

# Oral Hygiene Practices and Utilization of Dental Services among Prison Inmates in Bauchi, North East Nigeria

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## ABSTRACT

**Objective:** Oral hygiene awareness and practices are important determinant of oral health status of a population. The objective of this study was to assess the oral hygiene awareness and practices as well as oral health status of prison inmates in Bauchi, North East Nigeria.

**Methods:** The study was a descriptive cross-sectional study conducted among Prison inmates at the Bauchi Medium Security Prison. Data was collected using semi-structured questionnaires while oral examination was performed to record the periodontal health and oral hygiene status of the inmates. Data were analyzed with IBM SPSS version 23.0.

**Results:** The mean age (SD) of the respondents was 28.9 (8.58) years. Of the 280 respondents, 276 (98.6%) were male and about 60 per cent (163, 58.2%) lacked formal Education. The majority of the respondents cleaned teeth more than thrice daily but 250 respondents (89.3%) had never heard of dental floss. Only five (1.8%) had ever used dental floss. Also, 203 (72.5%) of the respondents had never visited a dentist, while most dental visits (51, 66.2%) were pain –induced. Twenty-nine (37.7%) of respondents had visited the dentist for tooth extractions while 39 (50.5%) only received medications. Close to seventy percent (68.6%) had poor oral hygiene.

**Conclusion:** The respondents had poor oral hygiene practices, used inappropriate oral hygiene materials and had poor oral hygiene. Their “impressive” oral health awareness did not translate to dental clinic attendance and service utilization.

**Keywords:** Oral hygiene practices, oral health services utilization, prison inmates

**Citation:** Idowu EA, Nwhator SO, Afolabi AO. Oral hygiene practices and utilization of dental services among prison inmates in Bauchi, North East Nigeria. *Nig J Dent Res* 2019; 4(2):97-105.

## INTRODUCTION

Prison is created to ensure restraint and custody of individual accused or convicted for violating state laws.<sup>1,2</sup> In Nigeria, as an arm of the criminal justice system, the Nigerian Prison Service is charged with the responsibility of providing safe custody of legally interned offenders i.e. the prisoners. Prisoners are therefore a group of people deprived of freedom

because of offences committed/allegedly committed under the law. Despite their social status, health is a fundamental human right.<sup>3,4</sup> Poor general health status oral health inclusive, has been reported among inmates in many countries.<sup>5, 6, 9, 10-12</sup>

“The Nigerian Prison Service mission and vision is centered on reformation, rehabilitation and integration of inmates.<sup>13</sup> Therefore, healthy inmates

stand a better chance of benefitting from the above statement. In the light of this, Lord William, a former British Prime Minister said "Prisoners are punished for their crime by losing their liberty, it is not part of punishment that they should receive a lower standard or inappropriate health care: custody must therefore offer an important opportunity for prisoners to improve their health and to adopt healthy lifestyle that will contribute to their chances of rehabilitation".<sup>14</sup> The result is a safer larger society. Previous reports have equally indicated that provision of good health is crucial to elimination of social exclusion and reduction in reoffending rate.<sup>3, 4</sup> Good oral health care improves the quality of life therefore oral health as part of general health is a fundamental right that every inmate no matter the class, group, race or sex must enjoy.<sup>10, 15</sup> Consequently, attention is shifting to the need for qualitative general and oral health care services to socially deprived persons including prisoners. The study was undertaken due to an observed practice of taking inmates out of prison facilities for the purpose of accessing dental care which may compromise their health physically and psychologically and also constitute a security risk to the society at large. The general and oral health of prisoners have been reported in India<sup>11,12</sup> South Africa<sup>10</sup> but only a handful of studies in Nigeria which reported high unmet needs especially with regards to dental caries and periodontal diseases.<sup>6,9,10</sup> This paucity of data has created a knowledge gap that the current study intended to address.

Many oral diseases can be prevented through good oral hygiene practices. Oral diseases have negative effects on general health therefore, they are now being considered as an integral part of Non-Communicable Diseases (NCD).<sup>16-18</sup> Report on oral hygiene status among inmates in Nigerian prisons especially in Northern Nigeria is scanty in the literature. The few reports on the oral health of Nigerian prison inmates were from the Southern part of the country, hence this study. While available reports in Nigeria like few others from different parts of the world reveal poor oral health status among prison inmates,<sup>10,12,19,20,21</sup> this present study was designed to investigate oral hygiene practices, status and oral health awareness among the inmates in Bauchi prison domiciled in the state capital of Bauchi state and being a major prison in Northeastern Nigeria.

Data generated from this study shall serve as scientific source of information that will assist all

relevant authorities in planning for sustainable oral health care delivery among inmates. It will Provide additional data on oral health status prison inmates particularly in northern part of the country. The data would further be useful in the planning of oral health services for prison inmates in Nigeria.

The objective of this study was to assess the oral hygiene awareness and practices as well as oral health status of prison inmates in Bauchi, North East Nigeria.

## MATERIAL AND METHODS

**Study design:** This was a descriptive cross-sectional study.

The study population consisted of inmates of medium security prison, Bauchi. The Bauchi Medium Security Prison was randomly selected out of the six states having a major prison in Northeastern Nigeria.

### Sample size determination and Sampling

At the time of this study, the total population of the inmates in Bauchi medium security prison with an official capacity for five hundred (500) was eight hundred and fifty (850). By simple random sampling technique, two hundred and eighty (280) inmates participated in this study. All the prison inmates who met the inclusion criteria formed the sampling frame from which a total of 290 inmates was selected comprising all consenting prison inmates that met the inclusion criteria and above the calculated sample size of one hundred and ninety-six. Of this, ten inmates could not complete the study due to discharge and other reasons while a total of two hundred and eighty (280) inmates fully participated in and completed this study. Proportional allocation was not practical considering that more than 90 percent of the inmates were male.

### Instrument for data collection

The research instrument used in this study was a pretested semi-structured questionnaire. The questionnaire was in three sections namely bio data, oral Hygiene practices and oral health awareness and utilization. Each item in the questionnaires was translated into Hausa for those with an English language barrier. There was no special training/calibration for language translators since they were not part of the study, however, investigators involved in administering the questionnaires and recording oral information were trained and calibrated.

**Inclusion/Exclusion criteria:** All consenting awaiting-trial and convicted inmates who had resided in the prison for an unbroken period of at least six months were included in the study. Those who had a few

months to be discharged were excluded from the study once they wouldn't have fulfilled the 6-month minimum residence criterion at the point of anticipated discharge. Anyone who did not fulfill the criteria were excluded from the study.

#### Data collection

The respondents were examined under natural light seated on a plastic chair. Oral examination was done using basic dental examination sets while the CPI probe was used for periodontal health screening.

The lead researcher and two other Dentists performed the clinical oral examination on an average of 35 respondents to an examiner per day for three days. Data recordings were done by three trained dental therapists.

Oral hygiene status was recorded using the Simplified Oral Hygiene Index of Green and Vermilion (OHI-S) and OHI-S score of 0-1.2 was regarded as good, 1.3-3.0 as fair and 3.1-6.0 as poor, Examiners were calibrated and Intra examiner calibration yielded a kappa value of 0.85. Recording clerks were also standardized.

#### Analysis

Data were treated with full confidentiality, coded, safely kept and analyzed using IBM SPSS version 23.0. The initial analysis involved generation of

frequency tables and chi-square. Chi square was used to compare categorical variables at 95% confidence level therefore p values of <0.05 was considered significant.

#### Ethical clearance

Ethical clearance for this study was obtained from the Institutional Review Committee of the Bauchi State Ministry of Health and The Nigerian Prison Service Authority. Consequently, informed consent was obtained from all respondents

#### RESULTS

A total of 280 respondents participated in the study of which 276 (98.6%) were male. The mean age (SD) of the respondents was 28.9 (8.58) years. Most respondents, 135 (48.2%) were within the age of 20-30 years old while 21 (7.5%) respondents were aged 40 and greater. One hundred and four (104, 37.1%) had spent 7-11 months in custody, while seventy (70, 25.0%) and eighty-seven (87, 31.0%) had spent 1-2 years and greater than 2 years in custody, respectively. Majority of the respondents, (163, 58.2%) lacked formal western Education and only sixteen (16, 5.7%) attained tertiary level of formal education (Table 1).

Table 1: Demographic variables of study respondents

Demographic variables	Frequency (n = 280)	Percentage (%)
<b>Sex</b>		
Male	276	98.6
Female	4	1.4
<b>Age group</b>		
≤20	42	15.0
21-30	135	48.2
31-40	59	21.1
>40	21	7.5
Don't know	23	8.2
<b>Duration of admission</b>		
6 months	19	6.8
7-11 months	104	37.1
1-2 years	70	25.0
>2 years	87	31.1
<b>Educational level</b>		
Non formal	163	58.2
Primary	36	12.9
Secondary	65	23.2
Tertiary	16	5.7

Table 2: Distribution of study respondents according to oral hygiene practices

Oral hygiene practices	Frequency (n = 280)	Percentage (%)	P-value
<b>How often do you clean your teeth?</b>			
Once a day	37	13.2	0.001
2-3 times a day	107	38.2	
>3times	108	38.6	
Once per week	2	0.7	
Rarely	26	9.3	
<b>When do you clean your teeth?</b>			
Before breakfast	39	13.9	0.001
After each meal	23	8.2	
Before breakfast and at night	79	28.2	
During prayers	117	41.8	
Non specific	22	7.9	
<b>Why do you clean your teeth?</b>			
To prevent infection such as caries	83	29.6	0.001
To prevent mouth odor	29	10.4	
The two above	133	47.5	
Don't know	35	12.5	

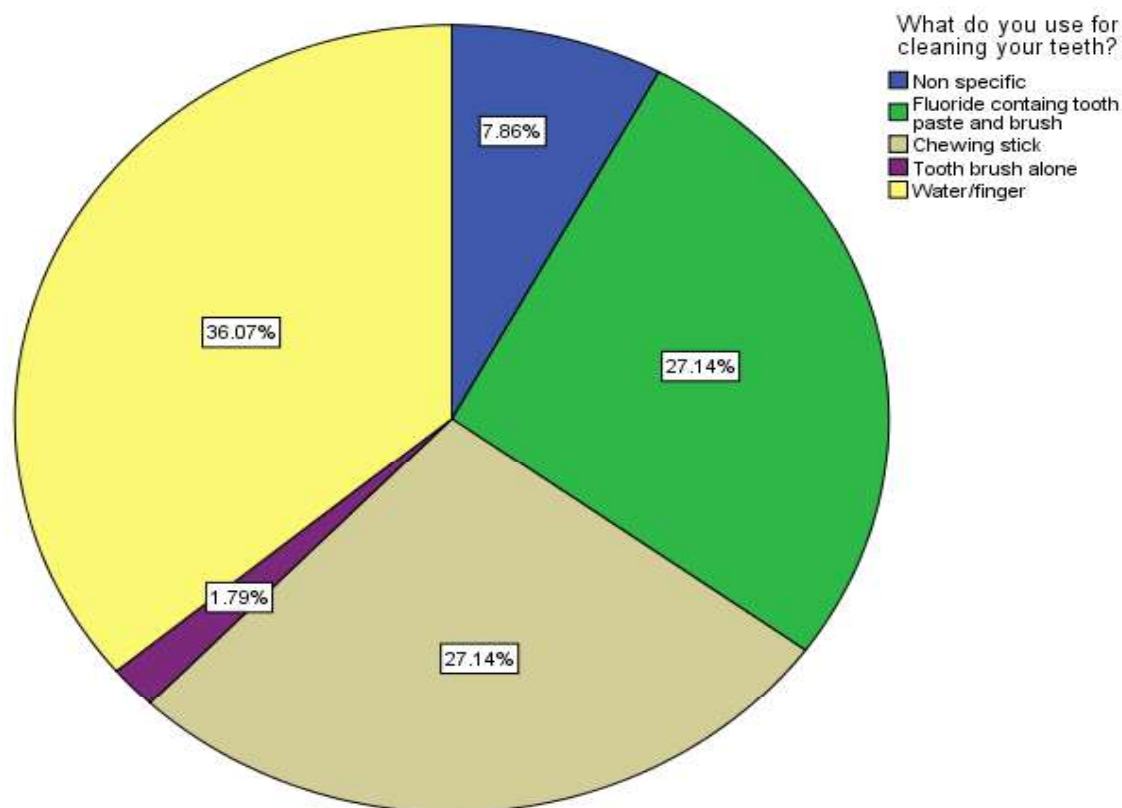
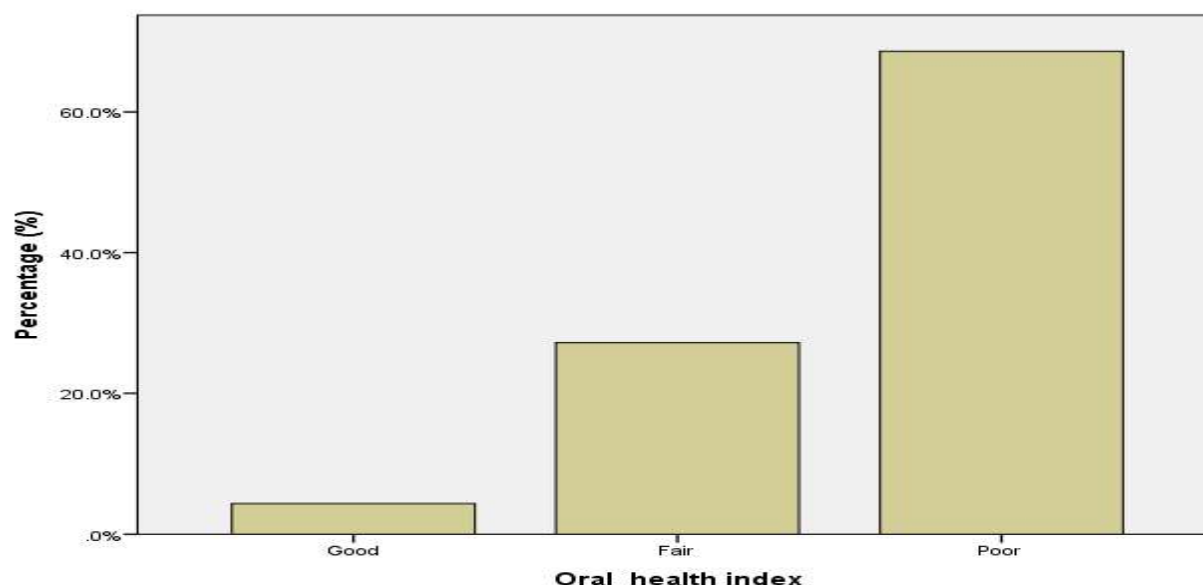


Figure 1: Teeth cleaning materials used by the respondents



$$\chi^2 = 178.400, p = 0.001$$

Figure 2: Oral hygiene status of study respondents

Table 2 depicts the oral hygiene practices among the respondents. The response of respondents to frequency of tooth cleaning and to the timing revealed that 108 (38.6%) cleaned their teeth more than 3 times a day, 107 (38.2%) between 2-3times a day, while 117 (41.8%) of the population chose to clean their teeth only during prayer time which is observed 5 times a day as part of Islamic ablutions. Majority of respondents, 133 (47.5%) chose to clean their teeth in order to prevent infection and mouth odor.

In figure 1, while 76(27.14%) of the subjects used chewing stick an equal number used tooth paste with fluoride for regular tooth cleaning. Majority of the respondents 123 (36.07%) used only finger and water to clean their teeth. The differences were significant ( $p=0.001$ ).

Table 3 shows the response of the subjects to questions on oral health awareness. Two hundred and fifty respondents (250, 89.3%) had never heard of dental floss and only five (5, 1.8%) of those aware had ever used it. ( $p=0.001$ ). Majority of the respondents, 177(63.2%) were aware of the importance of fluoride for healthy teeth compared with 77(27.5%) that were not aware and 26(9.3%) non affirmative. On the negative effect of frequent sugar intake on teeth, majority of the subjects representing

218(77.9%) were aware compared with 27(9.6%) that were not aware ( $p=0.001$ ). While most of the respondents 257(91.8%) agreed that their teeth were as important as any other part of the body, 23(8.2%) were not aware. Many respondents representing 248(88.6%) felt the need for regular dental visits while 8(2.9%) did not.

Table 4 shows patterns of previous utilization of oral health care facilities among the subjects. Over two hundred, (203, 72.5%) respondents had never visited a dentist, most dental visits (51, 66.2%) were pain – induced with twenty-nine (29, 37.7%) having tooth extractions while most (39, 50.5%) only received medications.

Majority of the respondents, 65(84.4%) visited the dentist pre- imprisonment compared with 12 (15.6%) during the course of imprisonment. Among those that had their last visit to dentist when in the prison, 11(91.7%) had their treatments within the prison facilities mostly 5 (41.7%) by Nurses who had no dental training.

Figure 2 shows the oral hygiene status of the respondents. Approximately two-third of the respondents representing 68.6% had poor oral hygiene, 27.1% had fair oral hygiene while only 4.3% had good oral hygiene.  $X^2=178.400, p = 0.001$

Table 3: Awareness of respondents about oral hygiene materials

Awareness	Frequency (n = 280)	Percentage (%)	P-value
<b><i>Have you heard of dental floss?</i></b>			
Yes	30	10.7	0.001
No	250	89.3	
<b><i>Have you used dental floss before</i></b>			
Yes	5	1.8	0.001
No	25	8.9	
<b><i>Use of fluoride is important for development of healthy teeth</i></b>			
Yes	177	63.2	0.001
No	77	27.5	
Non affirmative	26	9.3	
<b><i>Frequent sugar intake can cause tooth decay</i></b>			
Yes	218	77.9	0.001
No	35	12.5	
Don't know	27	9.6	
<b><i>Teeth are important as any other part of the body</i></b>			
Yes	257	91.8	0.001
No	-	-	
Don't know	23	8.2	
<b><i>Dental diseases are preventable by regular dental visit</i></b>			
Yes	248	88.6	0.001
No	8	2.9	
Don't know	24	8.6	

Table 4: Oral health care services utilization of respondents

Oral health care services	Frequency (n = 280)	Percentage (%)	P-value
<b><i>Have you ever visited a dentist?</i></b>			
Yes	77	27.5	0.001
No	203	72.5	
<b><i>Reason(s) for dental visit</i></b>			
Check up	3	3.9	0.001
Pains	51	66.2	
Tooth cavity	11	14.3	
Swollen gum	11	14.3	
Trauma	1	1.3	
<b><i>Treatment received</i></b>			
S & p	4	5.2	0.001
Medication	39	50.5	
Tooth extraction	29	37.7	
Fillings	3	3.9	
Others	2	2.6	
<b><i>When last did you visit a dentist?</i></b>			
Before imprisonment	65	84.4	0.001
In the course of imprisonment	12	15.6	
<b><i>If in the course imprisonment, where were you treated?</i></b>			
Outside prison health facility	1	8.3	0.004
Within prison health facility	11	91.7	

<b><i>If before imprisonment, where were you treated?</i></b>			
General hospital	43	66.2	0.001
Teaching hospital	5	7.7	
Private dental clinic	11	16.9	
Others	6	9.2	
<b><i>If treated within the prison health facility, the treatment was given by:</i></b>			
Dentist	3	25.0	0.213
Doctor	2	16.7	
Nurse	5	41.7	
Community health worker	2	16.7	

## DISCUSSION

Demographically, significant difference was observed in gender distribution of the respondents and this was due to the relative population of male to female sex in Bauchi prison at the time of this study. Therefore, no attention was paid to gender differences in oral hygiene practices in this present study because of the negligible population of the female inmates in the study centre compared with the male and also because oral hygiene practices and gender differences is still a subject of debate in the literature. While some studies in the past reported better oral hygiene practices among female than male,<sup>22,23,24</sup> reports from other studies shows no gender predilection in oral hygiene practices.<sup>25,26,27</sup> The mean age of the subjects in this study is in concordance with a previous study where a large proportion of the inmates were aged 21-39 years representing 48.2%.<sup>11</sup> Majority of inmates that participated in this study had no formal education corroborating a previous study.<sup>28</sup> Irregular and poor oral hygiene practices and poor oral health awareness observed in our study may therefore be associated with poor socio economic background of most of the respondents and corroborates previous studies.<sup>29,30</sup> While it appears that a "large" proportion of the respondents claimed they cleaned their teeth 2-3 times and more than 3 times daily representing 38.2% and 38.6% respectively, this practice was discovered not to be a deliberate action but as a religious obligations and this is in concordance with previous report as observed among a population from lower socioeconomic background in Nigeria.<sup>30</sup> In the present study, while almost half of the respondents representing 47.5% knows why there is need for regular tooth cleaning and gave reasons such as prevention of infection and mouth odor, a smaller proportion representing 12.5%

among the subjects could not give any reason for cleaning their teeth regularly ( $p=0.001$ ). We equally observed that a greater percentage of the subjects representing 36.07% relied on the use of finger and water for cleaning their teeth as against 27.14% who used fluoride-containing tooth paste and tooth brush. This is in contrast with reports of previous studies which reported between 70-100%<sup>31,32</sup> The poor oral hygiene practices noticed among the subjects may be responsible for their generally poor oral hygiene status corroborating previous studies.<sup>30,33,34,35</sup> In this present study, majority of the respondents were aware of the importance of fluoride as an agent needed for tooth development, aware of the cariogenic effect of frequent sugar intake and also aware of the importance of teeth just like any other part of the body. The high level of oral hygiene awareness observed among the respondents conform with other similar studies.<sup>11,35</sup> The educational attainment among the respondents was observed to be an important factor that influences the level of oral hygiene awareness among the respondents ( $p<0.001$ ). This agrees with previous studies although among non-prisoners in Nigerians<sup>24,30</sup> Therefore, regular oral hygiene instructions should be carried out in form of dental outreach programs among inmates in order to increase their dental awareness. Though the majority of the respondents representing 88.8% considered regular dental visit a means of preventing dental diseases, previous dental visit among them was observed to be very low. This observation agrees with previous reports of irregular and poor dental service attendance among the low social class and prison inmates.<sup>15, 29,32,36,37</sup> Among the respondents that have been to dentist in the past, 66.2% were because of pain/tooth ache, a large percentage 50.5% received medications as a form of treatment,



37.7% had tooth extraction and only 3.9% had their teeth filled. ( $p=0.001$ ). Among those that had visited dentists in the past, 84.4% did so before admission to the prison as compared with 15.6% that were treated within the prison facilities. Among those treated within the prison facilities, 41.7% were treated by nurses while 25.0% were treated by dentist. The low percentage of inmates (15.6%) treated within the prison facility is worrisome. Equally worrisome is the fact that almost half of those treated were by nurses who had no previous dental training while a quarter were treated by dentists. Lack of dental professionals in the prison observed during the present study may be the reason for the nurses attending to dental challenges among the inmates and this conforms to previous reports of limited health professionals working in the prisons.<sup>14, 19</sup>

The oral hygiene status of the subjects was generally poor. This is in conformity with results from previous studies on the oral health of prison inmates.<sup>19, 33,34,35,38</sup> Two thirds of the study population had poor oral hygiene while about 5% had good oral hygiene status. The low oral hygiene status among inmates was previously reported.<sup>19, 33,34,35,38</sup>

## CONCLUSION

Poor oral hygiene practices characterized by the use of inappropriate materials were noticed among many inmates and this may be responsible for poor oral hygiene status among the majority of the inmates. Poor oral hygiene status may constitute oral health care challenges in Nigerian prisons. Further study is recommended in order to establish a clear relationship between the poor oral hygiene status and prevalence of common oral diseases among the study population. Although oral health awareness was impressive, it did not translate to dental attendance and utilization of oral health care facilities among the inmates. Based on the findings of this study:

1. The Nigerian Prison Service should pay more attention to inmates' oral health care by making ideal tooth cleaning materials available to inmates regularly and health care services and oral health care professionals should be accessible to the prison inmates. Available oral health care professionals should be trained through updated management of oral pathologies among inmates. Finally, the close association between education of inmates and oral hygiene awareness makes it imperative to regularly give oral hygiene instructions to

inmates. This should be carried out by well-trained dental professionals like dental therapists and hygienists while complex cases should be referred to dentists.

## REFERENCES

1. Uju A, Louise M, Biko A. Toward good standard A manual for Prison offices in Nigeria – Prison Rehabilitation and Welfare Action (PRAWA), Nigerian Prisons Service 2001; 94-95.
2. Nigeria Prisons Service. HIV/AIDS MANUAL for state focal officer of the Nigerian Prisons Service, 2006.
3. Diane LA, Brenda AL. Correctional Healthcare: Implications for public Health Policy. National Medical Association J. (En) 2002.
4. Gerad N. Relevance and limits of the principle of 'Equivalence of care' in prison medicine. J Med Ethics 2007; (33)10: 610-613.
5. Amnesty International. Amnesty international press release, AI index: AFR 44/019/2007 (Public) News service No. 157:15 August 2007 (Accessed at <http://www.amnesty.ng> on 15<sup>th</sup> February 2015)
6. Audu O, Akoreele KW, Joshua IA. Five year Review of disease profile of inmates in three prison formation, in Kaduna state, Nigeria. A case control study. Nig Hosp Pract 2014; 13(5-6):65-71
7. Braimoh OB, Sofola OO, Okeigbemen SA. Caries and periodontal health of prison inmates in Benin City, Nigeria. Int J Biomed Health Sci 2011; 7:137-145.
8. Akaji E, Ashiwaju M. Oral health status of a sample of prisoners in enugu: a disadvantaged population. Ann Med Health Sci Res 2014; 4(4):650-653.
9. World health organization (WHO). Regional office of Europe, Edited by: Lars Moller, Heino Stover (2007) Health in prisons: A WHO guide to the essential, in prison health 2007. (Accessed at <http://www.euro.who.int/pubrequest> on 10<sup>th</sup> July 2010.)
10. Naidoo S, Yengopal V, Cohen B. A baseline survey; oral health status of prisoners Western Cape. SADJ 2005; 60(1):24-27.
11. Dayalear MM, Shivprasad D, Pai PG. Assessment of periodontal health status among prison inmates; A cross-sectional survey. J Indian Soc Periodontol 2014; 18(1):74-77
12. Reddy V, Kon dare CV, Siddanna S, Manjunath M. A survey on oral health status and treatment



- needs of life imprisoned inmates in centre jails of Karnataka India, *Int Dent J* 2012; 62(1):27-32.
13. Akpe AF. Visions and Missions of Nigeria Prison service Hand Book 2004.
  14. Diane LA, Brenda AL. Correctional Healthcare: Implications for public Health Policy. *J Natl Med Assoc* 2002; 94(5):294-298.
  15. Sheridan J, Aggleton M, Carson T. Dental health and access to dental treatment; a comparison of drug users and non-drug users attending community pharmacies. *Br Dent J* 2001; 191: 453-457
  16. William RC, Barnett A.H, Claffey N, Dacis M, et al. The potential impact of periodontal disease on general health: a Consensus view. *Curr Med Res Opin* 2008; 30:24(6):1635-1643.
  17. Mani Ameet M, Tejnani Avneesh H, Pawar Babita R, Margwar Pramod p. the relationship between periodontitis and systemic disease. *J Clin Diagn Res* 2013; 7(4):758-762.
  18. Daves S, Batista EL, VanDuke TE. The link between periodontal diseases and arteriosclerosis. *Compend Court Educ Dent* 2004; 25(7):26-37
  19. Akaji E, Ashiwaju M. Oral Health status of a sample of prisoners in Enugu: a disadvantaged population. *Ann Med Health Sci Res* 2014; 4(4): 650-653
  20. Nobile CG, Fortunato L, Pavia M, Angelillo IF. Oral Health status of male prisoners in Italy. *Int Den J* 2007; 57 (1):27-35
  21. Harvey SB, Anderson AS. Reforming Prison Dental Services in England- a guide to good practices. *Health Educ J* 2005; 4:27-35
  22. Orenuga OO, Sofola OO. A survey of the knowledge, attitude and practices of antenatal mothers in Lagos, Nigeria about the primary teeth. *Afr J Med Med Sci* 2005; 34:285-91.
  23. Jeboda SO, Adeniyi AA, Ogunbodede EO. Assessment of preventive oral health knowledge and practices among rural and urban mothers in Lagos State. *Niger Postgrad Med J* 2009; 16:239-244.
  24. Umanah AU, Braimoh OB, Oral hygiene practices and factors influencing the choice of oral hygiene materials among undergraduates students at the university of Port Harcourt, River, State, Nigeria. *J Dent All Sci* 2017; (1) 3-7.
  25. Kawamura M, Iwamoto Y, Wright FAC. A comparison of self-reported dental health attitudes and behavior between selected Japanese and Australian students. *J Dent Educ* 1997; 61:354-360.
  26. Tseveenjav B, Vehkalahti M, Murtomaa H. Preventive practice of Mongolian dental students. *Eur J Dent Educ* 2002; 6(2):74-78.
  27. Tseveenjav B, Vehkalahti M, Murtomaa H. Oral health and its determinants among Mongolian dentists. *Acta Odontol Scand* 2004; 62:1-6.
  28. Heidari Dickson C, Wilson R, Fiskel J. Oral Health of remand prisoners in HMP Brixton, London. *Br Dent J* 2007; E5:202
  29. Bradnock G, White DA, Nuttal NM, Morris AJ, Treasure ET, Pine CM. Dental attitude and behavior in 1998 and implication for the future. *Br Dent J* 2001; 190-228
  30. Idowu EA, Afolabi AO, Nwhator SO. Oral Health Knowledge and Practices of 12-14 year Almajiris in Nigeria; A problem of definition and a call to action. *J Pub Health Policy* 2016;1-18
  31. Andrea BEL, Lindsay MP. Oral health needs of Canadian prisoners as described by formerly incarcerated New Brunswicker. *Can J Dent Hyg* 2012; 46(3):173-180.
  32. Digra R, GuptaN, Arora V, Gupta P. Oral health knowledge, attitude and practices (KAP) among prison inmates of Ambala District Haryana. *Dent Oral Craniofac Res* 2015; 1(4):101-104
  33. Rouxel p, Duijster D, Tsakos G, Wat RG. Oral Health of Female Prisoners in HMP Holloway; Implication for oral health promotion in UK prisons. *Br Dent J* 2014; 214(12):627-632.
  34. Jones CM, Wood K, Neville J, Whittle JG. Dental health of prisoners in the Northwest of England in 200; Literature review and dental health survey results. *Community Dent Health* 2005; 22:113-117
  35. Osborn M, Butler T, Barnard PG. Oral Health Status of prison inmates in New South wales, Australia. *Aus Dent J* 2003; 48: 34-38
  36. Department of Health. Strategy for modernizing dental services for prisoners in England. London Department of Health, 2003
  37. Scott J, Brown C. HMP Brixton resettlement needs analysis. London; HMP Brixton Psychology Department, 2004
  38. Luann H, Morris J, Jacob A. The oral health of a group of prison inmates. *Dent Update* 2003; 30:135-138.