

SELF- REPORTED ORAL CARE AND ORAL HEALTH AMONG WOMEN DURING PREGNANCY, RIYADH, SAUDI ARABIA

Kawkab Al-Turck^{1*}, Norah Alsaeri², Rehab Alanazi², Ruba Alajaji², Shahad Alsulaiman², Nouf Al-Jehani², Fatimah Alodaini²

¹Department of Oral Medicine & Diagnostic Sciences (DDS), College of Dentistry, King Saud University, Riyadh 11451, Saudi Arabia. Katurck@ksu.edu.sa

²College of Dentistry, King Saud University, Riyadh 11451, Saudi Arabia.

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ABSTRACT

Gingivitis and periodontal infection are one of the primary conditions faced during pregnancy. Good oral hygiene practices can minimize gingival disease during pregnancy. To assess self-reported daily oral care, dental care during pregnancy, and its impact on oral health among women in Riyadh, Saudi Arabia. An online structured questionnaire was constructed included; demographic data, medical condition, pregnancy status and complications, daily oral care, dental visits during pregnancy, and an Arabic version of standard Oral Health Impact Profile (OHIP-14) to quantify self-referred Oral Health-Related Quality of Life (OHRQL). A pilot study was conducted and assessed for validity. A total of (818) women answered the survey; more than half (61%) of the participants were older than 35 years, the majority (92.1%) were married. The total score of OHIP-14; the results indicated 701 women (85.7%) reported good OHRQL and 117 women (14.3%) with poor OHRQL. The total score of OHRQL showed statistically significant results with education level ($P = 0.012$), frequency of brushing, flossing, has bleeding gum with brushing, and has toothache ($P = 0.001$), type of OBG YN clinic ($P = 0.024$), being diabetic during pregnancy ($P = 0.022$), and using medication ($P = 0.007$). It is required to develop, encourage and educate women about appropriate oral health care and dental care to prevent dental and oral diseases among Saudi women during pregnancy.

Key words: Oral care, Dental visits, Pregnancy, OHIP-14, Saudi women, Riyadh.

Introduction

Pregnancy includes complex hormonal and physical changes that critically influence most of the systems in the body, including the oral cavity. Oral health-related conditions during pregnancy may include Gingival Inflammation, and periodontal diseases [1]. The prevalence of Gingivitis among pregnant women has been shown to range from 36% to 100% [2]. It has also been reported that pregnant women with periodontal disease are associated with more than 18% of all pre-term births and low birth weight in infants [3].

During pregnancy, plasma estrogen and progesterone are higher due to the continuous progesterone Secretion by the corpus luteum at the onset and estrogen by the placenta afterward [4]. The following observations support literature that examined the influence of sex steroids on the periodontium. Reports have shown that human periodontium is where estrogen receptor (ER) and progesterone receptor (PgR) are localized, suggesting that the periodontium is the target tissue for these hormones [5]. The cytodifferentiation of the stratified squamous epithelium and the synthesis and maintenance of fibrous collagen can be influenced by Estrogen [6]. The activity of hormones on these cells can affect the efficiency of the epithelial barrier to bacterial invasion and maintenance of collagen and repair. These hormones can alter immunologic mediators and responses, including antigen expression and presentation, cytokine

production, the expression of apoptotic factors, and cell death. Progesterone, in special, has been given to enhance the production of the inflammatory mediator, prostaglandin E2 and enhance the accumulation of polymorphonuclear leukocytes in the gingival sulcus and down-regulates interleukin six productions by human gingival fibroblasts [7].

From another point of view, pregnancy can influence the body in several ways. Nutritional needs increase due to an increase in energy needs. Which further increases dietary carbohydrate intake to compensate for energy needs and can lead to increased risk for caries in pregnant women by providing a suitable substrate for cariogenic organisms [8]. Vomiting can also negatively disturb oral hygiene or may produce erosion on the motherly enamel layer. During pregnancy, a reduction in calcium levels happens. However, during pre-pregnancy, there is no difference seen in the ionized calcium level, even though the turnover is increased two-fold during pregnancy. Adopting good oral hygiene care habits during pregnancy can help to decrease or prevent this problem [8].

GIIncreased oral health care habits can lessen gingival diseases during pregnancy. Hence, women need to be evaluated for oral health status improvement, access to fluoridated water, Oral related conditions (e.g., gingivitis, tooth decays), and accessibility to dental care. Oral

examination should involve the teeth, gingiva, tongue, palate, and mucosa. Cases should be advised to perform routine brushing and flossing, avoid excessive sugary snacks and drinks. Oral status and plans for oral health care should be documented and discussed with a physician. Dentists are reported to be hesitant to treat pregnant women [9]. This circumstance can be overcome through appropriate knowledge, clear communication, and improvements of continuous collaborative relationships. Dentists can share information on the safety of dental treatment in pregnancy with dental colleagues and provide clear referral recommendations [10].

Estimating the influence of oral problems on quality of life should be part of evaluating oral health needs because clinical factors alone cannot describe the symptoms of dental patients. In cross-sectional and longitudinal studies, Oral health-related quality of life indicators was used [11]. The Oral Health Impact Profile (OHIP-14) is a 14-item questionnaire constructed to measure self-reported functional discomfort, restriction, and frailty attributed to oral conditions [12].

Numerous studies have reported on oral health care and knowledge during pregnancy [10, 13]. In Spain, Llena *et al.* affirmed according to the results that some factors were responsible for the general knowledge and safe care among pregnant women which their nationality, level of self-care, and knowledge on prevention in oral health [13]. In the United States, Boggess *et al.* found that participants' oral hygiene practices during pregnancy were associated with routine dental care utilization [14].

Few studies have reported oral health practices, dietary habits, and dental care among Saudi pregnant women [15-17]. There is a lack of studies on the impact of oral health and dental care on the quality of life among Saudi women during pregnancy. Therefore the present study aimed to assess self-reported daily oral care, dental care during pregnancy, and its impact on oral health among women in Riyadh, Saudi Arabia.

Materials and Methods

The study has been approved by the Institutional Review Board of King Saud University and the College of Dentistry's Research Centre. This was a questionnaire-based observational cross-sectional study conducted in the Riyadh area. An online structured questionnaire by Google forms was utilized to obtain the participants' data. It included; consent form, demographic data, medical and pregnancy status and complications, dental visits during pregnancy and related information, daily oral care. An Arabic version of the standard Oral Health Impact Profile (OHIP-14) was used to measure self-reported oral health-related quality of life (OHRQL) profile [18]. A pilot study on 20 participants was performed and evaluated for validity. The questionnaire was distributed in the Arabic language through social media

networks targeting women across Riyadh city from January 2018 to June 2018.

The participants answered the last section (OHIP-14) with a scale ranging from 1 to 5 depending on the presence or absence and the severity of the problems listed. 5 referred to never (never in the last six months), 4 for rarely (once or twice in the last six months), 3 stands for sometimes (every month or every week in the last six months), 2 as usually (twice or more per week in the last six months), and finally 1 referred to always (all the time in the last six months). For statistical purposes the total score for each participant is calculated and then assigned into two groups: Poor oral health group if scored from 14-41, Good oral health group scored from 42-70.

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 21 software (SPSS Inc., Chicago, IL, USA). The frequencies and percentages for all nominal variables were calculated. A Chi-square test was used to compare the total scores for different levels of education, age groups, and oral health status, and other demographic data. All statistical analyses were set at a significance level of $p < 0.05$.

Results and Discussion

A total of (818) participants were included in the study. The demographic characteristics of the sample revealed, more than sixty percent (61%) were older than 35 years (> 35), the majority (92.1%) were married. More than half of the surveyed women (54.8%) reported holding a bachelor's degree, and (43.3%) were employed in a government sector, as illustrated in **Table 1**.

Table 1. The Demographic Characteristics of the Participants.

Characteristic	Frequency	%
Age		
20-24	61	7.5
Pregnancy is a delicate condition involving complex physical and physiological changes.	104	12.7
25-29		
30-35	154	18.8
>35	499	61.0
Social Status		
Married	753	92.1
Divorced/widow, has children	65	7.9
Education Level		
Secondary school or less	35	4.3
High school	128	15.6
Diploma	94	11.5
Bachelor	448	54.8
Higher studies	113	13.8

Occupation		
Housewife	336	41.1
Student	44	5.4
Employee / government sector	354	43.3
Employee / private sector	84	10.3

Pregnancy status among the sample showed, the majority (78.1%) have been pregnant more than once, whereas (87.5%) were not pregnant at that time of the survey. More than one-half of the sample (59.9%) attended a private OBGYN clinic. Diabetes mellitus and hypertension were reported by (8.9%) and (9%) respectively. More than three-quarters (77.9%) reported no complications during previous pregnancies, as shown in **Table 2**.

Table 2. The Distribution of the Subjects according to Pregnancy Status.

Characteristic	Frequency	%
Pregnancy Status		
1st Pregnancy	103	12.6
More than one previous pregnancy, not pregnant currently	639	78.1
new delivery, less than 3 months	76	9.3
If you are Pregnant in which pregnancy period you are?		
not pregnant	716	87.5
Less than 6 months	41	5.0
6 months or more	61	7.5
Type of OBG YN clinic		
Private OBGYN clinic	490	59.9
Public OBGYN clinic	297	36.3
Do you have chronic systemic diseases?		
Diabetes Mellitus	73	8.9
Hypertension	74	9
Have you had any complications during your pregnancy		
Yes	181	22.1
No	637	77.9

Table 3 shows oral health practice and utilization of dental care services among the sample. Most of the subjects (61.1%) evaluate their general oral health as excellent/good. More than half (55.9%) reported having dental problems during the last six months. Bleeding gum with brushing was reported by (46.1%), and 34% reported having a toothache at the time of the survey. More than half of the sample (53.8%) indicated brushing 2-3 times a day, and daily flossing was reported by (16.5%).

Table 3. The Distribution of the Sample by reported Oral health Practice and Dental Care Services

Characteristic	Frequency	Percent
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How do you evaluate your general oral health?		
Excellent	119	14.5
Good	381	46.6
Moderate/Fine	251	30.7
Not good	67	8.2
Have you had any dental problem during the last 6 months?		
Yes	457	55.9
NO	361	44.1
Do your gums bleed while brushing your teeth?		
Yes	377	46.1
NO	441	53.9
Do you have a toothache/teeth ache at the moment?		
Yes	278	34.0
NO	540	66.0
How many times do you brush your teeth?		
Once a day	308	37.7
2-3 times a day	440	53.8
2-3 times a week	54	6.6
I don't brush my teeth	16	2.0
Do you use dental floss to clean between the teeth?		
Yes daily	135	16.5
Sometimes\ When needed	435	53.2
Never	248	30.3

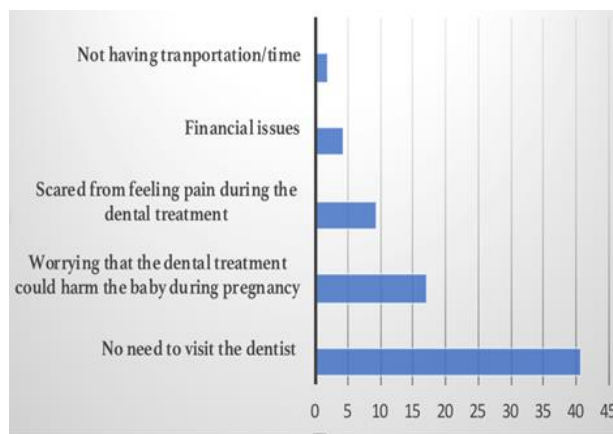


Figure 1. Reported reasons for avoiding dental appointments during Pregnancy.

The reported dental care during pregnancy revealed (44.5%) of the participants don't visit the dentist, and the most common reason reported by (40.6%) was "No need to visit the dentist," and "worrying that dental treatment could harm the baby" was the second most common reason among (17%), as illustrated in **(Figure 1)**. The majority of the sample (81.1%) were attending private dental clinics **Table 4**. Most of the participants (79.4%) did not receive any instruction about oral health care during pregnancy, and more than one-third (36%) of the social media was the source for their oral health information, followed by dentists among (29%).

Table 4. The Distribution of the Sample according to Reported Dental Care Services

Characteristic	Frequency	Percent
Have you had dental appointments during pregnancy?		
I don't visit the dentist	364	44.5
Only one visit	102	12.5
More than one visit	63	7.7
Only when I feel pain	289	35.3
Type of Dental clinic you visit during pregnancy?		
Private Dental clinic	663	81.1
Public Dental clinic	155	18.9
Did you receive any instruction on oral health during pregnancy?		
Yes	161	19.7

NO	650	79.4
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The score of (OHIP- 14), showed good oral health status and satisfaction with life (OHRQL) by 701 women (85.7%), and 117 women (14.3%) had poor OHRQL. No significant association was found between OHRQL and age, occupation, pregnancy period, and the frequency of dental visits. However, the total score of OHRQL showed statistically significant results with education level (P = 0.012), frequency of brushing, flossing, has bleeding gum with brushing, and has toothache (P = 0.001), type of OBG YN clinic (P = 0.024), being diabetic during pregnancy (P = 0.022), and using medication (P = 0.007). (P < 0.05 in all cases) (Table 5). The correlation between level of OHRQL and different variables is shown in Table 5, whereas the correlation between the level of OHRQL and education level has been illustrated in Figure 2.

Table 5. The Correlation between Level of OHRQL and Different Variables

Variable		OHRQL		P value
		Poor ORH NO =117	Good ORH NO=701	
Age	20-24	11(18.0%)	50(82.0%)	0.079
	25-29	11(10.6%)	93(89.4%)	
	30-35	14(9.1%)	140(90.9%)	
	>35	81(16.2%)	418(83.8%)	
Education Level	Secondary school or less	6(17.1%)	29(82.9%)	0.012
	High school	25(19.5%)	103(80.5%)	
	Diploma	21(22.3%)	73(77.7%)	
	Bachelor	56(12.5%)	392(87.5%)	
	Higher studies	9(8.0%)	104(92.0%)	
Do you use any medication for chronic systemic diseases ?	Yes	40(20.1%)	159(79.9%)	0.007
	NO	77(12.4%)	542(87.6%)	
Do you have Diabetes Mellitus?	Yes	17(23.3%)	56(76.7%)	0.022
	NO	100(13.4%)	645(86.6%)	
Have you had any complications during your pregnancy?	Yes	39(21.5%)	142(78.5%)	0.002
	NO	78(12.2%)	559(87.8%)	
How do you evaluate your general oral health?	Excellent	0	119(100%)	0.0001
	Good	36(9.4%)	345(90.6%)	
	Moderate/Fine	45(17.9%)	206(82.1%)	
	Not good	36(53.7%)	31(46.3%)	
Have you had any dental problem during the last 6 months?	Yes	96(21.0%)	361(79.0%)	0.0001
	NO	21(5.8%)	340(94.2%)	
Do your gums bleed while brushing your teeth?	Yes	84(22.3%)	292(77.7%)	0.0001
	NO	33(7.5%)	408(92.5%)	
Do you have a toothache/teeth ache at the moment?	Yes	75(27.0%)	203(73.0%)	0.0001
	NO	42(7.8%)	498(92.2%)	

How many times do you brush your teeth?	Once a day	54(17.5%)	254(82.5%)	0.0001
	2-3 times a day	43(9.8%)	397(90.2%)	
	2-3 times a week	15(27.8%)	39(72.2%)	
	I don't brush my teeth	5(31.3%)	11(68.8%)	
Do you use dental floss to clean between the teeth ?	Yes daily	10(7.4%)	125(92.6%)	0.0001
	Sometimes\ When needed	55(12.6%)	380(87.4%)	
	Never	52(21.0%)	196(79.0%)	
Type of OBG YN clinic?	Private OBGYN clinic	66(13.5%)	424(86.5%)	0.024
	Governmental OBGYN	51(17.2%)	246(82.8%)	

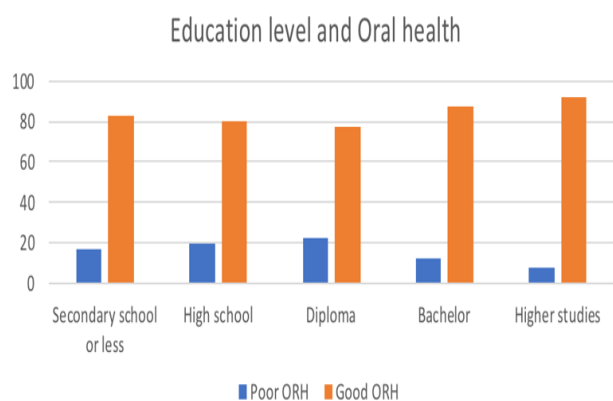


Figure 2. The correlation between the level of OHRQL and education level.

This was an observational cross-sectional study to assess self-reported oral health practices, dental care services among women during pregnancy in Riyadh, Saudi Arabia, and their impact on the quality of life.

Oral hygiene practices among the studied sample reported (53.8 %) brushing 2-3 times a day. This result is similar to those reported by Gaffar *et al.*, and Bamanikar and Kee. The pregnant women in their studies reported brushing once or twice a day by 51.5% and 51%, respectively [19, 20]. Whereas, Al-Turck found that about (46.4%) of the pregnant women reported brushing twice a day [15], and Assery reported a lower occurrence 33.3% of the sample brushed their teeth twice a day [21]. Likewise, daily flossing was reported by (16.5%) in the present sample. Other studies showed less percentage, as in Al-Turck study (7.2%) and Gaffer *et al.* (6.8%) reported using the floss daily [15, 19]. Frequency of brushing and flossing are of importance, especially in pregnant women, because they showed poor oral hygiene, more gingival inflammation, increase in pocket depth, and more periodontal disease as compared to non-pregnant women [22]. The importance of preventive intervention in pregnant women has long-lasting caries preventing effect in the children [15]. It is crucial because pregnant women who do not care enough to brush their teeth will mostly neglect cleaning their baby's mouth [23].

Hormonal alterations affecting oral health during pregnancy cannot be prevented. Therefore, pregnant women need regular dental check-ups as part of their prenatal care [19].

In the present study, only (7.7%) reported regular dental visits during pregnancy, other studies indicated slightly higher percentages ranging from 13.7 %, 18.1%, and 20.4% of the studied subjects [15, 17, 19]. S Honkala *et al.* indicated that fifty percent of the women had visited a dentist during pregnancy mostly for dental pain, and 40% experienced dental pain during the previous 6 months [24]. In addition, more than forty percent (44.5%) of the surveyed women avoided dental visits during pregnancy. Unfortunately, the perception of “No need for a dental visit during pregnancy” was the most common reason indicated by (40.6%), followed by “worried that dental treatment harms the baby” by (17%). Albasri *et al.* reported (52.6%) avoided dental visits during pregnancy, the most common reason was dental treatment being unsafe by (24.8%) followed by (17%) due to fear of dental treatment [17]. Whereas, Boggess *et al.* study revealed (74%) reported no routine dental visits during pregnancy. More than forty percent (45%) of their reason was “I was not having a dental problem”. Another reason reported was a financial barrier as “I do not have dental insurance” and can't afford to go to the dentist by 31% and 25% respectively.

In the present study, 61.1 % of the women reported excellent /good oral health, and 38.9 % reported fair/poor oral health. These results coincide with Boggess *et al.* study as (59%), and 41% respectively [14]. Whereas, Llana *et al.*, indicated more than seventy percent (73.4 %) reported no pain or oral infection in the last 10 months. However, 49.6% of their sample reported having bleeding gum, and 42.2 % had been to the dentist less than a year ago [13].

Dental care providers have recognized for decades that pregnant women have a higher incidence of gingival inflammation than do women who are not pregnant [25]. In the present study, 46.1% complained of bleeding during brushing, 34% with current dental pain, and 55.9 % reported dental problems during the last 6 months. These results are in agreement with previous studies.

The majority (79.4%) in the present study didn't receive professional instruction about oral health care during pregnancy. Social media was the source of oral health information for more than one-third of the sample (36%), followed by dentists (29%). Similarly, Gaffer reported 30.6% and 36% respectively [19].

Shah *et al.* reported that the pregnant group had the highest oral hygiene index score (i.e high plaque accumulation). Moreover, their gingiva was more edematous which make maintenance of oral hygiene difficult. In addition, the self-reported OHRQL in pregnant women was poorer than in other groups. They found that number of previous pregnancies, caries, and periodontal health were important predictors of OHRQL. Several other studies found the same association [26].

In our study, the total score of OHRQL showed statistically significant results with education level ($P = 0.012$), frequency of brushing, flossing, has bleeding gum with brushing, and has toothache ($P = 0.001$). These results are in agreement with Boggess *et al.* who indicated that education level affects oral hygiene practices. High-level education women were more likely than others to strongly agree that the use of dental floss would help prevent gingiva and tooth problems [14]. Women with lower education levels knew less about the beneficial effects of fluoride toothpaste, fluoridated water, and the ability of fluoride to prevent tooth caries without harm [27]. The lower level of self-care among pregnant women is usually associated with lower general knowledge in oral health and vice versa [10]. In addition, the OHRQL score showed statistically significant results with the type of prenatal care clinic ($P = 0.024$). The explanation for this finding, probably these women will have insurance coverage for their medical/ dental needs.

In the present study (8.9%) of women reported having diabetes, and 24.3 % of women reported using medication for chronic systemic diseases. Poor oral health has been linked to chronic diseases such as diabetes [23]. Periodontal inflammation and destruction are increased in pregnant diabetic women compared to non-diabetic pregnant women [28]. Demmer *et al.* reported that chronic diseases such as diabetes, pulmonary infections, cardiovascular disease, and stroke had been related to poor oral health, with consequences for health across the lifespan [29]. In addition, a recent study conducted by Anil *et al.*, 2020 reported that medications might **harm** the periodontium, especially in the presence of compromised oral hygiene care [30].

The main limitation of this study was relying on self-reports, in which the desire to give the correct response may have overestimated oral health practices. Future studies assessing oral hygiene clinically using plaque indices and assessing actual routine dental visits from records may avoid this bias. The other limitation was, the socioeconomic status and the availability of dental insurance coverage of the subjects were not assessed.

Conclusion

There is a need to improve the oral health knowledge and oral health care habits of Saudi women during pregnancy to prevent dental and oral diseases and encourage them to have regular dental care to prevent further disease. Routine dental

care utilization is important for the good oral health of mothers and children, however, it is low among pregnant women, lack of regular dental visits can aggravate dental problems. Therefore, both public and private medical providers need to incorporate the promotion of and referral for dental care into routine prenatal care protocols. In addition, suggestion for the utilization of social media by medical and dental professionals to promote oral health knowledge and encourage routine dental care among women in general and pregnant ones in particular. Moreover, to correct the misconception about pregnancy and dental treatment.

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