

Evaluation of the use of Traditional and Conventional Oral Hygiene and Disease Preventive Methods in the City of Douala, Cameroon

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Abstract

Introduction: Oral diseases being a preventable oral condition and a non-communicable disease could be of little concern but about 3 billion people suffer from these conditions worldwide. This study seeks to evaluate the means and methods of oral hygiene and disease prevention in the city of Douala by adults. The population of Douala is chosen due to the fact Douala is a metropolitan city and most representative of the Cameroonian population in which similar studies have not been carried out. **Methodology:** A cross-sectional questionnaire study was carried out with random sampling of 498 participants. Data was collected using a questionnaire based on the objectives which included identifying the means and methods used, the behaviors of the population in relation to oral disease prevention, the reasons for the behaviors and the methods and used as well as determining their satisfaction in oral disease prevention using the latter means, methods and behaviors. The data inputted, organized and analyzed using Microsoft excel 2016 and SPSS version 26. In addition to percentages, chi square and regression analyses were carried out and represented for various variables in the questionnaire. **Results:** It was found out that the population of Douala generally had an above average satisfaction in oral disease prevention due to the use of more conventional means and methods like toothbrushes (94.78%) and bicarbonate mouthwash (27.4%) while the main traditional substance was the neem extract (18.75%), and green tea extracts (16.67%). Their main reasons for using these methods were effectiveness (38.55%), low cost (20.88) and availability (20.08%) with a significant relationship between traditional methods and low cost. Majority of the population used both conventional and traditional methods (55.16%). The studied population show better oral hygiene and disease prevention with a higher level of education and greater monthly allowance. **Conclusion:** After this evaluation, proper oral healthcare in disease prevention produces satisfaction with oral hygiene at least twice a day with toothbrush and bicarbonate mouthwash, carrying out routine dental visits, participating in sensitization which are directly related to education and finances. In the same light, traditional methods include chew stick, extracts like green tea and neem.

Keywords: Oral disease prevention, traditional, conventional, adults, Douala City.

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I. INTRODUCTION

Oral health as defined by the World Health Organization (WHO) is “a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss and other disorders that limit an individual’s capacity in biting, chewing, smiling, speaking and psychosocial wellbeing (1). There exist a WHO recommended oral hygiene guideline that encourages research [1, 2].

Oral diseases are caused by a range of modifiable risk factors, including high sugar consumption, tobacco smoking, alcohol consumption and poor hygiene, and their underlying social and commercial determinants. These latter determinants, together with common risk factors shared by non-communicable diseases (NCD), provide the basis for integrated strategies for prevention and control [3]. Good oral care habits, healthier oral cavity and control

on oral diseases by self-care depends to a large extent on awareness, motivation and knowledge of oral hygiene practices, and not only on the oral hygiene aids [4, 5].

Over 3 billion people are affected by oral health problems worldwide and due to this high prevalence rate, oral health diseases have been added to the WHO's list of prioritized non-communicable diseases. These conditions account for 220 lives lost per 100,000 people and about US\$500 billion in health-related expenditures highly burdened in Sub Saharan Africa [6]. Orofacial disease is the 4th most expensive disease to treat in the world [7, 8]. There exists a strong relationship between poor oral hygiene and systemic diseases [9].

Although the cost of taking up an Oral Hygiene Standard (OHS) is lower than most of developed countries, it is however still considered expensive by a significant proportion of the population in the developing countries [10]. Most patients visit Traditional Practitioners (TPs) because of their low cost of treatment as compared to conventional treatment [11]. Other reasons for using traditional medicine are that; traditional medicine is accessible, affordable, culturally and socially accepted, and most people prefer it to the 'exorbitantly priced' conventional western medicine (4). Challenges to OHS are lack of knowledge on how to find dental clinics, inadequate oral healthcare centers to cater for health needs of the population, lack of knowledge on dental services, not seeing the need to take children to dental care clinics, and 80% of people living in sub Saharan Africa are considered to be living below the poverty level [12, 13]. High mean scores for physical pain and psychological discomfort like anxiety and fear are also reported [14]. Furthermore, Certainly, There is a statistically significant relationship between oral hygiene, education and esthetics perception [9, 11, 15, 16].

The use of traditional methods of oral hygiene maintenance should not be considered as obsolete or ineffective without having knowledge on it. In fact, a thorough knowledge about the advantages and disadvantages of the latter will help the dental health care professionals to guide the people using them in the right direction and this can go a long way in reaching the goal of optimal oral hygiene to areas where modern means of oral health care still have not reached [17]. On the other hand, it may be important to note that some of the ingredients in these medicines have common side effects on the mouth, stomach, and the entire gastrointestinal tract and may lead to severe consequences like "iatrogenic gastritis and colitis". A common complaint about traditional medicine is that healers claim they can treat everything and anything whether they have a sound knowledge of the etiology or pathophysiology of the disease or not. This calls for

caution about the efficacy of their treatment modalities [12].

The population of Douala is chosen due to the fact Douala is a metropolitan city and most representative of the Cameroonian population in which similar studies have not been carried out [18]. Thus the present study evaluated the use of traditional and conventional methods of oral hygiene and disease prevention by adults in the city of Douala.

II. MATERIAL AND METHODS

A descriptive cross-sectional study was carried out from March to June 2023 in Douala, the economic capital of Cameroon. It comprises of an estimated 3 million inhabitants [19]. The study was carried out according to the different subdivisions ranging from 'Douala I' to 'Douala V' according to the domicile or place of residence of the respondents [20]. The figure 1 showed not only the subdivisions in Douala but also a map of Douala as a whole and Cameroon in general hereby, situating the area of study.

II-1- STUDY POPULATION

II-1-1 Selection criteria

Inclusion criteria:

- ❖ Adults who were living in the city of Douala, Cameroon;
- ❖ Individuals who were willing to participate in the study and provide informed consent;
- ❖ Individuals who were able to communicate clearly in French, English or a local language;

Exclusion Criteria:

- ❖ Individuals with a history of oral diseases or conditions that require specific ongoing treatment;
- ❖ Individuals who are unable to provide informed consent due to cognitive, mental health or personal reasons;
- ❖ People who were less than 21 years old.

II-1-2. Sampling:

The sample size calculations

The formula used to calculate the sample population was the Slovin's formula. The error margin (e) was 5%, N being the size of population and n the size of sample. This formula was used because we didn't have enough information about the population's behavior to otherwise know the sample size necessary to achieve a certain confidence interval of 95% [22].

Slovin's formula:

$$n = \frac{N}{1 + N e^2}$$

Sampling technique

The sampling method was stratified according to subdivisions in the city of Douala. The population were met randomly in schools, universities, quarter

streets, industries and possibly cooperate societies. The collection was done by the researcher and 5 trained people. The data was collected by interviewing the studied population. Literate respondents answered alone while those who couldn't respond were guided by the researcher and trainees. The distribution of data collection was according subdivisions in the city of Douala.

Administrative procedure

Administrative authorizations were gotten from the faculty of medicine and pharmaceutical sciences of the university of Douala after submitting and approving of the protocol by a jury then obtaining

of ethical clearance from the ethical clearance committee of the university of Douala. Authorization was then obtained from the delegation of public health for the littoral region. These authorizations gave the permissions to carry out this research.

II-2- Method

Evaluating means, methods, behaviors of the population of Douala spanned from the research question which followed a cascade of events which led to significant and true results. The figure 2 presents the research framework which guides this cascade of events.

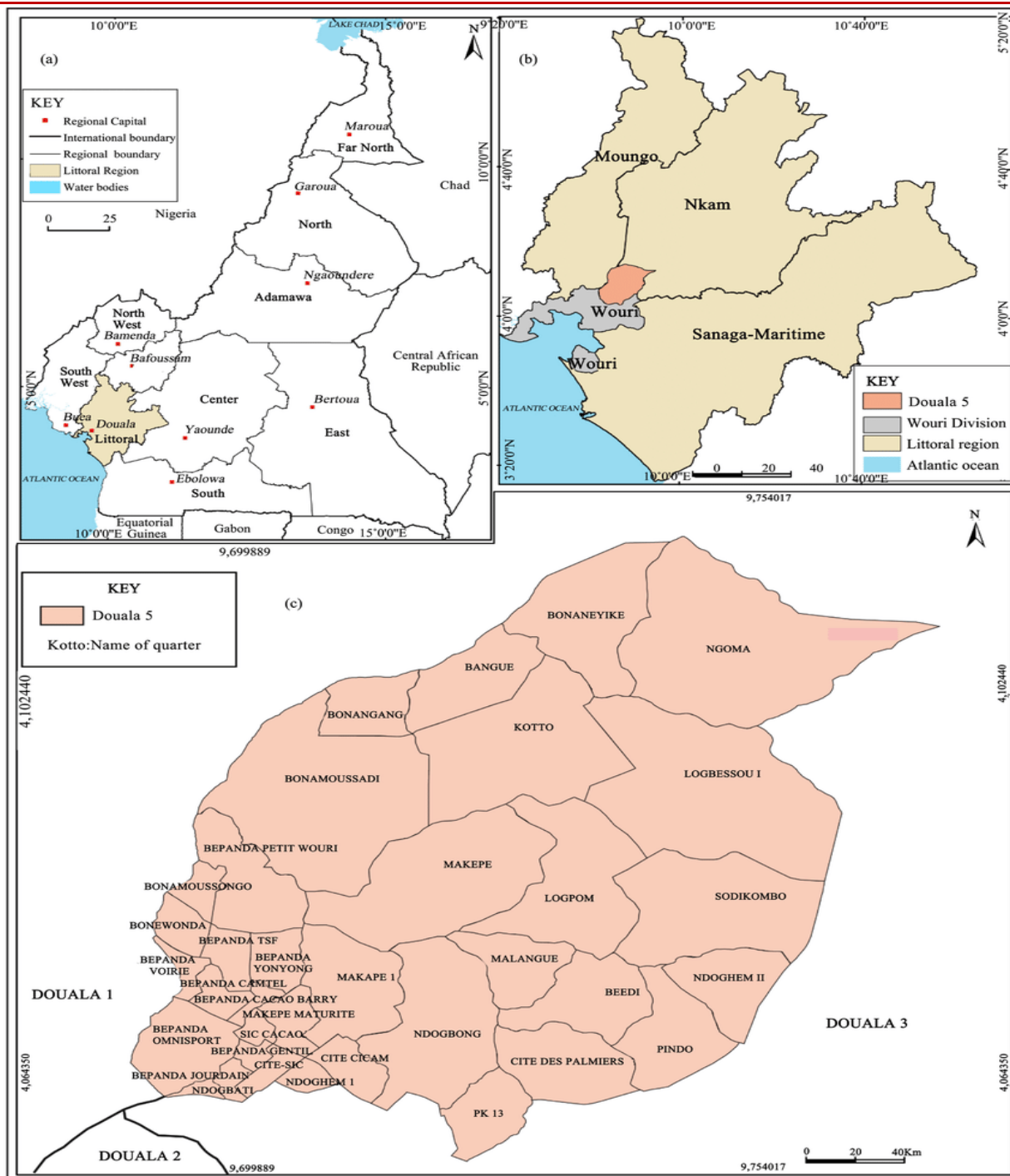


Figure 1: City of Douala in Cameroon [21]

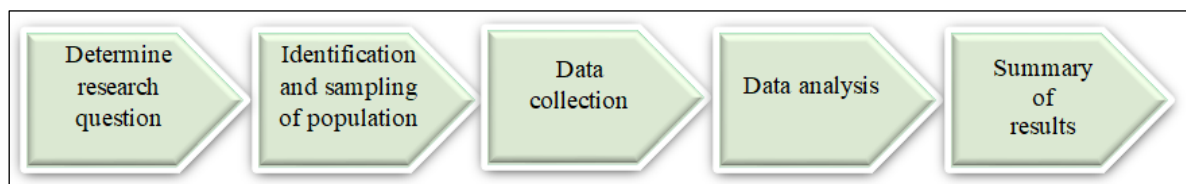


Figure 2: Research framework

II-2-1- Method of data collection and analysis

Data was collected using a questionnaire. Data was entered and organized using Microsoft Excel 2016.

The data was later imported from Microsoft excel 2016 and analyzed using SPSS version 26. Descriptive analysis was done, percentages were calculated for

qualitative variables (23) which were summarized and the percent of the population represented for different variables using pie and bar charts. Chi square and regression analysis was done to determine significant dependence between variables accordingly.

II-2-1-1- Demographic data

This included; nationality, age, sex, occupation, education (primary, secondary, degree, masters, doctorate), religion (christian, muslim, traditional believer, other), region of origin (north west, south west, littoral, center, west, east, south, adamawa, north, far north), Monthly allowance (10 000 – 500 000, above adding 50 000 to 200 000 and then 100 000 to reach 500 000), place of residence in Douala and mode of living (tobacco smoking, alcohol consumption and refined sugar consumption).

II-2-1-2- Identifying traditional and conventional means and methods used for oral hygiene and disease prevention

The application of traditional and conventional oral disease preventive tools as well as hygiene tools were determined by the percentages of the population who use these preventive measures to better their oral health related quality of life as well as the proper times of oral hygiene. The questionnaire comprised of toothbrush, chew stick, floss, sugar free gums, tongue scrapper, charcoal, toothpick, aloe vera, xylitol mouthwash, chlorhexidine mouthwash, cinnamon bark extract, fluoride toothpaste, onion leaves, Echinacea leaves, alcohol mouthwash, neem leaves mouthwash, black fruits mouthwash, honey extract, guava leaves, green tea and others. Other questions on oral hygiene will include; frequency of tooth brushing ranging from “once a day” to “more than twice a day” as well as time of the day ranging from “morning before meals” to “evening after meals”. It was also found if there was a significant relationship between used materials as the first variable and demographic data as the second. Significantly dependent variables were represented on a table.

II-2-1-3- Identifying oral health prevention behaviors

The questions on oral health behaviors were based on the participant’s routine visits to dental surgeon or technician, participating in community sensitization, visits to traditional practitioners, self-medicating, good dieting, receiving social media advice and others. The frequency of visits to either the dental

surgeon or traditional practitioner will range from “never” to “more than 3 times a year” and the conditions that obliged visits ranged from ‘pain’ to ‘mouth odor’ through ‘bleeding gums’ and ‘shaky teeth’. An additional option of routine visits was added for dental surgeon or technician visits. It was found if there was a significant relationship between used behaviors as the first variable and demographic data as the second. Significantly dependent variables were represented on a table.

II-2-1-4- Identifying the reasons for using traditional and conventional methods

To identify the reasons, 10 criteria indices including, cost, religion, availability, effectiveness, publicity, taste, nature lover, recommendation, color, odor and others were used. It was found if there existed a significant relationship between the reasons as the first variable the second variable involved demographic data, traditional materials and behaviors. Significantly dependent variables were represented on a table.

II-2-1-5- Measuring satisfaction in disease prevention while using conventional and traditional methods

The questionnaire was based on the RAND dental health index measure involving 3 questions and 3 dimensions of pain, worry, conversation. The responses were of 4 categories ranging from “not at all” to “a great deal” with ‘a great deal’ obtaining a measure of ‘0’ and ‘not at all’ obtaining a measure of [24]. It was found if there existed a significant relationship between the measure of satisfaction as the first variable the second variable involved demographic data, traditional materials and behaviors. Significantly dependent variables were represented on a table.

II-3- ETHICAL CONSIDERATION

The study was anonymous, voluntary, and non-compulsory. The participants were made to understand that the information they gave may be published and that their identity was safe.

III. RESULTS

III.1. SUMMARY OF DEMOGRAPHIC DATA

Of a calculated study population of 498 participants, the following sociodemographic distribution was obtained and presented in histograms and pie charts from figure 3 to figure 12.

III.1.1. Distribution of the study population according to nationality

97.59 percent of the respondents were cameroonians and the rest 2.14 percent were immigrants as shown in figure 3.

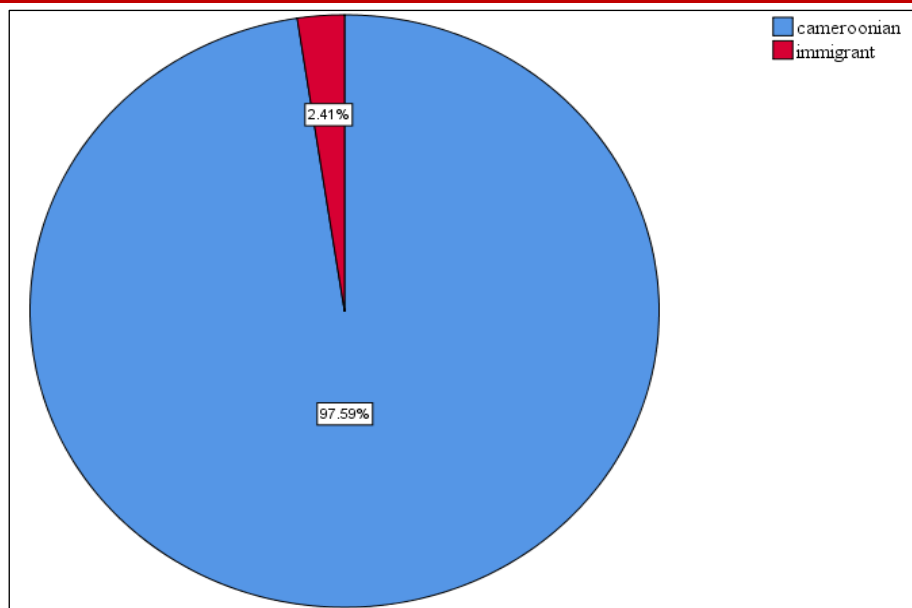


Figure 3: Distribution of the study population according to nationality

III.1.2. Distribution of the study population according to gender

According to figure 4, there are 53.4% of females and 46.5% of males in the population.

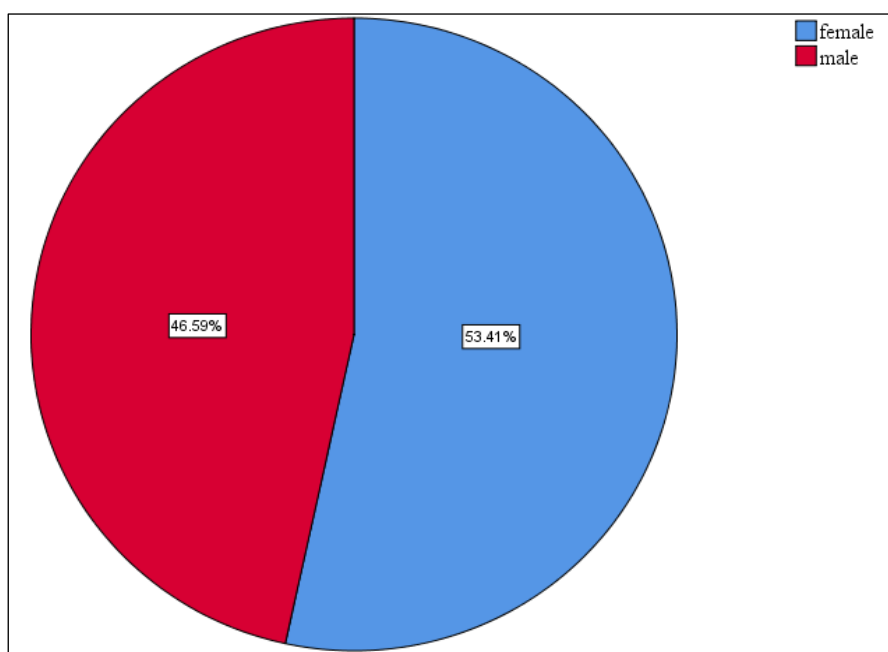


Figure 4: Distribution of the study population according to gender

III.1.3. A Distribution of the study population according to age range

80.7% of the respondents were between 21 and 30 years old and 10.8% were between 31 and 40 years

of age as presented in figure 5. The 6.43% were between 41 and 50 years old meanwhile the rest were above 50 years of age.

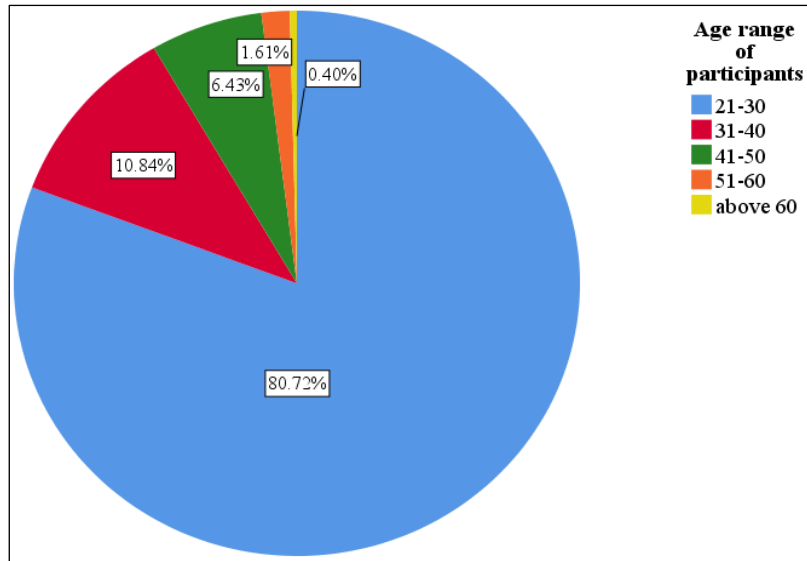


Figure 5: Distribution of the study population according to age range

III.1.4. Distribution of the study population according to region of origin

The most represented regions were the west with 33.7% followed by the north west of 20.88%, then the littoral with 14.46%, the south west with 12.05%,

the center with 8.84%, the south with 4.42%, the east with 2.41% and the far north with 1.61%. the least of the populations were those of the north with 1.20% and the adamawa with 0.4% as shown on figure 6.

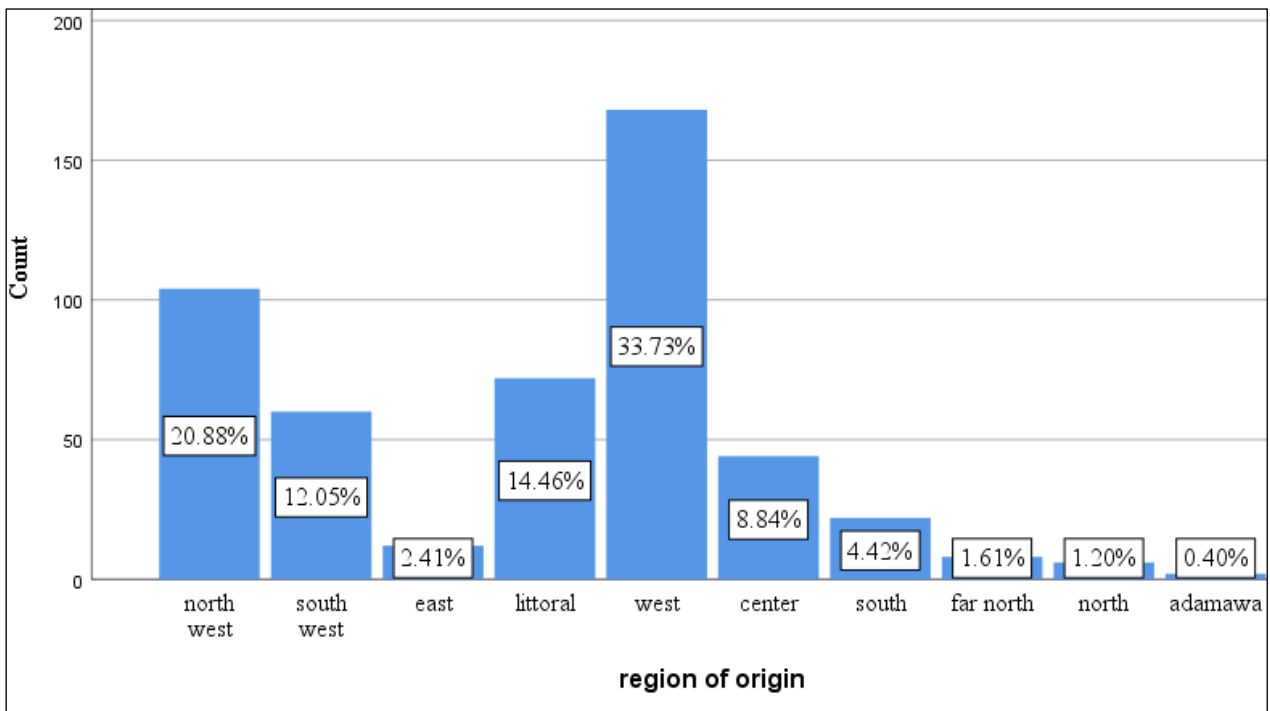


Figure 6: Distribution of the study population according to region of origin

III.1.5. Distribution of the study population according to religion of participants

Christianity was the main religion covering 90.8% of participants as shown on figure 7. Muslims

were 4.42%, traditionalists were 1.61 percent and others were those who did not have a religion or was not mentioned in the questionnaire.

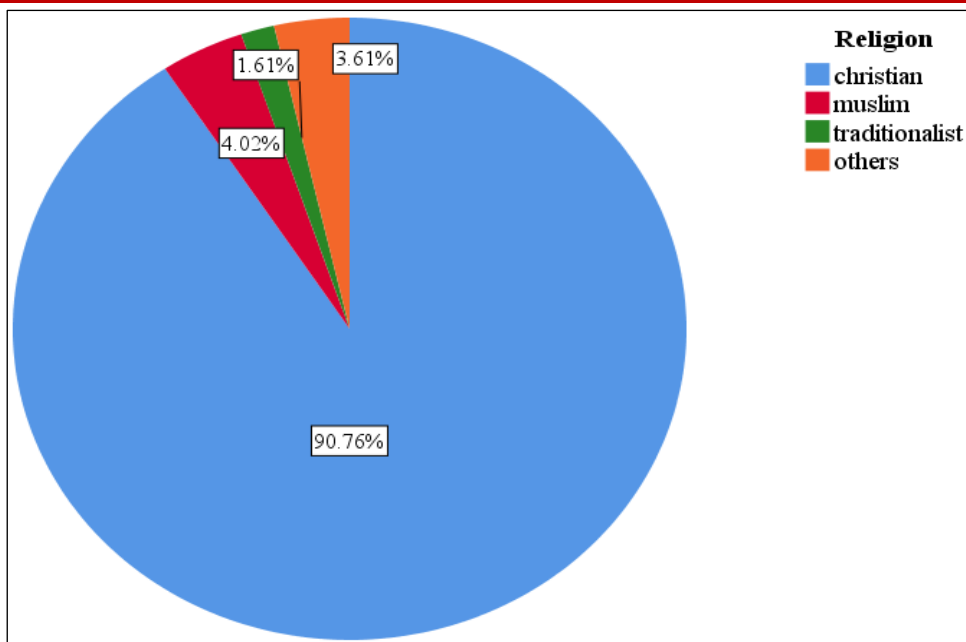


Figure 7: Distribution of the study population according to religion of participants

III.1.6. Distribution of the study population according to occupation

82.7% were occupied by the private sector and the rest 17.27% by the public sector as shown on figure 8.

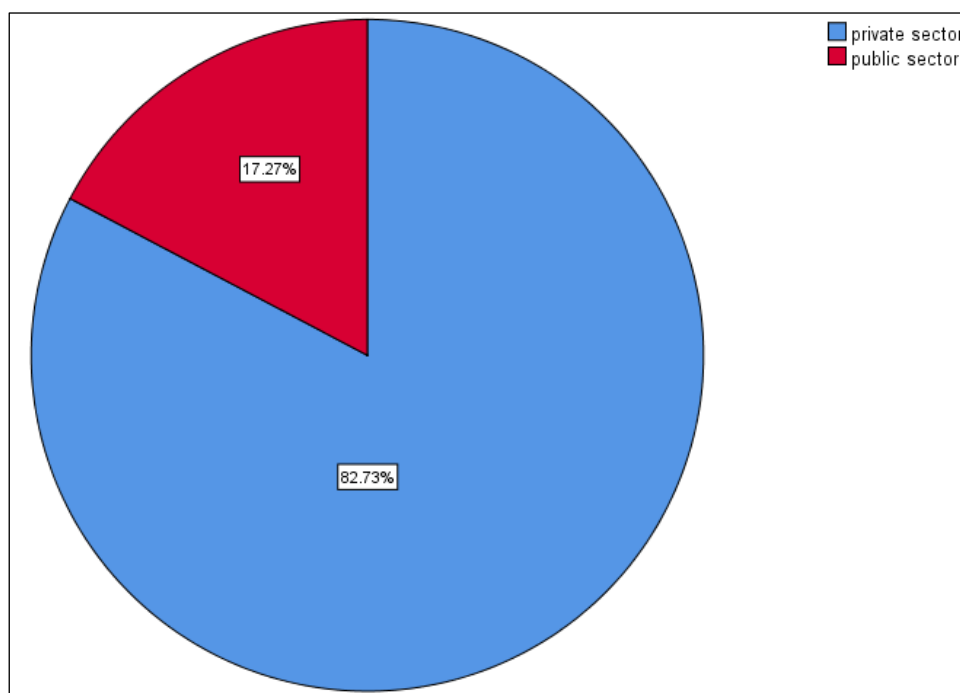


Figure 8: Distribution of the study population according to occupation

III.1.7. Distribution of the study population according to level of education

Figure 9 shows that 69.1% of the population were at bachelor’s degree level of education, 15.26 had

secondary level of education, 12.05% had masters degree level while 1.16 percent had primary level of education. The rest had doctorate level of education.

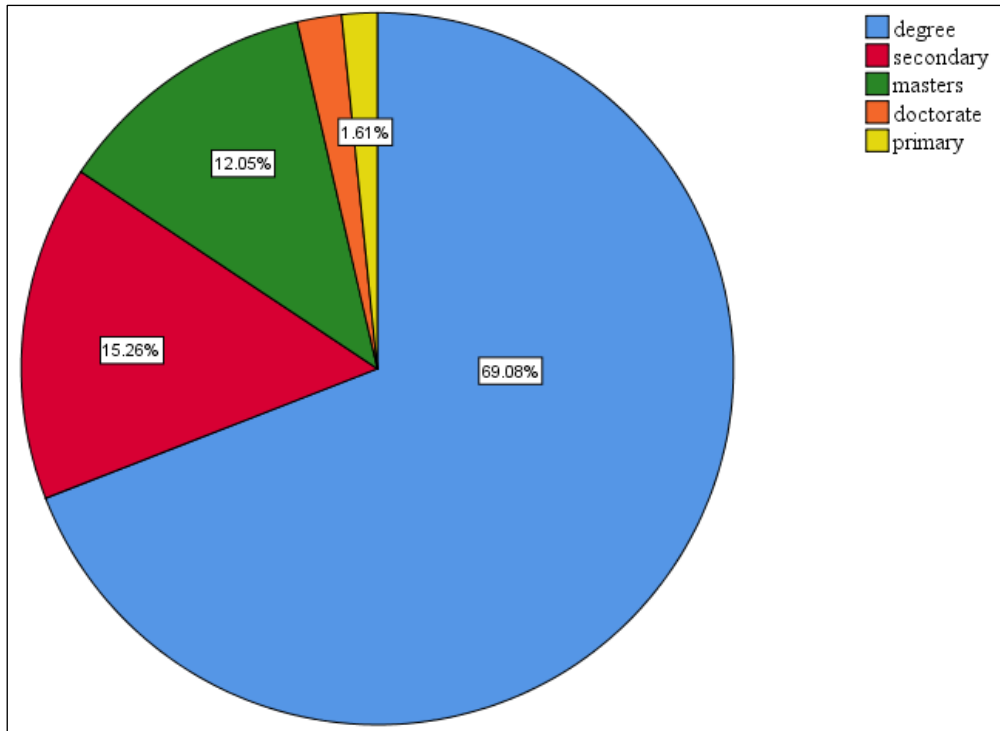


Figure 9: Distribution of the study population according to level of education

III.1.8. Distribution of the study population according to monthly allowance

The most range of monthly earnings was between 0 and 50 000FCFA of 69.48% as shown on

figure 10. Those earning 50 000 to 100 000 were 17.67%,

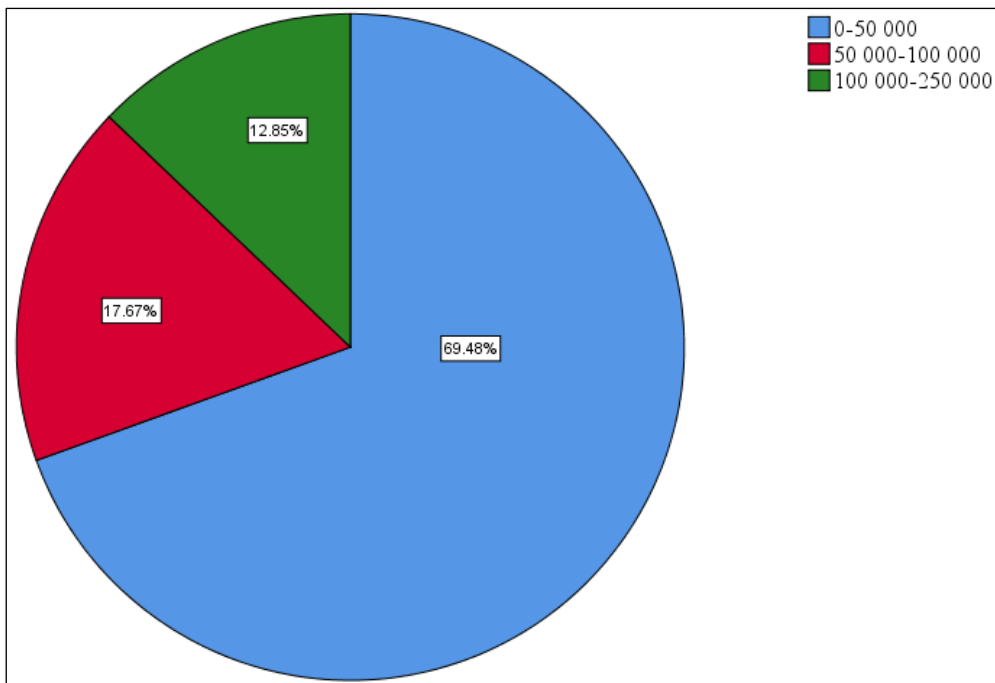


Figure 10: Distribution of the study population according to monthly allowance

III.1.9. Distribution of the study population according to place of residence

The most of the participants were from the Douala IV subdivision 31.93% and Douala III 32.13%

subdivision. The rest were from Douala IV (19.08%) and Douala I (10.04) and Douala II (6.83%) as shown on figure 11.

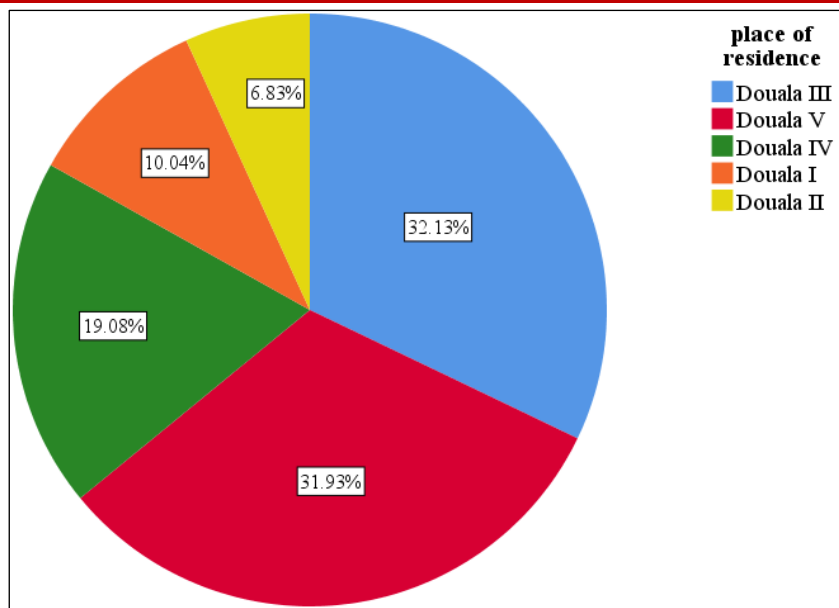


Figure 1: Distribution of the study population according to residence in Douala

III.1.10. Distribution of the study population according to mode of living

73.08% consumed refined sugars and 23.08% were alcohol consumers and 3.85% are tobacco consumers in the population as presented in figure 12.

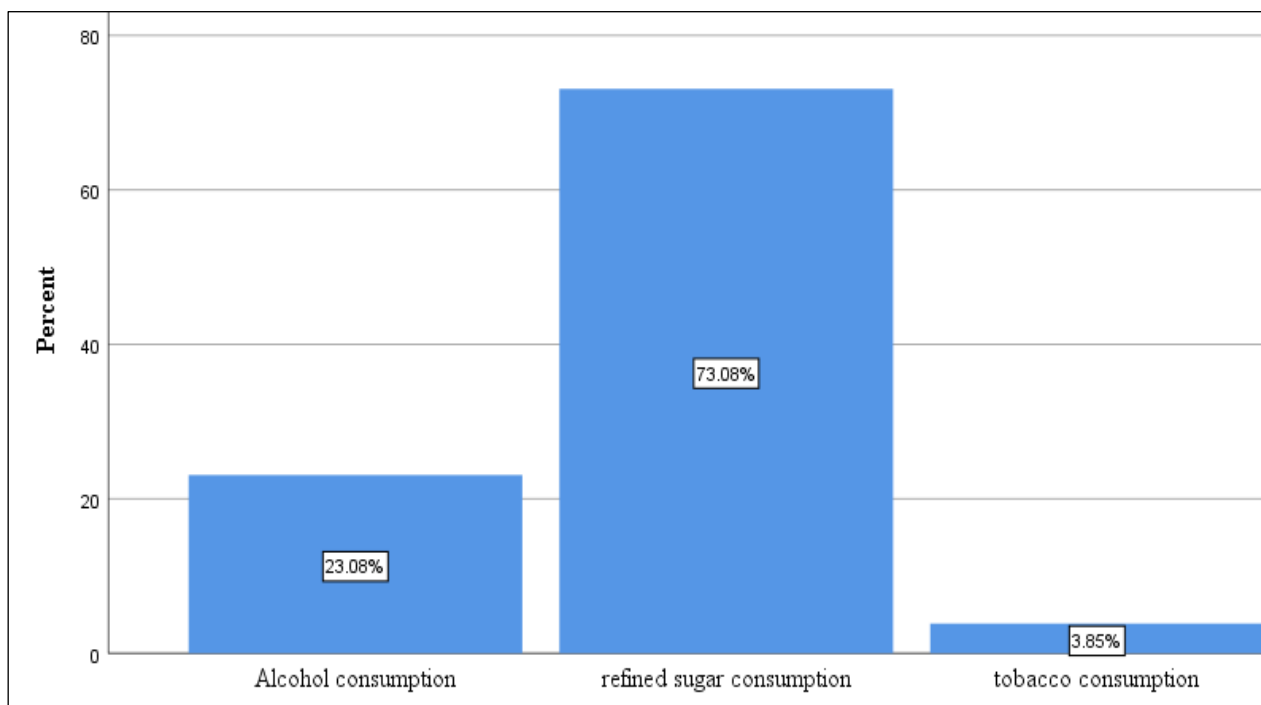


Figure 12: Summary of mode of living.

III.2. SUMMARILY IDENTIFIED TRADITIONAL AND CONVENTIONAL MEANS AND METHODS USED FOR ORAL HYGIENE AND DISEASE PREVENTION IN THE POPULATION

III.2.1. Distribution of the study population according to mechanical methods use

Figure 13 shows the main conventional mechanical material used was toothbrush with a cumulative percentage of the count 94.78%, charcoal use of 20.48%, tooth pick use of 22.89%, tongue scraper use of 16.87%, floss use of 8.84% and chew stick use of 4.82%.

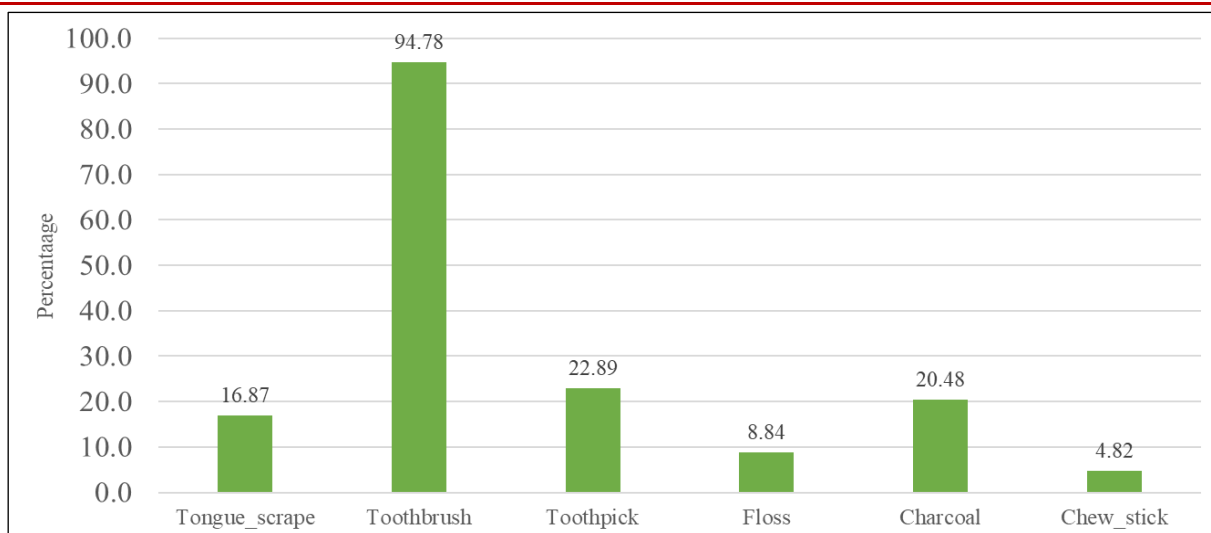


Figure 13: Distribution of the study population according to mechanical methods use

III.2.2. Traditional chemical substances

The most used traditional chemical method used was the neem extract with 18.75 of the population

using it as shown on figure 14. Other chemical methods mentioned were table salt, coconut plant leaves, clove bud, wood ash, and king plant.

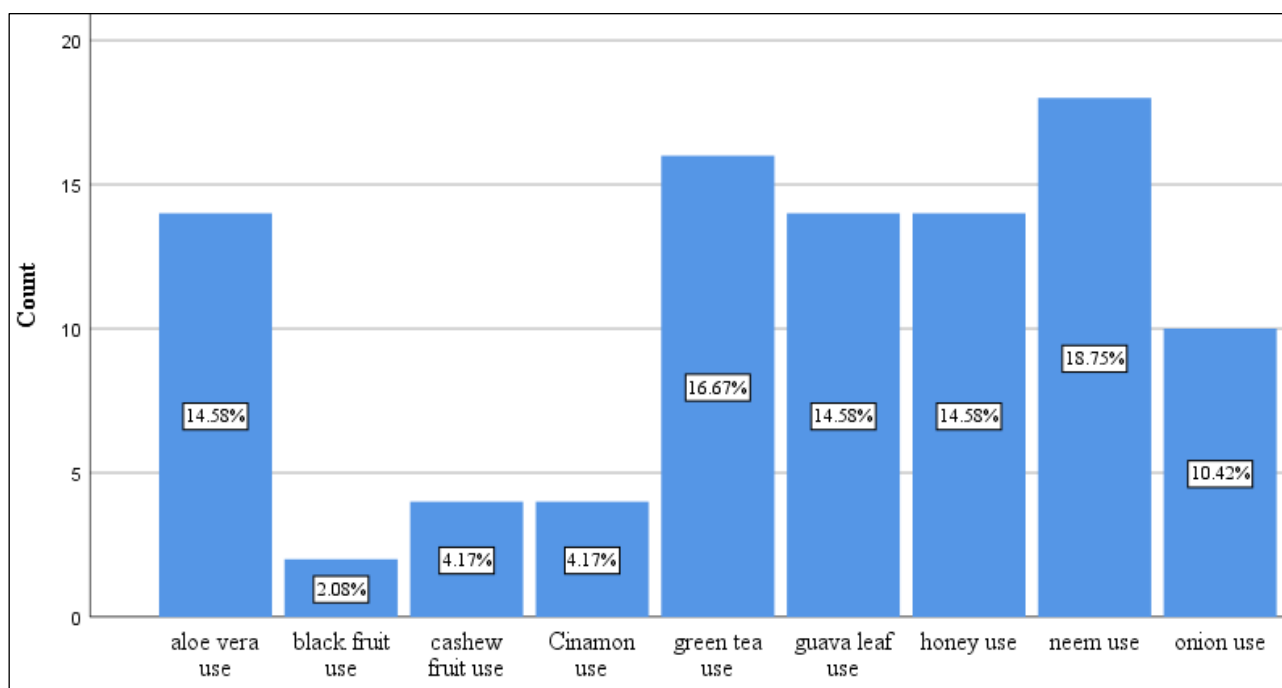


Figure 14: Summary of traditional chemical methods use.

III.2.3. Distribution of the study population according to conventional chemical substances use

The conventional chemical substance mainly used were fluoride toothpaste 77.9% and bicarbonate mouthwash 37.0% as shown on figure 15.

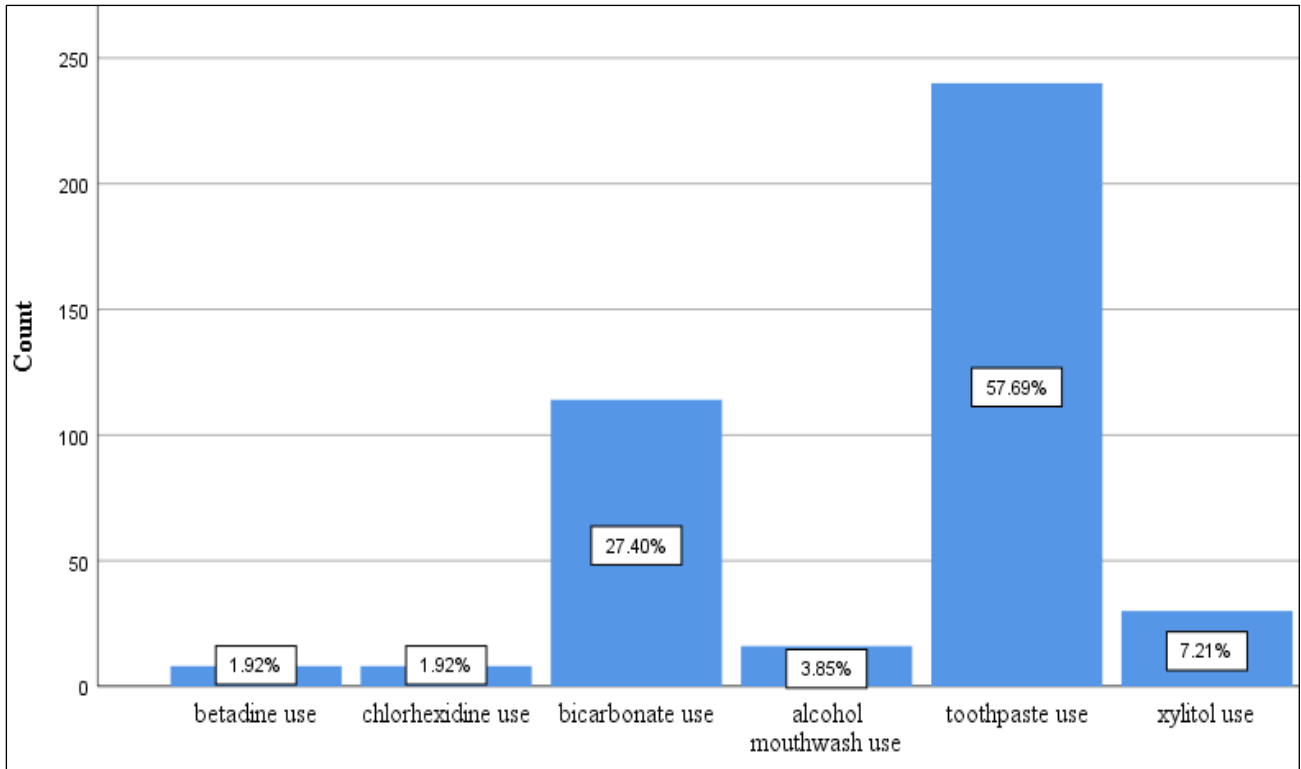


Figure 15: Distribution of the study population according to conventional chemical methods use

III.2.4. Distribution of the study population according to frequency of tooth brushing

The most times of brushing was twice a day 61.7% followed by 27% for once a day, 9% for more

than twice a day and 3% less than once a day as presented on figure 16.

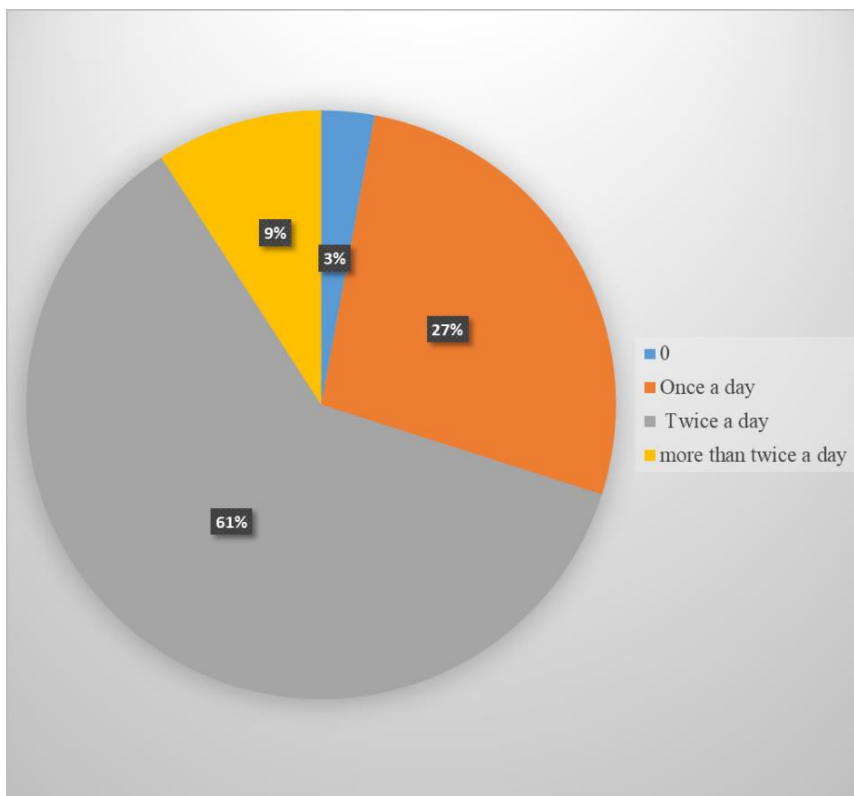


Figure 16: Frequency of tooth brushing

III.2.5. Distribution of the study population according to time period of tooth brushing

The most periods of tooth-brushing were in the evening after meals by 63.38% and morning before

meals of 87.55% of the population. 12.85% of the population was in the morning after meals, 6.43 percent brushed in the afternoon after meals and 5.22% in the evening before meals as presented on figure 17.

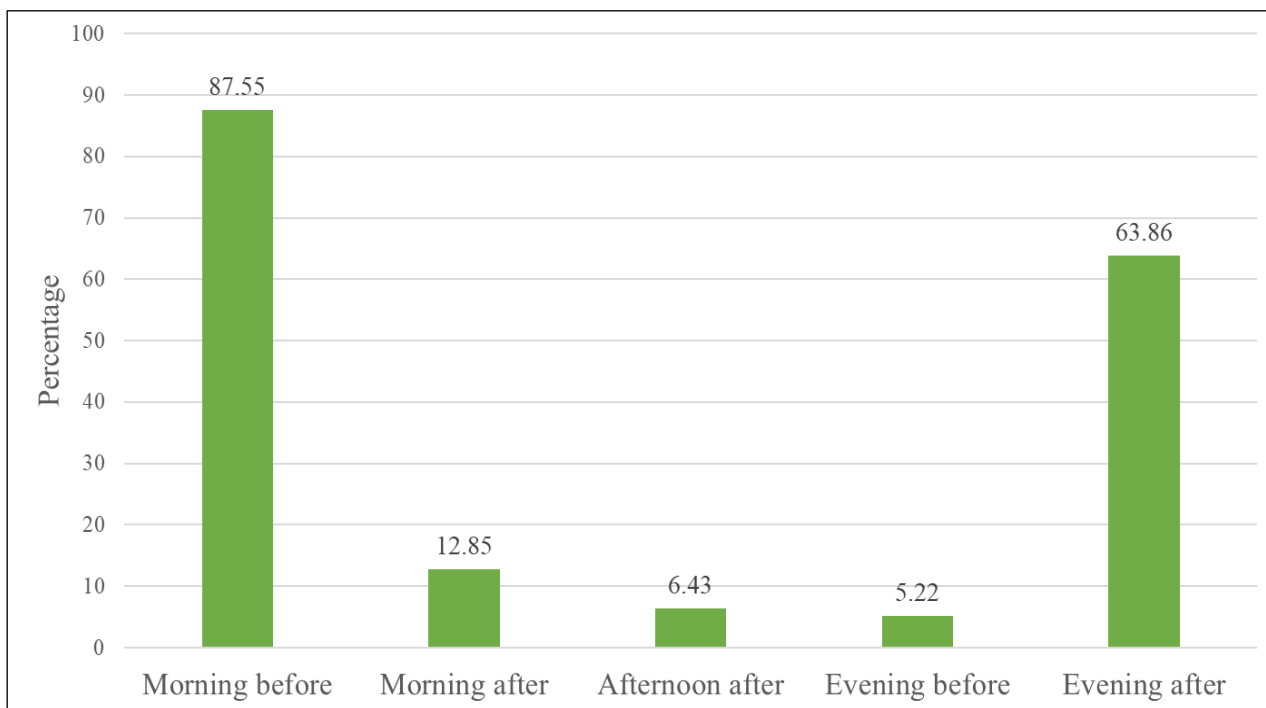


Figure 17: Distribution of the study population according to moments of tooth-brushing in the day

III.2.6. Chi-Square Tests

Chi square tests were carried out to find out the relationship between the demographic distribution and the use of the materials and substances as means and methods with a p value significant of less than 5%.

It was discovered that the studied population of the private sector uses more the traditional method of charcoal while a higher level of education meant that the population will use bicarbonate mouthwash; a conventional method.

Table I: Chi square values for significantly dependent conventional and traditional materials use against demography

| Chi square variables | p-value | Interpretation |
|--|---------|--|
| charcoal and occupation | 0.025 | The private sector uses charcoal more than the public sector |
| bicarbonate mouthwash and level of education | 0.003 | The greater the level of education the more the use of bicarbonate mouthwash |

III.3. SUMMARILY IDENTIFIED ORAL HEALTH PREVENTION BEHAVIORS

Counted percentage of 23.29% of the population carry out routine dental visits with dental surgeons or technicians. Meanwhile, a count percentage of 42.97% practice good dieting with respect to their oral health, 18.88% receive social media advice concerning oral hygiene and disease prevention.

23.29% carry out routine dental visits and 22.49% do self-medicate. 7.63% visit the traditional practitioner as shown on figure 18. Other health behaviors were Avoiding late night meals and mouth rising before sleeping.

III.3.1. Oral health behaviors

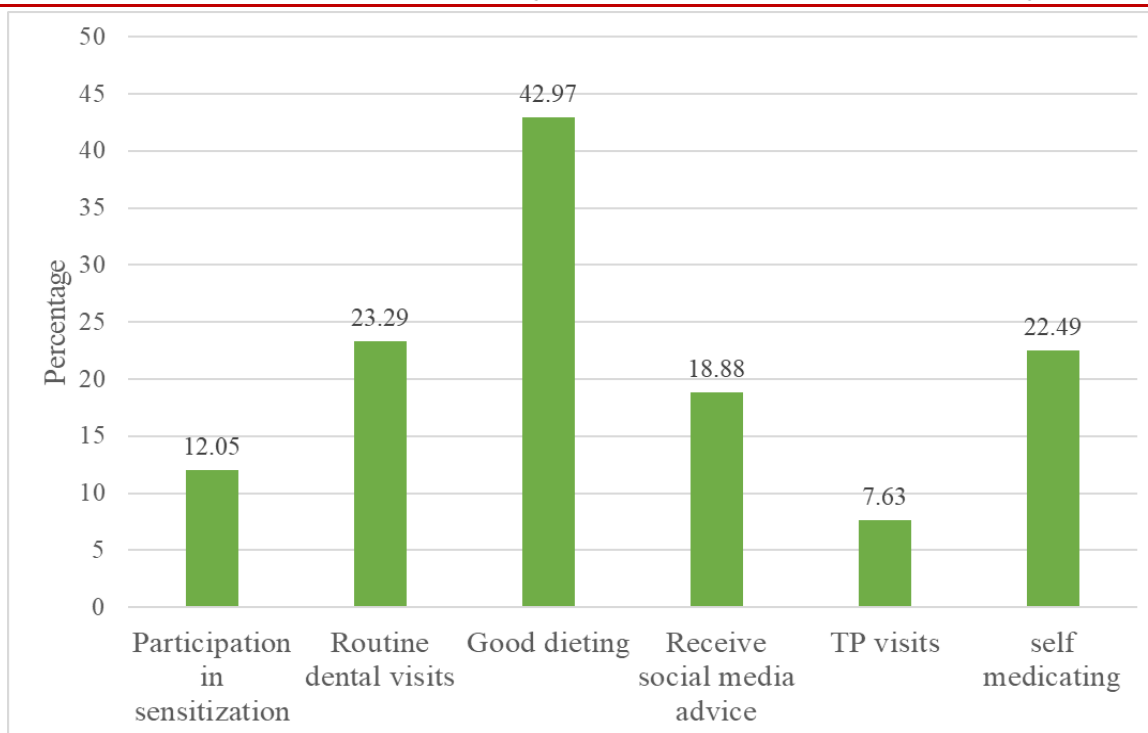


Figure 18: Summary of oral health behaviors by the studied population

III.3.2. Frequency of dental surgeon or technician visits

47.78% had never visit a dentist in a year while 34.5% visit once a year. The lowest are twice a

year of 12.45% and thrice as well as more than thrice to be 3.61% as shown on figure 19.

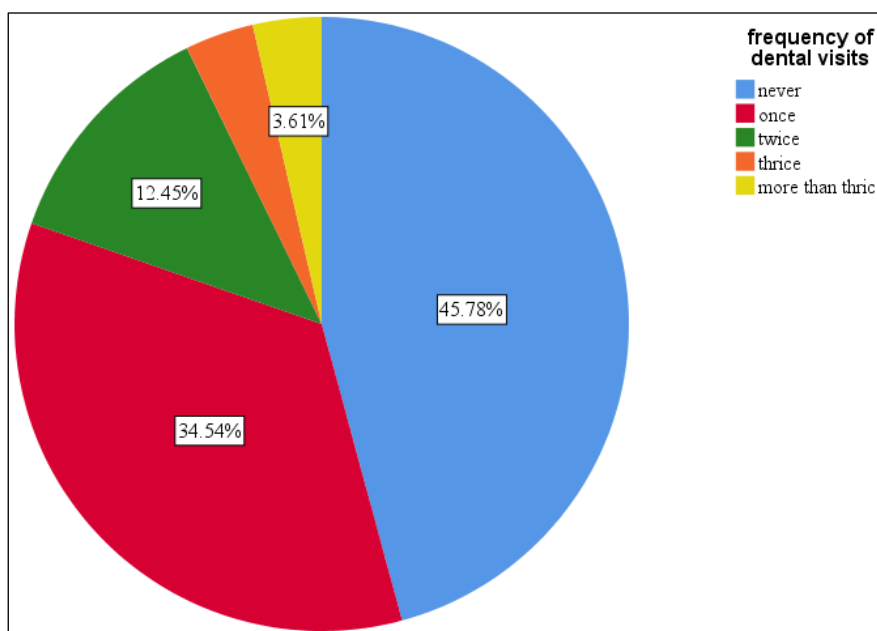


Figure 2: Summary of frequency of dental surgeon visits

III.3.3. Frequency of traditional practitioner visits

74.7% of the population do not visit the traditional practitioner in as often as once while 15.26

visit the traditional practitioner once a year, 4.42% visit twice as well as more than thrice As shown in figure 20.

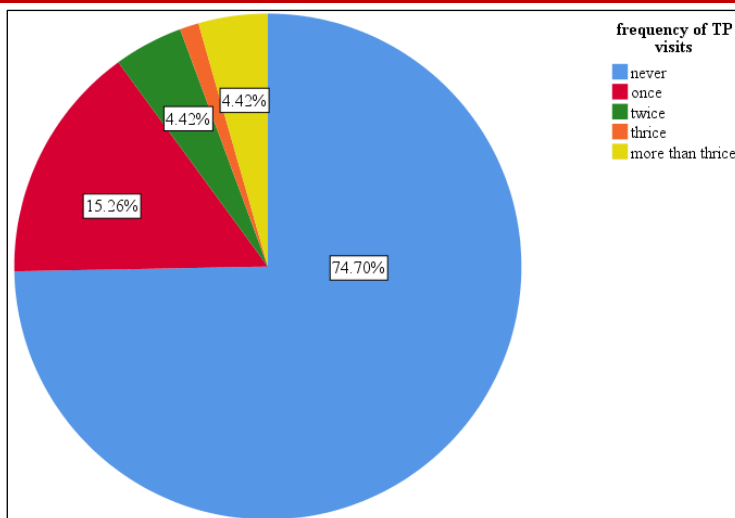


Figure 20: Summary of frequency of Traditional practitioner visits

III.3.4. Reasons for visiting conventional practitioners

44.18% of the population visit surgeon due to pain, 17.27% due to bleeding gums and 14.06% for

routine visits. 12.85% visit for shaky teeth and 7.23% for mouth odor as shown in figure 21.

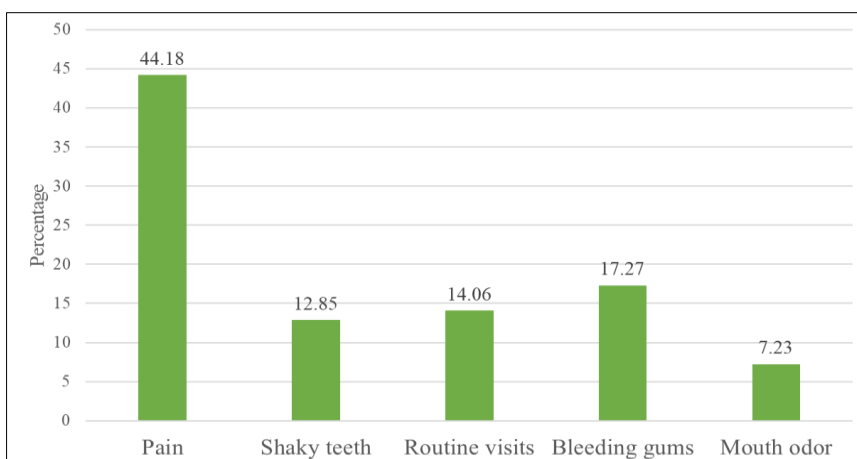


Figure 21: Summary of reasons for visiting the dentist

III.3.5. Reasons for Visiting traditional practitioners

19.28% of the population visit traditional practitioners for pain 8.03% for bleeding gums and

6.02% for mouth odor and 12.85% for shaky teeth as shown in figure 22.

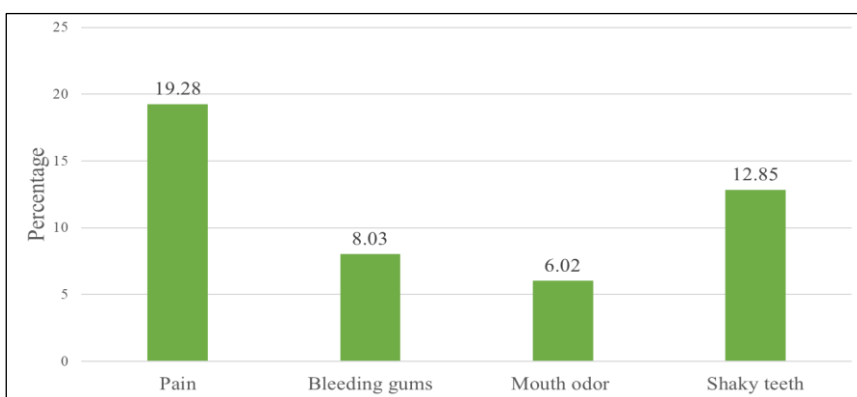


Figure 22: Summary or reasons for visits to the traditional practitioner

III.3.6. Chi-Square tests

Chi square tests were carried out to find out the relationship between the demographic distribution and behaviors with a p value significant of less than 5%. It was discovered that the studied population visit

the traditional practitioner visits according to their level of education as lower levels do more than higher levels. Also, there was an increase routine dental visits with monthly allowance

Table II: Chi square significant relationships for conventional, traditional behaviors and demography

| Chi square variables | P value | Interpretation |
|---|---------|--|
| TP visits and level of education | <0.001 | The more the level of education the lesser the visits to TP |
| Routine dental visits and monthly allowance | 0.05 | The more the monthly allowance the more there is routine dental visits |

III.4. SUMMARILY IDENTIFIED REASONS FOR USING TRADITIONAL AND CONVENTIONAL METHODS

Figure 23 shows that the 3 main reasons the studied population used each of the methods was due to

effectiveness 38.55%, low cost 20.88%, and availability 20.08%. the least were nature lovers 4.42%. recommended 17.27% and publicity 12.85%.

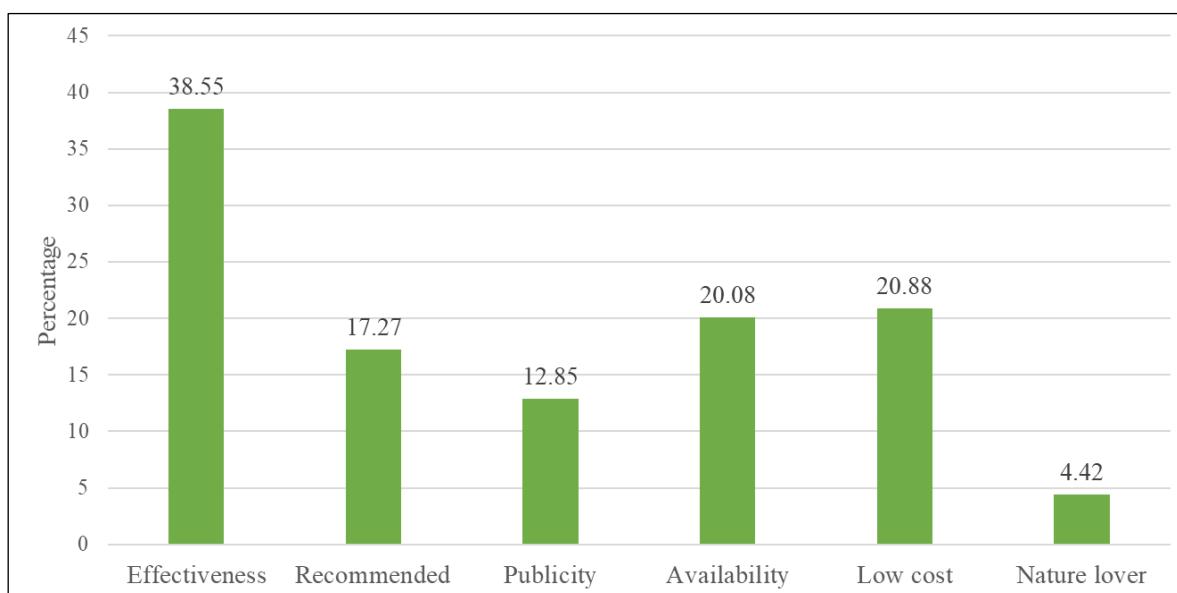


Figure 23: Summary of reasons for using methods

III.4.1. Chi square tests

Chi square tests were carried out to find out the relationship between the reasons and the methods used as a whole for a p value significant of less than

5%. The population who chosed the reason of low cost used more of traditional methods. Meanwhile those of the population who used conventional methods, was because such methods were effective.

Table III: Chi square values for choice of conventional, traditional or both and reasons for use

| Chi square variables | P value | Interpretation |
|------------------------------------|---------|---|
| Traditional and reason of low cost | 0.03 | The population who chosed low cost were more of traditional method users |
| effective and conventional | 0.06 | The population who chosed effectiveness as reason used more of conventional methods |

III.5. SUMMARY MEASURE OF SATISFACTION IN DISEASE PREVENTION WHILE USING CONVENTIONAL AND TRADITIONAL METHODS

VI.5.1. Rand index measure

Figure 24 shows a cumulative 52.61% (304) had above average oral health satisfaction as compared

to a 35.34% below average satisfaction.8.33% of the population had high satisfaction in using hygiene and disease prevention methods while 3.61% had zero satisfaction.

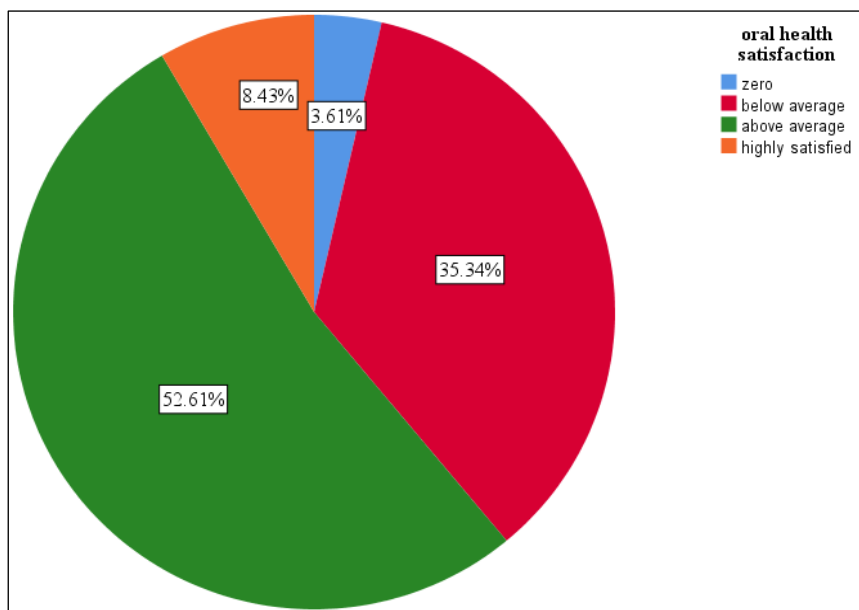


Figure 24: Summary of rand index of the studied population

III.5.3. Choice of traditional, conventional and both traditional and conventional

After general analysis, it was found out that 55.16% of the population actually uses both traditional

and conventional methods, 36.21% used conventional methods meanwhile 8.63% used traditional methods as shown in Figure 25.

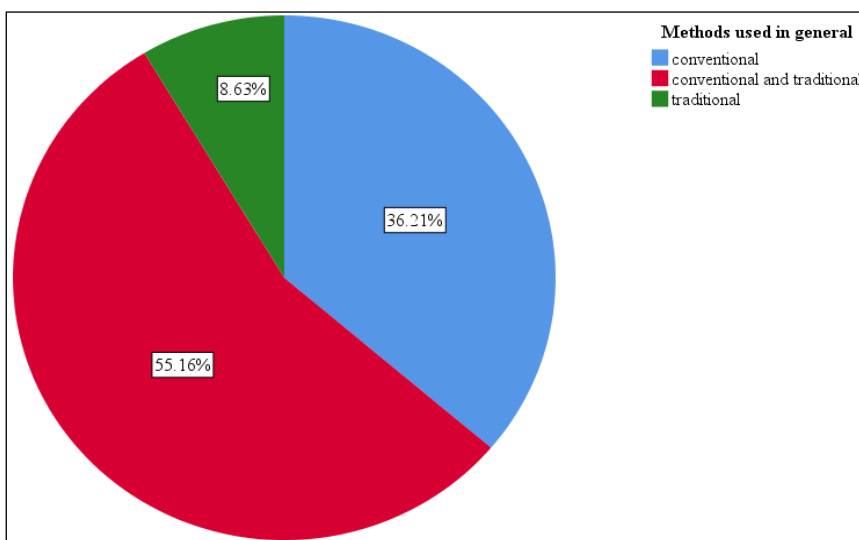


Figure 25: The summary of choice of traditional, conventional and both traditional and conventional

IV- DISCUSSION

According to the World Health Organization (WHO) in 2008 and 2020, the oral health strategy had included carrying out more research, Community participation in improvement of oral health which was weak has become stronger [1].

The present study had evaluated and presented the conventional and traditional methods of oral hygiene.

According to literature reviews, in general, the median age of the population of Douala was 22 years of age and populations between 20 and 29 years of age for females are slightly higher than for males [25] confirming the median age of the population ranging from 21 to 30 years of age. The age range was chosen due to the fact that the mode of living of adults involves alcohol consumption and tobacco smoking which are linked to oral diseases [26].

There was also about 23% of the population of Douala who consume alcohol. The results of confirmed

the consumption of alcohol and refined sugar from the literature review by the WHO report in 2015 [27] with respondents who ranged from 15 years and above.

Among adults ages 25 and older, three-in-ten Christians in sub-Saharan Africa had not completed even a year of primary schooling 30%. But among Muslims in the region, fully 65% had no formal education [28]. This explained the low participation of Muslims in the study since they could not give informed consent for the survey.

Estimates showed that the informal sector occupies 89.1% in Cameroon's working population [29]; this resonated with the high level of people employed in the private sector. The minimum salary for Cameroonian workers under the labor code was fixed at 41 875 Francs CFA [30]. This could explain the maximum amount of monthly allowance being between 0 and 50 000 Francs CFA.

The level of education was mostly a degree level, and was linked to the highest age range of the population being the age range at which the population should be above secondary level of education.

Dental caries and diseases of the tissues supporting the dentition are predominant oral diseases because of changes in the diets of people and inadequate management of these conditions.

The dominant teeth cleaning materials were toothbrush and toothpaste. Charcoal had been used for teeth cleaning in modern times. With school children in Cameroon, tooth brushing and toothpaste was the most commonly used method presented by Azodo and Agbor [31]. In other write-ups, majority of the respondents, 98.8%, used toothbrush and toothpaste to brush their teeth [10]. The choice of toothbrush was mostly due to the perceived efficacy while the choice of chewing stick was hinged on availability [32], religion and traditional beliefs [33].

The participants reported to brush their teeth twice or more times a day 87.55% in the morning before meals and 63.86% in the evening after meals as reported by Gupta V with a high percentage (67%) brushing twice a day [4].

57.69% of the population used fluoride toothpaste and is in reliance with the study of Ahmada I *et al.*, and 51% dental students prefer presence of fluoride while selecting their toothpaste [9] meanwhile, the highest moment of the day was the evening after meals.

The cost of conventional care was one of the main reasons why the population chooses either method as shown in our chi square dependency test being supported. This was the case of studies by Agbor M and

Azodo C where there was a significant relation between the choice of traditional methods and low cost [17].

Irrespective of a well-developed primary health care system in Cameroon and better accessibility to conventional health care, most people still relied on Traditional Healers (TH) because treatment was affordable, TH shared their patient's culture, beliefs, values and understood their expectations of health care [12].

Another supportive evidence was that the majority (64.5%) of the respondents in Cameroon used pharmaceutical products [34].

Other methods that were used included the clove bud. The use of clove and its oil were known to prevent a toothache and have been used for hundreds of years by rural folks. In a study conducted by Moon SE *et al.*, the major compounds of clove, which were eugenol and β -caryophyllene were tested positive for their antimicrobial activity alone [17] which the population used.

Literature review confirmed the availability of dental medics in Cameroon and the reasons probably being the lack of information on the location of these health facilities and services [27]. Also, the ratio of traditional health practitioners to population in Africa was 1:500, whereas the ratio of medical doctors to population was 1:40 000 [2]. This explained the about 23.29% of the population carrying out routine dental visits. These results are supported by the results had by Micheal [33] on self-medication for oral conditions which stated that most of the respondents in Cameroon got their products from the pharmacy (55.6%), road side vendors (26.1%) and native healers (7.8%). These already stated references also support that the traditional practitioner visits are supported by the level of education and the hypothesis that there was a significant relationship between routine dental visits and monthly allowance [12]. Also, 23.29% carried out routine dental visits with dental surgeons or technicians. This showed a low knowledge on where to access these services as presented in literature like respondents were aware of Oral Hygiene Status (OHS), but a lower percentage of the respondents (41.8%) knew where to access OHS.

One of the reasons for using the methods was the low cost 20.8%. This confirms that the low cost of traditional methods was the reason of choice as in the literature. Other reasons for availability were the presence of community pharmacies and road side vendors. Furthermore, for the percentage of the population who chose being recommended (17.27%), review also brings up recommended methods by friends and relatives done by Michael and Azodo [13], Blaise [18] and Agbor and Sudeshni [35]. The above average measure of oral health of 5.12 could be justified by the

choice of materials in this study used by the population of Douala which are toothbrush, toothpaste and bicarbonate which have pharmacologically proven properties [36, 37]. The population just like other populations of Bafia in the center region, the north and the north west regions, considerably used both traditional and conventional methods as showed by Agbor and Sudeshni, Blaise, Michael and Clement [12, 18, 33]. In a bit, the ministry of public health also comprises traditional medicine. Which encourages the presence and use of both conventional and traditional methods of oral hygiene and disease prevention.

CONCLUSION

After this evaluating the means, methods and behaviors used by the population of Douala for oral hygiene and disease prevention, proper oral healthcare in disease prevention, 498 respondents clearly brought out the substances and materials used both traditionally and conventionally to produces satisfaction in disease prevention in the studied population of Douala.

In identifying the traditional and conventional means and methods of oral hygiene, those that are related to oral disease prevention satisfaction include; bucco-dental hygiene with toothbrush and bicarbonate mouthwash which should be at least once a day in the morning. Traditionally, the methods included the use of chew stick, cinnamon extract, black fruit extract and that of green tea.

The established oral health prevention behaviors which were linked with oral disease prevention satisfaction included; routine dental visits, participating in community sensitization.

The main reasons for the use of the traditional or conventional was effectiveness with 55.2% of the study population, 29.9% on availability and 28.7% on low cost in their respective percentages of the general count. The population who chosed low cost was associated with the use of traditional methods and conventionally because the methods were effective.

According to the demography of the study, these means, methods and behaviors being associated to oral disease prevention satisfaction were prone by a good level of education and high monthly earnings.

More than half of the studied population of Douala use both traditional and conventional methods of oral hygiene with an above average satisfaction in oral disease prevention.

Ethical approval: All authors declare that 'ethical clearance was obtained from the Institutional Ethics Committee of the University of Douala for the conduct of this study and for the publication of this article'. All experiments were reviewed and approved.

Competing interests: Authors have declared that no competing interests exist.

Authors' contributions: This work was carried out in collaboration among all authors. Author GMME designed the study, supervised the work and corrected the first draft of the manuscript while author VGO carried out the tests and wrote the protocol. Author LEEB supervised the realization of the tests while authors NL and NNC managed the literature searches. Author JPN wrote the first draft while author BS managed the analyses of the study and corrected the written versions of the manuscript. All authors read and approved the final manuscript.

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