ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

DOI: 10.5336/dentalsci.2023-95978

Assesment of Pregnants' Consciousness, Behavior and Administration to Oral Health: Clinical Research

Gebelerin Ağız ve Diş Sağlığına Yönelik Bilinç Düzeylerinin, Uygulamalarının ve Tutumlarının Değerlendirilmesi: Klinik Araştırma

Abdülkadir TÜRKMENOĞLU[a], Özgün YILDIRIM[b], Nur MOLLAOĞLU[a]

[a]Department of Oral, Dental and Maxillofacial Surgery, Gazi University Faculty of Dentistry, Ankara, Türkiye
[b]Department of Oral, Dental and Maxillofacial Surgery, Çankırı Karatekin University Faculty of Dentistry, Çankırı, Türkiye

This study was prepared based on the findings of Abdulkadir Turkmenoğlu's thesis study titled "Evaluation of Awaerness Levels, Practises and Attitudes on Oral and Dental Health of Pregnants" (Ankara: Gazi University; 2021).

ABSTRACT Objective: Oral health condition of a pregnant woman may also influence the health of the unborn child. An association between gum disease and low weight births has been reported previously. Therefore, we aimed to survey the pregnants awarness and attitute about possible complications during pregnancy who referred for dental treatment by given a questionnaire. **Material and Methods:** This study was designed as a clinical trial. The study was carried out at Gazi University Faculty of Dentistry, Department of Oral and Maxillofacial Surgery (Ankara, Türkiye), between November 2020-February 2021. Total of 193 pregnants who were at least 18 years old and volunteer was included in the study. Participants were at various weeks of their pregnancy and they were given a questionnaire containing questions about their consciousnesss, administrations and behaviors towards oral health. **Results:** It was determined that pregnants who work at the private sector and brush their teeth twice a day and visiting dentist regularly during pregnancy have a significantly higher awarness to oral health. In addition, it was also found that pregnants who are self employed and tooth brush changing frequency is being once a month have significantly better attitutes in term of their oral health. **Conclusion:** Establishing a consensus among obstetricians and dentists on the subject of informing pregnant women by relevant health institutions, and creating a prenatal oral health guide will be a very positive approach for the health of both mothers and babies.

Keywords: Awarness; attitute; oral health; pregnant

ÖZET Amaç: Gebe bir kadının ağız sağlığına ilişkin durumu, doğmamış çocuğunun sağlığını da etkileyebilir. Diş eti hastalığı ile düşük ağırlıklı doğumlar arasında bir ilişki daha önce yapılan araştırmalarda bildirilmiştir. Bu nedenle diş tedavisi için fakültemize başvuran gebe bireylerin, gebelikte karşılaşabilecekleri komplikasyonlara ilişkin farkındalık ve tutumlarını bir anket vererek araştırmayı amaçladık. **Gereç ve Yöntemler:** Bu çalışma bir klinik araştırma olarak dizayn edilmiştir. Çalışma, Gazi Üniversitesi Diş Hekimliği Fakültesi Ağız, Diş ve Çene Cerrahisi Ana Bilim Dalında (Ankara, Türkiye), Kasım 2020-Şubat 2021 tarihleri arasında gerçekleştirilmiştir. Çalışmaya gönüllü, en az 18 yaşında toplam 193 gebe dâhil edildi. Katılımcılar, gebeliklerinin çeşitli haftalarındaydılar ve kendilerine ağız sağlığına yönelik bilinçleri, uygulamaları ve davranışları hakkında sorular içeren bir anket verildi. **Bulgular:** Özel sektörde çalışan, günde 2 kez dişlerini fırçalayan ve gebelikleri boyunca düzenli olarak diş hekimine giden gebelerin ağız sağlığı farkındalıklarının anlamlı olarak daha yüksek olduğu belirlendi. Ayrıca serbest meslek sahibi olan ve diş fırçası değiştirme sıklığı ayda bir olan gebelerin ağız sağlığı açısından tutumlarının anlamlı olarak daha iyi olduğu saptanmıştır. **Sonuç:** Gebelerin ilgili sağlık kuruluşları tarafından bilgilendirilmeleri konusunda kadın doğum uzmanları ve diş hekimleri arasında fikir birliğinin sağlanması ve doğum öncesi ağız sağlığı rehberinin oluşturulması, hem anne hem de bebek sağlığı açısından oldukça olumlu bir yaklaşım olacaktır.

Anahtar Kelimeler: Farkındalık; davranış; ağız sağlığı; hamilelik

Tissues in the oral cavity are affected by hormonal changes during pregnancy and most of these effects are seen in the gingiva.[1] Higher estrogen and progesterone levels during pregnancy may cause edema, hyperemia and bleeding in the periodontal tissue, as well as cause gingival enlargement.[2] Compli-

Correspondence: Özgün YILDIRIM
Department of Oral, Dental and Maxillofacial Surgery, Çankırı Karatekin University Faculty of Dentistry, Çankırı, Türkiye
E-mail: ozgunyldrm89@gmail.com

Peer review under responsibility of Turkiye Klinikleri Journal of Dental Sciences.

Received: 05 Feb 2023 ***Accepted:*** 08 May 2023 ***Available online:*** 16 May 2023

cations of this hormonal change in the oral cavity have been reported as increased permeability of capillaries in the gingiva, decreased host immunity, as a result, the host becomes more vulnerable to infections in the oral cavity.[3] This may cause some irreversible or irreversible changes in the oral cavities of pregnant women. High estrogen levels have been reported to be associated with gingival hyperplasia, gingivitis, pyogenic granulomas, dental caries, and changes in salivary flow.[4]

Gingival diseases may gradually get associated by increased levels of systemic diseases such as diabetes, cardiovascular diseases and osteoporosis.[5,6] It was reported that the incidence of periodontal problems and tooth caries may increase during pregnancy due to high estrogen and progesterone concentrations along with increased systemic inflammatory cytokine levels, nausea, gastroesophageal reflux, and increased snacking cravings.[5,7,8]

The oral health condition of a pregnant woman can also affect the health of the unborn child. Association between gum disease and low birth weight (LBW) births has been reported previously.[8] This correlation has been extended to preterm delivery as well as adverse pregnancy outcomes: miscarriage, stillbirth, preeclampsia, and intrauterine growth retardation.[9,10]

Periodontal disease can be prevented or treated.[11] Increasing the consciousnesss of oral health professionals is very important in reducing the likelihood of adverse pregnancy outcomes.[12,13] Pregnancy can also be an opportunity for women to improve their oral health administrations. Aiming to improve the oral hygiene knowledge of pregnant women will ultimately improve the oral health of unborn babies and children.

Therefore, the aim of this study was examine the level of consciousnesss of pregnant women if they know the importance of oral health for themselves and also for their newborn babies during pregnancy. The questionnaire prepared for oral health including oral health behaviors of pregnant women, such as the frequency of going to dentist or the reasons for not going to dentist; socio-economic levels such as educational status, employment status and monthly income.

MATERIAL AND METHODS

This study design included pregnant volunteers who applied to Gazi University Dental School, Department of Oral and Maxillofacial Surgery for tooth extraction. Ethics committee confirmation for the study was gained from Gazi University Dental School Clinical Research Ethics Committee on 09.01.2020 (no: 21071282-050.99). This research included 193 pregnant volunteers who were 18 years and older and at various weeks of their pregnancy. In the questionnaire, patients were asked questions about their consciousnesss, behaviors and administrations towards oral health. All individuals were informed about the procedures to be carried out and their consents were obtained. This study was conducted in accordance with the Declaration of Helsinki.

"There is no statistically significant relationship between the administrations and behaviors of pregnant women towards oral health and oral health awareness" was the null hypothesis of the research hypotheses. Alternative hypothesis was "There is a statistically significant relationship between oral and health consciousness and administrations and behaviors of pregnant women towards oral health." The scores obtained from the 2 titles will be tested with Pearson correlation analysis. In this study, the sample size was numbered at the 95% reliance level by using the G. Power-3.1.9.2 (HHU, Germany) program. At the end of the analysis, the standardized effect size was taken as 0.2 as the small value for the Cohen's (1988) correlation analysis, and the minimum sample size was numbered as 193 with a speculative power of 0.80. The data obtained as a result of the research, the power of the test will be calculated for the adequacy of the sample size at the level of 95% confidence.

STATISTICAL ANALYSIS

Data were investigated using the SPSS 25 (IBM, USA) program. Descriptive statistical methods were used while evaluating the data. Intercalarily, the normal distribution of the data used was tested by using Shapiro Wilk and Kolmogorov-Smirnov test. The assumption of homogeneity of variance was tested with the Levene test and the methods were decided. Parametric tests were used for normally delivered mea-

surements, and non-parametric tests were used for non-normally delivered measurements. For quantitative data, F test (ANOVA) was used for normally delivered measurements in comparison of the means of more than 2 groups, and Kruskal Wallis analysis was used for non-normally delivered measurements. Bonferroni analysis was performed in order to determine the difference between groups that were found to be statistically significant. The reliability of the survey used in the study was tested with the Cronbach alpha reliability analysis. Moreover, in order to measure the relationship between the variables used in the research, Spearman correlation analysis was performed and the results were interpreted.

RESULTS

I. Socioeconomic status

■ A mean of the participants' pregnancy; minimum 6th week, maximum 36th week mean: 22.73±7.68 week. Their age was found to be minimum 18, maximum 39, mean age was 28.47±4.32.

■ 32.1% (n=62) of the participants have no children, 40.9% (n=79) had 1 child, 23.3% (n=45) had 2 and 3.6% (n=7) had 3 children.

■ 2.1% (n=4) of the participants are literate, 19.2% (n=37) primary school educated, 40.4% (n=78) high school educated, 33.2% (n=64) university educated and 5.2% (n=10) had MSc degree.

■ 43.5% (n=84) of the participants were housewives, 5.2% (n=10) workers, 16.1% (n=31) goverment employees, 23.8% (n=46) were private sector employees, 11.4% (n=22) were self-employed.

■ When the income status of the participants is examined; 19.7% (n=38) $500 or less income, 36.8% (n=71) $501-$600 income, 28% (n=54) $601-700$ income had. It is seen that only 15.5% (n=30) participant had 701$ or higher income.

II. Oral health administrations in pregnant women

■ It was determined that; 5.2% of the participants (n=10) did not brush their teeth at all, 33.7% (n=65) once a day, 50.3% (n=97) twice a day, 10.9% (n=21) brushed more than 2 times a day.

■ 13% (n=25) of the participants once in a month, 30.6% (n=59) once in 3 weeks, 36.3% (n=70) once in 6 months, 20.2% (n=39) participants change their toothbrushes once a year.

■ 25.4% (n=49) of the participants use dental floss, 8.3% (n=16) use interface brush, 41.5% (n=80) use mouthwash, 39.9% (n=77) use any of them.

III. Behavior of pregnant women to oral & dental health

■ 39.9% (n=77) of the participants went to dentist within last 6 months, 32.6% (n=63) within last 6 months-1 year, 21.8% (n=42) when they have a complaine, 5.7% (n=11) have never been to the dentist.

Comparison of pregnants behavior to oral health and the scores they get from the questionnaire:

Kruskal Wallis test was used to determine whether there was a statistically significant difference between their educational status of the participant and the mean scores of the "Pregnant women's behaviors to oral health" and also by their "Tooth brushing frequency." Results indicated that there was no significant difference between the values ($p>0.05$).

Kruskal Wallis test was used to analyze whether there was a statistically significant difference between "Pregnants behaviors to oral health" and their working status. It was found that there was a statistically significant difference between the working status of the participants and behaviors of pregnant women to oral health ($X2=19.217$, $p=0.001<0.05$). Following that, Bonferroni analysis was done to determine the group with difference. It was found that there was a statistically significant difference for the self-employed status, and goverment employee status ($p=0.001<0.05$) displaying self-employed participants have a higher mean score than those who are being goverment employees (Table 1).

Kruskal Wallis test was done to analyze whether there was a statistically significant difference between the scores obtained from the "Pregnant women's behaviors towards oral health" and the "Frequency for the change of the toothbrush." There found to be a statistically significant difference ($X2=9.991$, $p=0.019<0.05$). Bonferroni analysis was done to determine the group with difference followed

TABLE 1: Comparison of survey scores according to employment status.

Working statues	n	Average	Standard deviation	Average rank	χ^2	p value	Bonferroni
Housewife (1)	84	7.38	1.87	99.48	19.217	0.001*	
Employee (2)	10	7.00	1.56	82.20			5>3
Goverment employee (3)	31	6.68	1.05	68.82			
Private sector employee (4)	46	7.26	1.69	96.86			
Self-employment (5)	22	8.45	1.34	134.27			

χ^2: Test statistic; *p<0.05.

TABLE 2: Comparison of survey scores according to toothbrush replacement frequency.

	n	Mean	Standard deviation	Mean rank	χ^2	p value	Bonferroni
1 per month (1)	25	8.08	1.73	125.20	9.991	0.019*	1>4
1 in 3 months (2)	59	7.49	1.71	101.54			1>3
1 in 6 months (3)	70	7.11	1.64	89.33			
1 per year (4)	39	7.05	1.67	85.82			

χ^2: Test statistic; *p<0.05.

by Kruskal Wallis test. Participants who change their toothbrush once a month have a higher mean value than the participants who change their toothbrush once in every 6 months-once a year (Table 2).

Comparison of the oral health consciousnesss level of volunteers and the scores they got from the questionnaire:

Analysis of variance (ANOVA) was used to test whether there was a statistically significant difference between participants "awarness for oral health" and their "monthly income" and also frequency of "changing toothbrush." It was found that there was no significant difference between the values (p>0.05).

Spearman correlation analysis was conducted to analyse whether there was a statistically significant relationship between "Oral health consciousnesss of pregnant women" and "Behaviors of pregnant women towards oral health." It was determined that there was no statistically significant relationship (p>0.05). Moreover, it was tested by the analysis of variance (Welch) whether there was a statistically significant difference between the average scores of the participants from the "Oral health consciousnesss level in pregnant" and "Frequency of going to the dentist." It was found that there was no significant difference between the values (p>0.05).

In addition, ANOVA was used to determine whether there was a statistically significant difference between the mean scores of the participants "Consciousnesss for oral health" and "Their working status." It was found that there was a statistically significant difference between the working status of the participants in terms of the mean scores of the "Oral health consciousnesss level in pregnant" (F=5.010, p=0.001<0.05). Bonferroni analysis was performed to determine groups with difference. It was observed that there was a statistically significant difference (p=0.001<0.05) between the mean scores of housewives and private sector employees. It can be said that the participants working in the private sector have a higher average score from the "Oral health consciousnesss level in pregnant" than the participants who are housewives (Table 3).

When the mean count of the volunteers "Consciousnesss for oral health" compared by the "Frequency of tooth brushing" by ANOVA, it was found that there was a statistically significant difference between the values (F=5.059, p=0.002<0.05). Bonferroni analysis was done to analyse the groups with difference and found to be a statistically significant difference between participants who never brushed their teeth and those who brushed twice a day (p=0.042<0.05), and those who brushed their teeth

TABLE 3: Comparison of survey scores according to employment status.

Working situations	n	Mean	Standard deviation	F	p value	Bonferroni
Housewife (1)	84	26.36	4.45	5.010	0.001*	
Employee (2)	10	25.80	3.58			4>1
Civil servant (3)	31	28.77	5.30			
Private sector employee (4)	46	29.70	4.80			
Self-employment (5)	22	28.59	3.98			

F: Test statistic; *p<0.05.

TABLE 4: Comparison of survey scores according to tooth brushing frequency.

Tooth brushing frequency	n	Mean	Standard deviation	F	p value	Bonferroni
None (1)	10	24.50	2.80	5.059	0.002*	
1 per day (2)	65	26.49	4.36			3>1
2 per day (3)	97	28.70	5.00			3>2
More than 2 times a day (4)	21	28.95	4.38			

F: Test statistic; *p<0.05.

TABLE 5: Comparison of survey scores according to the status of having a dental examination during pregnancy.

Dental examination during pregnancy	n	Mean	Standard deviation	t	p value
No	141	26.88	4.45	-4.447	0,000*
Yes	52	30.17	4.86		

t: Test statistic; *p<0.05.

once or twice a day (p=0.020<0.05). It can be said that those who brush their teeth twice a day have a higher average score than those who do not brush at all and brush once a day (Table 4).

When the consciousnesss of pregnants for "Oral health" and "Having a dental examination during pregnancy" was compared by using the statistical analysis of independent sample t-test, there found to be a statistically significant difference between the values (t=-4.447, p=0.000<0.05). The average scores of the participants who had a dental inspection during pregnancy were higher than the participants who did not have a dental inspection (Table 5).

DISCUSSION

When we look at the findings of the present survey, it was determined that the pregnants with poor behavior towards care of oral hygiene also had low level of consciousness regarding oral-dental health and periodontal diseases. In addition, they were also practising daily insufficient oral care. Comparison of the scores according to toothbrush replacement frequency and tooth brushing frequency is given in Table 2 and Table 4. In addition, 39.9% (n=77) of the participants declared that they have been to dentist within last 6 months, 32.6% (n=63) within last 6 months to 1 year, 21.8% (n=42) of them have been to dentist when they have a complaine and 5.7% (n=11) have never been to the dentist. A study including 2009-2011 data from The Pregnancy Risk Assessment Monitoring System (PRAMS) of Hawaii, it was determined that 33.4% of women visited the dentist regularly during pregnancy and 50% before pregnancy.[14] In a study including 1998 data from 4 different states of PRAMS, 23% of pregnant women visited dentist during their pregnancy; only 25% of them had complaints about oral health, however only 45% of those who had complaints received dental treatment.[15] In our study, the rate of visiting dentist

before the pregnancy was found to be 26.9%. It was determined that this group of pregnants who visited dentist had a high level of consciousnesss regarding oral health (Table 5). According to the literature, selective restorative and periodontal treatments had to be done during the 2nd trimester in pregnants. Pregnants experiencing pain and infection, dental treatment should not be delayed until postpartum.[16]

Previous studies reported that younger pregnant women whwo are with lower income, lower education level and visiting dentist irregularly during their pregnancy have low level of consciousnesss about oral health.[15,17] Results of present study indicated that there was no significant difference between behaviors of pregnant women on dental health and their monthly income, and education level ($p>0.05$). However, there was a difference being not statistically significant, between behaviors of pregnant women on dental health and education level. Total of 2.1% (n=4) of the participants are literate, 19.2% (n=37) primary school educated, 40.4% (n=78) high school educated, 33.2% (n=64) university educated and 5.2% (n=10) had MSc degree. When the monthly income status of the participants is examined; 19.7% (n=38) have $500 or less income, 36.8% (n=71) $501-$600 income, 28% (n=54) $601-700$ income had. It is seen that only 15.5% (n=30) participant had 701$ or higher income.

A study from India reported that, approximately 52,000 subjects from 18 centers were included in the 2002-2003 National Database over a 2-year period. According to the database, 14.5% of intramural live births were premature and 31.3% of total live births were LBW infants. Among extramural live births, 52.1% of babies were born with low birth weight, 31.5% of these babies were born prematurely. Premature birth and related complications account for 19.3% of newborn deaths. Even more important is the fact that 77.7% of total stillbirths are premature babies. These data suggest that preterm birth and related complications account a significant percentage of the total neonatal death or stillbirth in the region.[18] Inadequate oral health may also be one of the possible causes of these complications. Mean pregnancy of the participants included in our study was 22.73±7.68 weeks, minimum 6th week, maximum 36th week. Premature birth and related complications were not included.

In a study by Mannem and Chava in 2011, they found that there was a statistically significant difference between 2 groups ($p<0.05$). They reported that there is a significant relationship between periodontal health and the duration of pregnancy and that periodontal disease may cause a risk for preterm birth. Researchers have reported that maintaining ideal oral hygiene should be a part of the prenatal care protocol.[19] In the present study, 70.43% of the 193 pregnant women answered the question of "Poor oral health during pregnancy may cause premature birth of the baby" as undecided and disagreed. Therefore, it was concluded that more detailed information and guidance during pregnancy is very important, supporting the research of Mannem and Chava and also indicating that pre-pregnancy oral health controls should be a part of the routine.

Transnational guidelines in the United States, United Kingdom, and Europe recommend antenatal oral examination starting in the early stages of pregnancy, recognizing there is a relation between antenatal periodontal disease and adverse pregnancy consequences. These guidelines also encourage education and orientation for oral and dental care.[20-22] Australian national prenatal care guidelines were updated in 2012 to encourage oral health screening for all pregnant patients, as oral health is important to maternal and fetal health. And they also reported that dental treatment can be done safely during pregnancy.[23-25] In addition, obstetricians needs more. Moreover, previous research has found that obstetricians have insufficient information about teaching pregnant patients about the importance of prenatal oral health although they believe oral health is very important during pregnancy.[26] In the present study, 70.43% of 193 pregnant women were determined as "not knowing" or "not agreeing" by the possible consequences of poor oral health during pregnancy. For this reason, it is very important to establish a common behavior between gynecologists and dentists to maintane a optimum oral health during pregnancy.

CONCLUSION

It is concluded that, pregnants should have a strong behavior to ensure their oral hygiene and go to the dentist regularly. Ideally, pregnancy should begin

without periodontal infection, therefore pregnant women should be educated and motivated to maintain optimum oral hygiene before and throughout their pregnancy. It should be recommended that pregnant women should ensure their oral hygiene is optimum at the beginning of the process, and the development of this behavior should not be left to the preference of pregnant women. Therefore, establishing a consensus among obstetricians and dentists on the subject, informing pregnant women by relevant health institutions, and creating a prenatal oral health guide will be a very positive approach for the health of both mothers and babies.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Abdülkadir Türkmenoğlu;* ***Design:*** *Nur Mollaoğlu;* ***Control/Supervision:*** *Nur Mollaoğlu;* ***Data Collection and/or Processing:*** *Abdülkadir Türkmenoğlu;* ***Analysis and/or Interpretation:*** *Özgün Yıldırım;* ***Literature Review:*** *Özgün Yıldırım;* ***Writing the Article:*** *Özgün Yıldırım;* ***Critical Review:*** *Nur Mollaoğlu;* ***References and Fundings:*** *Abdülkadir Türkmenoğlu.*

REFERENCES

1. Ramos-E-Silva M, Martins NR, Kroumpouzos G. Oral and vulvovaginal changes in pregnancy. Clin Dermatol. 2016;34(3):353-8. [Crossref] [PubMed]
2. Sooriyamoorthy M, Gower DB. Hormonal influences on gingival tissue: relationship to periodontal disease. J Clin Periodontol. 1989;16(4):201-8. [Crossref] [PubMed]
3. Hajikazemi E, Oskouie F, Mohseny SH, Nikpour S, Haghany H. The relationship between knowledge, behavior and administration of pregnant women about oral and dental care. Eur J Sci Res. 2008;24(4):556-62. [Link]
4. Tarsitano BF, Rollings RE. The pregnant dental patient: evaluation and management. Gen Dent. 1993;41(3):226-34; quiz 233-4. [PubMed]
5. Dasanayake AP, Gennaro S, Hendricks-Mu-oz KD, Chhun N. Maternal periodontal disease, pregnancy, and neonatal outcomes. MCN Am J Matern Child Nurs. 2008;33(1):45-9. [Crossref] [PubMed]
6. Armitage GC. Bi-directional relationship between pregnancy and periodontal disease. Periodontol 2000. 2013;61(1):160-76. [Crossref] [PubMed]
7. Liccardo D, Cannavo A, Spagnuolo G, Ferrara N, Cittadini A, Rengo C, et al. Periodontal disease: a risk factor for diabetes and cardiovascular disease. Int J Mol Sci. 2019;20(6):1414. [Crossref] [PubMed] [PMC]
8. Wu M, Chen SW, Jiang SY. Relationship between gingival inflammation and pregnancy. Mediators Inflamm. 2015;2015:623427. [Crossref] [PubMed] [PMC]
9. Teshome A, Yitayeh A. Relationship between periodontal disease and preterm low birth weight: systematic review. Pan Afr Med J. 2016;24:215. [Crossref] [PubMed] [PMC]
10. Siqueira FM, Cota LO, Costa JE, Haddad JP, Lana AM, Costa FO. Intrauterine growth restriction, low birth weight, and preterm birth: adverse pregnancy outcomes and their association with maternal periodontitis. J Periodontol. 2007;78(12):2266-76. [Crossref] [PubMed]
11. Chapple IL, Van der Weijden F, Doerfer C, Herrera D, Shapira L, Polak D, et al. Primary prevention of periodontitis: managing gingivitis. J Clin Periodontol. 2015;42 Suppl 16:S71-6. [Crossref] [PubMed]
12. 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 Dis. 2016;22(7):609-19. [Crossref] [PubMed]
13. Payal S, Kumar GS, Sumitra Y, Sandhya J, Deshraj J, Shivam K, et al. Oral health of pregnant females in central India: Knowledge, awareness, and present status. J Educ Health Promot. 2017;6:102. [Crossref] [PubMed] [PMC]
14. Mattheus D, Shannon M, Lim E, Gandhi K. The association between sociodemographic factors, dental problems, and preterm labor for pregnant women residing in Hawai'i. Hawaii J Med Public Health. 2016;75(8):219-27. [PubMed] [PMC]
15. 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. [Crossref] [PubMed]
16. Tozar KM, Erken Almaz M. Hamilelikte ve yeni doğan çocuklarda ağız diş sağlığı [Oral health in pregnant women and newborns]. Dent & Med J-R. 2021;3(1):55-67. [Link]
17. Azofeifa A, Yeung LF, Alverson CJ, Beltrán-Aguilar E. Oral health conditions and dental visits among pregnant and nonpregnant women of childbearing age in the United States, National Health and Nutrition Examination Survey, 1999-2004. Prev Chronic Dis. 2014;11:E163. [Crossref] [PubMed] [PMC]
18. National Neonatology Forum NNPD Network National neonatal-perinatal database: report for 2002-2003. New Delhi: National Neonatology Forum NNPD Network; 2005. Available from: [Link]
19. Mannem S, Chava VK. The relationship between maternal periodontitis and preterm low birth weight: a case-control study. Contemp Clin Dent. 2011;2(2):88-93. [Crossref] [PubMed] [PMC]
20. Oral Health Care During Pregnancy Expert Workgroup. Oral Health Care During Pregnancy: A National Consensus Statement. Washington, DC, USA: National Maternal and Child Oral Health Resource Center; 2012. Available from: [Link]

21. National Maternal and Child Oral Health Resource Center. Oral Health Care During Pregnancy: A Resource Guide. 2nd ed. Washington, DC, USA: National Maternal and Child Oral Health Resource Center; 2017.

22. NHS Inform [Internet]. © 2023 NHS. Looking After Your Teeth and Gums in Pregnancy. Edinburgh, Scotland: NHS Health Scotland; 2019. [1.05.2020] [Link]

23. George A, Dahlen HG, Reath J, Ajwani S, Bhole S, Korda A, et al. What do antenatal care providers understand and do about oral health care during pregnancy: a cross-sectional survey in New South Wales, Australia. BMC Pregnancy Childbirth. 2016;16(1):382. [Crossref] [PubMed] [PMC]

24. Australian Health Ministers' Advisory Council. Clinical Administration Guidelines: Antenatal Care-Module 1. Canberra, ACT, Australia: Australian Government Department of Health and Ageing; 2012. [Link]

25. Nursing and Midwifery Board of Australia. Midwife Standards for Administration. Canberra, ACT, Australia: Nursing and Midwifery Board AHPRA; 2018. [8.09.2020] [Link]

26. Wooten KT, Lee J, Jared H, Boggess K, Wilder RS. Nurse practitioner's and certified nurse midwives' knowledge, opinions and practice behaviors regarding periodontal disease and adverse pregnancy outcomes. J Dent Hyg. 2011;85(2):122-31. [PubMed]