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Attitudes and knowledge of pregnant women about oral health

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Abstract:

BACKGROUND: This cross-sectional study aimed to evaluate attitudes and knowledge regarding oral health and infant oral health among pregnant women.

MATERIALS AND METHODS: The study involved 325 pregnant women in the Republic of Croatia who completed an anonymous online questionnaire (Google forms) from January to June 2019. The questionnaire was divided into three parts. The first part contained questions about the demographic data experience about oral health in pregnancy. The second part was related to the knowledge of the relationship between oral health and pregnancy. The third section consisted of questions related to knowledge about the oral health of children at the earliest age. The results were analyzed with descriptive statistics, Spearman correlation analysis, and Chi-square test.

RESULTS: The women are mostly informed about oral health in pregnancy from their dentists (53.54%) and least from their general doctors (4%). In pregnancy, gingival bleeding was observed by 52.31% of respondents and tooth mobility by 12.31%. The Chi-square test found that there was a difference in attitude regarding the age at which they should stop breastfeeding between respondents who had their first pregnancy and those who already had children. Only 9.23% of respondents are aware that breastfeeding can cause tooth decay.

CONCLUSION: Pregnant women in the Republic of Croatia do not have sufficient knowledge, and they are neither aware of the importance of oral health during pregnancy nor infant oral health.

Keywords:

Oral health, pregnancy, pregnant women

Introduction

Due to the growth of the fetus and the preparation of the mother's body for childbirth, many physiological changes occur in the body during pregnancy which can also be manifested in the oral cavity.[1] Oral health plays an important part of general health and as such should be maintained throughout the whole life and thus in pregnancy.[2] Good oral health of pregnant women is essential for their own health and health of the fetus and can reduce the risk of complication in pregnancy.[3] Increased pH of the oral cavity due to vomiting, frequent meals rich in carbohydrates, and poor oral hygiene contribute to the easier development of caries in pregnancy. If left untreated, it can lead to local and systemic complicates.[4]

Tooth erosion is a common finding in the oral cavity of pregnant women; they most often occur as a result of morning sickness and vomiting, especially in the first trimester. Another reason for the occurrence of tooth erosion is increased reflux of gastric acid, due to the weakened tone of the lower esophageal sphincter and the increase in intra-abdominal pressure.[5]

Because of increased levels of progesterone and estrogen, the periodontal ligament relaxes so the increased tooth mobility can occur. This condition is reversible and recedes soon after birth.[5] The most common change in the oral cavity during pregnancy

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is gingivitis which affects 36%–100% of pregnant women.[6] It occurs due to increased levels of estrogen and progesterone, changes in the oral flora and a reduce immune response, thus reducing the body's ability to repair and maintain healthy gingiva tissue. Periodontitis in pregnancy is associated with an increased risk of preterm birth, decreased neonatal birth weight, preeclampsia, and gestational diabetes.[6,7] Periodontal therapies can reduce the rate of unfavorable pregnancy outcomes in women and high risk of pregnancy complications and it can improve the general health of pregnant women.[5]

The most probable mechanism of association between periodontitis and unfavorable pregnancy outcomes is inflammatory response with suppression of local growth factors in the fetoplacental unit.[8] Premature birth is a birth before 37th week of pregnancy. Bacteremia caused by periodontitis stimulates the release of inflammatory cytokines which can cause an increase in the physiological level of prostaglandin E2 (PGE2) in tumor necrosis factor-α in the amniotic fluid leading to early contractions and premature birth.[9] A similar mechanism is thought to cause lower weight at birth (<2500 g). The release of PGE2 restricts placental blood flow and causes placental necrosis as well as intrauterine growth restriction.[5] Preeclampsia is a pregnancy disorder manifested by high blood pressure (≥140/90 mmHg) and proteinuria (≥300 mg).[9] It occurs in 2%–10% of pregnant women, usually after the 20th week of pregnancy and is the main cause of premature birth and slow growth of the child.[7] Periodontitis can affect the development of preeclampsia because periodontal pathogens can cause systemic maternal and placental inflammatory endothelial dysfunction.[9]

Pregnant women with poorer oral health have large amount of *Streptococcus mutans* in their saliva which increases the likelihood of colonization in the newborn's mouth and the consequent incidence of the early childhood caries, so there is a need to promote oral health during pregnancy and the perinatal period.[3]

The aim of this study was to determine the attitudes and knowledge of pregnant women in the Republic of Croatia about the relationship between oral health and pregnancy. Furthermore, this research examined the attitudes and knowledge of pregnant women about maintaining the oral health of children at the earliest age. To the best of our knowledge, this is the first study in the Republic of Croatia that examines above mentioned. Previous studies conducted worldwide showed that mothers play an important role in preventing oral diseases in children.[10-12] Their knowledge is essential in the prevention of all conditions and diseases previously mentioned, and pregnancy provides an appropriate time for health education if there is a need for it.[10-13]

The hypothesis of the study was that pregnant women in the Republic of Croatia are not sufficiently aware of the relationship between oral health and pregnancy and the oral health of children at the earliest age.

Materials and Methods

Study design and setting

This was a cross-sectional study conducted from January to June 2019 through online questionnaires (Google forms) among the pregnant women in the Republic of Croatia.

Study participants and sampling

The inclusion criteria were pregnant women who have approved their participation in the research by a written consent. The exclusion criteria were not pregnant women or pregnant women who had not approved their participation.

Data collection tool and technique

The online questionnaire was distributed through the social platform Facebook. Since Facebook is the largest social network in Croatia, questionnaire distribution on the pregnancy forum was the easiest way to rapidly obtain representative survey data. According to the data of Croatian bureau of statistics in 2018 year, the 36945 children were born.[14] Thus, sample size was calculated with the confidence level of 95%, margin of error 5%, and population proportion of 80% and was 245.

The questionnaire was completely anonymous. All respondents were informed about the purpose of the study and they signed a written consent before completing the printed questionnaire. Those respondents who completed the online questionnaire confirmed their voluntary participation by completing the questionnaire itself.

The questionnaire was divided into three parts. The first part contained questions about the general demographic data of the respondents and their own experience about oral health in pregnancy. The second part was related to the knowledge toward the relationship between oral health and pregnancy. The questionnaire from the study of Hashim and Akbar was adapted and supplemented with new questions.[15] Cronbach's alpha coefficient of internal consistency for this questionnaire translated into Croatian was 0.719, which implied a very good reliability.[16] The third section consisted questions related to knowledge about the oral health of children at the earliest age. This part was taken from the study by Di Giuseppe *et al*.,[17] it was modified and has been translated and validated into Croatian in 2017.[18] The both forms used close-ended questions.

The arithmetic means of all the answers given were determined as the boundary between the insufficient and sufficient knowledge of the respondents.[19] For each correct answer, the respondents got 1 point. The final sum for the second part could range from minimum of zero to maximum of 7 points. Similarly, the final sum for the third part ranged from 0 to 9 points.

All correctly completed questionnaires were entered into the database and analyzed using the software package SPSS (IBM Corp., Armonk, New York). Descriptive statistics were used to determine basic statistical parameters (mean, standard deviation, median, and minimum and maximum values). Spearman correlation analysis was used to determine the relationship between individual variables. Differences in responses related to the attitudes of pregnant women considering whether they already have children or not were examined by the Chi-square test. The level of significance was set at 0.05.

Ethical consideration

The research was approved by the Ethics Committee of the medical faculty of the University of Split (Class: 003-08/19-03/0003; Reg. No.: 2181-198-03-04-19-0024), which confirmed that the study was in full accordance with ethical principles including World Medical Association Declaration of Helsinki.

Results

The study involved 325 pregnant women aged 18–43 years. The mean age was 28.86 ± 4.78, and median was 29. There was no missing data.

The degree of pregnancy of the respondents ranged from the 5th to the 40th week (mean 25.21 ± 8.92 weeks). This was the first pregnancy for 188 women (57.85%), while 137 of them (42.15%) stated that they already have children.

Table 1 represents respondents' answers on how they get informed about the relationship between oral health and pregnancy, as well as dental treatments they consider safe in pregnancy. 25.85% of pregnant women (n = 84) stated that they were advised by a gynecologist to have a dental examination.

In pregnancy gingiva, bleeding was noticed by 170 respondents (52.31%), whereas the tooth mobility was noticed by 40 (12.31%). 62.15% (n = 202) of pregnant women knew what preeclampsia was 41.23% of pregnant women (n = 134) believe that the child should be taken to the dental examination around the 1st year of life. Most of them more precisely 53.23% (n = 173) believe that this should be done when all the deciduous teeth erupt. Ten respondents (3.08%) state that the time for the first examination is when the permanent teeth erupt while eight of them (2.46%) believe that the first examination should be done only when the first carious appears.

Two hundred and sixty two of pregnant women (80.61%) think that the child should start brushing their teeth as soon as the first tooth appears in their mouth while 58 respondents (17.85%) think that the right time to start brushing their child's teeth is when all teeth erupt. Five respondents (1.54%) answered that the child should start brushing teeth with the appearance of first carious.

The answers of pregnant women about the relationship between oral health and pregnancy are shown in Table 2, while the responses about the oral health of toddlers are shown in Table 3.

Table 1: Respondents' answers on how they get informed about the relationship between oral health and pregnancy and about dental treatments they consider safe

	n (%)
Attitudes about safety of treatments during the pregnancy	
Routine teeth cleaning	320 (98.4)
Production of fillings or crowns	72 (21.15)
Periodontal treatment	99 (30.46)
Extractions	31 (9.54)
Intraoral/extraoral radiograms	5 (1.54)
Source of information about relationship of oral health and pregnancy	
Dentist	174 (53.54)
Gynecologist	75 (23.08)
Family physicians	13 (4)
Books, journals, brochures	105 (32.31)
Internet	164 (50.46)

Table 2: Answers of pregnant women about the relationship between oral health and pregnancy

	Agree, *n* (%)	Disagree, *n* (%)
Pregnancy increases the risk of gingiva inflammation	207 (63.69)	118 (36.3)
There is a connection between dental and gingival health and pregnancy	231 (71.08)	94 (28.92)
Gingivitis/periodontitis can affect the outcomes of pregnancy	102 (31,38)	223 (68.62)
Periodontal disease can lead to premature birth and low birth weight	92 (28.31)	233 (71.69)
Local anesthesia is safe for pregnant women	180 (55.38)	145 (44.62)
The second trimester is the safest for dental treatments	224 (68.92)	101 (31.08)
Periodontal disease can lead to high blood pressure in pregnancy	82 (25.23)	243 (74.77)

Table 3: Answers of pregnant women about the oral health and pregnancy (*n*=325)

	Agree, *n* (%)	Disagree, *n* (%)
Dental caries may be prevented	237 (72.92)	88 (27.08)
Oral hygiene is important in preventing dental caries	304 (93.54)	21 (6.46)
Fluoride supplement is important in preventing dental caries	162 (49.85)	163 (50.15)
Routine dental visit is important in preventing oral diseases	303 (93.23)	22 (6.77)
Gingivitis may be prevented	187 (57.54)	138 (42.46)
Malocclusion may be prevented	119 (36.62)	206 (63.38)
Breastfeeding may cause caries	30 (9.23)	295 (90.77)

The average score of the second part of the questionnaire was 3.44, while the average score of the third part of the questionnaire was 5. About 34. 48% of respondents (n = 156) showed sufficient knowledge about the relationship between the oral health and pregnancy, while 67.38% (n = 219) demonstrated sufficient knowledge about the oral health of children at the earliest age.

Spearman correlation analysis

Spearman correlation analysis indicated a positive correlation between the age of the respondents and the fact that it was not the first pregnancy (R = 0.249, P < 0.001). In addition, the age of the respondents is positively correlated with getting the information on the relationship between oral health and pregnancy from books, magazines, and brochures (R = 0.171, P = 0.002). The knowledge about preeclampsia correlated positively with the age of the respondents (R = 0.158, P = 0.004) and the fact that it was not a first pregnancy for the respondents (R = 0.127, P = 0.023). The attitude that the child should start brushing teeth as soon as the first tooth erupts is positively correlated with the fact that the respondent already has children (R = 0.135, P = 0.015). A slight positive correlation was observed between the higher stage of pregnancy and noted gingiva bleeding (R = 0.122, P = 0.028). The attitude that the child should be taken for the first dental examination around the 1st year of life is positively correlated with the attitude that the child should start brushing teeth as the soon tooth erupt (R = 0.221, P < 0.001) and with the attitude that breastfeeding can cause carious (R = 0.122, P = 0.028). The result of knowledge about the relationship between oral health and pregnancy positively correlated with the result of knowledge of oral health of children of the earliest age (R = 0.287, P < 0.001).

Chi-square test

The Chi-square test showed that there was a difference in the attitude about when the child should begin to brush teeth between the respondents who had their first pregnancy and those who already had children (P = 0.017). There is a higher proportion of pregnant women with children who know that a child should start brushing teeth as soon as the first one erupts, in comparison to those who had their first pregnancy [Table 4].

The Chi-square test found no difference in the attitude that breastfeeding causes caries between the group of women who were pregnant for the first time during the study who already had children [P = 0.802; Table 4].

Discussion

The aim of this study was to assess the knowledge of pregnant women about the importance of maintaining oral health. When it comes to the knowledge about the oral health and pregnancy, 52% of the respondents answered below the average score of 3.44. This means that 52% of respondents have insufficient knowledge on the topic. The results of this study are close to the results of a study conducted by Mousa *et al*., which showed that 65% of pregnant women has high level of knowledge about oral health in pregnancy.[20] On the other hand, when the oral health of the children at the earliest age is considered, 67.38% of respondents answered above the average score of 5.35. This shows sufficient knowledge on the topic. Pregnant women with higher score in the second part also scored higher in the third part (R = 0.287, P < 0.001).

In this study, 71.08% of pregnant women consider that there is a connection between the health of teeth and gingiva with pregnancy, as opposed to the study conducted in Nigeria.[21] In that study, 81.8% of pregnant women do not know for the connection between oral illness and pregnancy.

However, only 28.31% of pregnant women knew that periodontal disease could cause premature birth and lower birth weight. In the study conducted by Alwaeli and Al-Jundi, an even lower number of pregnant women, only 5.1%, believed that there is a connection between periodontitis and premature birth.[22]

Pregnant women stated that they get the most information about the connections between oral health and pregnancy from their dentist (53.54%). Those responses are in line with the results obtained from a survey conducted among pregnant women in Poland.[23] The older the pregnant women are the more information they get from books, magazines, and brochures (R = 0.171, P = 0.002). Only 25.85% of pregnant women stated that their gynecologist advised them to have a dental examination. Similar results were observed in a study by Gaszyńska *et al*., according to which most pregnant women go for a dental visit on their own initiative, and only 3% of them are advised by a gynecologist.[23]

Table 4: The attitudes of pregnant women given the fact that they already have children

The attitude	Do you already have children		Chi-square test
	No, *n* (%)	Yes, *n* (%)	
When should parent/guardians start brushing children's teeth			
When the first tooth erupts	143 (44)	119 (36.62)	χ^2=8.112, df=2
When all deciduous teeth erupt	43 (13.23)	15 (4.62)	*P*=0.017
When first caries appears	2 (0.62)	3 (0.92)	
Breastfeeding may cause caries			
No	170 (52.31)	18 (5.54)	χ^2=0.063, df=1
Yes	125 (38.46)	12 (3.69)	*P*=0.802

χ^2=chi-square, df=degree of freedom, *P*<0.05

During pregnancy, 52.31% of the respondents noticed gingival bleeding and 12.31% noticed by tooth mobility. Similar results were observed by Nagi *et al.* in their study, where 50.1% of pregnant women showed gingival bleeding and 25% had tooth mobility.[24] Furthermore, those results are in accordance with those obtained in the study of Payal *et al*. where 60% of pregnant women had some dental problems, mostly gingiva bleeding.[25]

In this study, 68.92% of pregnant women knew that the second trimester is the safest period for the dental procedure. Similar results were obtained in the above-mentioned study by Nagi *et al*.[24] The ideal period for the dental procedures is the beginning of the second trimester (14th–20th week of pregnancy). At this stage, there is no risk of teratogens, nausea, and vomiting which are lowered, and the uterus is not yet large enough to cause discomfort.[3]

Emphasis should be placed on a control of the active disease and elimination of potential problems which could emerge later during in pregnancy or during the immediate postpartum period. Extensive reconstructions or surgical procedures are to be delayed after delivery.[26] In this study, pregnant women in the higher stage of pregnancy more often noticed gingival bleeding than those in the lower stage (R = 0.122, P = 0.028). These results coincide with the results obtained in the study conducted by Dinas *et al*., according to which the symptoms of gingivitis were noticed by pregnant women in the second (44.2%) and third (44.7%) trimesters.[27]

During pregnancy, X-rays should be avoided, especially in the first trimester as the fetus is most sensitive.[26] According to different studies, radiation exposure of <5 rad is not associated with an increase of fetal abnormalities or pregnancy loss. The estimated exposure of the fetus when an X-ray is taken amounts to 0.0001 rad. Therefore, 50,000 takes are required to reach the cumulative limit dose limit of 5 rad.[3] However, dental radiographs of pregnant women should be taken only when necessary, with mandatory appropriate protection in terms of lead apron and thyroid collar.[26]

The American Academy of Pediatrics recommends breastfeeding during the first 6 months of a child's life. After the first 6 months to 1 year, appropriate supplementary food should be introduced. Children who are breastfed for more than 12 months have an increased risk for the development of the early childhood caries due to nocturnal and frequent breastfeeding.[28,29] The flow of saliva during night is reduced so the contact of the cariogenic solution of breast milk with the tooth surface is prolonged.[28] In this study, only 9.23% of respondents were aware that breastfeeding can cause caries. There is no statistically significant difference between the women with first pregnancy and those who already have children [P = 0.802; Table 4].

According to the American Academy of Pediatric Dentistry guidelines, a child's teeth should be brushed as soon as the first tooth erupts.[30] In this study, women who already have children were more aware about it than those with first pregnancy [P = 0.017; Table 4].

The American Dental Association and the American Academy of Pediatric Dentistry recommend that the child's first dental check-up should be performed 6 months after the eruption of the first tooth, no later than the first birthday.[31] 41.23% of respondents of this study know that a child should be taken for a first dental check-up around the 1st year of life. However, 52.23% mistakenly believe that the right time for the first check-up is when all deciduous teeth erupt. A study conducted in India showed an even worse level of knowledge of pregnant women about the time of the child's first visit to the dentist, according to which only 22.3% of respondents knew that the child's first dental visit should be when first teeth erupt.[32]

Considering the results of this research, it is important to emphasize the need for better education of pregnant women but also of all women who plan a pregnancy. Dentists should do everything in their power to raise the awareness about the importance of oral health both during the pregnancy and the perinatal period. They should give pregnant women instructions on the proper implementation of oral hygiene, as well as educate them

about the possible oral changes during pregnancy and the connection between periodontitis and unwonted pregnancy outcomes. Furthermore, the study showed that a small number of pregnant women are referred by a gynecologist for a dental examination. Thus, additional communication between a gynecologist and a dentist is crucial. In this way, gynecologists would become more aware of the importance and safety of dental treatment in way so they could explain and recommend it to pregnant women.

Limitation and recommendation

This study has a certain limitation. Since this was the study with online data collection, it is based on volunteer sampling instead of probability sampling.[33] Furthermore, the study involved only pregnant women who use a computer and sought information on the home page where the survey was linked. Despite that, according to Lefever *et al*., the relatively large number of volunteer respondents gives confidence to the data's general reliability.[33] The recommendation for the future research is to include the pregnant women who do not have the access to the Internet. Furthermore, it would be desirable to make a clinical oral examination of pregnant women which would help to compare their subjective oral health condition with the objective one. New research on this topic could include the education of pregnant women, after which their knowledge of the topic would be re-examined. This would show the real need for education of pregnant women in the Republic of Croatia.

Conclusion

Preventive programs should be created on the global level and implemented by each country adapted by their own needs. In this way, not only the oral health of pregnant women would improve but also the oral health of the child would be protected and preserved.

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Conflicts of interest

There are no conflicts of interest.

References

1. Kurien S, Kattimani VS, Sriram RR, Sriram SK, Rao VK, Bhupathi A, *et al.* Management of pregnant patient in dentistry. J Int Oral Health 2013;5:88-97.
2. Committee Opinion No. 569: Oral health care during pregnancy and through the lifespan. Obstet Gynecol 2013;122:417-22.
3. Kloetzel MK, Huebner CE, Milgrom P. Referrals for dental care during pregnancy. J Midwifery Womens Health 2011;56:110-7.
4. Achtari MD, Georgakopoulou EA, Afentoulide N. Dental care throughout pregnancy: What a dentist must know. Oral Health Dent Manag 2012;11:169-76.
5. Kandan PM, Menaga V, Kumar RR. Oral health in pregnancy (guidelines to gynaecologists, general physicians & oral health care providers). J Pak Med Assoc 2011;61:1009-14.
6. Zi MY, Longo PL, Bueno-Silva B, Mayer MP. Mechanisms involved in the association between periodontitis and complications in pregnancy. Front Public Health 2014;2:290.
7. Wazir SS, Arora P, Ghosh S, Bhagat V, Khurana S, Mahanta S. Influence of maternal periodontal health as a risk factor for low-birth-weight infants in Terai population of Nepal. J Educ Health Promot 2019;8:233.
8. Sanz M, Kornman K, Working Group 3 of Joint EFP/AAP Workshop. Periodontitis and adverse pregnancy outcomes: Consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases. J Clin Periodontol 2013;40 Suppl 14:S164-9.
9. Herrera JA, Velez-Medina S, Molano R, Medina V, Botero JE, Parra B, *et al*. Periodontal intervention effects on pregnancy outcomes in women with preeclampsia. Colomb Méd 2009;40:177-84.
10. Öcek ZA, Eden E, Yücel U, Çiçeklioglu M. Effects of an oral health program: Community-based education among mothers of young children living in socioeconomically disadvantaged neighborhoods. J Educ Health Promot 2020;9:40.
11. Vamos CA, Thompson EL, Avendano M, Daley EM, Quinonez RB, Boggess K. Oral health promotion interventions during pregnancy: A systematic review. Community Dent Oral Epidemiol 2015;43:385-96.
12. Ozen B, Ozer L, Başak F, Altun C, Açıkel C. Turkish women's self-reported knowledge and behavior towards oral health during pregnancy. Med Princ Pract 2012;21:318-22.
13. Singhal A, Chattopadhyay A, Garcia AI, Adams AB, Cheng D. Disparities in unmet dental need and dental care received by pregnant women in Maryland. Matern Child Health J 2014;18:1658-66.
14. Croatian Bureau of Statistics. Statistical Yearbook of the Republic of Croatia. Zagreb: Croatian Bureau of Statistics; 2018.
15. Hashim R, Akbar M. Gynecologists' knowledge and attitudes regarding oral health and periodontal disease leading to adverse pregnancy outcomes. J Int Soc Prev Community Dent 2014;4:S166-72.
16. DeVellis RF. Scale Development: Theory and Applications. Newbury Park, CA: Sage Publications, Inc.; 1991.
17. Di Giuseppe G, Nobile CG, Marinelli A, Angelillo IF. Knowledge, attitude and practices of pediatricians regarding the prevention of oral diseases in Italy. BMC Public Health 2006;6:176.
18. Ljubicic J, Gavic L, Cigic L, Tadin A. Knowledge and attitude of pediatricians regarding children's oral health in Croatia. Acta Stomatol Croat 2018;52:162-71.
19. Folayan MO, Kolawole KA, Oyedele T, Chukwumah NM, Onyejaka N, Agbaje H, *et al.* Association between knowledge of caries preventive practices, preventive oral health habits of parents and children and caries experience in children resident in sub-urban Nigeria. BMC Oral Health 2014;14:156.
20. Mousa O, Hamed A, Omar NA. The association of knowledge on oral health and utilization of dental services among pregnant women. J Nurs Educ Pract 2019;9:1-6.
21. Obuna JA, Ugboma HA, Igbinedion H, Ejikeme BN, Aqwu UM, Ugboma EW. Awareness of pregnancy-related oral diseases in women attending antenatal clinics in a university teaching hospital in Nigeria. Int J Trop Med 2012;7:61-3.
22. Alwaeli HA, Al-Jundi SH. Periodontal disease awareness among pregnant women and its relationship with socio-demographic

variables. Int J Dent Hyg 2005;3:74-82.
23. Gaszyńska E, Klepacz-Szewczyk J, Trafalska E, Garus-Pakowska A, Szatko F. Dental awareness and oral health of pregnant women in Poland. Int J Occup Med Environ Health 2015;28:603-11.
24. Nagi R, Sahu S, Nagaraju R. Oral health, nutritional knowledge, and practices among pregnant women and their awareness relating to adverse pregnancy outcomes. J Indian Acad Oral Med Radiol 2016;28:396-402.
25. 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.
26. Little JW. Dental Management of the Medically Compromised Patient. 7th ed. St. Louis: Elsevier Mosby; 2008.
27. Dinas K, Achyropoulos V, Hatzipantelis E, Mavromatidis G, Zepiridis L, Theodoridis T, *et al*. Pregnancy and oral health: Utilisation of dental services during pregnancy in northern Greece. Acta Obstet Gynecol Scand 2007;86:938-44.
28. Tham R, Bowatte G, Dharmage SC, Tan DJ, Lau MX, Dai X, *et al*. Breastfeeding and the risk of dental caries: A systematic review and meta-analysis. Acta Paediatr 2015;104:62-84.
29. American Academy of Pediatric Dentistry Clinical Affairs Committee-Infant Oral Health Subcommittee. Guideline on infant oral health care. Pediatr Dent 2012;34:e148-52.
30. Guideline on perinatal and infant oral health care. Pediatr Dent 2016;38:150-4.
31. American Dental Association. ADA statement on early childhood caries. Chicago (IL): American Dental Association; 2004.
32. Nagaraj A, Pareek S. Infant oral health knowledge and awareness: Disparity among pregnant women and mothers visiting a Government Health Care Organization. Int J Clin Pediatr Dent 2012;5:167-72.
33. Lefever S, Dal M, Matthiasdottir A. Online data collection in academic research: Advantages and limitations. Br J Edu Technol 2007;38:574-82.