5)	254(31.5)

4.6 Factors influencing oral health practices

Table 4.6 and 4.7 show the association between respondents' characteristics and oral health practices. Oral health practices improved significantly with age of respondents ($p=0.04$). Sixty seven percent of those that were less than 20 years of age had good oral health practices while 79% of those above 24 years had good oral health practices. Oral health practices was significantly associated with study level of respondents ($p<0.0001$). About 60% of the respondents in 200 level had good oral health practices whereas over 90% of those in 600 level had good oral health practices.

Table 4.6 Association between respondents' characteristics and oral health practices

Variable	Bad practices n (%)	Good practices n (%)	p-value
Gender			
Male	117 (24.9)	352 (75.1)	0.452
Female	92 (27.3)	245 (72.7)	
Age group			
<20	57 (32.6)	118 (67.4)	0.04
20-24	117 (24.9)	353 (75.1)	
>24	35 (21.0)	132 (79.0)	
School			
UI	47 (29.0)	115 (71.0)	0.094
UNIBEN	33 (23.9)	105 (76.1)	
UNILAG	58 (25.4)	170 (74.6)	
OAU	27 (18.0)	123 (82.0)	
UNIPORT	24 (32.9)	49 (67.1)	
BUK	20 (32.8)	41 (67.2)	
Study Level			
100	37 (30.8)	83 (69.2)	<0.0001
200	55 (39.3)	85 (60.7)	
300	32 (22.4)	111 (77.6)	
400	42 (30.9)	94 (69.1)	
500	31 (23.0)	104 (77.0)	
600	12 (8.7)	126 (91.3)	

4.6.1 Factors influencing oral health practices (Contd)

Oral health practices was significantly associated with knowledge of oral health of respondents ($p < 0.0001$). Sixty five percent of those that had fair knowledge of oral health had good oral health practices, while 80% of those that had good knowledge of oral health had good oral health practices.

Table 4.7 Association between respondents' characteristics and oral health practices

Variable	Bad practices n (%)	Good practices n (%)	p-value
Father's Occupation			
Senior Civil Servant	113 (25.0)	339 (75.0)	0.846
Junior Civil Servant	11 (22.4)	38 (77.6)	
Small Scale Self Employed	27 (23.5)	88 (76.5)	
Large Scale Self Employed	44 (28.2)	112 (71.8)	
Unemployed	8 (29.6)	19 (70.4)	
Mother's Occupation			
Senior civil servant	111 (27.2)	297 (72.8)	0.127
Junior civil servant	19 (25.0)	57 (75.0)	
Small scale self employed	32 (18.4)	142 (81.6)	
Large scale self employed	36 (33.0)	73 (67.0)	
House wife	6 (23.1)	20 (76.9)	
Unemployed	3 (23.1)	10 (76.9)	
Highest educational level of father			
No formal education	3 (20.0)	12 (80.0)	0.489
Primary school	8 (17.8)	37 (82.2)	
Secondary school	29 (24.2)	91 (75.8)	
Tertiary school	169 (27.0)	456 (73.0)	
Highest Educational Level Of Mother			
No formal education	3 (13.6)	19 (86.4)	0.096
Primary school	17 (30.9)	38 (69.1)	
Secondary school	30 (19.6)	123 (80.4)	
Tertiary school	158 (27.5)	417 (72.5)	
Knowledge of oral health			
Good	95 (20.1)	377 (79.9)	<0.0001
Fair	103 (35.0)	191 (65.0)	
Poor	11 (23.9)	35 (76.1)	
Attitudes toward oral health			
Positive	187 (25.3)	552 (74.7)	0.368
Negative	22 (30.1)	51 (69.9)	

4.6.2 Factors influencing oral health practices (Contd)

Tables 4.8 and 4.9 show multivariable analysis using binary logistic regression of the factors associated with oral health practices of respondents. The analysis revealed that the only statistically significant predictor of oral health practices is the study level of respondents. Those in 200 level are 7.2 times less likely to practice good oral health compared to the 600 level students (OR = 0.14, 95% CI = 0.06 - 0.34). Those in 500 level are 3.6 times less likely to practice good oral health compared to the 600 level students (OR = 0.28, 95% CI = 0.13 - 0.61).

Table 4.8 Binary logistic regression of respondents' factors on oral health practices

Variable	OR	(SE)	95% CI (Lower)	95% CI (Upper)	p-value
Gender					
Male	1.10	0.20	0.75	1.61	0.63
Female(ref)					
Age group					
<20	1.52	0.40	0.70	3.29	0.29
20 - 24	1.42	0.28	0.81	2.47	0.22
>24 (ref)					
School					
UI	0.94	0.37	0.45	1.96	0.87
UNIBEN	1.18	0.38	0.56	2.49	0.66
UNILAG	1.04	0.37	0.51	2.13	0.92
OAU	1.56	0.39	0.73	3.36	0.25
UNIPORT	0.75	0.42	0.33	1.72	0.50
BUK (ref)					
Study level					
100	0.21	0.51	0.08	0.57	0.002
200	0.14	0.46	0.06	0.34	0.000
300	0.33	0.45	0.14	0.80	0.014
400	0.19	0.41	0.08	0.41	0.000
500	0.28	0.40	0.13	0.61	0.001
600 (ref)					
Father's Occupation					
Senior civil servant	1.72	0.60	0.53	5.55	0.36
Junior civil servant	1.98	0.68	0.52	7.55	0.32
Small-scale self-employed	1.03	0.64	0.30	3.58	0.97
Large-scale self-employed	1.37	0.62	0.41	4.63	0.61
Unemployed(ref)					

Table 4.9 Binary logistic regression of respondents' factors on oral health practices (Contd)

Variable	OR	(SE)	95% CI (Lower)	95% CI (Upper)	p-value
Mother's Occupation					
Senior civil servant	0.75	0.88	0.13	4.16	0.74
Junior civil servant	0.87	0.90	0.19	5.08	0.88
Small-scale self-employed	1.16	0.87	0.25	7.51	0.72
Large-scale self-employed	0.66	0.89	0.12	3.79	0.64
House wife	1.55	0.95	0.24	9.91	0.64
Unemployed(ref)					
Highest Educational Level of father					
No formal education	0.78	0.90	0.13	4.59	0.79
Primary School	2.34	0.59	0.74	7.47	0.15
Secondary School	0.96	0.34	0.49	1.89	0.91
Tertiary School (ref)					
Highest Educational Level of mother					
No formal education	2.40	0.93	0.39	14.74	0.34
Primary School	0.46	0.51	0.17	1.23	0.13
Secondary School	1.37	0.33	0.72	2.67	0.34
Tertiary School (ref)					
Knowledge of oral health					
Good	0.30	0.42	0.25	1.83	0.60
Fair	0.56	0.39	0.26	1.21	0.14
Poor (ref)					
Attitudes toward oral health					
Positive	1.35	0.31	0.73	2.47	0.34
Negative (ref)					

Table 4.9 Binary logistic regression of respondents' factors on oral health practices (Contd)

Variable	OR	(SE)	95% CI (Lower)	95% CI (Upper)	p-value
Mother's Occupation					
Senior civil servant	0.75	0.88	0.13	4.16	0.74
Junior civil servant	0.87	0.90	0.19	5.08	0.88
Small-scale self-employed	1.36	0.87	0.25	7.53	0.72
Large-scale self-employed	0.66	0.89	0.12	3.79	0.64
House wife	1.55	0.95	0.24	9.93	0.64
Unemployed(ref)					
Highest Educational Level of father					
No formal education	0.78	0.90	0.13	4.59	0.79
Primary School	2.34	0.59	0.74	7.47	0.15
Secondary School	0.96	0.34	0.49	1.89	0.91
Tertiary School (ref)					
Highest Educational Level of mother					
No formal education	2.40	0.93	0.39	14.74	0.34
Primary School	0.46	0.51	0.17	1.25	0.13
Secondary School	1.37	0.33	0.72	2.62	0.34
Tertiary School (ref)					
Knowledge of oral health					
Good	0.80	0.42	0.35	1.83	0.60
Fair	0.56	0.39	0.26	1.21	0.14
Poor (ref)					
Attitudes toward oral health					
Positive	1.35	0.31	0.73	2.47	0.34
Negative (ref)					

4.7 Factors influencing dental caries status

Tables 4.10 and 4.11 show the association between respondents' characteristics and dental caries status. There was a significant variation in the dental caries status with study location of the students. Students of OAU had the best (13.3%) while students of UNIBEN had the poorest (38.4%) dental caries status ($p < 0.0001$).

Table 4.10 Association between respondents' characteristics and dental caries status

Variable	Dental Caries Status		P-Value
	Absent n (%)	Present n (%)	
Gender			
Male	362 (77.2)	107 (22.8)	0.686
Female	256 (76.0)	81 (24.0)	
Age Category			
<20	130 (74.3)	45 (25.7)	0.660
20-24	360 (76.6)	110 (23.4)	
>24	131 (78.4)	36 (21.6)	
School			
UI	134 (82.7)	28 (17.3)	<0.0001
UNIBEN	85 (61.6)	53 (38.4)	
UNILAG	181 (79.4)	47 (20.6)	
OAU	130 (86.7)	20 (13.3)	
UNIPORT	50 (68.5)	23 (31.5)	
BUK	41 (67.2)	20 (32.8)	
Study Level			
100	82 (68.3)	38 (31.7)	0.205
200	103 (73.6)	37 (26.4)	
300	113 (79.0)	30 (21.0)	
400	109 (80.1)	27 (19.9)	
500	105 (77.8)	30 (22.2)	
600	109 (79.0)	29 (21.0)	

Table 4.11 Association between respondents' characteristics and dental caries status
(Contd)

Variable	Dental Caries Status		P-Value
	Absent n(%)	Present n(%)	
Fathers Occupation			
Senior civil servant	348(77.0)	104(23.0)	0.133
Junior civil servant	44(89.8)	5(10.2)	
Small scale self employed	82(71.3)	33(28.7)	
Large scale self employed	118(75.6)	38(24.4)	
Unemployed	22(81.5)	5(18.5)	
Mother Occupation			
Senior civil servant	308(75.5)	100(24.5)	0.183
Junior civil servant	67(88.2)	9(11.8)	
Small scale self employed	126(72.4)	48(27.6)	
Large scale self employed	84(77.1)	25(22.9)	
House wife	20(76.9)	6(23.1)	
Unemployed	10(76.9)	3(23.1)	
Highest Educational Level Of Father			
No formal education	9(60.0)	6(40.0)	0.379
Primary school	34(75.6)	11(24.4)	
Secondary school	89(74.2)	31(25.8)	
Tertiary school	485(77.6)	140(22.4)	
Highest Educational Level Of Mother			
No formal education	18(81.8)	4(18.2)	0.228
Primary school	45(81.8)	10(18.2)	
Secondary school	108(70.6)	45(29.4)	
Tertiary school	444(77.2)	131(22.8)	
Knowledge of oral health			
Good	373(79.0)	81(27.6)	0.811
Fair	213(72.4)	11(23.9)	
Poor	35(76.1)	173(23.4)	
Attitudes toward oral health			
Positive	566(76.6)	18(24.7)	0.431
Negative	55(75.3)	45(21.5)	
Oral health Practices			
Bad practice	164(78.5)	45(21.5)	0.431
Good practice	457(75.8)	146(24.2)	

4.7.1 Factors influencing dental caries status (Contd)

Table 4.12 shows the association between study level and the occurrence of decayed, missing and filled teeth among the students. The decay component of the DMFT was decreased significantly from 22.4% in 100 level to 7.2% in 600 level ($p < 0.0001$) and the filled component increased significantly from 2.5% in 100 level to 13.1% in 600 level ($p < 0.018$).

Table 4.12 Association between study level and occurrence of decayed teeth, missing teeth and filled teeth

Study level	Decayed Teeth		Missing Teeth		Filled Teeth	
	Absent n (%)	Present n (%)	Absent n (%)	Present n (%)	Absent n (%)	Present n (%)
100	90(77.6)	26(22.4)	111(92.5)	9(7.5)	117(97.5)	3(2.5)
200	110(79.1)	29(20.9)	123(87.9)	17(12.1)	128(91.4)	12(8.6)
300	128(89.5)	15(10.5)	127(89.4)	15(10.6)	137(95.8)	6(4.2)
400	125(92.6)	10(7.4)	119(87.5)	17(12.5)	125(91.9)	1(8.1)
500	120(88.9)	15(11.1)	121(89.6)	14(10.4)	126(93.3)	9(6.7)
600	128(92.8)	10(7.2)	122(88.4)	16(11.6)	119(86.9)	18(13.1)
	$(p < 0.0001)$		$(p = 0.829)$		$(p = 0.018)$	

4.7.2 Factors influencing dental caries status (Contd)

Tables 4.13 and 4.14 show the multivariable analysis using binary logistic regression of respondents' factors on dental caries status. The analysis revealed that some of the categories of three variables show statistical significance. The variables and corresponding categories were school (UI and OAU); highest educational level of father (no formal education) and highest educational level of mother (primary school). UI students were 2.3 times less likely to have dental caries compared to BUK students (OR = 0.44, 95% CI: 0.20 – 0.94). OAU students were 2.9 times less likely to have dental caries compared to BUK students (OR = 0.34, 95% CI: 0.15 – 0.76). Participants whose fathers had no formal education were 13.3 times more likely to have dental caries compared to participants whose fathers had tertiary education (OR = 13.308, 95% CI: 2.25 – 78.87). Participants whose mothers had primary education as highest educational level were 3.5 times less likely to have dental caries compared to participants whose mothers had tertiary education (OR = 0.29, 95% CI: 0.08 – 0.99).

Table 4.13 Binary logistic regression of respondents' factors on dental caries status

Variable	OR	(SE)	95% CI Lower	95% CI Upper	P-Value
Gender					
Male	0.72	0.206	0.48	1.08	0.11
Female (ref)					
Age group					
<20	1.00	0.420	0.44	2.27	0.99
20 – 24	1.19	0.287	0.68	2.08	0.56
>24 (ref)					
School					
UI	0.43	0.393	0.20	0.94	0.03
UNIBEN	1.51	0.375	0.73	3.16	0.27
UNILAG	0.59	0.379	0.28	1.25	0.17
OAU	0.34	0.410	0.15	0.76	0.01
UNIPORT	1.00	0.432	0.43	2.33	1.00
BUK (ref)					
Study level					
100	1.57	0.460	0.64	3.86	0.33
200	0.99	0.416	0.44	2.24	0.99
300	0.87	0.384	0.41	1.84	0.71
400	0.84	0.349	0.42	1.66	0.61
500	1.17	0.322	0.62	2.20	0.63
600 (ref)					
Father's Occupation					
Senior civil servant	1.62	0.656	0.45	5.87	0.46
Junior civil servant	0.45	0.825	0.09	2.28	0.34
Small-scale self-employed	1.82	0.694	0.47	7.11	0.39
Large-scale self-employed	1.51	0.680	0.40	5.73	0.54
Unemployed(ref)					

Table 4.14 Binary logistic regression of respondents' factors on dental caries status (Contd)

Variable	OR	(SE)	95% CI Lower	95% CI Upper	P-Value
Mother's Occupation					
Senior civil servant	1.03	0.87	0.19	5.61	0.97
Junior civil servant	0.40	0.93	0.06	2.49	0.33
Small-scale self-employed	0.94	0.86	0.17	5.03	0.94
Large-scale self-employed	0.82	0.88	0.15	4.61	0.82
House wife	1.13	0.92	0.19	6.87	0.89
Unemployed(ref)					
Highest Educational Level of father					
No formal education	13.31	0.91	2.25	78.87	0.004
Primary School	2.97	0.60	0.92	9.63	0.07
Secondary School	1.25	0.35	0.63	2.48	0.52
Tertiary School (ref)					
Highest Educational Level of mother					
No formal education	0.18	0.94	0.03	1.13	0.07
Primary School	0.29	0.63	0.08	0.99	0.049
Secondary School	1.24	0.33	0.65	2.38	0.51
Tertiary School (ref)					
Knowledge of oral health					
Good	1.17	0.45	0.48	2.84	0.73
Fair	1.72	0.43	0.75	3.98	0.20
Poor (ref)					
Attitudes toward oral health					
Positive	1.06	0.33	0.55	2.03	0.87
Negative(ref)					
Oral health practices					
Good	0.72	0.22	0.47	1.11	0.14
Bad (ref)					

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

The past fifty years may have witnessed a reduction in the severity and prevalence of oral diseases among the population of the developed countries (Holst et al, 1997). This is because dental care has been systematically organized in these developed countries to improve dental health attitudes and behaviours among children and adolescents (Holst et al, 1997). This development has improved children's and adolescents' oral health and changed the dental caries pattern affecting them (Holst et al, 1997; Jalevik et al, 1999). It also resulted in more adults being able to keep their natural dentition functional into a later age (Holst et al, 1997; Jalevik et al, 1999; Downer, 1991). Unfortunately, this is not the case in many developing countries, like Nigeria (Maania and Mumghamba, 2004; Taani, 2001).

Dentists play an important role in the improvement of the public's oral health education. Therefore, acquiring knowledge and attitudes related to dental health and the prevention of oral disease is very important during the future dentists' training period (Bertolami, 2001).

5.1.1 Socio-demographic characteristics

In this study, the males were more than the females. This reflects the ratio of the number of students in the study population which is in favor of the males. The reverse was the case in one study among undergraduate dental students in Pakistan (Umerubab, 2013), where the male to female ratio was found to be 2:3. The mean age of respondents was similar to that found in a study of dental students at the University of Zagreb, Croatia, in which the mean age was reported

to be 22.3 ± 2.6 years (Badovinac et al, 2013). It was however less than that found (25 ± 7.1 years) in a study of dental students in Ajman University (Al-Mashhadani and Hashim, 2006).

5.1.2 Dental Caries Status

The overall caries experience observed in this study was low and much better than those observed in many other studies among undergraduate dental students in different Universities in other countries where the values observed range from 1.38 ± 0.54 (Umerubab et al, 2013) to 8.5 ± 6.8 (Al-Mashhadani and Hashim, 2006). The statistics available in Nigeria show that there is a low value of DMFT (lower than expected globally) but it is gradually on the increase (Adegbembo et al, 1995). The overall prevalence of dental caries among the participants was better and exactly half of that determined by Ma et al among undergraduate University students in which the prevalence rate was found to be 48% (Ma et al, 2007).

5.1.3 Knowledge of Oral Health

The respondents had good knowledge of oral health. This finding regarding the oral health knowledge of the undergraduate dental students in Nigeria were in consonance with the results of similar surveys carried out in some other countries (Neeraja et al, 2011). This finding was however not in agreement with that of a similar survey (Al-Zarea, 2013).

In general, good knowledge of oral health was commoner in studies involving dental students than those involving other University students (Al-Batayneh et al, 2014; Al-Ansani et al, 2003; Baseer et al, 2012). This finding is probably due to the fact that dental students are generally motivated to maintain good oral health. The latter was also reported in a 2013 study of the undergraduate dental students of Lahore medical and dental college (Umerubab et al, 2013). This study further demonstrated a significant association between knowledge of oral health and study

level of respondents (Appendix VI). This implies that dental education has a positive influence on the knowledge of oral health.

5.1.4 Attitudes toward Oral Health

Majority of the respondents had positive attitudes toward oral health and only a few had negative attitudes. These findings were in keeping with findings from most other studies (Neeraja et al, 2011; Baseer et al, 2012; Sato et al, 2013; Dogan, 2013).

This study further demonstrated a significant association between sex and study level on one hand and attitudes toward oral health on the other hand (appendix VII). Female dental students showed significantly better attitudes than their male colleagues. This finding may be explained on the basis that females usually are more aesthetically conscious. They would be more interested in visiting the dentist and would tend to be better informed about their oral health even before entering a course related to dentistry (Kawamura et al, 2000). This finding was in consistence with those of previous surveys in different countries of the world (Al- Omari et al, 2005; Rahman and Kawas, 2013; Al- Washadni et al, 2004; Petersen et al, 2004; Kawamura et al, 2000). Study level of the participants was the major factor influencing attitudes toward oral health in this study. There was an improvement in the attitudes toward oral health with increase in the study level. Some other studies of dental students in other countries reported the same relationship (Neeraja et al, 2011).

5.1.5 Oral Health Behaviour

The oral health behaviour of the undergraduate dental students in Nigeria was generally fair on the average. Similar finding was also recorded in some other surveys of dental students in other countries (Al-Mashhadani and Hashim, 2006; Rahman and Kawas, 2013; Dogan, 2013). This

finding was also in agreement with that of a similar survey among senior dental students in Nigeria. Oral health behaviour was reported to be poor in several other Nigerian studies among nursing students in University of Nigeria teaching hospital (Udoye and Aguwa, 2008), among medical house officers in Benin City (Azodo & Unamatokpa, 2012) and among 12 to 15-year-old school children in Benin City (Okeigbemen, 2004). The latter concluded that although the prevalence of dental caries in the study area was very low, poor dental practices and dietary habits were likely to increase this prevalence. It stressed the need for continuous monitoring and establishment of preventive programs.

5.1.6 Factors Influencing Oral Health Behaviour

The bivariate analysis revealed that oral health practices were generally improved with age, study level and knowledge of oral health of respondents. This implies that constant exercises and growing knowledge in the field of the profession reflects a growing capability to perform good oral health behaviour. The improvement in oral health behaviour with age is probably due to increasing level of education with age. Study level and knowledge of oral health were also found to be positively associated with oral health behaviour ($p < 0.05$) in similar survey of dental students in Nigeria and beyond (Folayan et al, 2013; Neeraja et al, 2011; Sato et al, 2013; Badovinac et al, 2013). Age of respondents was also found to be associated with oral health behaviour ($P < 0.001$) in a study of the determinants of preventive oral health behaviour among senior dental students in Nigeria (Folayan et al, 2013). Gender and socio-economic factors were not significantly associated with oral health behaviour in this study. However, gender and socio-economic factors were found to be significantly associated with oral health behaviour in a few other studies (Shekar et al, 2011; Azodo and Unamatokpa, 2012).

The multivariable analysis revealed that the only statistically significant predictor of oral health behaviour is the study level of respondents. Those in 100, 200, 300, 400 and 500 levels were less likely to practice good oral health compared to the 600 level students. The courses in clinical dentistry taken by year-6 dental students and their exposures to dental clinics may have contributed to the improvement observed in their preventive oral health behaviour.

5.1.7 Factors Influencing Dental Caries Status

The bivariate analysis revealed that only one of the predictive factors (location of study) significantly influenced the dental caries status. Students of OAU had the best oral health status while students of UNIBEN had the poorest.

However, the multivariate analysis revealed that some of the categories of three variables (predictors) show statistical significance. The variables and corresponding categories were school (UI and OAU); highest educational level of father (no formal education) and highest educational level of mother (primary school). UI and OAU students were less likely to have dental caries compared to BUK students. Participants whose fathers had no formal education were more likely to have dental caries compared to participants whose fathers had tertiary education. This may be due to the fact that educational level of fathers correlates positively with the care received by their children, which includes dental health care. The latter has been attributed to increased awareness and efforts at securing dental care as a result of improved affordability associated with people of higher socio-economic status. This finding corroborates those of previous reports (Noah, 1986; Adenubi, 1983; Masayuki et al, 2012). This was however not the case with the educational level of respondents' mothers. Participants whose mothers had primary education as highest educational level were less likely to have dental caries compared to

participants whose mothers had tertiary education. This unexpected but interesting result could be as a result of the fact that the higher the educational level of mothers, the less the time they spend with their children and thereby less care received by their children from them, including dental health care. This should not be surprising in a survey of University students who are no longer receiving such care from their mothers, since the DMFT index used in assessing the dental caries status measures the total lifetime caries experience of an individual or a population (Hiremath, 2011). This implies that the present dental caries status of the students might just be a reflection of their caries status as children.

Although there was no significant difference in the dental caries status when measured by the mean DMFT score among the different professional years, the decay component of the mean DMFT was significantly decreased from 100 level to 600 level and the filled component significantly increased from 100 level to 600 level, reflecting positive influence of their dental education on their oral health status. A similar finding was observed in a DMFT index study among undergraduate dental students of Lahore medical and dental college (Pakistan) in different professional years of dentistry (Umerubab et al, 2013), which also reported that dental students completed their undergraduate training period with higher number of treated teeth. This has been attributed to their motivation and good perception of their dental health.

5.1.8 Study Limitations

The data for the study relied partly on the information received from the respondents and so there may be overestimations or underestimations but, the explicit nature of the questions may have reduced its impact on the results. The missing (M) component of the DMFT might have been

overestimated since some of the teeth recorded as missing might not have been due to dental caries.

5.2 CONCLUSION

The knowledge of oral health and the attitudes toward oral health among the Nigerian undergraduate dental students were good, but their oral health behaviour was only just fair. The oral health behaviour of the students was significantly influenced by age, location of study, level of education and knowledge of oral health of respondents.

The dental caries status of the students was good. The status was significantly influenced by location of study and highest educational level of parents.

Although the dental caries status was good, bad oral health behaviour and dietary habits are likely to worsen the status.

5.3 RECOMMENDATIONS

1. Based on the findings of this study, changes may be suggested to improve the dental curriculum, such as practical sessions to supplement preventive dentistry courses and persistent reinforcement of oral hygiene during the six-year dental education period.
2. As part of their curriculum, dental students should start learning about preventive aspects of oral health as early as their first year in the university.
3. The students should be taught dental plaque control, tooth brushing techniques and flossing as early as first year in the University.
4. It is also important that dental hygienists take an active role in educating students in the aspect of oral health.
5. Finally, it is necessary to put more emphasis on the teaching of prevention in the dental faculty and especially on finding the best way to transmit the message of oral health promotion.

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APPENDIX I

QUESTIONNAIRE

DENTAL CARIES STATUS AND ORAL HEALTH BEHAVIOUR AMONG UNDERGRADUATE DENTAL STUDENTS IN NIGERIAN UNIVERSITIES

My dear dental students,

I am a lecturer in the Department of Oral Diagnosis and Radiology, School of Dentistry, University of Benin and a post-graduate student of the Department of Epidemiology and Medical Statistics, Faculty of Public Health, University of Ibadan. Your cooperation in completing this questionnaire will be highly appreciated. Purpose is to determine your dental caries status and your oral health-related knowledge, attitudes and practices. All information will be treated with strict confidentiality. Thank you.

Instructions

Please read each question carefully before answering. Kindly answer all questions. There is no right or wrong answer.

SECTION A: SOCIO-DEMOGRAPHIC DATA

1. Sex: A. Male B. Female
2. Age as at last birthday: _____
3. School: A. UI B. UNIBEN C. UNILAG D. OAU
E. UNIPORT F. BUK
4. Study level: A. 100 B. 200 C. 300 D. 400 E. 500 F. 600
5. Father's Occupation (before retirement, if retired):
 - A. Senior civil servant
 - B. Junior civil servant
 - C. Small-scale self-employed

- D. Large-scale self-employed
 - E. Unemployed
6. Mother's Occupation (before retirement, if retired):
- A. Senior civil servant
 - B. Junior civil servant
 - C. Small-scale self-employed
 - D. Large-scale self-employed
 - E. House wife
 - F. Unemployed.
7. Highest Educational Level of father:
- A. No formal education
 - B. Primary School
 - C. Secondary School
 - D. Tertiary School
8. Highest Educational Level of mother:
- A. No formal education B. Primary School
 - C. Secondary School D. Tertiary School

SECTION B: KNOWLEDGE OF ORAL HEALTH

9. Does plaque (soft debris) accumulate on tooth surfaces after brushing?
- A. Yes B. No C. I don't know
10. Plaque could lead to dental caries.
- A. Yes B. No C. I don't know
11. Brushing teeth prevents tooth decay. A. Yes B. No C. I don't know
12. What causes tooth decay? A. Worms B. Magic C. Sugar. D. I don't know
- E. Others (specify) _____
13. Using fluoride strengthens the teeth. A. Yes B. No C. I don't know
14. What is dental plaque?
- A. Build-up of bacteria
 - B. Build-up of calculus (Calcified plaque)
 - C. Discoloured tooth surface

- D. I don't know
15. How important is dental plaque in relation to caries/tooth decay?
- A. Important
 - B. Not important
 - C. I don't know
16. How important is sugar in relation to caries/tooth decay?
- A. Important
 - B. Not important
 - C. I don't know
17. How important is bacteria in relation to caries/tooth decay?
- A. Important
 - B. Not important
 - C. I don't know
18. Which one of these activities is best for preventing caries / tooth decay?
- A. Limiting sugary snacks. B. Chewing sugarless gum
 - C. Brushing with fluoride toothpaste D. Use of mouth wash E. I don't know
19. What is the purpose of fluoride? A. Prevent caries / tooth decay B. Help clean teeth
- C. Remove discoloration from teeth D. I don't know
20. Does dental plaque cause inflammation of the gums? A. Yes B. No C. I don't know
21. Does sweet affect dental health? A. Yes B. No C. I don't know
22. Does dental caries affect aesthetics? A. Yes B. No C. I don't know
23. What is the most important initiating factor of periodontal disease?
- A. Bacterial plaque B. Dental calculus C. Malnourishment D. Hereditary E. Diabetes
 - F. Infection G. I don't know
24. What is the most effective measure to prevent periodontal disease?
- A. Use toothbrush and dental floss
 - B. Good nourishment
 - C. Regular visits to the dentist
 - D. Mouth wash.
25. Is there any relationship between gum disease and diabetes?
- A. Yes B. No C. I don't know

26. Is there any relationship between gum disease and heart disease?

- A. Yes B. No C. I don't know

27. Is there any relationship between gum disease and smoking?

- A. Yes B. No C. I don't know

28. Periodontal disease increase the risk of which of the following medical conditions?

- A. Heart diseases B. Leukaemia C. Stroke D. Low birth-weight babies

- A. Hormonal imbalance F. I don't know

SECTION C: ATTITUDES TOWARD ORAL HEALTH

For each of the items in this section, tick:

A. If you AGREE

B. If you are NOT SURE

C. If you DISAGREE

ITEM NO.	QUESTION	A	B	C
29	Regular visits to the dentist are necessary			
30	Patients should decide the type of treatment they receive			
31	Treatment of the teeth is as important as any other part of the body			
32	It is important to visit the dentist whether there is pain or not			
33	It is not necessary to border about the colour of our teeth			
34	The toothbrush is an oral hygiene aid			
35	Dental floss is not a useful oral hygiene aid			
36	Smoking has harmful effects on oral health			
37	Tooth ache is the main reason for visiting a dental clinic			
38	Fear of pain is the main reason for avoiding or not visiting the dentist			
39	The dentist should explain the procedure to patient before treatment			
40	"I think I can clean my teeth well without using toothpaste"			

SECTION D: PRACTICE OF ORAL HEALTH

42. How many times do you brush your teeth in a day? A. Once B. Twice
C. More than twice D. None
43. When do you brush your teeth? A. Morning B. Noon(after lunch) C. Before going to bed.
44. For how long do you brush your teeth? A. Less than one minute
B. One minute C. Two minutes D. More than two minutes.
45. Do you use dental floss regularly? A. Yes B. No
46. Do you use toothpaste with fluoride when you brush your teeth?
A. Yes - every time B. Yes – sometimes
C. No D. I don't know
47. How often do you visit your dentist?
A. Regularly every 6 to 12 months B. Occasionally
C. When I have tooth ache D. I never visit a dentist.
48. How often do you consume sugary snacks?
A. More than twice daily B. Twice daily
C. Once daily D. Less than once a day.
49. Do you use mouth rinse on a regular basis? A. Yes B. No
50. Do you brush each tooth carefully while cleaning your teeth? A. Yes B. No

WHICH OF THE FOLLOWING (51 – 57) DO YOU USE IN CLEANING YOUR TEETH (MORE THAN ONE ANSWER ARE ALLOWED):

51. Toothbrush A. Yes B. No

52. Toothpaste containing fluoride A. Yes B. No

53. Any toothpaste (fluoride or no fluoride) A. Yes B. No

54. Dental floss A. Yes B. No

55. Chewing stick A. Yes B. No

56. Toothpick A. Yes B. No

57. Mouth wash A. Yes B. No

SECTION E: ORAL EXAMINATION

58. Decayed (D): _____

59. Missing (M): _____

60. Filled (F): _____

61. Caries Index: _____

APPENDIX II

INFORMED CONSENT FORM

Title of the Research: Dental caries Status and Oral Health Behaviour among Undergraduate Dental students in Nigerian Universities

Name and Affiliation of Research: This research is being conducted by Dr. L. O. Igbiosa of the School of Dentistry, University of Benin, and M.Sc. student of the department of Epidemiology and Medical Statistics, Faculty of Public Health, University of Ibadan.

Sponsor of Research: This study is self-sponsored.

Purpose of Research: The purpose of this study is to find out the factors that influence oral health behaviour and dental caries status among dental students.

Procedure of the Research, what shall be required of each participant and approximate total number of participants that would be involved in the research: A total of 875 participants will be recruited into this study throughout the country. Each participant is expected to fill the first four sections of the questionnaire that you would be given (Sections A, B, C and D). The last section (Section E) will be completed by one of the examiners after looking into your mouth.

Expected duration of research and of participant(s)' involvement: This research is expected to last for six weeks. You are expected to spend about 30 minutes with our questionnaire. Any of the examiners will meet you at any point and take about one minute of your time to complete section E of the questionnaire after looking into your mouth.

Risk: Your involvement in this study is not associated with any risks, as the oral examination is merely that of inspection. No invasive procedure.

Costs to the participants, if any, of joining the research: Your participation in this research will not cost you anything, apart from the time we are spending with you.

Benefit(s): The goal of this research is to find ways of improving dental education in order to train students who are better placed to motivate patients to adopt good oral hygiene.

Confidentiality: All information collected in this study will be given code numbers and no name will be recorded. This cannot be linked to you in anyway and your name or any identifier will not be used in any publication or reports from this study.

Voluntariness: Your participation in this research is entirely voluntary.

Alternatives to participation: If you choose not to participate, this will not affect you in any way.

Due inducement(s): You will not be paid any fees for participating in this research.

What happens to research participants and institutions when the research is over: The researchers will inform you of the outcome of the research through a news bulletin.

Statement of person obtaining informed consent: I have fully explained this research to _____ and have given sufficient information, including about risks and benefits, to make an informed decision.

DATE: _____

SIGNATURE: _____

NAME: Dr. Lawrence O. Igbiosa.

Statement of person giving consent: I have read the description of the research. I understand that my participation is voluntary. I know enough about the purpose, methods, risks and benefits of the research study to judge that I want to take part in it. I understand that I may freely stop being part of this study at any time. I have received a copy of this consent form and additional information sheet to keep for myself.

DATE: _____

SIGNATURE: _____

NAME: _____

In addition, if you have any question about your participation in this research, you can contact the principal investigator, Name; Dr. Lawrence O. Igbiosa

Department: Epidemiology and medical Statistics. Phone: 08038101970.

Email: surglaw@yahoo.com

PLEASE KEEP A COPY OF THE SIGNED INFORMED CONSENT.

APPENDIX III

Sample Size Determination (Other Objectives)

Sample sizes were determined for each of the research objectives. The largest sample size which satisfies all the research objectives was used. The determinations of other sample sizes that were not used in this study, that were based on other objectives, are shown below:

1. **Based on the objective to determine the prevalence of dental caries among the participants:** Sample size was determined using the formula for cross-sectional study, for qualitative outcome (Lemeshow et al, 1990):

$$n = \frac{z^2_{\alpha} P(1 - P)}{d^2}$$

Where:

n = the desired minimum sample size

Z_{α} = the value of the standard normal deviate corresponding to specified confidence level.

$Z_{\alpha} = 1.96$, corresponding to a 95% confidence level.

P = the estimated proportion of dental students with dental caries = 48% = 0.48 (Ma et al, 2007)

$d = 0.04$ = desired level of precision

A sample size of 599 was obtained from the above formula as shown below:

$$\begin{aligned} n &= 1.96^2 \times 0.48 \times 0.52 / 0.04^2 \\ &= 599 \end{aligned}$$

2. **Based on the objective to assess the oral health behaviour among the participants:**

Sample size was determined using the formula for cross-sectional study, for qualitative outcome (Lemeshow et al, 1990):

$$n = \frac{z^2_{\alpha} P(1 - P)}{d^2}$$

Where:

n = the desired minimum sample size

Z_{α} = the value of the standard normal deviate corresponding to specified confidence level.

$Z_{\alpha} = 1.96$, corresponding to a 95% confidence level.

P = the estimated proportion of dental students that have good oral health behaviour = 35% =
0.35 (Lavanya et al, 2012)

$d = 0.04$ = desired level of precision

A sample size of 546 was obtained from the above formula as shown below:

$$n = 1.96^2 \times 0.35 \times 0.65 / 0.04^2$$
$$= 546$$

APPENDIX IV

Summary of the total (N) and the selected (n) number of students in each of the study levels in all the six schools of study

STUDY LEVEL	UI		UNIBEN		UNILAG		OAU		UNIPORT		BUK	
	N	n	N	n	N	n	N	n	N	n	N	n
100	28	21	23	17	50	37	26	19	20	15	67	50
200	32	24	20	15	52	39	32	24	27	20	50	37
300	33	25	20	15	77	58	32	24	33	25	26	19
400	28	21	20	15	66	49	13	10	23	17	25	19
500	35	26	40	30	49	37	33	25	16	12	7	5
600	33	25	32	24	55	41	38	28	10	7	0	0
Total	189	142	155	116	349	261	174	130	129	96	175	130

APPENDIX V

Determination of inter-examiner variability in UNIBEN

Caries Experience			
Examiner	Decayed	Missing	Filled
1	1	0	0
2	1	0	0
3	1	0	0
4	1	0	0
5	1	0	0
R_i	5	0	0
R_i^2	25	0	0

$$b = 5$$

$$k = 3$$

$$\sum R_i^2 = 25$$

By substitution into the formula below:

$$W = \frac{12 \sum R_i^2 - 3b^2 k(k+1)^2}{b^2 k (k^2 - 1)}$$

$$W = -5.5$$

Using Chi-square:

$$\chi^2 = b(k-1)W$$

$$\chi^2 = -55$$

Using the Chi-square distribution table,

$$\chi^2_{k-1, 0.95} = \chi^2_{2, 0.95} = 5.991$$

Since $-55 < 5.991$, we accept H_0 : that there is no difference, i.e. no variation, meaning there is agreement among the examiners.

APPENDIX VI

Association between study level and knowledge of oral health

The table below shows that there was a significant association between study level and knowledge of oral health ($p < 0.0001$). Knowledge of oral health increased with study level of respondents. About 23% of those in 100 level had good oral health, while about 99% of those in 600 level had good oral health.

Study Level	Knowledge of Oral Health			P-Value
	Good	Fair	Poor	
100	27 (22.5%)	76 (63.3%)	17 (14.2%)	<0.0001
200	31 (22.1%)	95 (67.9%)	14 (10.0%)	
300	51 (35.7%)	81 (56.6%)	11 (7.7%)	
400	98 (72.1%)	35 (25.7%)	3 (2.2%)	
500	129 (95.6%)	6 (4.4%)	0 (0.0%)	
600	136 (98.6%)	1 (0.7%)	1 (0.7%)	

APPENDIX VII

Association between respondents' characteristics and attitudes toward oral health

The table below shows that there was a significant association between study level ($p < 0.0001$) and sex (0.034) on one hand and attitudes toward oral health on the other hand. About 78% of those in 100 level had positive attitudes toward oral health, whereas about 99% of those in 600 level had positive attitudes toward oral health. About 89% of the male respondents had positive attitudes toward oral health, whereas about 94% of the female respondents had positive attitudes toward oral health.

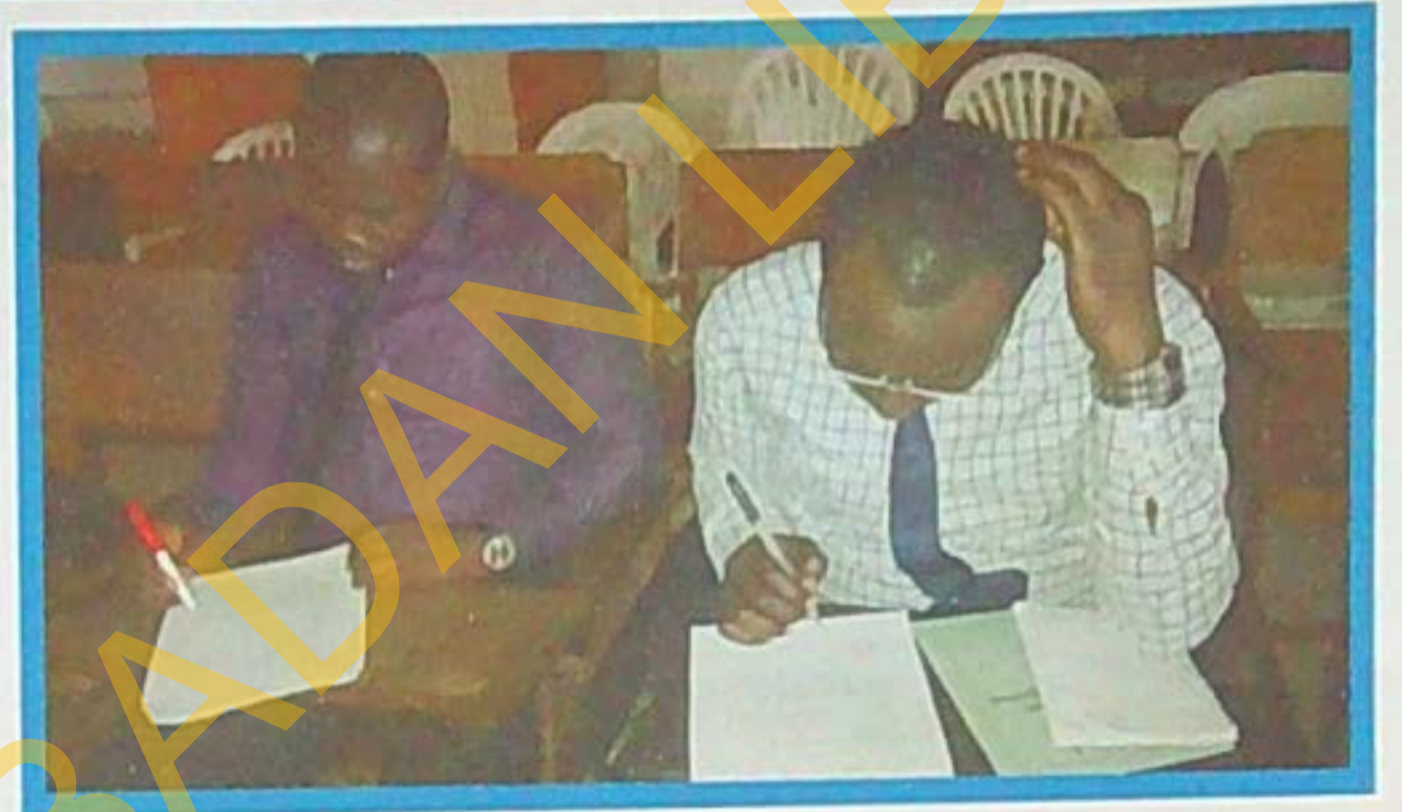
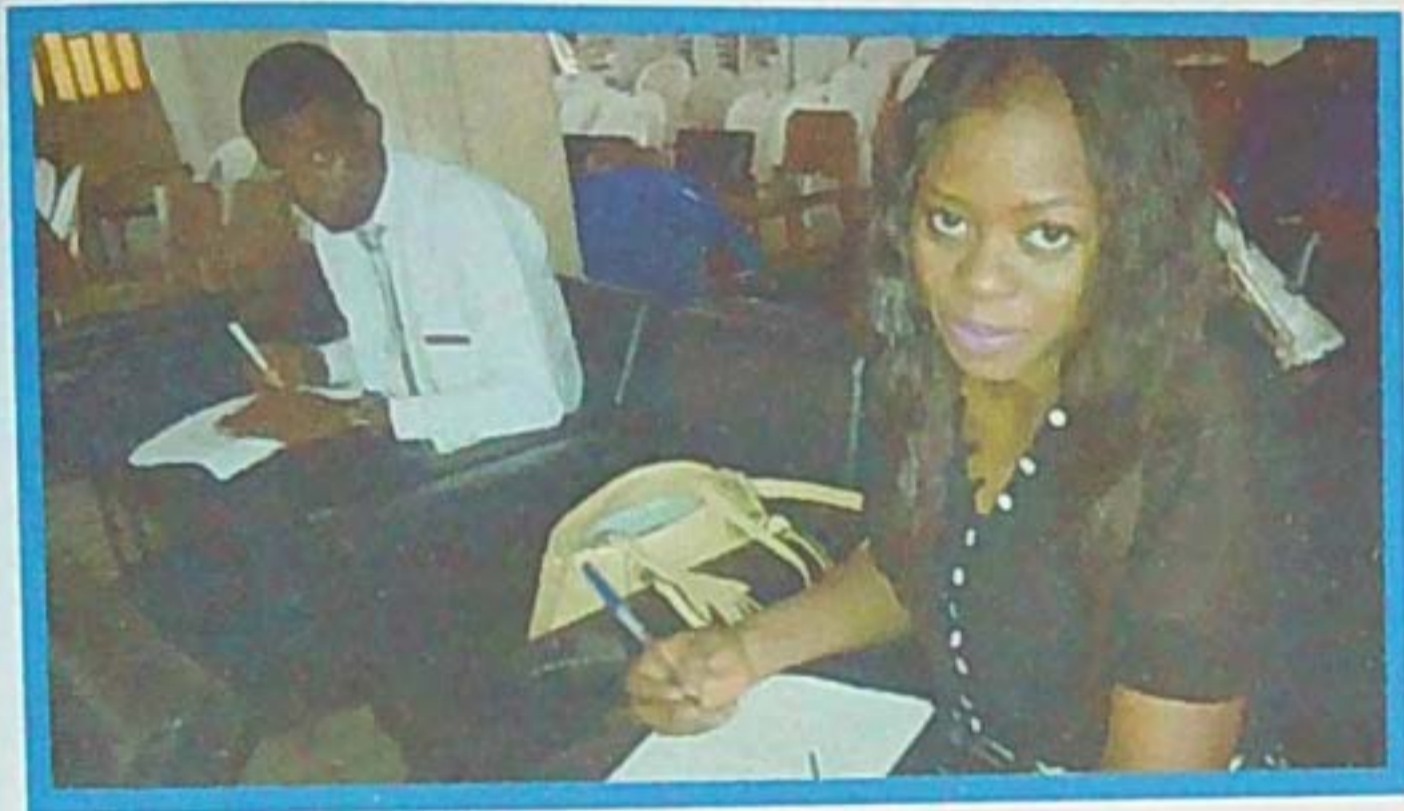
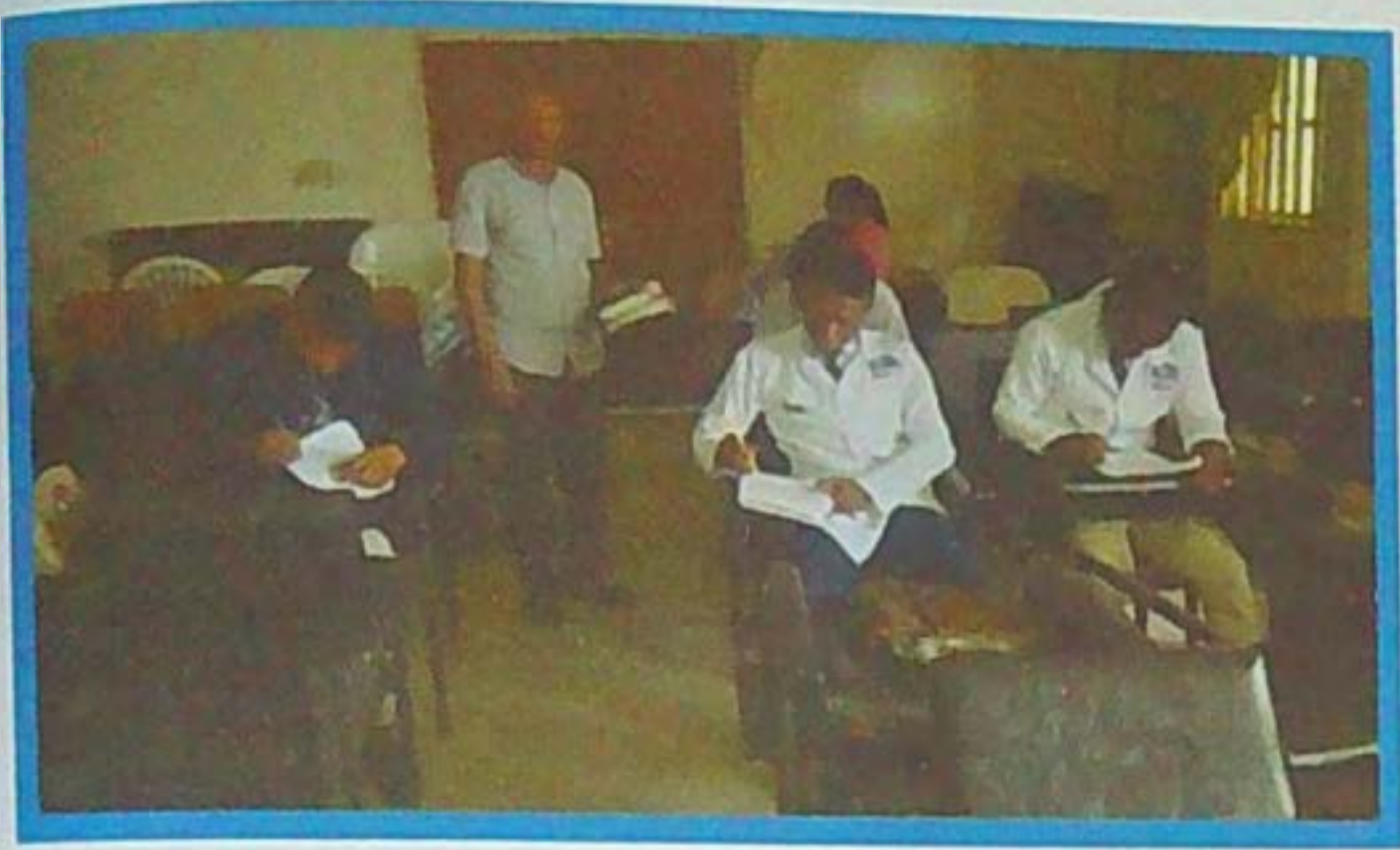
Variable	Attitudes toward Oral Health		P-Value
	Positive	Negative	
Study level			
100	94(78.3%)	26(21.7%)	<0.0001
200	129(92.19%)	11(7.9%)	
300	121(84.6%)	22(15.4%)	
400	131(96.3%)	5(3.7%)	
500	128(94.8%)	7(5.2%)	
600	136(98.6%)	2(1.4%)	
Gender			
Male	418(89.1%)	51(10.9%)	0.034
Female	315(93.5%)	22(6.5%)	

APPENDIX VIII

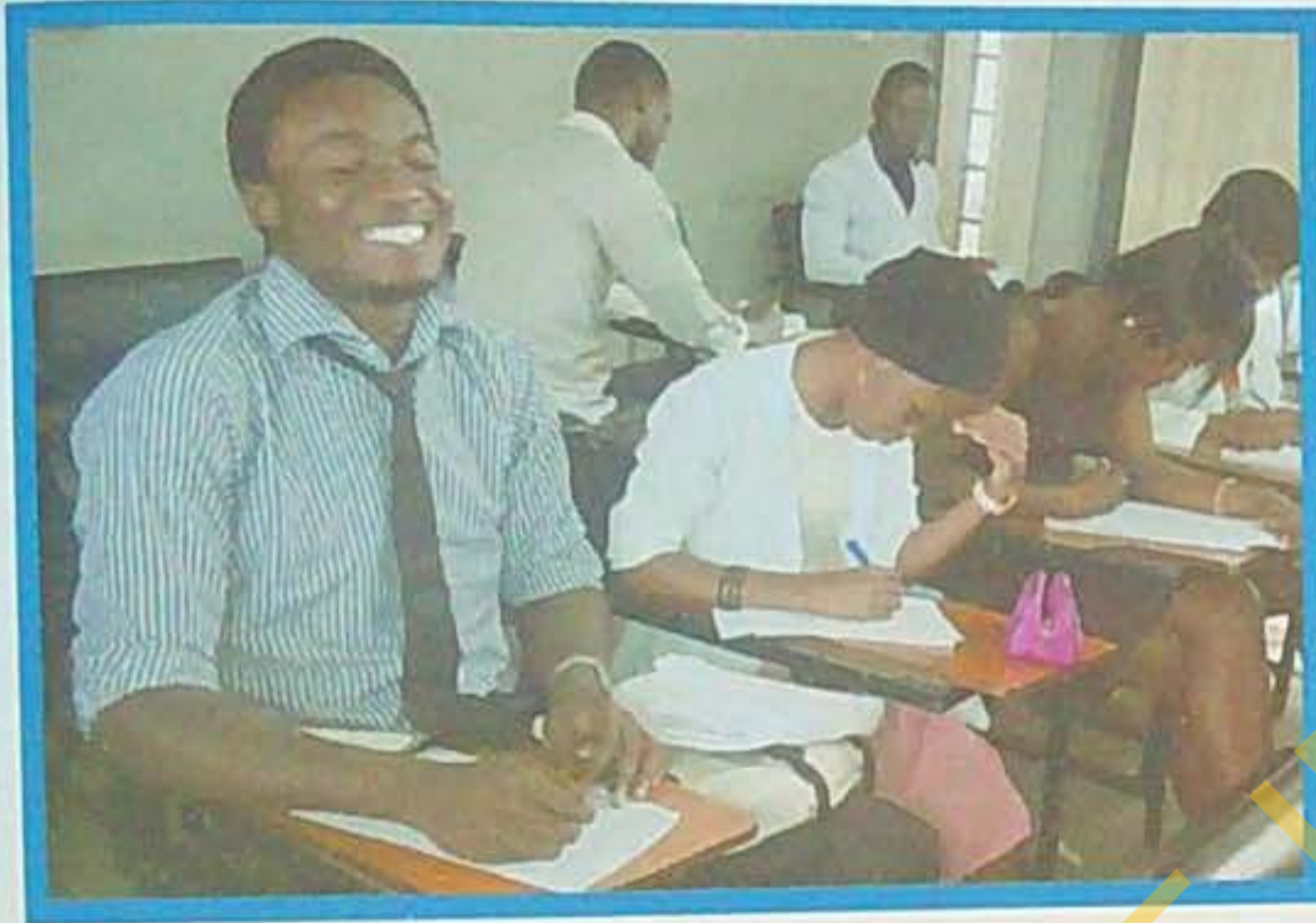
PICTURE OF THE PRINCIPAL INVESTIGATOR ON FIELD-WORK



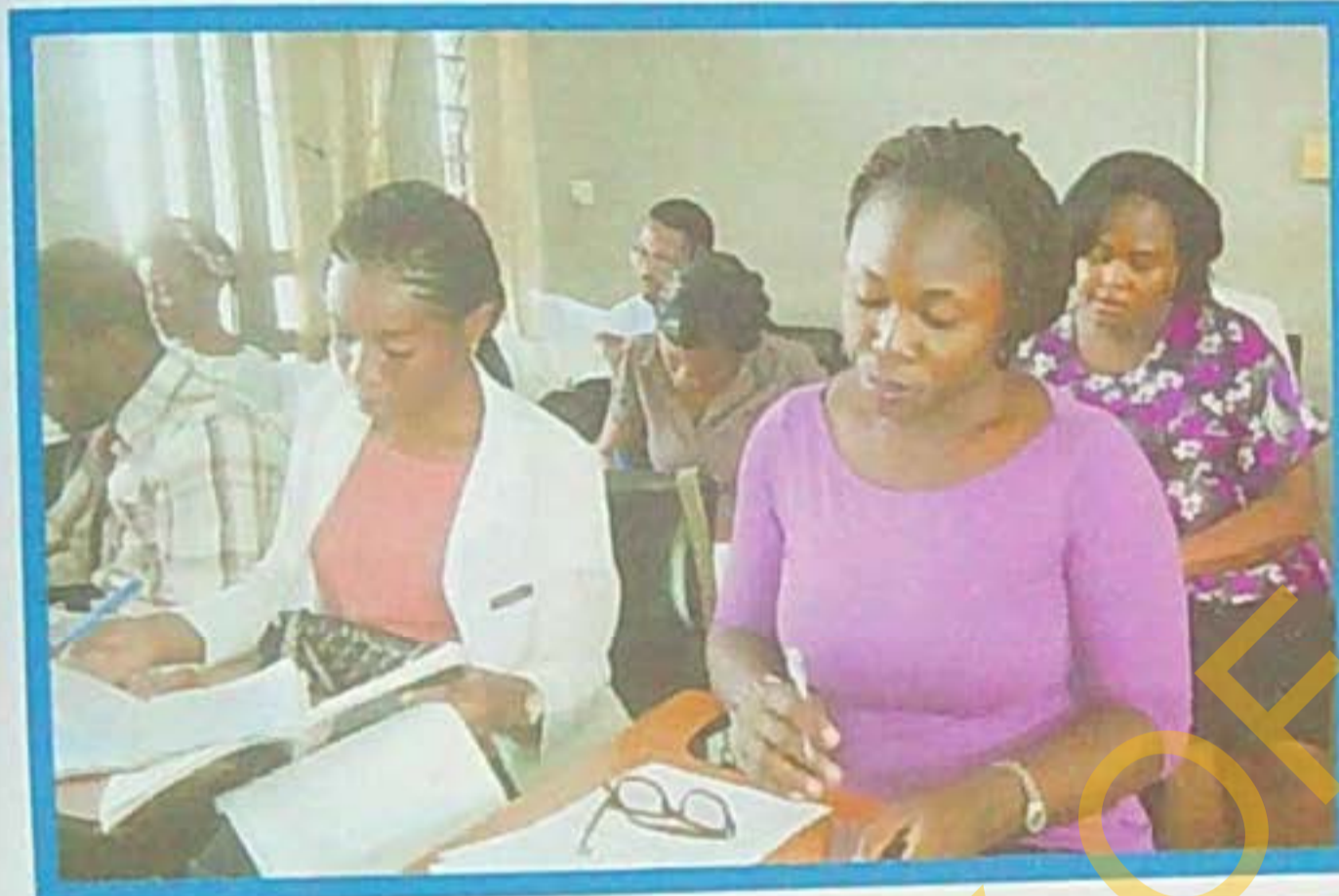
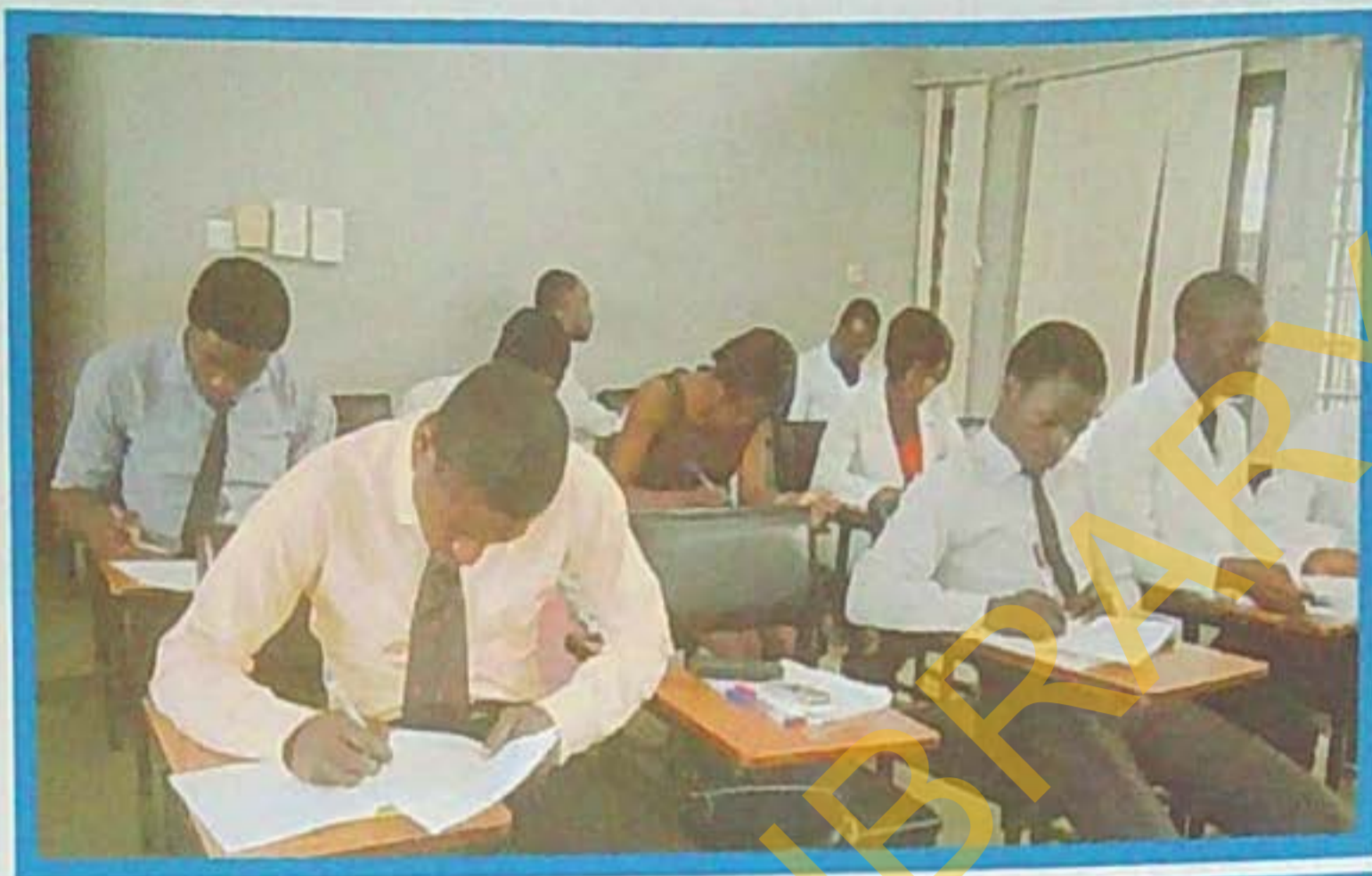
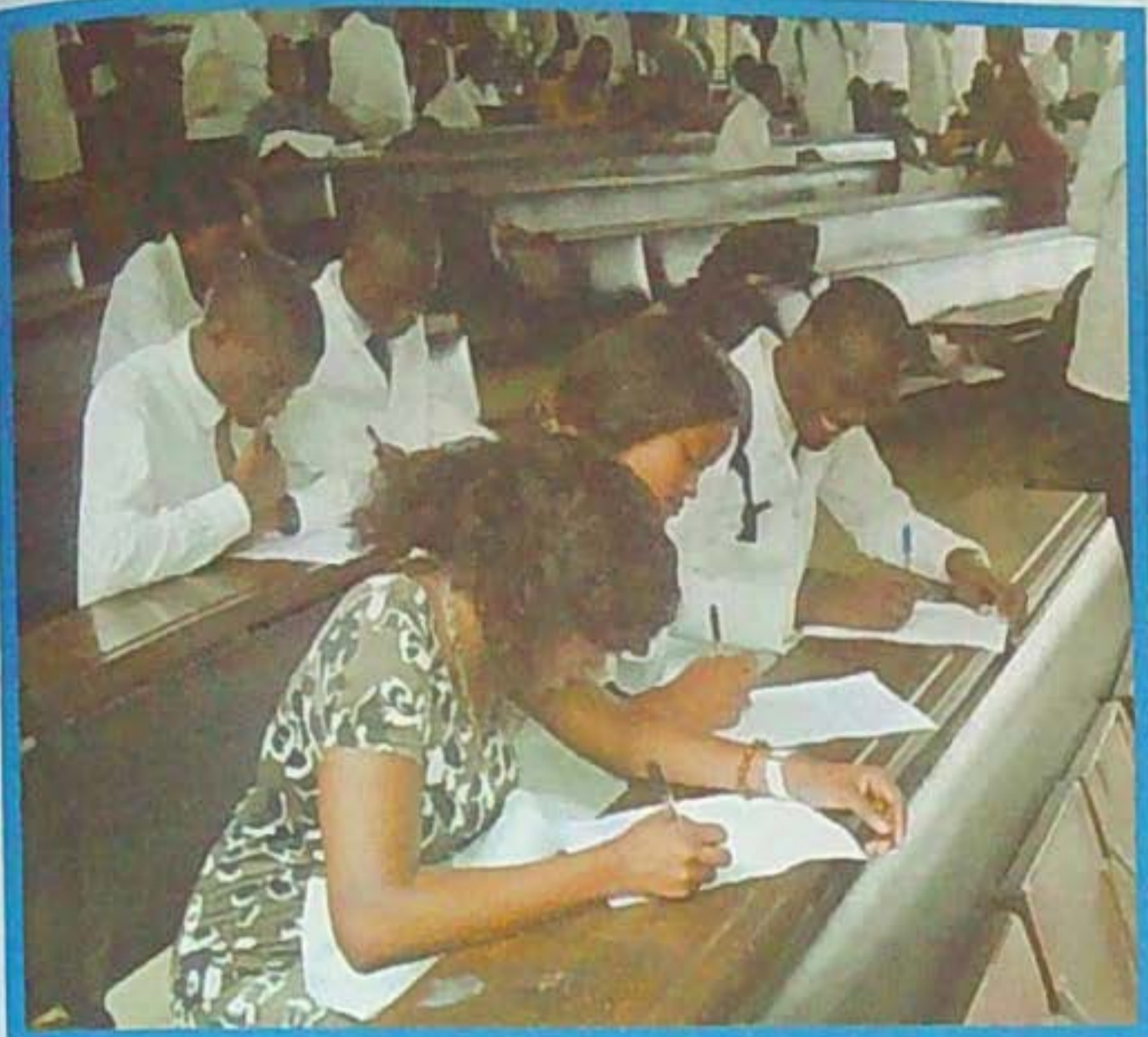
STUDENTS IN THEIR CLASSES ATTENDING TO THE QUESTIONNAIRES



STUDENTS IN THEIR CLASSES ATTENDING TO THE QUESTIONNAIRES (Contd)

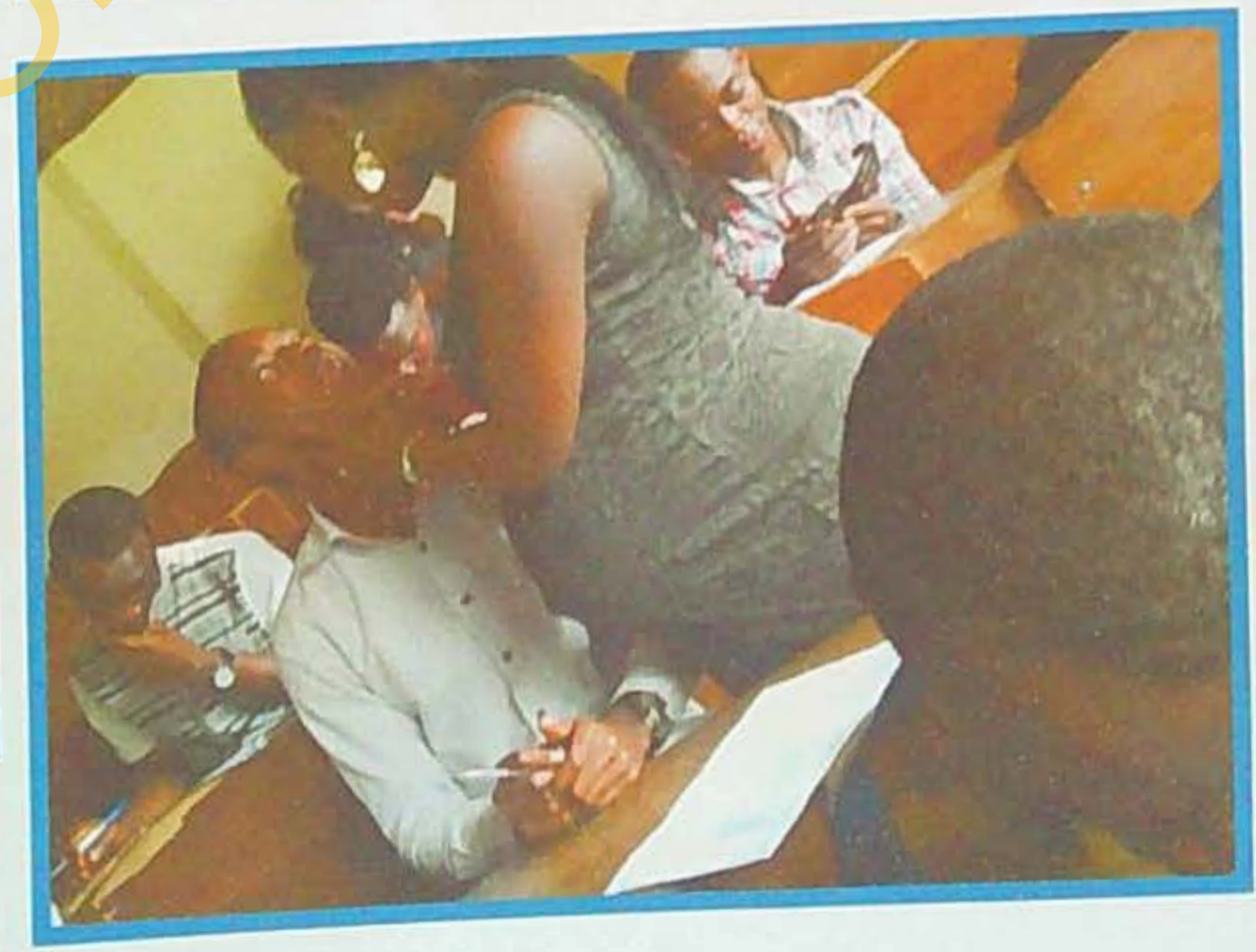
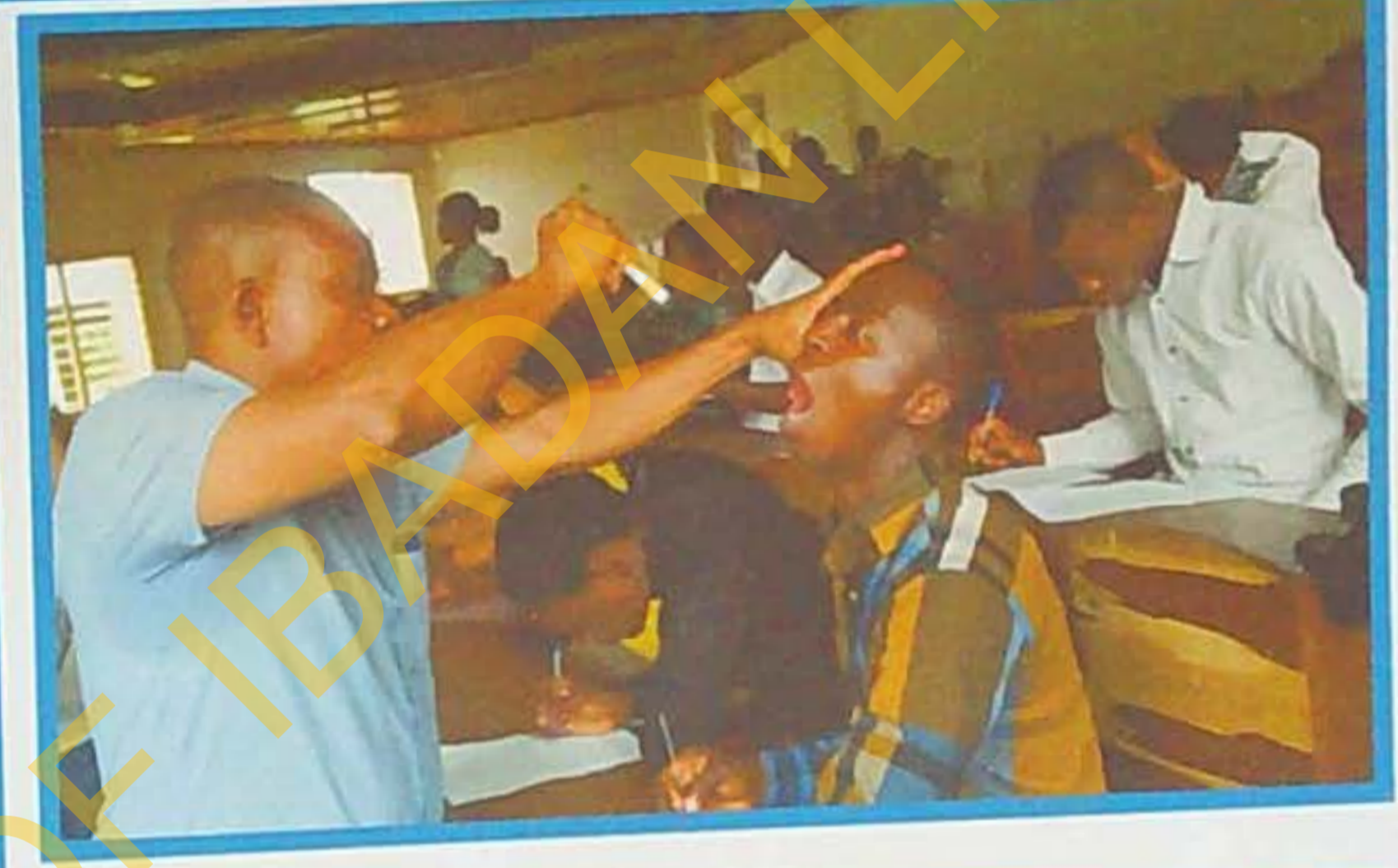
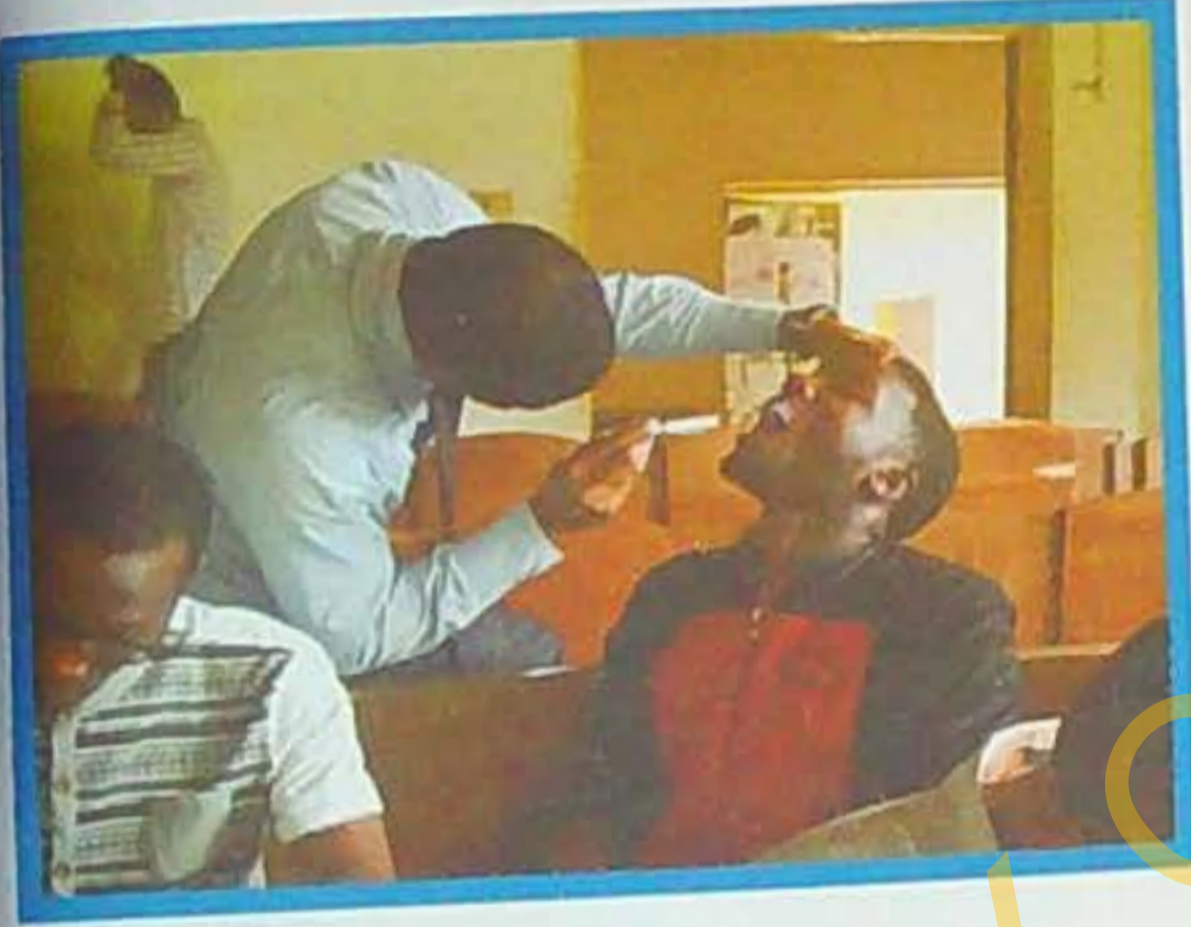
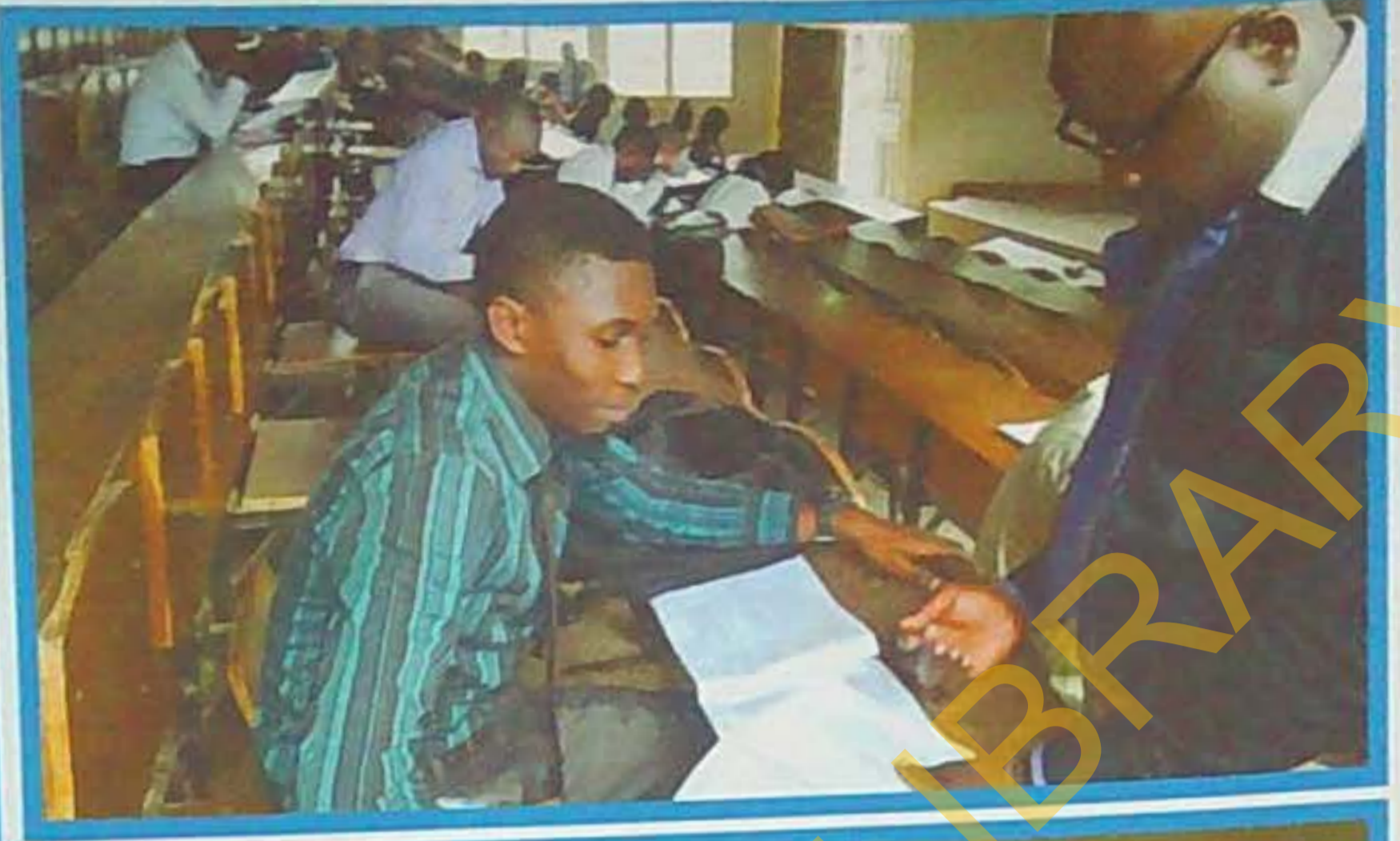
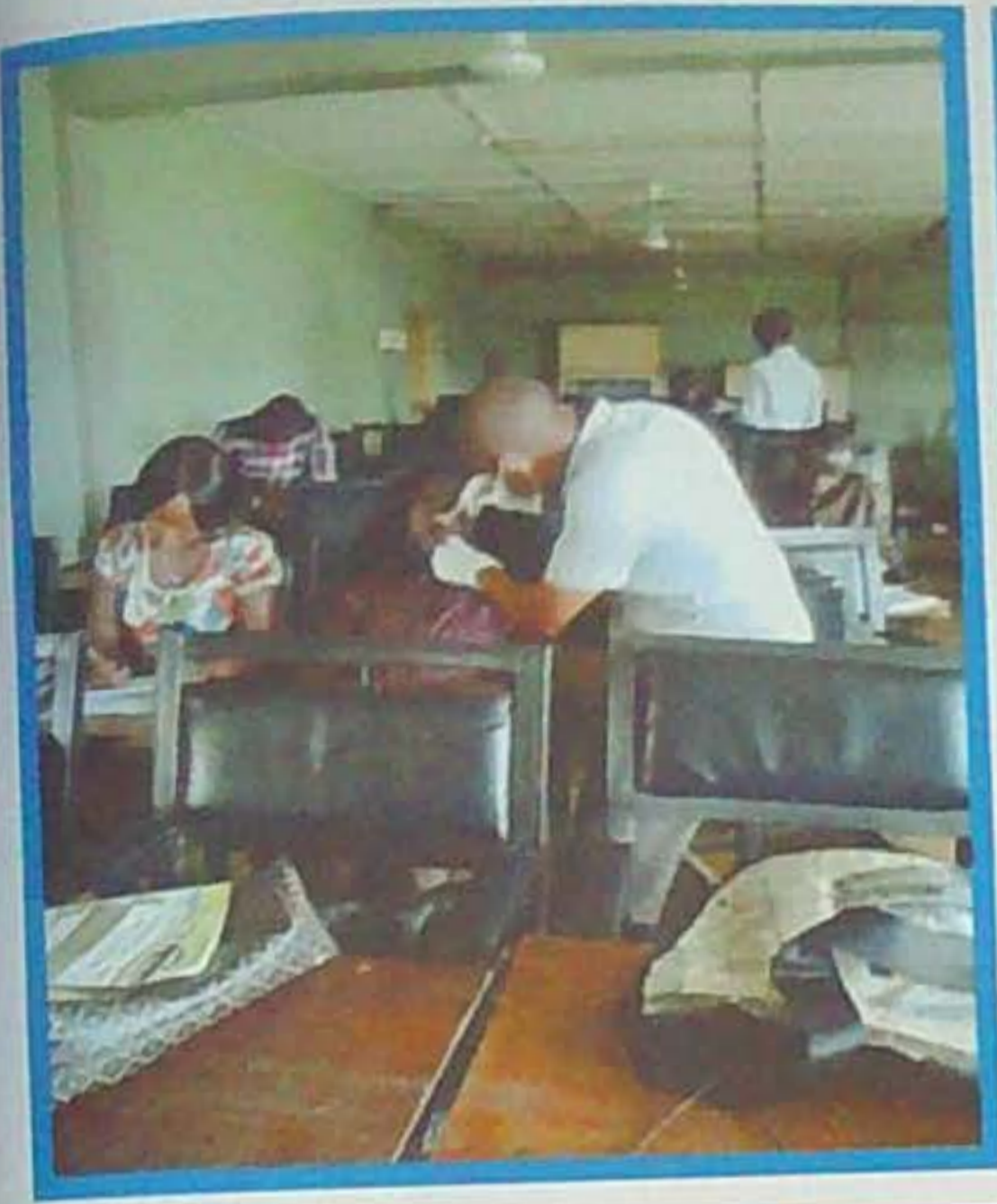


STUDENTS IN THEIR CLASSES ATTENDING TO THE QUESTIONNAIRES (Contd)

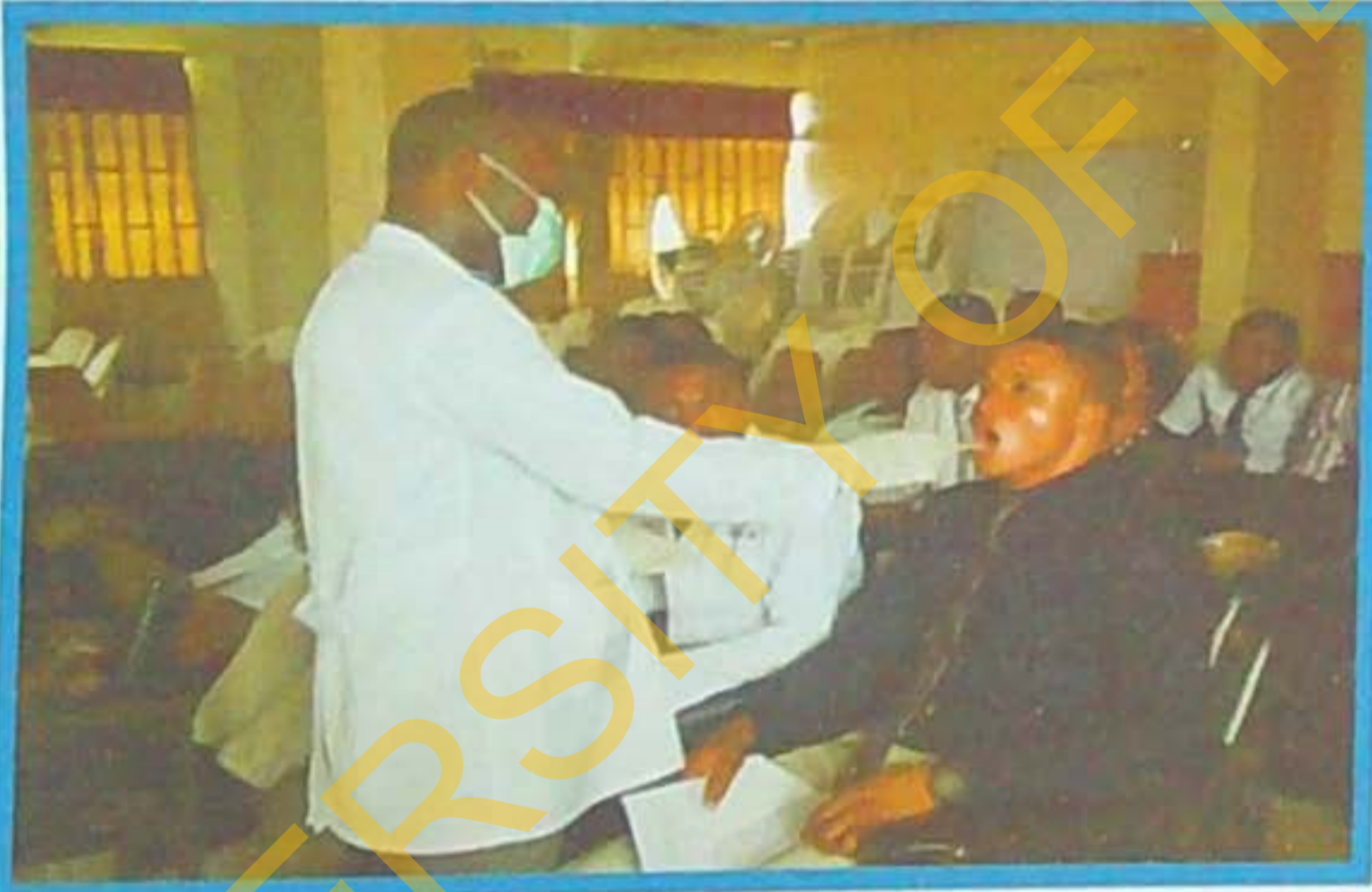
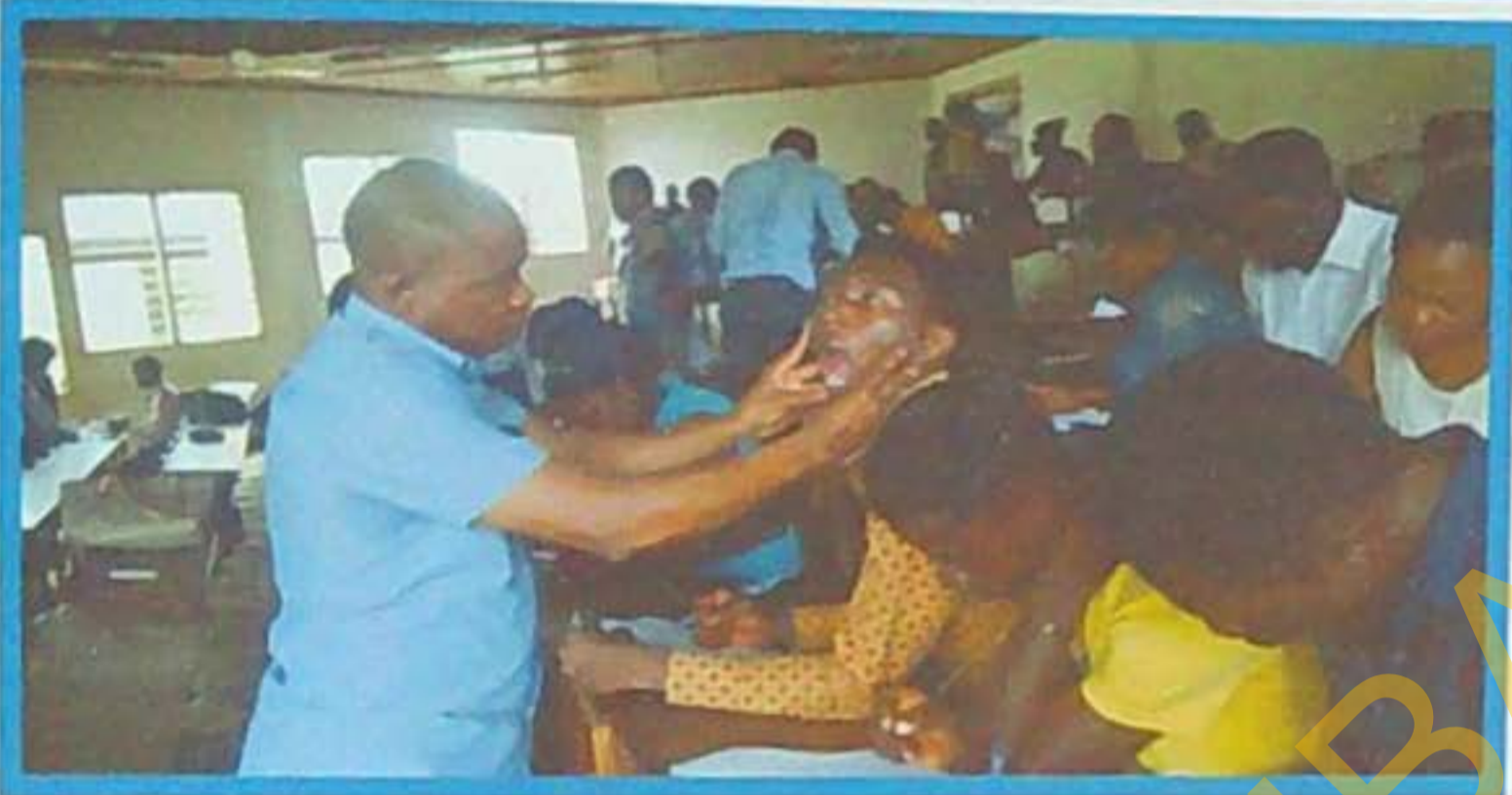


APPENDIX X

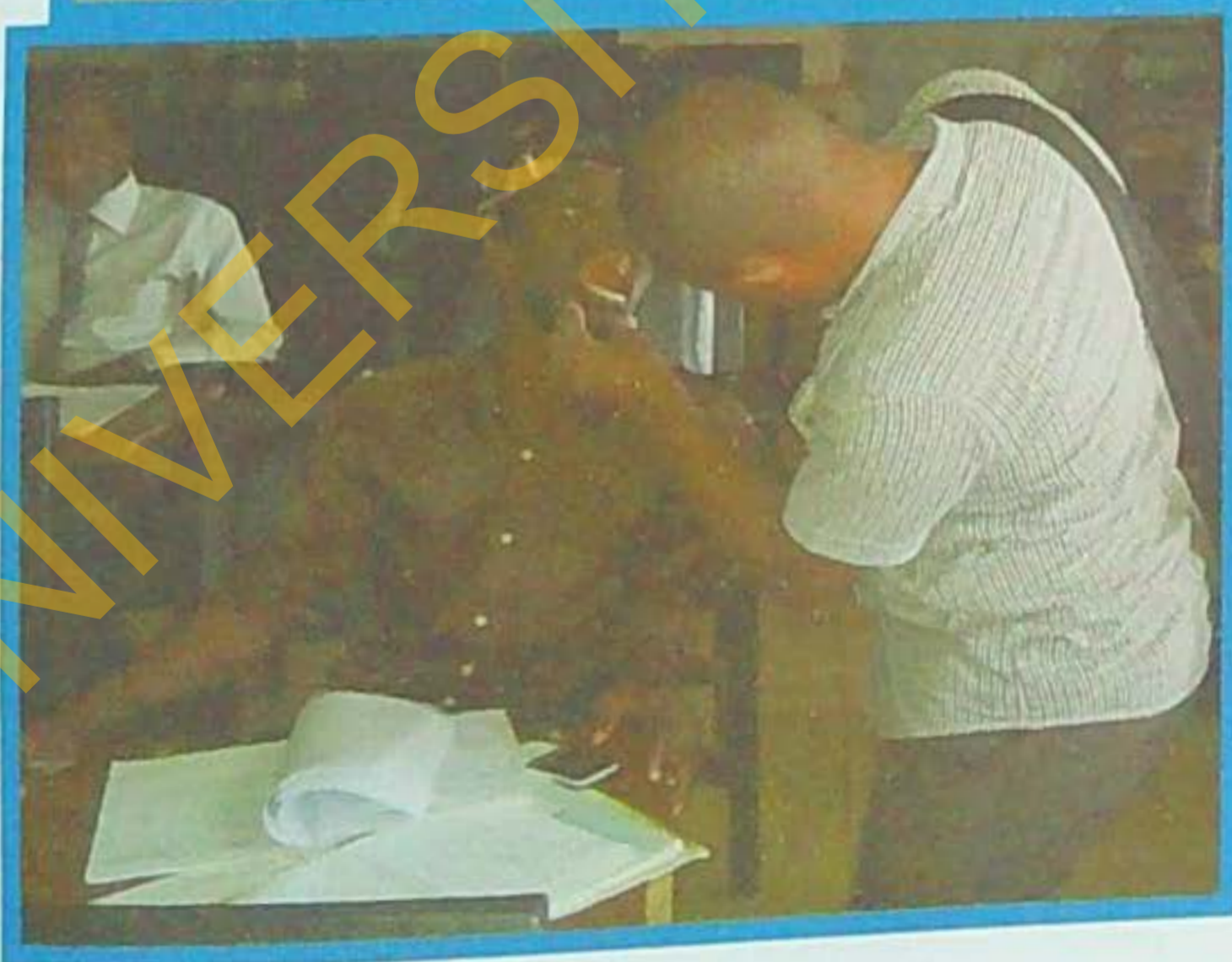
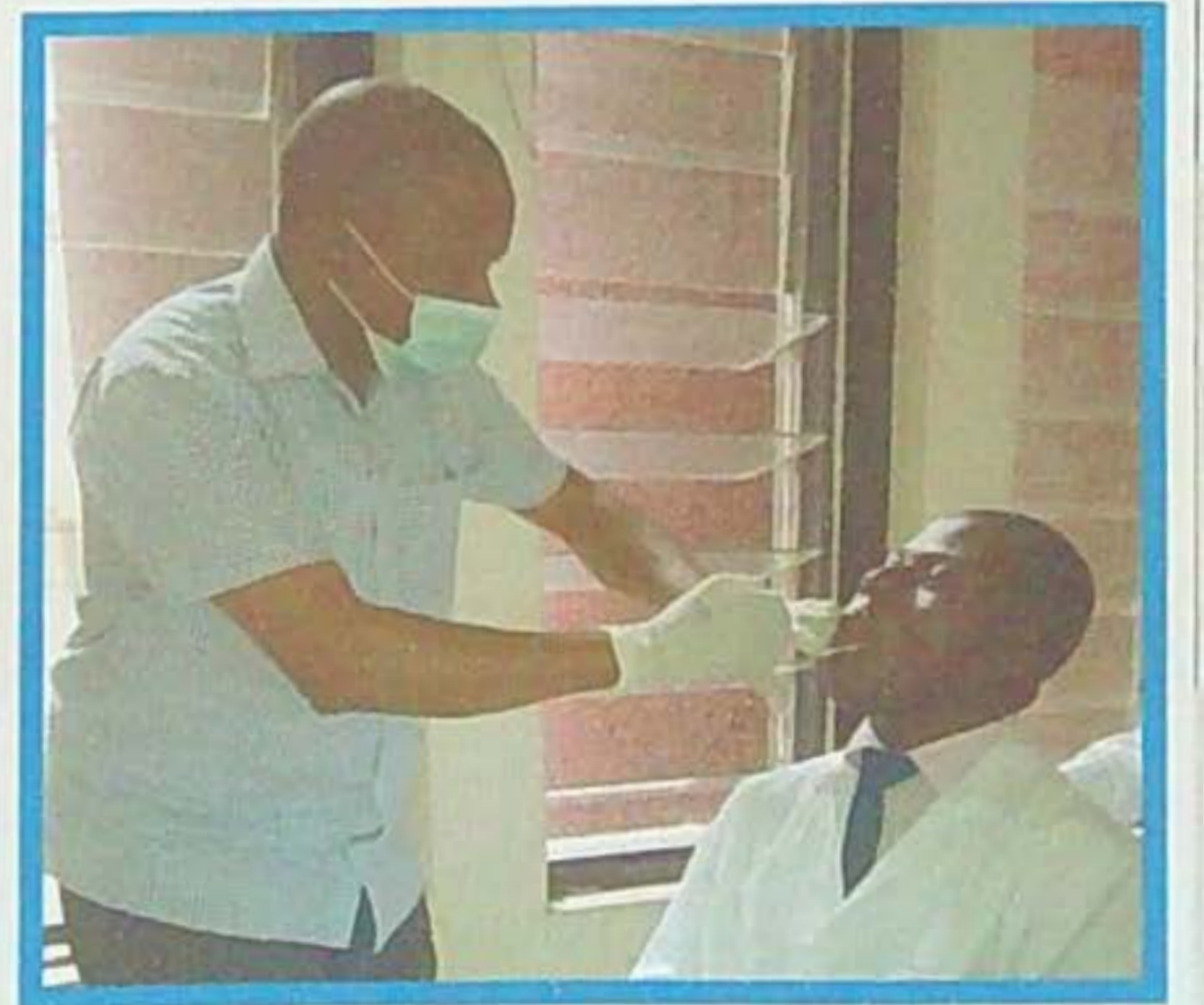
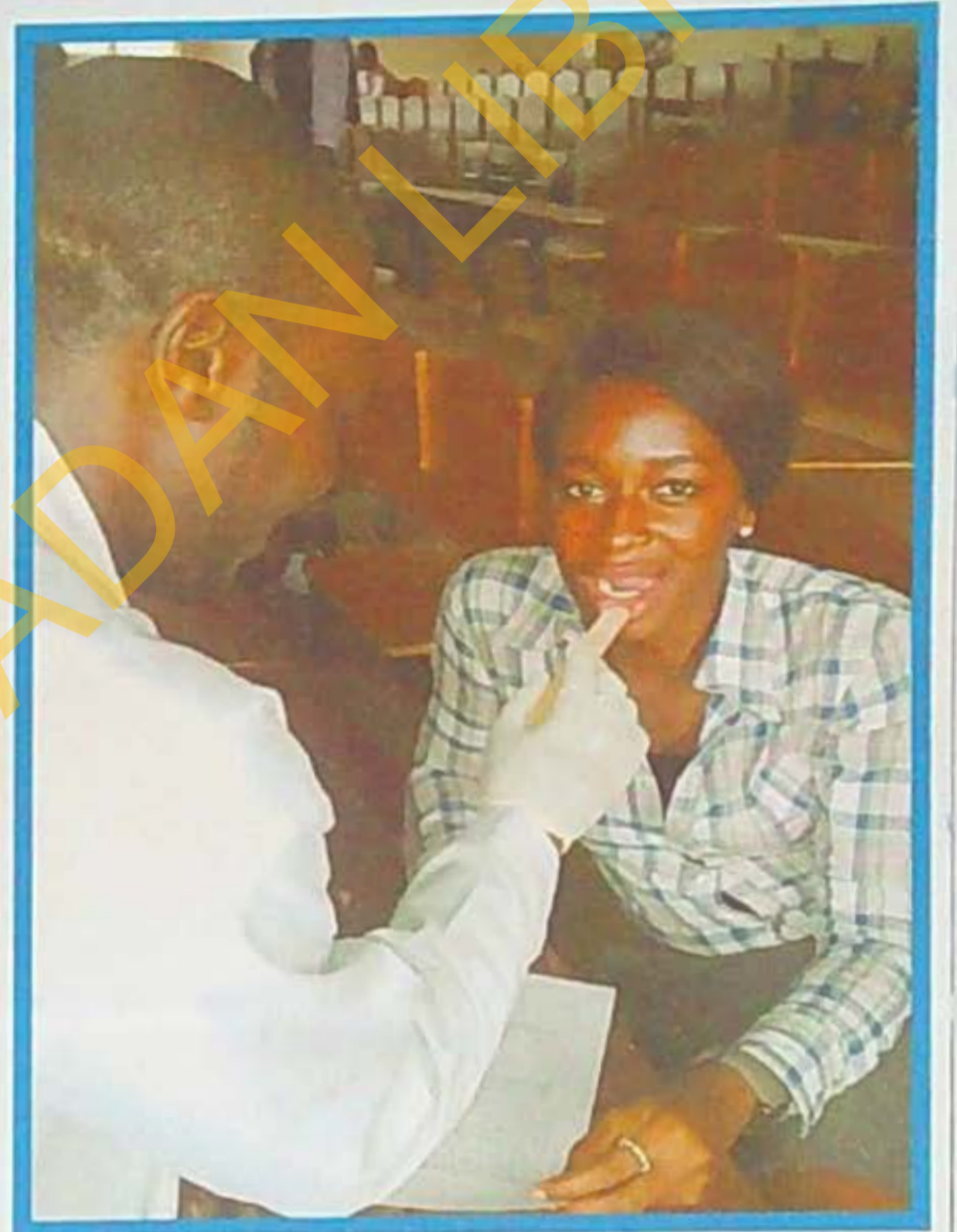
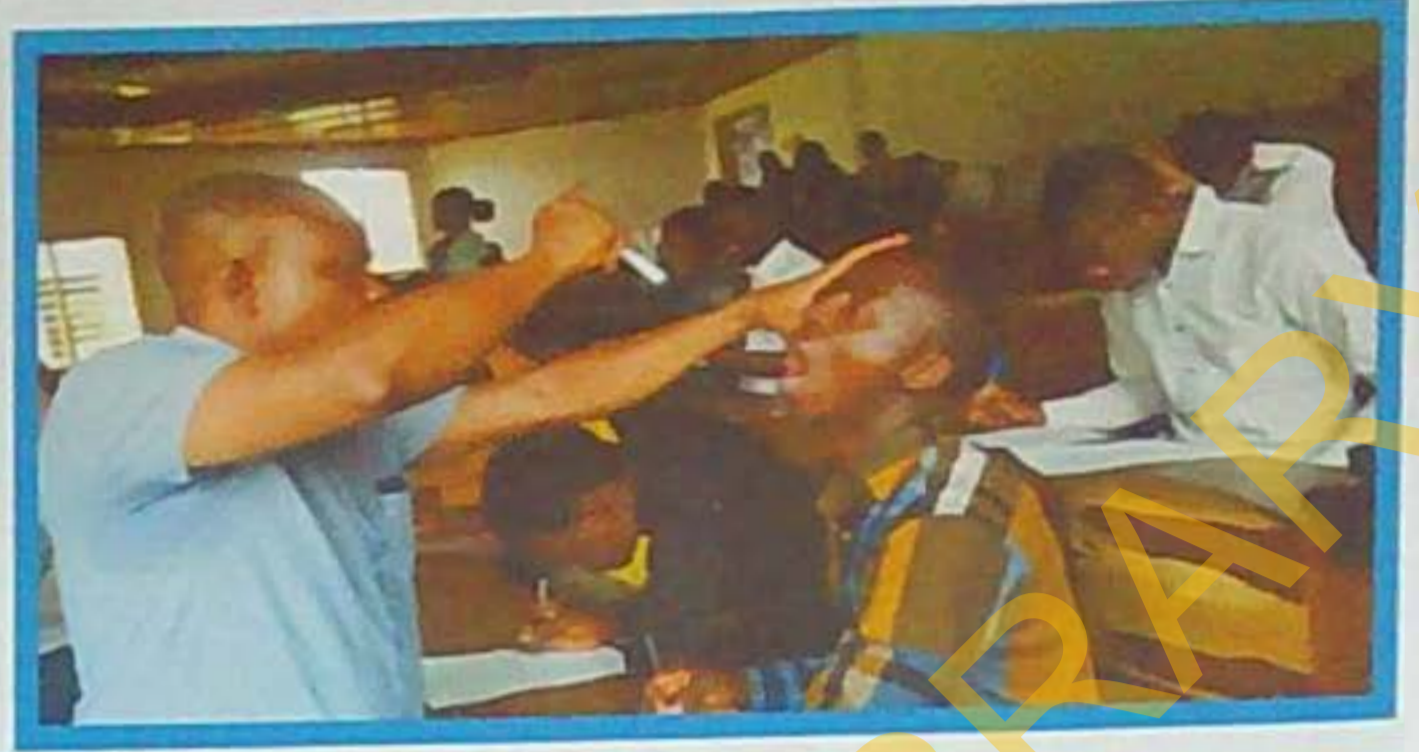
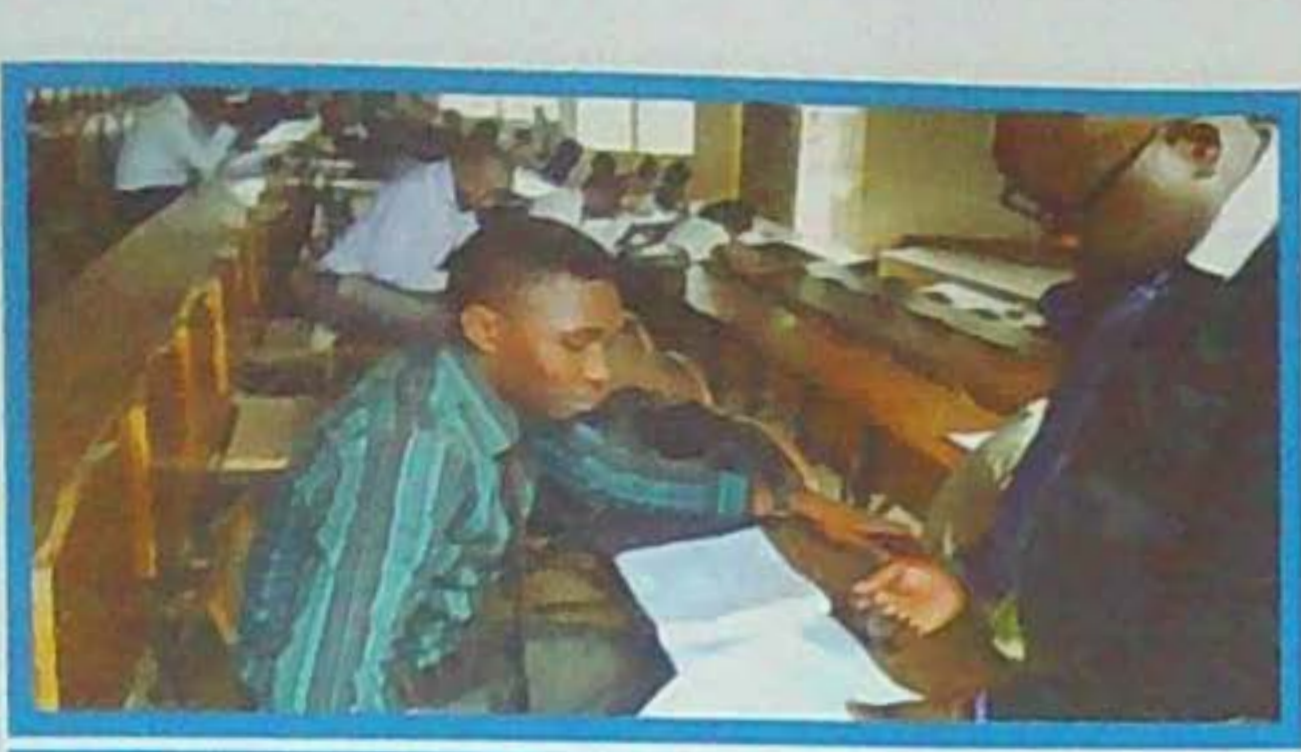
DATA COLLECTORS ATTENDING TO STUDENTS IN THEIR CLASSES



DATA COLLECTORS ATTENDING TO STUDENTS IN THEIR CLASSES (Contd)



DATA COLLECTORS ATTENDING TO STUDENTS IN THEIR CLASSES (Contd)

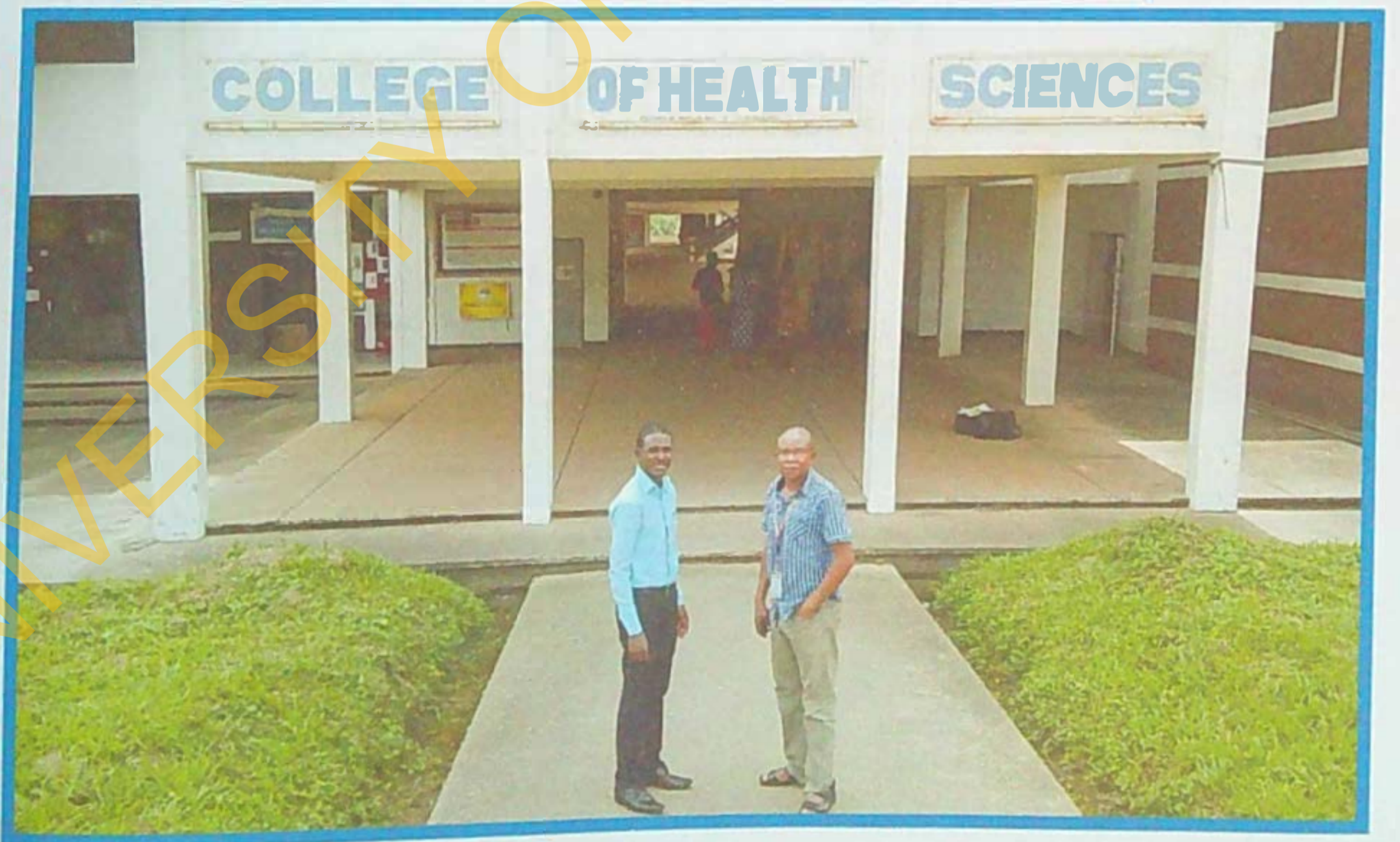


APPENDIX XI

STUDENTS OUTSIDE THEIR CLASSES ATTENDING TO QUESTIONNAIRES









October 20, 2014

Dr. L. O. Igbiosa

Department of Epidemiology & Medical Statistics,
College of Medicine,
University of Ibadan,
Ibadan,

Dear Dr. Igbiosa,

RE: ORAL HEALTH STATUS AND BEHAVIOUR OF DENTAL UNDERGRADUATES IN NIGERIAN UNIVERSITIES

This is to acknowledge the receipt of the above titled proposal you submitted on September 26, 2014 for ethical review.

The proposal is undergoing the review process by the UI/UCH Ethics Committee. The reference number for all correspondence on the proposal is REF: UI/EC/14/0322

Thank you.

A.T. Akindele

Senior Assistant Registrar,

Secretary, UI/UCH Ethics Committee

For: Chairman, UI/UCH Ethics Committee

E-mail: uichire@yahoo.com

12th January 2015

The Vice Chairman
UI/UCH Ethics Committee
College of Medicine
University of Ibadan
Ibadan

Dear Sir

REVIEW OF PROPOSAL

Re: Oral Health Status and Behaviour of Dental Undergraduates In Nigerian Universities

Thank you Sir, for the opportunity to review the enclosed proposal as titled as above.

The candidate should note the following:

1. Title: This need modification because:

- ✓ The instrument of measurement (DMFT) to be used is not adequate to measure oral health status of an individual
- ✓ ".....dental undergraduates in Nigerian University" should read ".....undergraduates dental students in Nigerian Universities"

2. Research Methodology

Exclusion Criteria

- ✓ Be specific on these medical conditions that could affect oral health status
- ✓ How will Asthma affect oral health status?

Sample size determination

- ✓ How did you get the figure "630 students" in the dental schools
- ✓ Other corrections are as in the text

Instrument for Measurement

- ✓ Instrument for measurement intended to be used for assessing oral health status in this proposal is inadequate. Dental caries status alone (DMFT) cannot describe oral health status of an individual.
- ✓ See other queries in the text

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