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Oral Health Related Illness and Associated Factors among Bank Workers and Teachers in Addis Ababa, Ethiopia: Cross-Sectional Study

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Abstract

Background: Oral health related illness is among serious public-health problems and the fourth most expensive diseases to treat in developing country. According to WHO estimation, in Ethiopia 71% of the population are affected by oral health related illness. Although oral health related illness is affecting the majority of Ethiopian, much is not known about the extents and the factors influencing the occurrence of oral health related illnesses; oral care practices and health care seeking behaviors.

Objective: To determine the magnitude of oral health related illness and its associated factors among Bank employees and Teachers in Addis Ababa, Ethiopia.

Methods: Data collected for Non-Communicable Diseases Survey among Bank employees and Teacher in Addis Ababa was used for this study. After carefully cleaning for completeness of data, 2144 study participants were considered for the study. The data were analyzed using SPSS version 20.0.

Results: The magnitude of oral health related illness among study participants was 16.40%. Age (i.e., 55 years and older) (AOR=1.70; 95% CI: 1.01–2.87), work place (Commercial Bank of Ethiopia) (AOR= 1.46; 95% CI: 1.07–2.01), poor/fair general health condition (AOR=1.31; 95% CI: 1.01–1.67) and Mental Distress (AOR=1.47; 95% CI: 1.03–2.10) were determined as associated factors for Oral health related illness.

Conclusion: Magnitude of self-reported oral health related illness among the study participants was 16.40%. And the factors associated with oral health related illness were age, work place, general health condition and Mental Distress. This finding was relatively similar and

comparable to another studies conducted in other places and still remained as a public health important issue.

Keywords: Oral health related illness; Cross sectional study; Bank workers

Abbreviations: ACIPH: Addis Continental Institute of Public Health; AIDS: Acquired Immuno-deficiency Syndrome; AOR: Adjusted Odds Ratio; CBE: Commercial Bank of Ethiopia; DMFT: Decayed, Missed, Filled Tooth; HIV: Human Immuno-deficiency Virus; NCD: Non-Communicable Disease; OHIP: Oral Health Impact Profile; SD: Standard Deviation; SRQ: Self Reporting Questionnaire; SPSS: Statistical Package for the Social Science; USA: United States of America; WHO: World Health Organization

Introduction

Oral health related illness is an important contributor to overall health and quality of life for individuals and population [1,2]. According to WHO, oral health is a state of being free from mouth and facial pain, oral and throat infection, sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing and acquiring any of oral diseases or disorder affecting oral health [3]. Oral health related illness affects all human beings irrespective of location, country, nationality, and race or color [4]. It is the fourth most expensive disease to treat in developing country [5].

Studies showed that the prevalence of oral health related illness is very high in several developing countries. It affects all age groups, and since the end of the 1970's has become common among children (50%) and adults (75%) [6,7]. Another cross-sectional study conducted in Nigeria among

elementary school teachers found that the magnitude of oral health related illness was 39% [8,9].

The experience of pain, problems with eating, chewing, smiling and communication due to missing, discolored or damaged teeth have a major impact on people's daily lives and well-being. It also restricts activities at school, at work place, and at home causing millions of school and work hours to be lost each year throughout the world. In a large national survey conducted in Thailand, discomfort on chewing (15.8%), poor social interaction due to oral health related illness (12.5%) and pain (10.6%) were the most common oral health related quality of life problems [1,2,8].

In Ethiopia, prevention and treatment of oral health related illness had little attention; although oral health related illness is affecting majority of the Ethiopian, much is not known about the extents and factors associated with oral health related illnesses and oral care practices and health care seeking behavior in most parts of the country including in Addis Ababa [10,11]. Therefore, this study sought to estimate the prevalence of oral health related illness and its associated factors among bank employees and teachers in Addis Ababa.

Methods

Study setting

Addis Ababa is the largest and the capital city of Ethiopia. The city had 3.3 million inhabitants with male to female ratio of 0.9. Addis Ababa has three layers of Administration: City Government at the top, 10 Sub City Administrations in the middle, and 116 Woreda Administrations at the bottom. The city has 49 Hospitals of which 6 are owned by Addis Ababa Health Bureau, 4 by Federal Ministry of Health, 1 by Addis Ababa University, 3 by Non-Governmental Organizations, 3 by Defense Force and Police and 32 by the private owners. There are 69 health centers of which 63 are owned by the city administration, 5 by Non-Governmental Organizations and 1 by the public [12].

Study design and sample size

This study used secondary data collected for baseline assessment of non-communicable disease survey conducted in public schools and Commercial Bank of Ethiopia (CBE) in 2010, Addis Ababa, Ethiopia. The survey was conducted between December 2009 and January 2010. Study participants were permanent employees of the Commercial Bank of Ethiopia (CBE) and Teachers in government schools of Addis Ababa. Workplaces were selected based on their relatively high stability of workforce and willingness to participate in the study [13]. As explained on baseline assessment survey, a multistage probabilistic stratified sampling method was used to identify and recruit study participants. Probability proportional to size (PPS) sampling procedures were used to select Commercial Bank of Ethiopia branch offices and schools. All employees of the selected workplaces were invited to participate in the study. The study population was 2207 individuals. But after cleaning missing data (n=63), the final

sample size was 2,144. The study was conducted in accordance with the STEP- wise approach of the WHO for NCD surveillance in developing countries [13,14].

Data extraction and management

The desired data for the study were extracted carefully based on the proposed study objectives. We extracted a wide range of socio-demographic, behavioral characteristics (smoking, alcohol consumption and Khat use), co-morbidities (Diabetes Mellitus, Mental Distress) and oral health related variables.

Operational definitions

Oral Health related illness: If the study participants had any oral health related complain in the last 12 months prior to the survey.

Oral Health care visit practice: Visits to oral health care professionals for either of the following reasons; for dental consultation/advice, follow up and/or routine checkup [15].

Ever smoke daily: This was measured by asking study participants tobacco smoking experience. Those who reported smoking tobacco daily either in the past or currently were considered as ever smoked tobacco daily.

Alcohol consumption: Number of standard alcohol consumed and number of occasions of consumption of alcohol.

Low alcohol consumption: No alcohol ever or alcohol consumed in the past 12 months but not in the past 30 days.

Medium alcohol consumption: Alcohol consumed in the past 30 days but not in the past 7 days.

High alcohol consumption: Alcohol consumed in the past 7 days.

Ever chew Khat: Is reported chewing of Khat either current or in the past.

Diabetes Mellitus: Diagnosed in participants with fasting blood glucose levels greater than or equal to 126 mg/dl (7.0 mmol/l), or with normal glucose but under treatment (diet or medical) for diabetes. Fasting is defined as no caloric intake for at least 8 hours [16,17].

Mental Distress: This was measured based on a standard assessment tool. The assessment tool has a 20 item SRQ. The response to each item is scored 0 or 1 with a maximum score of 20. Those scoring 7 or more were classified as having symptoms of mental distress [18].

Data analysis

The extracted data were analyzed using SPSS version 20.0. Variables were defined, categorized and recoded. Frequency distributions of socio-demographic, lifestyle, clinical, and behavioral characteristics of the study participants were first explored by cross-tabulations and expressed in percentage. Bivariate and multivariate logistic regression analysis was

carried out to determine the association between oral health related illness and independent Variables. Variables with P-value <0.25 at bivariate logistic regression analysis were entered to multivariate logistic regression analysis. Variables at multivariate logistic regression with P-value <0.05 were considered as statistically significant. Hosmer-Lemeshow test of goodness of fit was carried out to check the appropriateness the model for analysis.

Ethical consideration

Ethical clearance was obtained from Ethical Review Board of Addis Continental Institute of Public Health, Addis Ababa Ethiopia and Human Subjects Division at the University of Washington, USA before starting the actual work. The datasets were accessed after receiving permission from Addis Ababa Commercial Bank of Ethiopia and Addis Ababa Education Bureau. Confidentially and anonymity was assured by assigning codes to each study participants information and that code was kept confidential and was kept in a locked cabinet [13].

Results

Socio-demographic characteristics of the respondents

The mean age of the study participants was 35.62 ± 11.82. More than two-third of the study participants were school teachers 1512 (70.20%) and three-fifth of the study participants were male 1277 (59.60%). More than half of the study participants were less than 35 years old 195 (55.80%). Majority of the study participants had attended technical school 1148 (53.55%). About three-fourth of them were earning monthly income ranging 10001 – 50000ETB 1520 (70.90%). Three-fifth of the study participants had excellent self-reported general health condition 1289 (60.10%) (Table 1).

Table 1 Socio-demographic characteristics among Bank employees and teachers in Addis Ababa, 2010.

Characteristics	Frequency (n=2144)	Percent
Sex		
Male	1277	59.6
Female	867	40.4
Age		
≤ 24	437	20.4
25 – 34	758	35.4
35 – 44	356	16.6
45 – 54	409	19.1
≥ 55	184	8.5
Marital Status		
Never married	1076	50.1

Currently married	925	43.2
Other	143	6.7
Educational status		
≤ High school	40	1.86
Technical school	1148	53.55
≥ Bachelor	956	44.59
HH Income/month		
<10000 birr	181	8.5
10001 – 50000 birr	1519	70.9
>50001 birr	444	20.6
Self-reported Health Status		
Poor/fair	855	39.9
Excellent	1289	60.1
Work place		
CBE	632	29.5
School	1512	70.5

Behavioral characteristics and level of co-morbidities

The study participants who had ever smoked any tobacco products daily were (279) 13.40%. Among the study participants nearly two-fifth of them are high degree alcohol consumers 829 (38.73%). On the other hand, study participants who ever chewed Khat were 539 (21.13%). The prevalence of Diabetes Mellitus based on fasting blood glucose test was (94) 4.90%. Moreover, prevalence of Mental Distress among the study participants was (301) 14.30% (Table 2).

Table 2 Oral health illness, co-morbidity and behavioral characteristics of bank employees and teachers in Addis Ababa, 2010.

Variables	Frequency	Percent (%)
Oral health related illness		
Yes	352	16.4
No	1792	83.6
Number of natural teeth		
No natural teeth	17	0.81
1 to 9 teeth	3	0.13
10 to 19 teeth	20	0.93
20 teeth or more	2104	98.13
Do you have any removable dentures?		
No	1292	60.2
Yes	852	39.8
Dental care visit practice		

No	2061	96.7
Yes	83	3.3
Oral hygiene practice		
Poor	21	0.9
Fair	133	6.2
Good	498	23.2
Excellent	1492	69.7
Smoked daily		
Yes	279	13.01
No	1865	86.99
Chewed Khat		
Yes	539	21.13
No	1605	78.87
Alcohol consumption		
Low	736	34.32
Medium	578	26.95
High	830	38.73
Fasting blood glucose		
Normal	1829	85.31
DM	315	14.69
Mental Distress		
No	1843	85.96

Yes	301	14.04
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Oral health status

The magnitude of oral health related illness (complained to have any pain or discomfort of their teeth, gums and/or mouth) was 352 (16.40%). Among the study participants only two-fifth of them had removable denture 852 (39.80%). Majority of the study participants had not sought dental care for counseling/advice, follow-up and/or routine check-up, 2061 (96.70%) (Table 2).

Factors associated with oral health related illness

Variables found to be significantly associated with oral health related illness was age (≥ 55 years), work place (CBE), fair/poor health status and Mental Distress. Those study participants in the older age category (≥ 55 years) were found to be about 1.7 times more likely to have oral health related illness than those in the younger age category (≤ 24 years) (AOR=1.70; 95% CI: 1.01-2.87). Study participants from CBE were found to have 1.5 times higher risk of oral health related illness than school Teachers (AOR=1.46; 95% CI: 1.07-2.01). Those study participants who reported their general health status as poor/fair were found 1.3 times more likely to develop oral health related illness than those study subjects with excellent self-reported (AOR= 1.31; 95% CI: 1.01-1.67). Additionally, those study participants with mental distress were 1.5 times more likely to have oral health related illness than those who don't have (AOR=1.47; 95% CI: 1.03-2.10) (Table 3).

Table 3 Multivariate analysis of factors associated with oral health related illness among bank employees and teachers in Addis Ababa, 2010.

Variables	Oral health related illness		Unadjusted OR [95% CI]	AOR [95% CI]
	Yes	No		
Gender				
Male	195	1082	1	1
Female	157	710	1.227[0.974 -1.545]	1.072[0.795- 1.447]
Age				
≤ 24	57	380	1	1
25 - 34	118	640	1.23[0.874-1.728]	1.165[0.789 -1.720]
35 - 44	54	302	1.19[0.798-1.781]	1.035[0.645-1.661]
45 - 54	83	326	1.69[1.175-2.453] [*]	1.362[0.884-2.097]
≥ 55	40	144	1.85[1.167-2.873] [*]	1.701[1.010-2.867] [*]
Level of Education				
\leq High School	8	32	1.33[0.611-2.991]	1.400[0.568-3.449]
Technical School	193	955	1.07[0.865-1.380]	1.160[0.863-1.559]
\geq Bachelor degree	151	805	1	1

Income				
<475 \$	26	155	1	1
475 - 2376 \$	246	1273	1.15[0.756 -1.869]	1.285[0.754 -2.188]
>2377 \$	80	364	1.31[0.814-2.198]	1.266[0.683-2.344]
Work Place				
CBE	127	505	1.438[1.131- 1.830]*	1.466[1.069-2.009]*
School	225	1287	1	1
Self-reported general health				
Excellent	192	1097	1	1
Poor/fair	160	695	1.31[1.048 - 1.663]*	1.310[1.010-1.667]*
Smoked daily				
No	302	1563	1	1
Yes	50	229	1.160[0.833-1.615]	1.118[0.757-1.652]
Alcohol consumption				
Low	131	605	1	1
Medium	98	480	0.94[0.630-1.297]	0.961[0.632 -1.463]
High	123	707	0.80[0.533-1.018]	0.804[0.540-1.199]
Chewed Khat				
No	270	1335	1	1
Yes	82	457	0.912[0.696-1.196]	0.747[0.541-1.030]
Dental care visit practice				
No	334	1727	0.69[0.454-1.550]	1.238[0.542 -2.828]
Yes	18	65	1	1
Oral hygiene practice				
Poor	4	17	1.14[0.263-3.145]	0.775[0.171-3.521]
Fair	24	109	1.06[0.673-1.695]	1.196[0.711-2.009]
Good	69	429	0.78[0.585-1.040]	0.889[0.641-1.234]
Excellent	255	1237	1	1
Fasting blood glucose				
Normal	303	1526	1	1
DM	22	72	1.539[0.940-2.520]	1.508[0.868-2.620]
Mental Distress				
No	289	1554	1	1
Yes	63	238	1.39[1.043-1.920] *	1.473[1.034-2.100] *
*P-Value<0.05				

Discussion

This study revealed that oral health related illness was 16.40%. This finding was consistent with a cross sectional study conducted in Nigeria, epidemiological study conducted in Albania and cross-sectional study conducted in North

Finland [2,8,19-21]. Whereas, the finding of this study was lower than the report of WHO [7]. This difference might be, the WHO report used the oro-dentic examination for DMFT and the physical examination could capture problems, which may not be identified by individuals, in self-report only studies.

Moreover, the study participants of this study were younger than the study participants of WHO report.

The study participants in the older age category (≥ 55 years) were found to be 1.7 times more likely to have oral health related illness than those in the younger age category (≤ 24 years) (AOR=1.70; 95% CI: 1.01-2.87). This finding was in line with study conducted in Brazil, America, and Sweden [22-26]. This association between Oral health related illness and old age might be due to the age of the tooth itself and other age related co morbidities such as diabetes mellitus [23].

In our study, work place (CBE) of the study participants was positively associated with oral health related illness. As far as our knowledge, there is no any research finding comparing these two work places as a factor to oral health related illness. However, one study suggested that work place stress has a significant association with a compromised oral health status [27]. Our study also identified higher level of mental distress among Bank employees than teachers.

Additionally, poor/fair self-reported general health condition has significant association with oral health related illness. Different studies suggested that oral health related illness significantly compromise individuals' quality of life [8,28]; which could directly or indirectly influence peoples' self-reported general health condition of the study participants.

Another associated factor with oral health related illness was Mental Distress; this finding was in line with study conducted in Korean [29]. Although psychological stress, anxiety and depression might often be ignored while assessing dental health, elevated levels of psychological factors are reported to have the potential, to intensify perceived pain, reduced an individual's capacity to tolerate pain and affect overall well-being [30,31]. Though it did not function independently of other systems in the body, stress affects the immune function [32] and this could indirectly affect the oral health of the mentally distressed individuals. The other possible explanation could be the poor oral hygiene practice of mental distressed individuals [33].

The interpretation of the results of this study has to be in light of the following limitations: even though self-reported oral health is a simple, inclusive and valid measure of oral health which has been widely used in population groups [34,35] and monitor changes in the oral health status of society, more detailed and comparable result would have been obtained if our study conducted intra-oral examination and orthodontic evaluation. In addition, this study did not measure some important explanatory variables such a sweet intake.

Conclusion

Magnitude of self-reported oral health related illness among the study participants was 16.40%. Majority of the study participants had not sought dental care visit. And factors associated with oral health related illness were age, work place (Commercial Bank of Ethiopia), general health condition, and Mental Distress. This finding was relatively similar and

comparable to other places in the world and still remained as a public health important issue.

Limitation of the Study

Even though self-reported oral health is a simple, inclusive and valid measure of oral health which has been widely used in population groups and monitor changes in the oral health status of society, more detailed and comparable result would have been obtained if our study conducted intra-oral examination and orthodontic evaluation. In addition, since our study used a secondary data, some important explanatory variables like Sweet intake were not considered in this study.

Competing Interests

The authors declare that they have no competing interests.

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