Common Periodontal Diseases and Socio-Cultural Factors Associated with Occurrence of Periodontal Disease among Women of Reproductive Age Seeking Health Care in Banadir Hospital, Mogadishu Somalia

Mohamed Hussein Haji Mumin[1,2,] Japheth Mativo Nzioki[2]*and Mary Kerich[2]

1. *Department of Health, Benadir Regional Directorate, Hamarwenye District, Mogadishu, Somalia*
2. *School of Public Health, Jomo Kenyatta University of Agriculture and technology, P. O. Box 62000-00200, Nairobi-Kenya*

*Corresponding author: Dr. Japheth Mativo Nzioki, School of Public Health, Jomo Kenyatta University of Agriculture and technology, P. O. Box 62000-00200, Nairobi-Kenya.
Email: nzioki.mativo@jkuat.ac.ke

Summary

INTRODUCTION

According to the World Health Organisation (WHO) oral health refers to a state of being free from oral or facial pain, oral infection, sores, periodontal disease, tooth loss and other diseases that inhibit the capacity to chew, bite, smile and speak. Dental and oral health is an essential part of systemic health and well-being. Poor oral hygiene can lead to dental cavities and gum disease, and has also been linked to heart disease, cancer, and diabetes. Oral diseases virtually affect the entire population, but it has not been made a priority. Hence oral diseases have been termed as a "neglected epidemic".

Globally, the prevalence of dental caries among adults is nearly 100% and prevalence of severe periodontitis is 15-20%. Due to the collapse of the central government of Somalia since 1991, the health system also collapsed including oral health care and no surveys done since then. However, non-official reports suggest that oral health service utilization in Benadir region and Somalia in general is poor, as most patients only attend dental clinics with advanced stages of decayed teeth which can only be extracted. The objective of this study was to establish the social cultural and lifestyle factors associated with occurrence of Periodontal Disease among women of reproductive age attending Benadir Hospital in Mogadishu Somalia.

MATERIALS AND METHODS

This was a descriptive cross-sectional study conducted in Benadir region in South-Eastern Somalia. The study was conducted among women in their reproductive age between 15-49 years residing in Benadir region and attending Benadir Hospital for ANC and outpatient care. Sample size was determined as 422 using the Fisher (1998) formula. Systematic sampling method was used for data collection.

RESULTS

The prevalence of periodontal disease among women of reproductive age attending Benadir Hospital in Mogadishu is 82%. Sociocultural and lifestyle factors found to be influencing occurrence of periodontal disease among these women were smoking tobacco (OR=22.60, 95%CI=3.071-166.29., P<0.05), drinking alcohol (OR=3.399, 95% CI of OR=1.123-10.396, P<0.05), chewing *miraa* (OR=1.926, 95%CI=1.093-3.396, P<0.05) and taking soft drinks regularly (OR=2.010, 95%CI of OR=1.150-3.510, P<0.05).

CONCLUSION AND RECOMMENDATION

To help reduce the burden of periodontal disease in Mogadishu, health promotion officers need to focus more on emphasizing on lifestyle changes such as reduction in alcohol intake, reduction of uptake of sugary drinks, not chewing *miraa* or smoking tobacco to bring down prevalence of periodontal diseases among women in Mogadishu.

Introduction

According to the World Health Organisation (WHO) oral health refers to a state of being free from oral or facial pain, oral infection, sores, periodontal disease, tooth loss and other diseases that inhibit the capacity to chew, bite, smile or speak. Oral health is important as it enhances the quality of life. Oral diseases have been documented to contribute significantly to the global burden of disease (1). For instance periodontitis has been documented among the major prevalent diseases affecting over half a million people in the world (2). Additionally the over 3.5 million years lived with disability is associated with periodontal disease (3).

Periodontitis is usually an advanced form of periodontal disease usually characterized by breakdown of the tissues supporting the teeth. The clinical signs of periodontal disease include the deepening of periodontal pockets and loss of attachment which results to loosening of the tooth and ultimately loss of tooth (1).

Periodontal disease is a non-communicable disease whose development is associated with several factors. Studies have documented poor oral hygiene practices such as poor tooth brushing and lack of use of dental cleaning aids as the major cause of accumulation of dental biofilms that consequently leads to periodontal disease (4). In addition socio-cultural factors such as low education level, poor living conditions, lack of beliefs and traditions that support oral health have been reported as potential determinants of periodontal disease (5).

Similarly tobacco smoking, obesity and poor nutrition and inadequate physical activity have been linked to the development of periodontitis (6). Socio economic status is another factor associated with periodontitis. For instance in a study done in Mbale, Uganda women of low socioeconomic status with poor

oral hygiene practices presented with signs of periodontal disease (7).

The burden of periodontal disease has translated to detrimental effects. For instance, loss of teeth because of the disease results in loss of masticatory function. The masticatory dysfunction causes dietary changes which impact negatively on nutrition status (4). Furthermore periodontitis has been shown to negatively affect birth outcomes whereby infants are born with low weight or preterm (8). In addition in 2010 the burden of periodontitis was estimated to cause a loss of 54 USD per year (9).

Several strategies have been put in place to help overcome the negative effects of periodontitis. For instance the World Health Organization has developed a number of strategies which include; promoting healthy lifestyle and reducing the risk factors to oral disease, developing of oral health systems aimed at ensuring improved oral health outcomes, framing policies in oral health among others (5).

Good oral health is a key component of the general body health and quality of life. For instance it has been documented that preventive dental care is important in pre and post-natal stages (10).

Globally, periodontal disease has been shown as a significant contributor to the global burden of chronic diseases and is therefore a disease of public health concern (1). According to the recent global burden of disease severe periodontitis was rated 6th most prevalent disease globally with an overall prevalence of 11.2% and an estimated 743 million people affected (11).

Oral diseases have been shown to have detrimental effects on health, in particular women of reproductive age, elderly citizens among other groups have been reported as a population with distinct oral health needs (10). A study reported that antepartum moderate

severe periodontal disease increased the risk for spontaneous preterm births by 2 folds (12). Furthermore hormonal changes during pregnancy have been identified as a risk factor for gingivitis which is a precursor to severe periodontal disease (10). Additionally studies have documented a strong association between periodontal disease and gestational diabetes mellitus (13). GDM has been shown to increase the rates of maternal and infant morbidity, birth injury and the need for caesarean section (14).

Adequate nutrition is important in ensuring good health and a productive life. The levels of malnutrition still remain very high especially in developing countries. Women of reproductive age with periodontal diseases are considered to be among the vulnerable groups to malnutrition. This is because of reduced mastication capacity that reduces food intake and change of dietary patterns (15). Equally periodontal disease was documented to have significant effect on inflammation and malnutrition (16).

Due to the collapse of the central government of Somalia since 1991, the health system also collapsed including oral health care and no surveys done since then, however, observations as well as non-official reports suggest that oral health service utilization in Benadir region and Somalia in general is poor, as most patients only attend dental clinics with advanced stages of decayed teeth which can only be extracted. Similar to reports from other countries in Africa documented by (17). The reasons for this undesirable utilization of oral health services have not been systematically explored and understood. This makes it difficult for health care planners to find solutions for improving access, utilizations and responsiveness of health services. The objective of this study was to establish the social cultural and lifestyle factors associated with occurrence

of periodontal disease among women of reproductive age attending Benadir hospital in Mogadishu Somalia.

Materials and Methods

Study Site

Benadir region is an administrative region in South-Eastern Somalia. It covers the same area as the city of Mogadishu, Somalia's capital. Although, by far the smallest administrative region in Somalia, it has the largest population estimated at 1,650,227 (including 369,288 internally displaced persons) (United Nations Population Fund, 2014).

The region is an administrative region bordered by the Somali regions of Middle Shabelle and Lower Shabelle, as well as the Indian Ocean. Its capital is Mogadishu, although the administrative region itself is co-extensive with the city. Banadir is the smallest of Somalia's eighteen administrative regions. The Banadir region consists of seventeen districts and considered the highest populated among the eighteen regions of the country with an estimate of about 2 million of people. The region has three major referral hospitals, and 17 Mother and Child Health facilities (MCH); one for each district in the region. There is no specialized dental facility or hospital in Benadir region.

Study Design

This was a descriptive cross-sectional study of women of reproductive age between 15 to 49 years residing in Benadir region and attending antenatal (ANC) and outpatient clinics (OPD) of Benadir Hospital. A comprehensive oral examination was performed by well trained nurses using DMFT Index and CPI on all patients who attending above clinics during a three-month period from 1st of March 2020 to 31st May 2020. Women who accepted to sign an informed consent form were given an oral health questionnaire to collect information on socio-demographics, distance of the hospital to her home, dietary habits and tobacco/ substance use history.

Study Variables

This research work was part of a larger study. Study variables consisted of both dependent and independent variables; the dependent variable was oral and dental health problems. The independent variables included: 1. Socio-economic and demographic characteristics (income, educational level and occupation etc); 2. Health service related factors; and 3. Socio-cultural factors which included but not limited to lifestyle and dietary practices.

Study Population

The study was conducted among women of reproductive age between 15-49 years residing in Benadir region and attending Benadir Hospital for ANC and outpatient care, who gave consent. The age group of 15-49 years was selected because it is the period when women are highly vulnerable to various oral morbidities leading to tooth loss and almost no community-based studies have been done among this age group in Somalia particularly Benadir region.

Inclusion Criteria

The study included women of reproductive age between 15 to 49 years old seeking reproductive health services at Benadir Hospital who were willing to participate in the study and give consent to be interviewed and examined, as well as geographically residing in the Benadir region of Somalia.

Exclusion Criteria

Women who declined to sign the consent form for interview and examination and those who were seeking services at the hospital but not residing in Benadir, or not seeking reproductive health services, were excluded.

Sample Size Determination

The total number of women of reproductive age (15-49 years) was given as approximately 14,000 in Benadir of Mogadishu (World Vision, 2017). This number exceeds 10,000. Therefore, the minimum sample size was obtained using the following formula by fisher *et al* (1998)(18):

$$n = \frac{Z^2 pq}{d^2}$$

Where;

n = is the desired sample size (when the study target population is over 10,000)

Z = is the standard normal deviate=1.96. (Corresponding to 95% Confidence Interval)

p - Proportion of the target population estimated to have the desired characteristics.

q= 1.0 – p

d = Degree of accuracy required usually set as 0.05

Though the estimated number of women of reproductive age in Benadir district is 14,000 (World Vision, 2017), the proportion of the target population (women of reproductive age with a child aged 12 to 23 months is not known. Therefore, in the absence of a reasonable estimate, **p** is estimated at 50% (0.50) (18).

p = 50/100 or 0.50

q = 1-p = 1- 0.50 = 0.50

Hence, the desired sample size (**n**) was calculated as follows:

$$n = \frac{Z^2 pq}{d^2} = \frac{1.96^2 \times 0.50 \times 0.50}{(0.05)^2}$$

$$n = \frac{0.9604}{0.0025}$$

n = 384.16 was approximately 384.

10% of 384 participants were added to increase representativeness and non-response of respondents.

Therefore, if 10% of 384 = 38.4 subjects

Thus **n** = 384+38.4= 422 Women of reproductive age.

Sampling Technique

Systematic sampling was applied. Every 2nd patient who was attending outpatient clinic and ANC at Benadir hospital and satisfied the inclusion and exclusion criteria was selected. The patients were referred to the investigator by the attending clinicians. Where the 5th patient did not qualify the next patient was selected.

Data Collection Tools and Procedures
Questionnaire

All participants were requested to sign voluntary written informed consent before enrolment. The researcher asked for consent from the patients after explaining to them the nature of the procedures to be carried out in a simple fashion

Socio-demographic data, patients' medical details including information on other illnesses and other medication, and the observations of oral cavity examinations were recorded in a structured questionnaire) administered by the researcher.

Clinical Examination for Oral Health

Oral cavity examinations were carried out by the researcher, a dental surgeon by training assisted by skilled nurses, using established WHO clinical diagnostic criteria for oral pathological conditions associated with HIV infection and recorded in a standard data capture sheet. Examinations were done in the ANC consultation office using natural daylight and, where necessary, a headlamp was used. Wooden tongue depressors were used to retract the lips

and depress the tongue for a careful oral and pharyngeal examination.

Pre-Testing of Data Collection Tools

Pretesting of questionnaires was done in different hospital located in Benadir region Somalia, among 10% of respondents with a view to ascertain the internal consistencies of questions. Cronbach's alpha statistic was used to test internal consistency of the data collection tool.

Data Collection Procedures

Interviews were carried out to collect data. Three well trained nurses assisting the researcher at Benadir hospital were responsible for communicating and examining patients to collect the data. Participants were interviewed and examined using Decayed Missing and Filled Teeth (DMFT) index. The questionnaires focused on factors that might be associated with oral health problems and seeking behaviour among women in reproductive age in Benadir region.

Data Processing and Analysis

Data was coded into Statistical Package for social scientist (SPSS) version 25. Measures of dispersion and measures of central tendencies were used to describe data. Inferential statistics such as chi square and regression analysis were used to test hypothesis.

Ethical Consideration

The researcher sought Ethical Clearance from the University of Eastern Africa, Baraton's Ethical Review Committee. Authorization from the Research Unit coordinator at the Ministry of Health, Federal Republic of Somalia (FRS) was also sought before conducting the study. Informed consent was administered to all participants in this study.

Results

Socio Demographic Characteristics

Over a third of the respondents were aged 31-35 years while 32.9%, 15.5%, 14.0%, 2.9% mad 0.5% were 26-30 years, 21-25 years, 36-40 years, 16-20 years and 41-45 years, respectively. Over a quarter of the respondents had 4 children with the least number of respondents (4.2%) having 6 children and above.

Most of the respondents had attained secondary school education while the least (2%) had no education at all. Over half of the respondents were peasant farmers, over a quarter were small scale entrepreneurs, 12.5% were permanently employed and 2.5% were not working. A majority of the respondents were married while the least were widowed (table 1).

Prevalence of Periodontitis and Common Dental Problems

The prevalence of periodontitis among women of reproductive age attending Benadir hospital was 82.1%. The most common dental problems were tooth loss followed by toothache and the least being tender gums. The following figure represents a summary of common dental problems among patients receiving health care in Benadir hospital.
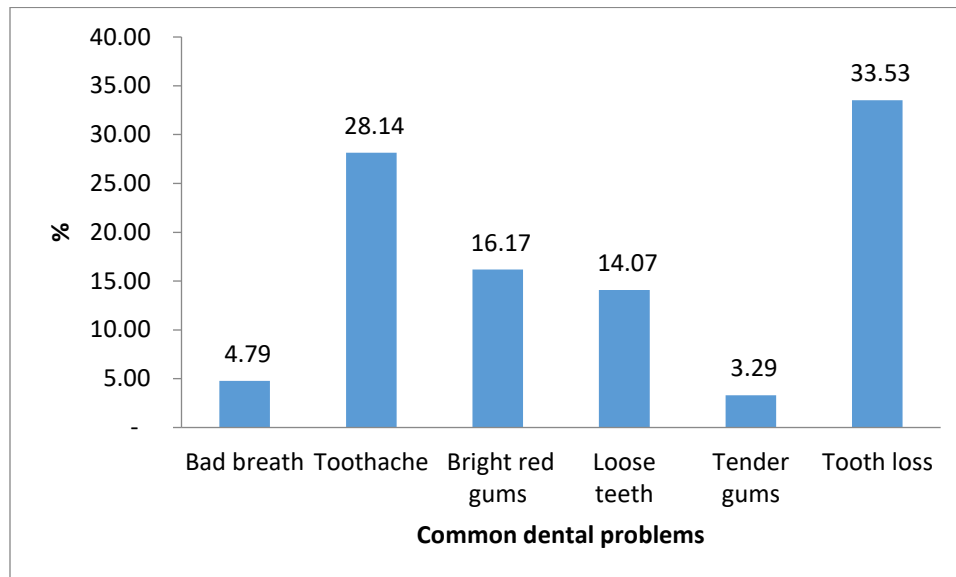
Figure 1: Common Dental Problems in Benadir

Associated Socio-Cultural and Lifestyle Factors

Socio cultural and lifestyle factors shown to influence occurrence of periodontal disease were smoking [(OR = 22.598, 95% CI = 3.071- 166.291, P<0.05)], chewing *miraa* [(OR = 1.926, 95% CI = 1.093- 3.396, P<0.05)], alcohol consumption [(OR = 3.399, 95% CI= 1.123- 10.290, P<0.05)], and soft drink consumption [(OR= 2.010, 95% CI= 1.150-3.510, P<0.05)]. Respondents who smoked, chewed *miraa*, who consumed alcohol and consumed soft drinks were 22 times, 1.9 times, 3.5 times and 2 times, respectively, more likely to develop periodontitis as compared to those who did not.

Discussion

Prevalence of Periodontitis

In this study a high rate (82.1%) of periodontitis was reported among women of reproductive age. Similarly in a study done in China high rates of periodontitis were reported among women of reproductive age (19). equally based on a study conducted in Mali high rates of periodontitis (73%) was reported among women of child bearing age (20). The high rate could be attributed to the hormone estrogen whose levels increase during pregnancy hence increasing the susceptibility to periodontitis (21). Furthermore, women of reproductive age normally experience cravings for very sweet foods during pregnancy which further predisposes them to periodontitis. Studies have therefore recommended for treatment of periodontitis among pregnant women in order to prevent adverse pregnancy outcomes (22,23).

Common Dental Problems

Key findings from this study shows that the major dental problem experienced by women of reproductive age is tooth loss. Equally the rate of tooth loss among women of reproductive age in Mbale Uganda was 35.7 % (24). Similarly the findings of this study are similar with those of a study conducted in Nepal where tooth loss among women of reproductive age was about 26% (25). The consequence for occurrence of

periodontitis and lack of treatment ultimately results to teeth loss. Tooth loss has also been reported among American women of reproductive age. The occurrence of this phenomenon has been associated with socio demographic and economic factors such as economic status where tooth loss was reported in high rates among women of low socio economic status (26).

Socio Cultural and Lifestyle Factors Influencing Occurrence of Periodontitis

The key highlights in this data indicated that women who smoked tobacco or used tobacco were 22 times more likely to report to have Periodontal disease (OR=22.60, 95%CI=3.071-166.29., P<0.05) compared to those who did not smoke, women chewing *miraa* were nearly 2 times more likely to develop Periodontal disease (OR=1.926, 95%CI=1.093-3.396, P<0.05) compared to those who do not chew *miraa*, those who reported to be taking alcohol were 3.3 times more likely to have a Periodontal disease (OR=3.399, 95% CI of OR=1.123-10.396, P<0.05) compared to those who do not take alcohol, and those who reported to be taking other soft drinks regularly were 2 times more likely to have a Periodontal disease compared to those who do not take soft drinks regularly.

Studies have shown that smoking is a key risk factor to occurrence of periodontitis among women of child bearing age in the US (27). Studies have also documented a strong association between alcohol consumption and occurrence of periodontitis. Similarly in a study conducted in Brazil alcohol consumption was strongly linked to the occurrence of periodontitis (28). Alcohol has been shown to cause biofilm formation and accumulation thus resulting to

growth of pathogenic bacteria that further leads to occurrence of periodontitis (29). Khat (*miraa*) is use predominant among the Somali community. In a study done in Sudan it was documented that chewing of khat predisposes people to periodontitis (30). This is because khat chewing modifies the microbial composition of the subgingival biofilm thus resulting in the occurrence of periodontitis (31).

Conclusions

The prevalence of Periodontal disease among women of reproductive age attending Benadir Hospital in Mogadishu is 82%. Sociocultural and lifestyle factors influencing occurrence of Periodontal disease among women in reproductive age attending Benadir Hospital in Mogadishu are smoking tobacco (OR=22.60, 95%CI=3.071-166.29., P<0.05), Drinking alcohol (OR=3.399, 95% CI of OR=1.123-10.396, P<0.05), chewing *miraa* (OR=1.926, 95%CI=1.093-3.396, P<0.05) and taking soft drinks regularly (OR=2.010, 95%CI of OR=1.150-3.510, P<0.05).

Recommendations

To help reduce the burden of periodontal disease in Mogadishu, health promotion officers need to focus more on emphasizing on lifestyle changes such as reduction in alcohol intake, reduction of uptake of sugary drinks, not chewing *miraa* and smoking tobacco to bring down prevalence of periodontal diseases among women in Mogadishu.

References

1. **Ogawa H, Peterson PE.** The global burden of periodontal disease: towards integration with chronic disease prevention and control. Periodontology. 2012;60:15–39.

2. **Kassebaum NJ, Bernabé E, Dahiya M, Bhandari B, Murray CJL, Marcenes W.** Global burden of severe periodontitis in 1990-2010: A systematic review and meta-regression. *Journal of Dental Research.* 2014;93(11):1045–53.

3. **Lim SS, Allen K, Dandona L, Forouzanfar MH, Fullman N, Goldberg EM, et al**. Measuring the health-related Sustainable Development Goals in 188 countries: a baseline analysis from the Global Burden of Disease Study 2015. *The Lancet.* 2016;388(10053):1813–50.

4. **Tonetti MS, Jepsen S, Jin L.** Impact of the global burden of periodontal diseases on health , nutrition and wellbeing of mankind : A call for global action. 2017;(April):1–7.

5. **WHO**. Strategies for oral disease prevention and health promotion. 2018.

6. **Chapple SJ, Keeley TP, Mastronicola D, Arno M, Vizcay-Barrena G, Fleck R, et al**. Bach1 differentially regulates distinct Nrf2-dependent genes in human venous and coronary artery endothelial cells adapted to physiological oxygen levels. *Free Radical Biology and Medicine*. 2016;92:152–62.

7. **Wandera M, Engebretsen IM, Okullo I, Tumwine JK, Åstrøm AN.** Socio-demographic factors related to periodontal status and tooth loss of pregnant women in Mbale district, Uganda. *BMC Oral Health.* 2009;9(1):18.

8. **Gaffield ML, Gilbert BJ, Malvitz DM, Romaguera R.** Oral health during pregnancy: an analysis of information collected by the pregnancy risk assessment monitoring system. *J Am Dent Assoc*. 2001;132(7):1009–16.

9. **Listl S, Galloway J, Mossey PA, Marcenes W.** Global Economic Impact of Dental Diseases. 2015;

10. **Ressler-Maerlender J, Krishna R, Robison V**. Report from the CDC. Oral health during pregnancy: current research. *Journal of Women's Health* (15409996). 2005;14(10):880–2.

11. **Jin LJ, Lamster IB, Greenspan JS, Pitts NB, Scully C, Warnakulasuriya S.** Global burden of oral diseases: emerging concepts, management and interplay with systemic health. *Oral Diseases.* 2016;22(7):609–19.

12. **Offenbacher S, Boggess KA, Murtha AP, Jared HL, Lieff S, McKaig G, et al.** Progressive periodontal disease and risk of very preterm delivery: EBSCOhost. *Obstetrics and gynecology.* 2006;107(1):29–36.

13. **Xiong X, Buekens P, Vastardis S, Pridjian G**. Periodontal disease and gestational diabetes mellitus. *American Journal of Obstetrics and Gynecology.* 2006;195(4):1086–9.

14. **Xiong X, Saunders LD, Wang FL, Demianczuk NN.** Gestational diabetes mellitus: prevalence, risk factors, maternal and infant outcomes. *International Journal of Gynecology & Obstetrics.* 2001;75(75).

15. **Gil-Montoya JA, Ponce G, Sánchez Lara I, Barrios R, Llodra JC, Bravo M**. Association of the oral health impact profile with malnutrition risk in Spanish elders. Archives of Gerontology and Geriatrics. 2013;57(3):398–402.

16. **Garneata L, Slusanschi O, Preoteasa E, Corbu-Stancu A, Mircescu G**. Periodontal Status, Inflammation, and Malnutrition in Hemodialysis Patients - Is There a Link?

Journal of Renal Nutrition. 2015;25(1):67–74.

17. **Ministry of Health K**. Kenya National Oral Health Survey Report. 2015.

18. **Fisher A.A, Laing J.E, Stoeckel J.E. TownsendJW**. Handbook for Family Planning Operations Research. Second Edi. New York: Population Council; 1998.

19. **Wu YM, Liu J, Sun WL, Chen LL, Chai LG, Xiao X, et al**. Periodontal status and associated risk factors among childbearing age women in Cixi City of China. *Journal of Zhejiang University:* Science B. 2013;14(3):231–9.

20. **Hess RF, Gililland CS, Dembélé J**. Annals of Medical and Health Sciences Research Original Article How to Cite this Article: Rosanna F Hess. Prevalence and Predictors of Periodontal Disease among Pregnant Women in Mali, West Africa. *Ann Med Health Sci Res*. 2017;7:263–70.

21. **Clothier B, Stringer M, Jeffcoat MK.** Periodontal disease and pregnancy outcomes: exposure, risk and intervention. Best Practice and Research: *Clinical Obstetrics and Gynaecology.* 2007;21(3):451–66.

22. **Macek MD.** Non-Surgical Periodontal Therapy may Reduce Adverse Pregnancy Outcomes. *Journal of Evidence-Based Dental Practice*. 2008;8(4):236–7.

23. **Barnes CM.** Treatment of periodontal disease and the risk of preterm birth. Practical procedures & aesthetic dentistry : PPAD. 2007;19(2):118.

24. **Wandera M, Engebretsen IMS, Okullo I, Tumwine JK, Åstrøm AN, Group PS**. Socio-demographic factors related to periodontal status and tooth loss of pregnant women in Mbale district , Uganda. 2009;11:1–11.

25. **Agrawal P, Manohar S, Thorne-Lyman AL, Angela KC, Shrestha B, Klemm RD, et al**. Prevalence of damaged and missing teeth among women in the southern plains of Nepal: Findings of a simplified assessment tool. *PLoS ONE.* 2019;14(12):1–13.

26. **Russell SL, Ickovics JR, Yaffee RA**. Exploring potential pathways between parity and tooth loss among American women. *American Journal of Public Health*. 2008;98(7):1263–70.

27. **Iida H, Kumar J V, Kopycka-kedzierawski DT, Billings RJ**. Effect of Tobacco Smoke on the Oral Health of US Women. 2009;69(4).

28. **Ejp L, Fo C, Emb L, Lom C, Sc C, Gc N.** Risk variables in the association between frequency of alcohol consumption and periodontitis. 2012;(Casswell 2011):115–22.

29. **Lages EMB, Nobre-franco GC**. Alcohol Consumption and Periodontitis : 2015;(June).

30. **Al-sharabi AK, Shuga-aldin H, Ghandour I, Al-hebshi NN**. Qat Chewing as an Independent Risk Factor for Periodontitis : A Cross-Sectional Study. 2013;2013.

31. **Al-hebshi NN, Al-sharabi AK, Shuga-aldin HM, Al-haroni M, Ghandour I**. Effect of khat chewing on periodontal pathogens in subgingival biofilm from chronic periodontitis patients. *Journal of Ethnopharmacology*. 2010;132(3):564–9.

Appendix

<div align="center">

Table 1: Socio- Demographic Characteristics

</div>

Variable	Frequency (n= 407)	Percentage
Age of respondent		
15-20 years	12	2.9
21-25 years	63	15.5
26-30 years	134	32.9
31-35 years	139	34.2
36-40 years	57	14.0
41-49 years	2	.5
Level of education		
No education at all	8	2.0
Primary education level	86	21.1
Secondary education level	228	56.0
College/University	85	20.9
Primary occupation		
Not working	10	2.5
Peasant Farmer	232	57.0
small scale entrepreneur	114	28.0
Permanent employment	51	12.5
Marital status		
single	31	7.6
Married	348	85.5
Separated/Divorced	17	4.2
Windowed	11	2.7

<div align="center">

Table 2: Sociocultural and lifestyle factors associated with Periodontal Disease among Women of reproductive age attending Benadir Hospital in Mogadishu Somalia

</div>

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B) Lower	Upper
Step 1ᵃ Smoking	3.118	1.018	9.374	1	.002*	22.598	3.071	166.291
Chewing *Miraa*	.656	.289	5.135	1	.023*	1.926	1.093	3.396
Alcohol consumption	1.223	.565	4.686	1	.030*	3.399	1.123	10.290
Soft drink consumption	.698	.285	6.014	1	.014*	2.010	1.150	3.510
Constant	.703	.172	16.659	1	.000	2.020		

a. Variable(s) entered on step 1: Smoking, chewing *miraa*, alcohol consumption, soft drink consumption.