Self-Reported Toothache Experience in an Adult Population in Benin City, Edo State, Nigeria

Christopher Okunseri^a/James S. Hodges^b/David Born^c

Purpose: This pilot study was conducted to estimate the prevalence of self-reported toothache, bleeding gums and oral ulcer experiences, reasons for dental visits and associated sociodemographic factors among adults living in Benin City, Edo State, Nigeria.

Materials and Methods: This cross-sectional study was based on a convenience sample in an urban setting. Out of the 540 persons surveyed, 508 had complete usable information, 48% males and 52% females, and aged 18 – 54 years. A closed questionnaire was used to collect the data at two large medical outpatient facilities and a university community.

Results: The proportion reporting toothache experience in the previous 12 months was 34%; painful/ bleeding gums 28%, and oral ulcers/painful spots 14%. Univariate analysis showed that toothache experience was associated with time since last dental visit (p < 0.001), age (p < 0.001), gender (p < 0.001) and education (p < 0.001). Experience with bleeding gums was associated with gender (p < 0.001), education (p < 0.001) and last dental visits (p < 0.001). Oral ulcers were associated with gender (p = 0.004), age (p < 0.001) and last dental visits (p < 0.001). Fewer males than females reported toothache (25% vs. 42%, OR 1.65) but more males reported bleeding gums (37% vs. 19%, OR = 0.34) and oral ulcers (19% vs. 10% OR = 0.33).

Conclusions: Toothache experience was the most prevalent oral health problem reported by adults. Oral health problems were associated with age, gender and last dental visits.

Key words: toothache, bleeding gums, oral ulcers, adults

Oral Health Prev Dent 2005; 3: 119–125. Submitted for publication: 29.01.05; accepted for publication: 07.04.05.

- ^a Public Health Program, Department of Clinical Services, Marquette University School of Dentistry, Milwaukee, Wisconsin
- ^b Division of Biostatistics, University of Minnesota, Minneapolis, Minnesota
- Department of Preventive Sciences, School of Dentistry, University of Minnesota, Minneapolis, Minnesota, 55455.

Reprint requests: Christopher Okunseri, Marquette University School of Dentistry, Department of Clinical Services, Room 356, P.O. Box 1881, Milwaukee, Wisconsin. 53201-1881, USA. Tel: 414 288 6524; fax: 414 288 3586, email: christopher.okunseri@marquette.edu

Parts of the paper were presented at the 81st general session of the International Association of Dental Research 2003, second meeting of the Pan European Federation, held in conjunction with the British, Continental European and Irish Divisions of the IADR and the Scandinavian Association for Dental Research in Gothenburg, Sweden. **C** ommon oral health problems are generally not life-threatening, but in developing countries, such as Nigeria, with high levels of poverty and inadequate health-care infrastructure, it could greatly impact on the overall health of the population. According to the Surgeon Generals' report released in the United States in May 2000, oral health is part of general health and thus contributes to a person's quality of life and overall well being (Oral Health in America, 2000). This statement expresses a holistic approach to health and health care delivery. This holistic approach should be reflected in the health policies and health planning of both developed and developing countries.

Kononen et al (1994) and Airila-Mansson et al (2004) reported that utilization of self-reported

data is cost-effective in research studies and also useful for educational purposes and it saves time. Self-reported oral health information from epidemiological research, especially in developing countries, where oral health data is poorly documented and little emphasized, could aid policy developments and health-care planning. However, the validity and reliability of the information collected is crucial, as incorrect or misleading data can compromise policy and planning (Heloe, 1972; Kononen et al, 1994).

Ankkuriniemi and Ainamo (1997) and Buhlin et al (2002) reported that the use of an oral health questionnaire in epidemiological surveys, asking about bleeding gum experience to assess gingival health, shows good correlation with a clinical examination. Kallio et al (1995) in their study concluded that self-reported gingival health information of a population following screening was useful. Studies have also indicated that self-reported data from an oral health questionnaire are fairly good in the assessment of periodontal status of a population when compared with clinical examination (Glavind and Attstrom, 1979; Joshipura et al, 1996), while a clinical examination of the gingiva is the gold standard for epidemiological research. The advantages in cost and simplicity of a questionnaire outweigh the potential disadvantages (Joshipura et al, 1996), especially where countries lack the infrastructure to undertake large clinically based studies (Brunswick and Nikias, 1975).

Toothache is a common oral health symptom indicative of the presence of oral disease (Honkala et al, 2001), and so are bleeding gums. Toothache is also a symptom that is correctly identified by patients and is one of the main reasons why they seek dental care (Edward, 2000). The prevalence and incidence of these conditions vary by sociodemographic factors and have been investigated in different countries. Sindet-Peterson et al (1985) reported that the sequelae of caries is the main cause of toothache in adults and can therefore be used as a proxy measure of dental ill health. Toothache experience resulting from dental caries could also impact an individual's ability to adequately perform routine daily functions.

Oral ulcers/painful spots are another common oral symptom reported by patients, suggestive of recurrent apthous ulcers or even premalignant lesions. Ulcers could also be early manifestations of an infectious disease, for example, human immunodeficiency virus (HIV). The prevalence of HIV infectious disease is much higher in developing countries than in developed countries. With insufficient resources and inadequate workforce in developing countries early detection of oral lesions and treatment of oral lesions can be difficult. This could ultimately lead to poor oral health-related quality of life.

Studies on the oral health status of the Nigerian population have used standard indices to record dental caries prevalence and unmet orthodontic treatment need in children (Otuyemi et al, 1997; El-Nadeef et al, 1998), but to date researchers have not documented self-reported oral health problems in an adult population. The objectives of this study were: (1) to estimate the prevalence of perceived oral health problems and (2) to identify factors associated with perceived oral health problems among adults living in Benin City, Edo State, Nigeria.

METHODS

The study was conducted in Benin City, Edo State, Nigeria. It has a population of 2.2 million and is a major commercial center that serves as gateway between the northern, western and eastern parts of Nigeria. The city has a state-owned general hospital with a dental clinic, a federally owned teaching medical and dental school and other private medical and dental clinics. It is also the most ethnically diverse city in Edo State.

The cross-sectional study recruited 540 adults in the summer of 1999, of whom 508, aged 18-54 years, provided usable information. True probability sampling was deemed impossible because of cost and workforce requirements. The participants were recruited among the outpatients and staff of medical care facilities of the University of Benin Teaching Hospital, Central Hospital, and from the University of Benin, Ugbowo campus. The purpose, potential benefits, and the need to collect oral health data was explained to the participants before the questionnaire was administered. Participation in the study was voluntary, and no incentives were offered.

The closed oral health questionnaire administered to participants included questions about sociodemographic characteristics, dental visits and perceived oral health problems. The questionnaire was pilot-tested in a group of university community members and medical hospital outpatients before

Okunseri et al

administering it to the study population. The questionnaire was in English and, when necessary, was translated into broken or Pidgin English by the interviewers, who also served as the translator/interpreter. Three trained interviewers conducted the survey over a five-week period. On average, 10 minutes of contact time between the interviewer and the participant were needed to complete the questionnaire. One of the investigators (CO) trained the interviewers in two sessions.

Subject characteristics included gender, age, educational level, employment status, tribe/ethnicity, and time since the last dental visit. The education variable was structured to reflect the educational system in Nigeria, in which the first six years are spent in primary school, the next six years in two three-year periods of secondary school (junior and senior) and the last four years at a university.

Data management and statistical analyses

In univariate analyses, individual subject characteristics were tested for association with self-reported toothache, painful/bleeding gums, and oral ulcer/ painful spots using Pearson's chi-square test and Fisher's exact test. For a multivariate analysis, logistic regression was used to assess association of these self-reported oral health problems with all five subject characteristics, i.e., age, sex, education, tribe/ethnicity and time since the last dental visit. Adjusted odds ratios and 95% confidence intervals were also computed.

RESULTS

Eighty percent of the participants were below 35 years of age, 52% were women, and 16% had at least secondary education. Fifty-five percent were employed and 24% were tertiary level students. Twelve percent of the sample was Yoruba-speaking, 20% were lbo-speaking and 46% was Edo-speaking. The proportion with 20 or more teeth was 97.8%; 0.2% had fewer than 10 teeth. Twenty-one percent had visited a dentist in the last twelve months and 30 percent had never being to a dentist (Table 1).

Table 2 shows the proportion of adults with toothache and other oral health problems and their reasons for dental visits. The proportion reporting toothache experience in the previous 12 months was 34%; 28% reported painful/bleeding gums;

Table 1 Characteristics of the study sample							
Variables	Number	%					
Total	508 100.0						
Age (years)							
18 – 24	157	31.0					
25 – 34	248	49.0					
35 – 44	61	12.0					
45 – 54	42 8.0						
Sex							
Men	246	48.0					
Women	262	52.0					
Education							
Primary	27	5.0					
Secondary	78	16.0					
Tertiary	403 79.0						
Employment status							
Employed	277	55.0					
Not employed	109	21.0					
Student	122 24.0						
Tribe/ethnicity							
Hausa	4	1.0					
Yoruba	63	12.0					
lbo	103	20.0					
Edo	231	46.0					
Other	107 21.0						
Teeth present							
20 or more	497	97.8					
Between 10 and 19	10	2.0					
Less than 10	1	0.2					
Last dental visit							
Within the last 12 months	106	21.0					
Between 12-36 months	85 17.0						
More than 36 months	165	32.0					
Never been to dentist	152	30.0					

14% reported oral ulcers/painful spots and 3% reported a broken denture or bridge or crown. About a quarter of the subjects (27%) visited the dentist

Table 2Proportion of adults with toothacheand other oral health problems and the reason fordental visits							
Description	Number	%					
Toothache							
Yes	172	34.0					
No	336	66.0					
Painful/bleeding gums							
Yes	140	28.0					
No	368	72.0					
Oral ulcers/painful spots							
Yes	73	14.0					
No	435	86.0					
Loose teeth							
Yes	51	10.0					
No	457	90.0					
Broken denture or bridge or crown							
Yes	14	3.0					
No	494	97.0					
Broken tooth or fillings							
Yes	69	14.0					
No	439	86.0					
Reason for dental visits							
In pain/emergency	109	22.0					
Check up	100	20.0					
Treatment	141	27.0					
Referral	6	1.0					
Never been	152	30.0					

for treatment, 30% had never visited a dentist and only 1% had visited the dentist because of a referral.

Table 3 shows how subject characteristics were associated with self-reported oral health problems. Univariate unadjusted analyses showed that tooth-ache was associated with last dental visits (p < 0.001), education (p < 0.001), age (p = 0.001), sex (p < 0.001) and tribe/ethnicity (p = 0.015). A report of bleeding gums was associated with gender (p < 0.001), age (p = 0.023), education (p = 0.023), educ

0.003), and last dental visit (p < 0.001). Self-reported oral ulcers were associated with gender (p = 0.004), education (p < 0.001), last dental visits (p < 0.001), tribe/ethnicity (p = 0.047) and age (p < 0.001).

Adjusted (multivariate) analyses gave generally similar results except that a report of oral ulcers/ painful spots was no longer significantly associated with tribe/ethnicity or education (Table 3). Fewer males than females reported toothaches (25% vs. 42%, OR = 1.65), but more males reported bleeding gums (37% vs. 19%, OR = 0.34) and oral ulcers (19% vs. 10%, OR = 0.33).

DISCUSSION

This descriptive study documented self-reported toothache, bleeding gums and oral ulcer experiences among adults living in an urban setting in Nigeria. However, the study has several limitations that may affect its interpretation and generalizability. Most of the study participants had tertiary education and were in the younger age group. This probably happened because one of the study sites was within a university community with a large number of young and tertiary educated persons. Anecdotally, it is difficult to get participants with primary and or secondary education to participate in oral health questionnaire survey in the community where the survey was done, especially when they perceive that they are not particularly at risk for dental disease.

A study on socio-demographic factors and edentulism in an adult population conducted in Nigeria at two university community sites had more tertiary educated populations than other educational group. The reason given for this was that people with high educational background are more informed about their health needs and are more likely to seek dental treatment (Esan et al, 2004). In addition, tertiary educated persons are expected to be able to afford dental care service, have better than average oral health habits, and should have better access to adequate dental care.

Another limitation is the use of a convenience sampling method, which may have resulted in a sample that does not represent the adult population of Nigeria. Also, the non-validation of self-reported data with patient's dental records could also have resulted in under-reporting or over-reporting. Self-reported data are subjective and are also po-

		Toothache		Painful/bleeding gum		Oral ulcer/painful spot			
Variables	Unad- justed	Adjusted		Unad- Adj justed		justed	Unad- justed	Adjusted	
	%	Odds Ratio	95% CI	%	Odds Ratio	95% CI	%	Odds Ratio	95% CI
Age (years)									
18 – 24	40	1.00		31	1.00		17	1.00	
25 – 34	25	0.51	0.31, 0.80	22	0.47	0.28, 0.79	6	0.17	0.08, 0.36
35 – 44	41	1.17	0.58, 2.32	33	0.95	0.47, 1.94	20	1.07	0.46, 2.48
45 – 54	52	0.36	0.13, 0.95	40	0.45	0.16, 1.28	50	3.23	1.12, 9.28
p-value	< 0.001	0.006		0.023	0.015		< 0.001	< 0.001	
Sex									
Male	25	1.00		37	1.00		19	1.00	
Female	42	1.65	1.05, 2.59	19	0.34	0.21, 0.54	10	0.33	0.18, 0.63
p-value	< 0.001	0.030		< 0.001	< 0.001		0.004	< 0.001	
Dental visits									
0 – 12 months	53	1.00		19	1.00		14	1.00	
13 – 36 months	39	0.52	0.28, 0.96	37	2.41	1.19, 4.86	4	0.13	0.03, 0.49
> 36 months	33	0.31	0.17, 0.55	39	1.82	0.96, 3.44	22	1.07	0.47, 2.40
Never been	19	0.13	0.07, 0.26	16	0.55	0.27, 1.11	13	0.62	0.26, 1.46
p-value	< 0.001	< 0.001		< 0.001	< 0.001		< 0.001	< 0.001	
Ethnicity									
Hausa	100	N/A*		0	N/A*		0	N/A*	
Yoruba	43	1.00		35	1.00		16	1.00	
lbo	37	0.55	0.27, 1.12	19	0.44	0.20, 0.94	6	0.35	
Edo	31	0.37	0.19, 0.72	29	0.54	0.28, 1.02	18	0.61	0.11, 1.12
Other	29	0.38	0.18, 0.80	29	0.59	0.28, 1.23	14	0.97	0.26, 1.46
p-value	0.015	0.019		0.136	0.18		0.047	0.18	0.37, 2.58
Education									
Primary	85	1.00		56	1.00		56	1.00	
Secondary	37	0.04	0.01, 0.18	22	0.20	0.05, 0.74	18	0.77	0.17, 3.53
Tertiary	30	0.02	0.01, 0.09	26	0.16	0.05, 0.52	11	0.35	0.09, 1.36
p-value	< 0.001	< 0.001	·	0.003	0.010	,	< 0.001	0.070	
* Our sample had only 4 Hausa speakers, so they were excluded from the adjusted analyses									

Table 3 Subject characteristics associated with self-reported oral health problems

tentially limited by recall bias. Finally, the study collected data only from adults attending two medical outpatient facilities and a university community in Benin City. In a country with over 130 million people residing in 36 states, the results cannot be generalized to all adults nationwide. Thirty-four percent of this study population reported that they had toothache experience. Sa'adu and colleagues' (2003) study on oral health care practice and socio-demographic findings among physicians in Ilorin, Nigeria reported that toothache (68%) was the most common conditions treated by physicians. A low proportion (34%) of participants reported toothache experience in this study when compared to the study conducted in Ilorin, Nigeria (68%). Toothache experience reported in this study is suggestive of unmet dental need in a population of a highly educated and presumably relatively privileged group living in an urban setting.

Sheiham (1968) reported that urban dwellers in Nigeria had a higher prevalence of dental caries compared to rural dwellers. Urban dwellers generally have better access to medical and dental health care, while rural dwellers have better access to traditional healers. In a study conducted in rural Tanzania on the role of traditional healers in the treatment of toothache, Ngilisho et al (1994) reported that half of the study participants had experienced toothache, and 60% of those who had experienced toothache within the last two years had sought treatment from a traditional healer.

Studies undertaken in developed countries have usually reported a higher prevalence of toothache experience in men compared to women (Reisine 1985, Honkala et al 2001). In this study, 42% of women reported toothache experience, compared to 25% of men (OR = 1.65, 95% CI: 1.05, 2.59). Another study conducted in a dental school setting in Ile-Ife, Nigeria, reported that more males requested for dental treatment than females, and 55% of the participants requested for care due to toothache. While this study did not investigate the reasons for the difference between men's and women's toothache experience, a possible explanation could perhaps be that men are less likely to admit a problem, or perhaps women have poorer access to care or are less likely to visit a dental clinic.

Our data showed that age was associated with toothache experience (p < 0.001), bleeding gums (p = 0.023) and oral ulcers (p < 0.001), with the highest prevalence for bleeding gums (40%), toothache experience (52%), and oral ulcers (50%) among the 45-54-year-olds. One explanation for this could be that oral health care is least practiced by 18-24-year-olds and 35-54-year-olds, and they could also have the most oral diseases. Education was associated with oral health problems in both the univariate and multivariate analysis. People with only primary education had the most oral health problems, which is not unexpected because those with the least education tend to be less informed about oral health, less able to afford dental care, and are more likely to seek care from a tradiMost people who visited the dentist within the last 12 months reported toothache experience (53%), compared to 19% and 14% for bleeding gums and oral ulcers respectively. Also, 20% of the dentate adults aged 18-45 had visited a dentist for dental check-up, 22% only when in pain, 27% for treatment, and 1% as referrals – and 30% had never being to the dentist at all. In this study about 98% reported that they had more than 20 teeth and 0.2% had fewer than 10 teeth. Toothache experience in this study could be used as a proxy measure for dental caries prevalence in this population.

Describing the prevalence of self-reported oral health problems is important from a public health perspective, especially for developing countries that lack the necessary resources to routinely collect national oral health data as in developed countries. The study provides clinicians and health planner with some insight into the level of oral health problems in a young adult population living in an urban setting. The study also highlights the possibility of oral health problems becoming a public health problem in Edo State, Nigeria, if left unchecked. Toothache was the most prevalent oral health problem reported by participants in this study. It suggests a need for adequate restorative and preventive dental services for adults, especially in an urban setting. Oral health problems were associated with age, gender and time since last dental visit.

The study also provides a starting point for understanding the prevalence of self-reported oral health problems and a call for a national oral health strategy to address the problem. This call could start with the integration of oral health with general health and with the full implementation of the World Health Organization (WHO) principles of primary health-care approach, designed to meet the health care needs of developing and developed countries. Further research is also needed in a similar setting in Nigeria to help health planners and clinicians to better understand the dynamic of how socio-environmental and cultural factors are associated with oral health.

REFERENCES

 Airila-Mansson S, Jin LJ, Soder PO, Klinge B. Self-reporting of periodontal diseases and clinical assessment outcome in a Swedish urban population of smokers and non-smokers. Acta Odontol Scand 2004;62:111-115.

- 2. Ankkuriniemi O, Ainamo J. Dental health and dental treatment needs among recruits of the Finish Defence Forces, 1919-91. Acta Odontol Scand 1997;55:192-197
- Buhlin K, Gustafsson A, Andersson K, Klinge B. Validity and limitations of self-reported periodontal health. Community Dent Oral Epidemiol 2002;30:431-437.
- 4. Brunswick AF, Nikias M. Dentist ratings and adolescents' perception of oral health. J Dent Res 1975;54:836-843.
- 5. Edward Odell. Clinical problem solving in Dentistry. Churchill Livingstone Edinburgh, London. 2000.
- 6. El-Nadeef MA, Adegbembo AO, Honkala E. The association of urbanization with the prevalence of dental caries among schoolchildren in Nigeria new capital territory. International Dental Journal 1998;48:1:44-49.
- Esan TA, Olusile AO, Akeredolu PA, Esan AO. Socio-demographic factors and edentulism. The Nigerian experience. BMC Oral Health 2004; 4:3 doi:10.1186/1472-6831-4-3
- Glavind L, and Attstrom R. Periodontal self-examination. A motivational tool in periodontics. J Clin Periodontol 1979;6: 238-251.
- 9. Honkala E, Honkala S, Rimpelä A, Rimpelä. The trend and risk factors of perceived toothache among Finnish adolescents from 1977 to 1997. J Dent Res 2001;80(9): 1823-1827.
- 10. Heloe LA. Comparison of dental health data obtained from questionnaires, interviews and clinical examination. Scand J Dent Res 1972;80:495-499.
- 11. Joshipura KJ, Douglass CW, Garcia RI, Valachovic R, Willett WC. Validity of a self reported periodontal disease measure. J Public Health Dent 1996;56:4:205-212.

- Kallio P, Nordhlad A, Croucher R, Ainamo J. Self-reported gingivitis and bleeding gums among adolescents in Helsinki. Community Dent Oral Epidemiol. 1994 Oct;22:277-282.
- 13. Kononen M, Lipasti J, Murtomaa H. Comparison of dental information obtained from self-examination and clinical examination. Community Dent Oral Epidemiol. 1986 Oct;14: 258-260.
- 14. Ngilisho LA, Mosha HJ, Poulsen S. The role of traditional healers in the treatment of toothache in Tanga region, Tanzania. Community Dent Health 1994;11:240-242.
- 15. Oginni AO. Dental care needs and demands in OAUTHC, Ile-Ife, Nigeria. J Dent Res 2004;83:(Spec Iss B).
- Otuyemi OD, Ugboko VI, Adekoya-Sofowora CA, Ndukwe KC. Unmet orthodontic treatment need in rural Nigeria adolescents. Community Dent Oral Epidemiol 1997;25:363-366.
- 17. Reisine ST. Dental health and public policy: the social impact of dental disease. Am J Pub Health 1985;75:27-30.
- Sa'adu ZO, Abdulraheem IS. Oral health care practice and socio-demographic findings among the physicians in Ilorin, Nigeria. Niger J Med. 2003;Oct-Dec:12:4:211-216.
- 19. Sindet-Pedersen S, Petersen JK, GÖtzsche PC. Incidence of pain conditions in dental practice in a Danish county. Community Dent Oral Epidemiol 1985;13:244-246.
- 20. Shieham A. The prevalence of dental caries in Nigerian population. Br. Dent. J 1968;123:144-148.
- 21. U.S. Department of Health and Human Services Oral Health in America: A Report of the Surgeon General. Rockville, MD: HHS, National Institute of Health, National Institute of Dental and Craniofacial Research, 2000.