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The Impacts of Socio-Demographic Factors on Oral Health Status (Halitosis) among Students in the University of Calabar, Calabar, Cross River State Nigeria

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Abstract:

Background:

Halitosis (breath malodour) is a condition that has both health and social implications. The origin of breath problems is related to both systemic and oral conditions. Modern social norms emphasize the importance of personal image and interpersonal relationships. Consequently, breath malodour may be an important factor in social communication and therefore may be the origin of concern not only for a possible health condition but also for frequent psychological alterations leading to social and personal isolation. This is the first study that examined the association between socio-demographic factors and oral health in Nigeria especially among university students in Nigeria.

Aims: The aim of this study is to determine the association between socio-demographic factors and oral health status (halitosis).

Method: This is a cross sectional descriptive study. Full time university students were recruited from the department of public health in the University of Calabar, Cross River state Nigeria. Data collection was based on an anonymous questionnaire and the sample size was (n= 291). Descriptive tests, chi-square tests were conducted.

Results: The findings of the study indicated that gender and age have a significant relationship with oral health status and frequency of teeth cleaning. The study indicated that while male students in the last age category reported poor oral health contrary to female students in the last age category that reported excellent oral health status. On the other hands, male students in the last age category reported higher frequency of teeth cleaning better than female students in the last age category.

Conclusion:

This study is the first to examine the association between socio-demographic variables and oral health status, among university students in Nigeria. The findings of this study will provide baseline information needed as a reference for more similar studies in Nigeria. The result indicated that age and gender have a significant association with oral health status, and the frequency of teeth cleaning. This study recommends more studies on oral health diseases such as cancer, periodontitis and gingivitis among adults in Nigeria by ethnicity. Another significant finding in this study is with regard to income. Unlike in general health, income plays a significant role in determining positive health status, but in oral health the role of income seems to be insignificant. There is a need for more studies on the association of socio-demographic variable and oral health status.

Keywords: Oral health, halitosis, public health, students, university students, non-communicable disease, gender, Nigerian students

1. Introduction

Halitosis, (Bad breath, Oral Malodour) is an offensive odour exhaled by the mouth, nasal, facial or pharyngeal sinuses (Sanz et al, 2001, Rosenberg 1996: Delanghe et al. 1997). However, Rosenberg (2002) stated that in most cases (85-90%) of bad breath originated from the mouth alone. But Struch et al. (2008) stated that their study provided a clear evidence for an association between gastro-esophageal reflux disease (GERD) and halitosis. But according to Rahimi (2001) halitosis almost never arises from the esophagus, stomach or intestines, because the esophagus is normally collapsed and closed, but that an occasional belch may carry odour up from the stomach, but that the possibility of air escaping continuously is very remote.

This view was supported by Rayman and Almas (2008), who noted in their study that the vast majority of patients with halitosis approximately (80- 90%) originate within the oral cavity and not from the stomach. Rosenberg, (2002) argued that most researchers considered the stomach as a very uncommon source of bad breath. However, the intensity of bad breath differs during the day, as a function of oral dryness, which may be due to stress or fasting, but eating certain foods such as (garlic, onions, meat, fish and cheese), smoking and alcohol consumption will impact on breath odour (Knaan et al. 2005, Hawxhurt 1987). More so, because the mouth is dry and inactive during the night, the odour is usually worse

upon awakening (Knaan et al. 2005). However, the cause of halitosis is still incompletely understood (Rayman and Almas 2008).

Halitosis has a significant impact both personally and socially on those who suffer from it or hope they do (halitophobia or delusional halitosis) and is estimated to be the third most frequent reasons for seeking dental aid, following tooth decay, and periodontal disease (Loesche and Kazor 2002). Halitosis can be considered a social impediment, an important factor in social relations and can cause concern, not only related to health aspects, but also to psychological changes that leads to social and personal isolations (Sanz et al. 2002). People suffering from halitosis creates a social barrier between themselves and their friends, relatives or colleagues at work (Bosy 1997). He noted that many of the subjects he interviewed for a research project confided to him that they talk with their faces averted.

Individuals with real or perceived oral malodour are extremely sensitive to discriminating behaviour and usually interpret occurrences such as opening of windows or the placing of a finger across the nose as an indication that their mouth odour is at a socially unacceptable level (Yaegaki, and Coil 1999). However, Masui, (1997) has proved that gestures such as covering the nose are usually not a reaction towards another person's malodour that this gesture are performed incidentally, often without any specific reasons, but they are misunderstood by halitosis patients. This misrepresentation and misinterpretation of other people's behaviour by the halitosis sufferer is because these psychological conditions are caused by psychosomatic factors such as social phobia. On the cultural and ethnic impacts of mouth odour, (SIRC 2008) reported that mouth odour is not just a biological and psychological experience, it is also a social and cultural phenomenon. According to (SIRC 2008) the Bororo of Brazil, and the serer Ndut of Senegal associated personal identity with breath-odour, similar practices are found in Arab countries, where breathing on people as you speak to them signals friendship and goodwill and to deny someone your breath-smell conveys a shameful avoidance of involvement. Race and ethnicity therefor, is a marker for oral health status (Butani et al. 2008). This study is focused on the Nigerian population that lives in Gloucestershire England. Halitosis for long has been identified among Nigerians and has been on the increase since then. According to (SIRC 2008) publication, reported that the Nigeria Songhay are drenched with perfumes to reduce mouth odour. Adesanya et al. (2007) reported that since ancient times till this day that the Yorubas of western Nigeria use chewing stick called pako to cure mouth odour.

In their own study, Aderinokun (2000) noted that the increase of halitosis in Ibadan western Nigeria might be due to lack of access to oral health care and health educational intervention. Similarly, Roach (2009) reported a high rate of patients seeking help for halitosis at the university of Benin Dental Hospital in Nigeria. However, Bamigboye and Akande (2007), noted that the increase of halitosis in Nigeria might be linked to the increase of caries, gingivitis, and periodontal diseases. Although Ogunbodede et al. (2005) reported that an increase of diabetes in Nigeria may be responsible for the noted increase of halitosis among Nigerians. However, they noted that few studies exist on halitosis in Nigeria, and called for more studies so as to fill the gap in Knowledge.

Global epidemiology estimated that 90 million Americans or approximately 30% of the U.S population currently suffers from halitosis on a regular basis (Malcmacher, 2005). Similarly, 20-60% of the Americans suffers from chronic oral malodour, and approximately in half of these individuals, the problem becomes serious enough to create personal discomfort and social embarrassment (Bosy 1997, Brunette et al. 1998). On the other hand, over (20%-60%) of Canadians are suffering from chronic halitosis. Similarly, studies have indicated that in Asia, over 80 million people are affected with halitosis (Aquino, 2007), of which about 23% of Japanese population have chronic halitosis (Rosenberg, 1994). This is the first study that investigated halitosis among university students in Nigeria, the findings will provide a base line information for further studies.

1.1. Background of the Study

Nigeria is the most populous country in sub-Sahara Africa with an estimated area of 923,773 km² (National Bureau of Statistics (NBS) 2010; Aregbeshola, 2011), comprising of 36 states and a population of 152 million people (Ucha, 2010; Akuede *et al.*, 2012). Based on natural landscape, Nigeria is divided into three regions namely: Northern region, Western region and Eastern region, by the intersection of the River Niger and the River Benue (Figure 2) before terminating into the Gulf of Guinea (Philips, 2004). The geographical location of the Federal Republic of Nigeria is on the Gulf of Guinea in the West Africa. It is between Benin in the west and Cameroon in the east, in the north is Chad in the north east and Niger in the north-west. The diversity of climates observed in Nigeria are aridity in the North, tropical in the center, and equatorial in the South, with a maximum temperature above 32 degrees Celsius in the North (Walker, 2008). The annual rainfall is more in the South 2000 millimeters than in the North 500-700 millimeters (Aregbesola, 2011). Therefore, the Northern region is exposed to a prolonged heat, prolonged drought, and dry seasons, this harsh environmental conditions is expected to affect growing of crops, vegetation, and grazing of animals, sources of domestic water and sanitation and farming among others.

Consequently, it is assumed that the environmental conditions will affect both the physical health and psychological health of Nigerians living in the Northern region, differently from those living in the other two regions (Terrass & Benjelloun, 2010). However, no comparative cultural study exists in Nigeria that examined the demographic factors and its association with oral health status among any of the three regions, by gender across any selected population group in Nigeria. Nigeria is multi-ethnic, organized into three major ethnic groups that included Igbo in the East, Yoruba in the West and Hausa/Fulani in the North (Bangdiwala *et al.*, 2010; Ucha, 2010). The present study is located in the eastern part of Nigeria.

Half of the population of Nigerians is Muslim while 40% of the population are Christians, and the rest 10% of the population follows the traditional African religion (Paden, 2008; Fafowora, 2011). Although, there is sufficient evidence to

show that people's religious orientation, religious affiliations and practice, are associated with psychological health (Ojewumi, 2010). However, no study exists in Nigeria that examines the association between socio-demographic variables and oral health status especially halitosis.

1.2. Why the Study Is on University Students

However, the evidence is still not clear, whether gender differences occur in student's health status or not in Nigeria. For example, some studies have reported that male students appear to have better cognitive health (e.g. Ebert *et al.*, 2002; Jorm *et al.*, 2004) and mental health (Zawawi & Hamaideh, 2007) compared to female students. On the contrary, others have found no gender differences in cognitive health (e.g. Hilari *et al.*, 2006; Mikolajczyk *et al.*, 2008) and mental health (Bayram & Bilgel, 2008). These conflicting results suggested that further study of sex differences in student's health status might benefit from the examination of students' health status and lifestyles in non-western culture such as Nigeria. especially health evidence of sex-ethnic interaction. Measuring the health status of university students in Nigeria is important to ascertaining health intervention effectiveness, monitoring progress, and as a critical step in measuring the health of the general population. Furthermore, students are future leaders and potential policy makers, their health and wellbeing need to be guided at this most important phase of their development, and equipped with the right knowledge to be able to distinguish between healthy and unhealthy lifestyles (Garrusi *et al.*, 2008; Brunt & Rhee, 2008; Schmidt, 2012).

2. Research Method

2.1. Consent and Confidentiality

However, the present study involved only healthy and non-vulnerable adults from the age of 18 years, and no stage of the data collection involved any invasive procedure, emotional or psychological impact. However, the researcher sought permission to conduct the research from the Dean of the Faculty. A letter for approval was presented by hand directly to the Dean of the Faculty of Public health. The letter contained the required information concerning the research: title, objectives and the data collection techniques.

The letter also explained that the participants consent would be sought before administering the questionnaire, and that their confidentiality will be assured by employing a self-anonymous questionnaire, which does not ask participants name, address or any other form of identification. The letter also explained that the participants have a right to withdraw from the study at any time without any legal implication therefore participation is voluntary. Prior to data collection, similar information was given to the participants.

2.2. Sampling of Participants

The samples for the current study were university students, drawn from the department of public health at the University of Calabar. The health survey was administered to 400 students of which 335 were returned of which 291 respondents completed their questionnaire with the required data and were consequently entered for the analysis. To ensure that these samples have equal representation by the academic year of study, the intended sample ($n=400\pm10$) was shared among four academic years, allowing ($n=100\pm10$) students to be recruited from each academic year (e.g. 1, 2, 3, & 4). However, since students were recruited from lecture rooms, the recruitment exercise for each year goes on, until the estimated number of participants was met.

2.3. Data Collection Procedures

Data were collected from students in the department of public health in the University of Calabar. The data collection took place between August and September 2019. Data collection was carried out by the use of anonymous questionnaire. The questionnaire was given to the participants during lecture with the entire student's on-sit. Giving to students on hand in this form was a good strategy as it recorded a very high participation and completion rate. Data collection process lasted for about 40 minutes. Consequently, students' responses to the questions in the present study were transferred to the SPSS statistical package, 20.0 version, for analysis.

2.4. Statistical Data Analysis for the Present Study

2.4.1. Descriptive Statistics

Preliminary data analysis of this study was conducted with descriptive tests. By conducting the descriptive tests, it was possible to check the entire data set entered into the SPSS for errors. Descriptive tests enabled these errors to be identified and corrected in the data set. In addition, descriptive statistics made it possible for the description of the characteristics of the sample in percentage, mean, and standard deviation. The Chi square test was employed to explore the relationship between categorical variables in the analysis. Chi square analyses provide information on the simple 'main effect' for the current study on sex and ethnic, which enables the level of associations to be determined.

3. Results

A total of ($n=291$) of the sample completed the questionnaire correctly and was computed into the SPSS version 20.0 for statistical analysis. The descriptive analysis of the socio-demographic factors indicated more females than males among the students (Table 1). With regard to age the age distribution is not even. The middle age group 21-26 age range group are more (59%) compared to the oldest age group (32 years +) that are only 10 (3%).

Variables	Frequency	Percentage (%)
Gender		
Male	100	34.0
Female	191	66.0
Age		
15-20 years	88	30.0
21-26 years	166	59.0
27-32 years	26	8.0
32 years+	10	3.0
Religiosity		
Catholic	86	30.0
Protestant	80	28.0
Other	124	42.0
Income		
Always Sufficient	20	7.0
Sometimes Sufficient	40	14.0
Insufficient	201	74.0
Mostly Insufficient	15	5.0

Table 1: Prevalence of Socio-Demographic Factors (n=291)

'Other religious' groups are numbered more than Catholics and Protestants (Table 1). The study also indicated a significant difference between students who indicated that their monthly income is sometimes insufficient (70%), compared to those who indicated their income to be always sufficient (7%) Table 1.

Sample N =291							
Variable	Very Poor	Average	Good	Very Good	Excellent	P	Phi
Gender)							
Male	0(0.0)	6(6.0)	13(13.0)	30(30.0)	50(51.0)	.20	.20
Female	4(2.1)	14(7.0)	35(19.0)	77(41.0)	59(31.0)		
Age							
15-20 Years	0(0.0)	6(7.0)	18(21.0)	40(46.0)	24(27.0)	.078	.260
21-26 Years	4(2.5)	9(6.0)	25(15.0)	55(34.0)	70(43.0)		
27-32 Years	0(0.0)	4(15.0)	3(12.0)	6(23.0)	13(50.0)		
32 Years+	0(0.0)	1(10.0)	2(20.0)	6(23.0)	1(10.0)		
Income							
Always Sufficient	0(0.0)	1(5.0)	5(25.0)	6(30.0)	8(40.0)	.030	.23
Mostly Sufficient	2(5.0)	2(5.0)	5(13.0)	17(43.0)	14(35.0)		
Sometimes Sufficient	1(1.0)	15(8.0)	34(17.0)	71(36.0)	78(40.0)		
Mostly Insufficient	1(7.0)	0(0.0)	1(7.0)	8(57.0)	4(29.0)		
Religiosity							
Catholic	2(2.0)	3(4.0)	13(15.0)	30(40.0)	38(44.0)	.83	.20
Protestant	2(0.0)	9(12.0)	14(18.0)	28(36.0)	27(35.0)		
Other	2(2.0)	8(7.0)	21(18.0)	48(73.0)	44(69.0)		

Table 2 Prevalence (%) of Socio-Demographic Factors by Oral Health Status (Chi Square Analysis)

With regard to gender and oral health status (state of the teeth), chi square analyses indicated a significant difference (p value = .020), though the effect size was small (.020), however, more male students (51%) than female (31%) reported excellent oral health status (Table 2). With regard to age differences with oral health status, there was no significant association by age. However, when age difference was examined by gender with a Bar graph, the result indicated that older male age grade reported poor oral health, while the oldest female age groups reported better oral health status than other female age groups (Figure 1).

Though religious denomination or affiliation shows no significant differences, however, the result indicated that those affiliated to 'Other religion' (69%) groups reported better oral health status than Catholics (40%), or Protestants (35%). However, these other religious group includes Muslims, Traditional religions and many other forms of non-orthodox religious denominations (Table 2). On the other hands religious affiliation or denomination indicated no significant difference with regard to oral health status by gender.

Figure 1: Oral Health Status by Gender and by Age

Income status with regard to gender and oral health status, the result indicated significant differences with those who reported their income to be always sufficient had the best oral health status (40%) compared to those who reported their income to be mostly insufficient (Table 2). However, when the result was examined by gender using Bar chart, the result indicated that male students who reported their income to be mostly insufficient reported their oral health status to be excellent while on the contrary female students who reported their monthly income to be mostly insufficient also reported the poorest oral health status (Figure 2).

On the other hands those who reported their income status to be 'always sufficient' both in male and female shows no significant differences with other income groups. More so among female students, those who rated their income status to be mostly sufficient and those who rated it 'sometimes insufficient' rated their health status the same (Figure 2).

Figure 2: Oral Health Status by Income Sufficiency and by Gender

With regard to the association between socio-democratic factors and the frequency of teeth cleaning, only age have a significant difference, and the study indicated that men in the oldest age category reported higher frequency of teeth cleaning 'twice or more times per day' than women in the oldest age category (Table 3, Figure 3). With regard to monthly income there was no significant difference between the different income groups (Table 3). However, when a bar graph was plotted by gender, the study indicated that male students whose income was mostly insufficient reported highest frequency of teeth cleaning, contrary to female students whose income was mostly insufficient but reported lowest frequency of teeth cleaning (Figure 4). The study also indicated that the young age groups among female students (15-20 years and 21-26 years) showed a slightly higher frequency in teeth cleaning than their male counterparts.

Variable	Once Monthly	2-3times Monthly	2-3 Times per week	Once Daily	Twice or More Per Day	P	Phi
Gender							
Male	2(2)	1(1.0)	2 (13.0)	35(35.0)	60(60.0)	.576	.100
Female	1(0.5)	1(1.0)	2 (1.0)	58(31.0)	127(67.0)		
Income							
Always Sufficient	0(0.0)	0(0.0)	1(5.0)	6(30.0)	13(65.0)	.670	.189
Mostly Sufficient	1(25.0)	0(0.0)	0(0.0)	10(25.0)	29(73.0)		
Sometimes Insufficient	1(1.0)	2(1.0)	2(10)	66(33.0)	128(33.0)		
Mostly Insufficient	0(0.0)	0(0.0)	1(7.0)	5(33.0)	9(60.0)		
Age							
15-20 Years	1(1.0)	0(6.0)	1(1.0)	24(27.0)	62(70.0)	.016	.293
21-26 Years	0(0.0)	1(1.0)	3(2.0)	63(38.0)	98(43.0)		
27-32 Years	1(4.0)	1(4.0)	0(0.0)	3(12.0)	20(80.0)		
32 Years+	1(10.0)	0(0.0)	0(0.0)	3(30.0)	6(60.0)		
Religiosity							
Catholic	0(0.0)	0(0.0)	2(2.0)	26(31.0)	57(44.0)	.814	.195
Protestant	1(1.0)	0(0.0)	1(1.0)	32(41.0)	45(57.0)		
Other	2(2.0)	2(2.0)	1(1.0)	34(60.0)	85(76.0)		

Table 3: Prevalence (%) of Socio-Demographic Factors by Frequency of Teeth Cleaning

With regard to the frequency of teeth cleaning, the study indicated that female students reported more frequency of teeth cleaning (67%) per day than their male (60%) counterparts (Table 3). However, there was no significant difference between male and female students, ($p = .576$), and effect size was also very small ($\Phi = .100$). When the income status was assessed with regard to the frequency of teeth cleaning, the result indicated that students who are in the income sufficient category reported higher frequency of teeth cleaning than those who are in the income insufficient category (Table 3). On the other hands when the chi square analyses were done by gender, the result indicated that female students who reported income sufficient either always or mostly, have a higher frequency of teeth cleaning than their male counterparts. Conversely, the study indicated that male students in the income 'mostly insufficient' reported higher frequency of teeth cleaning than other categories (Figure 3).

Figure 3: Frequency of Teeth Cleaning by Gender and by Monthly Income

However, age differences with regard to different income groups showed a significant association with regard to the frequency of teeth cleaning ($P = .016$, $\Phi = .293$). The study indicated that men who are in the oldest age group (32 years and above) reported the highest frequency of teeth cleaning, compared to other age groups. On the other hands women who belonged to the oldest age group (32 years and above), reported the lowest frequency of teeth cleaning compared to the rest of the group. However, women who are in the youngest age group (15-20 years), reported higher frequency of teeth cleaning when compared with male students of the same age group (Figure 4).

Figure 4: Frequency of Teeth Cleaning by Gender and by age

4. Discussion of results

4.1. Prevalence and Percentages of Socio-Demographic Factors

A total of ($n = 291$) students participated in the study and the analyses showed that there are more female students than males (66% and 34%). This study supported other similar studies with university students in Nigeria which reported higher population of females than males in Nigeria universities (e.g. Agwu et al., 2017; Adewuya et al., 2006). These gender differences may be related to high motivation for female education in Nigeria, by different local and international agencies which encourage women liberation. Age differences in the study were remarkable. The result indicated that the middle age groups (21-26 years) were more than other age grades. Since the university age in Nigeria is from 18 years and above, it may be possible that majority of the students waited for age qualification because before they start arrangements to enter a university, by then their age may have gone high.

With regard to income, the study indicated that majority of the students indicated their income to be 'mostly insufficient'. This is not surprising considering the economic hardship in Nigeria, large population size, high cost of living added to high school fees in Nigeria. In addition, most students in Nigeria are either self-sponsor, or family sponsor as the era of scholarships are fast declining. With regard to religion, most students reported 'other religion' which is either spirituality, traditional or Muslim followed by Catholics. Due to the economic hardship among Nigerian students it may be possible that most students have resorted to spirituality or Islam as a way of coping strategy as reported by Francis et al., (2004) indicated that spirituality is a coping method.

4.2. Prevalence and Percentages of Socio Demographic Factors by Oral Health Status

When gender was examined with regard to oral health status, the study indicated that more female students reported more excellent oral health than male students. This finding is contrary to earlier studies (e.g., Rosenberg et al 1999; Rahimi 2001) that reported more women to have poor oral health than men, which was attributed to the fact of ovulation and menstruation common to all women and which has a negative impact on oral health (Bosy 1997). With regard to age, the present study finds no significant association between oral health and age grade (table 2). However, the findings of (Vandana and Sridhar 2008; Rosenberg 1996) noted that poor oral health is more in older age groups. On the contrary the findings of Liu et al. (2006) supported the current study in their report that age and environmental factors have no effect on oral health Status.

However, when the different age groups were analyzed by gender, the result showed that it is mostly among males, that old age was associated with poor oral health (Figure 1). On the other hands middle aged men (21-26 years) of age reported a better oral health than their female counter parts. With regard to income differences in relation to oral health, the study indicated a significant association ($P=0.30$) but not with a wide margin ($\Phi=230$). The study further indicated that by gender, only male students whose income category was 'Mostly insufficient' was more associated with excellent oral health while female students with 'insufficient income' reported the worst oral health among the participants. However, oral health has been found to be very expensive to maintain (Agwu 2020) and since women are more associated with halitophobia than men (Agwu 2020) it is possible that they may attribute a poor income status as a gateway to poor oral health status.

Also, women are more body image conscious than men, it is also possible that they may develop a negative behavioural attitudes towards minor changes in oral health (e.g. Temporal halitosis, bleeding gums) as a sign of poor oral health, while men may refuse to report such incidents as an oral health issue. With regard to the association of demographic variables with the frequency of teeth cleaning only age categories showed a significant difference (Table 3, Figure 4). This finding is very remarkable, for while age was not an important factor in oral health status (Table 2 Figure 1), it showed significant effects in the frequency of teeth cleaning. ($P=0.16$; $\Phi=293$). It is possible to suggest that because teeth colour has been reported to change to darker shade with increasing age, this may be the explanation for increased frequency of teeth cleaning associated with age. Secondly as widely reported in some studies that halitosis is more in adults than in younger age groups (e.g. Vandana and Sridhar 2008; Rosenberg 1996). However, when the aged categories

were examined by gender, it was shown that among men, old age was associated with high frequency of teeth cleaning than among the female students (Figure 4). On the other hands among the female students being young (15-20years) was associated with high frequency of teeth cleaning. This finding supported other studies (e.g. Agwu et al., 2017; Jones et al., 2007).

5. Conclusion and Limitation

This study is the first to examine the association between socio-demographic variables and oral health status, among university students in Nigeria. The findings of this study will provide baseline information needed as a reference for more similar studies in Nigeria. The result indicated that age and gender have a significant association with oral health status, and the frequency of teeth cleaning. These findings are important especially when planning for oral health interventions among university students in Nigeria. The study indicated that while male students in the last age category reported poor oral health contrary to female students in the last age category that reported excellent oral health status. On the other hands, male students in the last age category reported higher frequency of teeth cleaning better than female students in the last age category.

These findings may be due to oral health inequalities among adult male and females in Nigeria (Bosey 1997). This study recommends more studies on oral health diseases such as cancer, periodontitis and gingivitis among adults in Nigeria by ethnicity. Another significant finding in this study is with regard to income. Unlike in general health, income plays a significant role in determining positive health status, but in oral health the role of income seems to be insignificant. I recommend more studies with regard to the role of income status and oral health status. This study has some certain limitations. First it is a cross sectional study, it is centered on association and not on cause and effects. So, I recommend interventional studies based on the outcomes of the current study. Second, the sample for the current study was based on a single faculty and a single university in Nigeria, therefore caution is required in the generalization of the results to Nigerian students. Third, the sample size was small, a larger sample may give a different outcome. I also recommend repeating this study using both qualitative and quantitative methods.

6. References

- i. Agwu M.E. (2020), Exploring The Psychosomatic Effects of Halitosis Among Married Nigerians Living In Gloucestershire England. *RA Journals of Applied Research*: 2394-6709
- ii. Agwu M. E. (2017), Social Support, Body Image Perception And Depressive Symptoms, Among University Students In Nigeria, By Gender And Ethnicity *Science Journal of Public Health*: 2328-7950
- iii. Adesanya, A. Oluyemi, K and Ofusuru, D. (2007) Micro morphometric and Stereological Effects of Ethanolic Extracts of Garcinia Cambodia Seeds on The Testes And Epididymis' of Adult Rats. *The Internet Journal of Alternative Medicine*, 5.
- iv. Aguino m.f.t (2007) bad breath (online) asian journal, review on 20th October m available at <<http://www.asianjournal.com>
- v. Bamigboye, O. and Akande, T.M. (2007) Oral Hygiene Status of Students in Selected Secondary Schools In Oshogbo Nigeria. *Journal of the Nigerian Medical Practitioner*, Vol. 51(4).
- vi. Bangdiwala, S. I. Fonn, S. Okoye, O., & Tollman, S. (2010). Work force resources for health in developing countries. *Journal of Public Health Reviews*, 32: 296-318.
- vii. Bayram, N., & Bilgel, N. (2008). The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Journal of Social Psychiatry and Psychiatry Epidemiology*, 43, 667-672.
- viii. Bosy, A. (1997) Oral Malodor: Philosophical and Practical Aspects. *Journal of Canadian Dental Association* 63 (3)196-201.
- ix. Bosy, A. Kulkarni, G. V., Rosenberg, M. et al. (1994) Relationship of oral Malodour to Periodontal Disease of Independence in Discrete Subpopulations. *Journal of Periodontology*, 64 (1): 37-46.
- x. Butani, Y. Weintranb, J.A. and Barker, J.C. (2008) Oral Health-Related Cultural Beliefs for Four Racial and Ethnic Assessment of the Literature. *Journal of Bio Med Central of Oral Health*, 8:26.
- xi. Brunette, D.M., Proskin, H.M. and Nelson, B.J. (1998) The Effects Of Dentifrice Systems In Oral Malodour. *Journal of Clinical Microbiology*, 43:5721-5732.
- xii. Brunt, A. R., & Rhee, Y. S. (2008). Obesity and lifestyle in U.S. college students related to living arrangements. *Appetite*, 51:615-621.
- xiii. Delanghe, G. Ghyselen, J. Van Steenbergher, D. and Feenstra, L. (1997) Multidisciplinary breath odour clinic. *Lancet*, 350:187-188.
- xiv. Derogates, L.R. (1977) SCL-90-R: Administration, Scoring And Procedure Manual. Baltimore Clinical Psychometric Research, Vol. 1.
- xv. Ebert, S. A., Tucker, D. C., & Roth, D. L. (2002). Psychological resistance factors as predictors of general health status and physical symptom reporting. *Journal of Psychology, Health and Medicine*, 7 (3).
- xvi. Eli, I. Baht, R. Kozlovosky, A. And Rosenberg, M. (1996) The Complaint Of Oral Malodour: Possible Psychological Aspects. *Journal Of Psychosomatic Medicine*, 58(2), 152-159.

- xvii. Fafowora, D. (2011). The ethnic factor in Nigeria politics, The Nation Politics. Retrieved on May, 12, 2012 from <http://www.thenationonline.org.net>.
- xviii. Garrusi, B., Safizadch, H., & Pourhossen, O. (2008). A study on the Lifestyle of the Iranian university students. *Iranian Journal of psychiatry and Behavioural Sciences*, 2(2).
- xix. Hawxhurst, D.C. (1987) Offensive Breath. *Dental Register*, 27:104-110.
- xx. Hilari, R., Mehrotra, R. Sharma, T., NG. V., & Kumar, I. V. (2006). Cognitive impairments but preservation of sexual dimorphism in cognitive abilities in chronic schizophrenia. *Journal of Psychiatry Research*, 141, 129-139.
- xxi. Idehen, E. E., & Ojewumi, A. K. (2010). Religiosity and the preventive health behaviour. *Journal of Life Psychologia*. Retrieved on April 16, 2012 from, <http://readperiodicals.com/201003/19732388//.html>
- xxii. Jorm, A. F., Anstey, K. J. Christensen, H., & Rodgers, B. (2004). Gender differences in cognitive abilities: The mediating role of health state and health habits. *Journal of intelligence*, 32(1), 7, 23
- xxiii. Liu, X.N. Shinada, K. Chen, X.C., Zhang, B.X., Yaegaki, K., and Kawaguchi, Y. (2006) Oral Malodour Related Parameters In The Chinese General Population. *Journal Of Clinical Periodontology* 33.31-36.
- xxiv. Loesche, W.J. (1985) Nutrition And Dental Decay In Infants. *American Journal Of Clinical Nutrition*, 41:423-435.
- xxv. Malcmacher, L. J. (2005) Significant Gains Made In America's Oral Health Canadian *Dental Association*, 33,925-930.
- xxvi. Masui, L. (1997) Perception and Behaviour toward Oral Malodour and Psychomatic Factors. *Japanase Jorنال of Dental Administration*, 32:107-125.
- xxvii. Mikolajczyk, R. T, Maxwell, A. E, Naydenova, V, Meier, S., & Ansari, W. (2008). Depressive symptoms and perceived burdens related to being a student: Survey in three European countries. *Journal of Clinical Practice and Epidemiology in Mental Health* 4, 19.
- xxviii. Ogunbodede, E.O., Fatus, O. A., Akintomide, A., Kolawole, K., and Ajayi, A. (2005) Oral Health Status in a Population of Nigeria Diabetics. *Journal of Contemporary Dental Practice*, (6) 4:075-084
- xxix. Rahimi, R. (2001) Halitosis (Fetor en Ore). *Shiraz E-Medical Journal Vol. 2, No. 4*.
- xxx. Rayman, S., and Almas, K. (2008) Halitosis among Racially Diverse Populations an update. *International Journal of Dental Hygiene*. 6(1), 2-7.
- xxxi. Knaan, T., Cohen, and Rosenberg, M. (2005) Predicting Bad Breath In The Non-Complaining Population. *Journal of Oral Disease* 11 (1), 105-106.
- xxxii. Loesche, W.J. (1985) Nutrition and Dental Decay In Infants. *American Journal Of Clinical Nutrition*, 41:423-435.
- xxxiii. Paden, J., J. (2008). Faith and politics in Nigeria. Nigeria as a pivotal state in the Muslim World. Washington DC. *United States Institute of Peace Press*, P. 34.
- xxxiv. Philips, D. A. (2004). *Nigeria geography*. Philadephia; Chelsea House Rahimi, R. (2001) Halitosis (Fetor en Ore). *Shiraz E-Medical Journal Vol. 2, No. 4*.
- xxxv. Rayman, S., and Almas, K. (2008) Halitosis among Racially Diverse Populations an update. *International Journal of Dental Hygiene*. 6(1), 2-7.
- xxxvi. Schmidt M. (2012). Predictors of self-rated health and lifestyle behaviours in Swedish university students. *Global Journal of Health Science*, 4(4)1-14.
- xxxvii. Social Issues Research Center, (SIRC,2008). Personal Identity and Breath Odour. Available at **Error! Hyperlink reference not valid..** Accessed on 6/6/08.
- xxxviii. Terrass, F. Benjelloun, M. (2010). The effect of water shortages on health and human development. *Perspectives in Public health*, 132(5).
- xxxix. National bureau of statistics (nbs, 2010). the review of the Nigerian economy. Retrieved on june ,20,2013, from <http://www.nigerianstat.gov.ng>
- xl. Ucha, C. (2010). Poverty in Nigeria: some dimensions and contributing factors. Global majority. *E-Journal*, 1(1), pp. 46-56.
- xli. Zawawi, J. A., & Hamaideh, S. H. (2009). Depressive symptoms and their correlates with locus of control and satisfaction with life among Jordanian college students. *Europe's Journal of Psychology*, PP. 71-103.