

Knowledge, Attitude and Practices of Gynecologists Regarding the Prevention of Oral Diseases in Riyadh City, Saudi Arabia

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Abstract

Aim: To assess the knowledge, attitude and practices of gynecologists regarding the prevention of oral diseases in Riyadh city, Saudi Arabia.

Methods: A structured, self administered, close-ended questionnaire was distributed among the randomly chosen sample of 200 gynecologists and their responses were recorded and analyzed.

Results: Nearly half of the respondents knew all the main risk factors of dental caries, gingivitis and malocclusion. An overall mean scores of 16.49 ± 5.63 , 6.62 ± 1.59 and 7.13 ± 2.82 , were observed for knowledge of risk factors, attitude and practices towards prevention of oral diseases respectively. Gynecologists working in the private hospitals showed significantly higher mean attitude and practice scores towards prevention of oral diseases. A linear positive correlation between knowledge and attitude ($r=0.11$, $p=0.11$), knowledge and practice ($r=0.07$, $p=0.26$), instead a negative correlation between attitude and practice ($r=-0.04$, $p=0.53$) was found by a Spearman's test.

Conclusion: Gynecologists considered in the present study showed inadequate oral health knowledge, attitude and practices towards prevention of oral diseases. However, gynecologists expressed their need for further information regarding the prevention of oral diseases.

Key Words: *Attitude, Gynecologists, Knowledge, Oral Diseases, Practices, Prevention, Saudi Arabia.*

Introduction

Pre-term delivery is defined as a gestational-age of less than 37 weeks [1] and low-birth weight less than 2500 g [2]. Association between periodontal disease and unfavorable birth outcomes associated with Pre-term Low Birth Weight (PTLBW) babies has been supported [3]. However, research evidence has shown that maternal periodontal disease can lead to a sevenfold increased risk of delivery of a PTLBW baby, suggesting the presence of a relationship between PTLBW babies and periodontal disease [4,5]. PTLBW has been stated as the major cause of neonatal death and is a significant health care expense [6]. Moreover, women's are at risk of oral diseases during puberty, menses, pregnancy, menopause and use of contraceptive medications [7]. Therefore, oral health should be integral part of the woman's overall health [8].

There has been an increase in Decayed, Missing and Filled Teeth (DMFT) and periodontal disease is very common among Saudi females with only 4-6% free from the disease [9]. Expectant and non-expectant women are more likely to visit gynecologists frequently than any other health care specialists. It has been reported that very high proportion (96.6%) of Saudi women living in capital city Riyadh are utilizing ante-natal care [10].

Oral health care needs to be addressed by a multi-professional approach and should be integrated into comprehensive health-promoting strategies and practices [11,12] gynecology and dentistry. Moreover, the common risk factor approach for chronic diseases demands for multi-professional collaboration [13]. Thus, oral health promotion is needed within health care practices of physicians, nurses

[14,15] and gynecologists.

Previous study by Zanata et al. evaluated oral health care among Brazilian gynecologists and observed that their knowledge is limited and it is not consistent with established guidelines [16]. Similarly, Rocha et al. concluded that obstetricians were aware of the association between gingival inflammation and adverse obstetric outcomes but their attitudes were not in agreement with apparent knowledge of periodontal diseases and its possible impacts [17].

Gynecologists are important health care professionals involved in assessment and treatment of women thorough out their life. With increasing links between oral and general health problems it is essential for them to know the impact of dental caries and periodontal diseases and its associated risk factors on women's overall health. This will help to make appropriate decisions regarding timely and effective intervention for oral health. Hence, primary preventive approaches towards oral health are important for women by combined and coordinated efforts of dentists and gynecologists.

To our knowledge there is no published literature that focuses on the knowledge, attitude and practices of gynecologists with regard to the prevention of oral diseases in Saudi Arabia. Clearly, such studies are important because the knowledge and the attitude of gynecologists may improve or delay the implementation and eventual success of early oral health preventive programs targeted towards women seeking gynecologic care. Therefore, the purpose of this survey was to assess the knowledge, attitude and current practices of gynecologists regarding the prevention of oral diseases in Riyadh city, Kingdom of Saudi Arabia.

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Materials and Methods

Participants

This was a cross-sectional survey of a study sample consisting of gynecologists from Riyadh, the capital city of Saudi Arabia. Sample size was determined by using Gpower statistical power analysis program 3.1.1 [18]. A sample size of 200 was determined by considering effect size of F test 0.25, alpha error probability of 0.05, power of the study 0.848 and number of groups 4 for comparing mean knowledge, attitude and practice scores. A list of all the government and private hospitals and polyclinics providing gynecologic care was obtained from the directory of hospitals in Riyadh City. Few government and private hospitals were selected from the list and the gynecologists working in these hospitals were then selected randomly by employing simple random sampling technique. Study was approved by the research center of Riyadh Colleges of Dentistry and Pharmacy (RCsDP), Riyadh.

A structured, self-administered, close-ended questionnaire with a letter providing a purpose of the study was distributed by two dental hygiene interns by hand to the gynecologists during consultation hours. Informed written consent for their participation was obtained and confidentiality of responses was assured. Gynecologists answered the questionnaire and returned back to the interns. It took 7-10 minutes to answer all the questions. Data was collected during the month of February-March 2012.

Original instrument developed by Di Giuseppe et al. for pediatricians [19] was modified and used in the present study. A pilot study was conducted among a sample of 50 gynecologists by using modified version of the questionnaire to ensure comprehensibility and reliability. Cronbach's alpha test showed the reliability coefficient of 0.87 and found satisfactory for conducting the study. These 50 questionnaires were not included in the final study.

Survey instrument

The instrument was divided into five sections comprised of a series of questions related to socio-demographic and practice characteristics; knowledge regarding the risk factors for oral diseases; attitude towards the prevention of oral diseases; management practice in regard to preventive measures for oral diseases; and source of information about oral diseases.

The demographic and practice portion of the instrument included questions on age, gender, number of years in clinical practice and practice sector (government or private).

For assessing knowledge of the main risk factors of dental caries, gingivitis, and malocclusion respondents were asked a series of 10 questions in each category. Respondents indicated their responses (Yes, No, Don't Know) on a 3-point Likert scale. Every correct answer was scored 1 and wrong answers were given a score of zero.

For attitude towards the prevention of oral diseases, respondents were also asked to use a 3-point Likert scale (Agree, Uncertain and Disagree) in eight numbers of questions exploring gynecologist's agreement/disagreement with the statements related to: prevention of dental caries, gingivitis and malocclusion; the role of gynecologist's in prevention of oral diseases; the gynecologist should provide an oral health examination; oral hygiene, fluoride supplement and routine dental visit for effective in prevention. Every correct responses was scored 1, wrong responses were scored zero.

The fourth set consisted of 15 questions for assessing management practice by gynecologists. During the gynecologic care do they perform a dietary habits assessment, an oral health

examination and how frequently they recommend a dental visit; recommendation to clients about dietary fluoride supplements; do they provide counseling and other educational materials about interventions to prevent or control oral diseases. Correct answers to the questions pertaining to practice were scored 1, and all other responses were scored zero. Finally, in the fifth section gynecologists were asked about the sources of oral health information and the need for further information.

Statistical Analysis

Descriptive statistics were generated for demographic data, knowledge of main risk factors, attitude and practices of gynecologists towards prevention of oral diseases. Statistical models were developed for One Way Analysis of Variance (ANOVA) with mean knowledge, attitude and practice scores as the dependent variables and age, gender, sector and duration of practice of gynecologist's as independent variables. Spearman's correlation coefficient was applied to compute the correlation between knowledge-Attitude, knowledge-practice and attitude-practice. The SPSS® statistical program version 21 was used to process and analyze the data. The level of significance was set at $p \leq 0.05$.

Results

Table 1 shows the distribution of gynecologists and their demographic characteristics. Mean age of the gynecologists was 40.37 ± 9.28 years with most of them belonged to the age group of 30-34 years. More than half of the gynecologists were females and more than two thirds of the gynecologists were working in the private sector. Mean duration of the practice was 10.76 ± 7.71 years.

Gynecologists were questioned about the risk factors for oral diseases. As seen in *Figure 1*, nearly more than three-fourth correctly identified that frequency of sugar consumption (80%) increases the risk of caries, that poor oral hygiene, inadequate tooth-brushing both increase the risk for dental caries (81.5%, 79%, respectively) and gingivitis (77.5%, 75.5% respectively). Less than two-third

Table 1. Demographic characteristics of the gynecologists.

	Characteristics	Frequency	Percent
Age (Years)	25 – 29yrs	26	13.0
	30 – 34yrs	41	20.5
	35 – 39yrs	25	12.5
	40 – 44yrs.	34	17.0
	45 – 49yrs	33	16.5
	50 – 54yrs	14	7.0
	55 – 60yrs	27	13.5
	Total	200	100
	Mean	40.37 ± 9.28	
Gender	Male	96	48.0
	Female	104	52.0
	Total	200	100.0
Sector	Government	58	29.0
	Private	142	71.0
	Total	200	100.0
Duration of practice(Years)	1 – 5yrs	71	35.5
	6 – 10yrs	34	17.0
	11 – 15yrs	42	21.0
	16 – 20yrs	33	16.5
	21 – 25yrs	14	7.0
	26 – 30yrs	6	3
	Total	200	100.0
	Mean	10.76 ± 7.71	

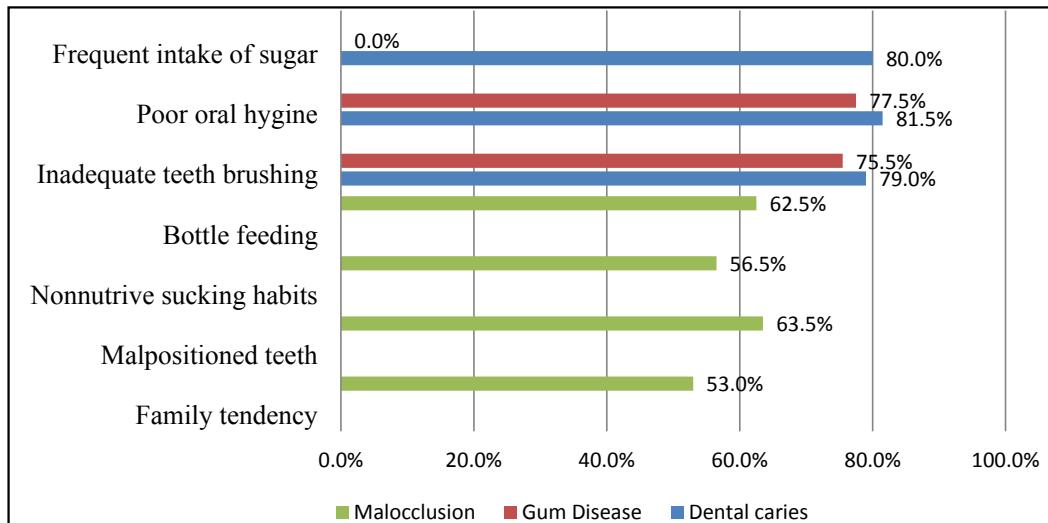


Figure 1. Gynecologist's knowledge about the main risk factors for oral diseases.

said that mal-positioned teeth were a risk factor for malocclusion. However, gynecologist's had lower knowledge of bottle feeding (62.5%) and non-nutritive sucking habits (56.5%) as risk factors for malocclusion. Nearly half of the respondents knew all the main risk factors of dental caries, gingivitis and malocclusion. However, (44.5%) gynecologists knew about the relationship between the gum disease and delivery of preterm low birth weight babies.

Gynecologists exhibited variable attitude towards prevention of oral diseases. Almost (90%) of them agreed that dental caries is preventable disease, oral hygiene, fluoride supplements and routine dental visits are important in the prevention of oral diseases. When enquired about the prevention of gum diseases and malocclusion (81%) and (66.5%) agreed respectively. However, (77%) of gynecologists said that they should provide oral health examination of the patients and their role is important in prevention of oral diseases.

In actual practice, (63%) of the gynecologists performed dietary habit assessment of their patients, (35%) ignored the oral health examination and (37%) performed oral health examination soon after the diagnosis of the pregnancy. In general, (65%) of the gynecologists recommended six months interval for oral health examination of their patients. Almost (64%) gynecologists never enquired about the kind of water patient drinks, (55.5%) never prescribed fluoride dietary supplement to their patients and (63%) never tried to modify their fluoride prescription based upon fluoride content of the community water. However, (60%) prescribed fluoridated tooth paste and (68%) informed about the importance of oral hygiene to their patients. More than half of the gynecologists advised oral health examination of the child at the age of one year and (74%) advised parents to wash their child's teeth. Only (37.5%) gynecologists provided oral health educational materials to their patients.

Thirty two percentage of gynecologists said that the scientific journals were the main source of information about the prevention of oral diseases, and (87%) expressed that there is need for further information about the prevention of oral diseases (*Table 2*).

Comparison of mean knowledge, attitude and practice scores among gender and different age groups of gynecologists did not show any statistical significance by ANOVA test. However, gynecologists with 21–25 years of experience showed the higher mean attitude score towards prevention of oral diseases as compared to the others and the difference was statistically significant ($p<0.05$) (*Table 3*). Similarly, gynecologists working in private hospitals showed significantly higher mean practice score towards prevention of oral

diseases as compared to the government counter parts ($p<0.05$) (*Table 4*).

Mean and standard deviations of knowledge, attitude and practice scores towards prevention of oral diseases among gynecologists have been presented in *Table 5*.

A linear positive correlation between knowledge and attitude ($r=0.11$, $p=0.11$), knowledge and practice ($r=0.07$, $p=0.26$) was observed. However, a negative correlation between attitude and practice ($r=-0.04$, $p=0.53$) was observed by Spearman's correlation (*Table 6*).

Discussion

In interpreting the findings of the present study, it's important to outline the possible limitations. First, the cross-sectional nature of the data presented in the study did not make potential links between level of knowledge and attitude to the extent of the best practice used by the gynecologists so causality cannot be proved. Secondly, because of the self-reported aspect of the data, it is difficult to determine whether reported practices reflected actual practices, so there may be element of social desirability biases, which may permit respondents to over-or under report attitude and practice. Thirdly, only few studies reported among gynecologists on this subject make it difficult for comparing the results of the present study. Despite these limitations, our study gives an insight into the behavioral sciences in dentistry and enlightens about the knowledge, attitude and practices of gynecologists regarding the prevention of oral diseases in Riyadh, Saudi Arabia.

Since the introduction of concept of common risk factor approach for the prevention of oral diseases, the whole idea of medical and dental practice is regaining different dimension. Practice of risk assessment and preventive dentistry is not only the domain limited to the dental health care professionals, instead it becomes the field of an inter-professional initiatives towards prevention. Gynecologists

Table 2. Sources of information about prevention of oral diseases.

Sources of information	Participants	Percentage	
Sources of information about the prevention of oral diseases	None	39	19.5%
	Associations	20	10.0%
	Scientific journals	63	31.5%
	Colleagues	42	21.0%
	CDE courses	35	17.5%
	Others	1	0.5%
Need for further information	Yes	173	86.5%
	No	27	13.5%

Table 3. One-way ANOVA of mean value of Knowledge, Attitude and Practice scores and Duration of practice.

		N	Mean	SD	F	Sig
Knowledge	1 - 5yrs	71	17.31	5	0.699	0.651 (NS)
	6 - 10yrs	34	17.35	7.18		
	11 - 15yrs	42	18.88	5.56		
	16 - 20yrs	33	17.15	5.53		
	21 - 25yrs	14	15.93	5.72		
	26 -30yrs	6	16.4	3.91		
Attitude	1 - 5yrs	71	6.68	1.57	2.497	0.024 (S)
	6 - 10yrs	34	7.12	1.34		
	11 - 15yrs	42	6.14	1.75		
	16 - 20yrs	33	6.64	1.64		
	21 - 25yrs	14	7.21	0.8		
	26 -30yrs	6	5	2.35		
	Total	200	6.63	1.6		
Practices	1 - 5yrs	71	7.77	2.57	1.614	0.145 (NS)
	6 - 10yrs	34	7.15	3.44		
	11 - 15yrs	42	6.43	2.65		
	16 - 20yrs	33	6.36	2.3		
	21 - 25yrs	14	7.57	2.85		
	26 -30yrs	6	7.4	5.03		

Table 4. One-way ANOVA of mean value of Knowledge, Attitude and Practice scores and Sector.

		N	Mean	SD	F	Sig
Knowledge	Government	58	18.12	5.17	1.024	0.313 (NS)
	Private	142	17.23	5.81		
Attitude	Government	58	6.97	1.26	3.755	0.054 (NS)
	Private	142	6.49	1.7		
Practice	Government	58	6.05	2.65	12.675	0.000 (S)
	Private	142	7.58	2.79		
	Total	200	7.14	2.83		

Table 5. Mean knowledge, Attitude and Practice Scores towards prevention of oral diseases among gynecologists.

	Mean	Std. Dev	Minimum	Maximum
Overall Knowledge score of risk factors	17.49	5.63	1	30
Attitude score	6.62	1.59	2	8
Behaviour Score	7.13	2.82	0	13

as health care practitioners assess and treat women across their lifespan. Preventive awareness of oral diseases among gynecologists not only helps to improve oral health status of their patients it will also have positive outcomes on overall health of the women.

Several studies have explored health professional's attitude and awareness of the association between oral health and general health. The present study is unique because it assessed gynecologist's knowledge, attitude and practices regarding prevention of oral diseases in Riyadh city. Study showed that most of the gynecologists have adequate knowledge of the main risk factors for dental caries as indicated by higher percentage of correct responses to the risk factors such as frequent intake of sugar (80%), poor oral hygiene (81.5%) and inadequate teeth brushing (79%). Similarly, gynecologists acknowledged that poor oral hygiene (77.5%) and inadequate toothbrushing (75.5%) are the risk factors for gum diseases. However, relatively lower responses were observed for bottle feeding (62.5%), Non-nutritive suckling habits (56.5%), malpositioned teeth (63.5%) and family tendency (53%) as risk factors for malocclusion. This indicates gynecologist's lowered knowledge of risk factors of malocclusion. It is important for gynecologists to have some knowledge about malocclusion and its risk factors. Malocclusion causes functional and aesthetic disturbances in affected individuals, and treatment is often costly [20]. Yet, malocclusion can still be prevented, as it has been proved that breastfeeding decreases the chance of malocclusion occurrence. Gynecologists could advise

their patients about the importance of breastfeeding in comparison to bottle feeding, which not only increases the risk of malocclusion, but also tooth decay [21]. Even though, overall mean knowledge score of risk factors of oral diseases was 17.49, which indicated lack of knowledge of risk factors among the gynecologists and urgent need for improvement. Similar finding of limited oral health knowledge was reported by Zanata et al. [16]. But, results of present study are in contrast with that reported by Shah et al. in Indian study [22].

It has been recommended that communication among health professionals themselves, as well as with patients is a key attitude towards health promotion [23]. In this study gynecologists showed a mean attitude score of 6.62 towards prevention of oral diseases. Hence, it's logical to expect that more recently trained gynecologist would give greater attention to interdisciplinary and multi-professional approach, but this was not the finding in the present study. Instead, gynecologists with 21-25 years of experience showed significantly higher mean attitude score as compared to the other age groups. This could be suggestive of continued learning process towards oral health during gynecologic care. Other possible explanation may include oral self-care attitudes of gynecologist's themselves.

Disordered eating has been linked to the adverse obstetric and gynecologic outcomes among pregnant woman and fetus; such as amenorrhea, infertility, hyper emesis gravidarum [24]. Similarly, nutritional deficiencies not only results in adverse pregnancy

Table 6. Correlation between knowledge, Attitude and Practice.

Variable	Knowledge -Attitude	Knowledge -Practice	Attitude-Practice
Correlation coefficient	0.111	0.079	-0.042
P value	0.118	0.269	0.558

outcomes but may also lead to cleft lip and palate in newborn. Gynecologists are in a unique position to address the issues of dietary habits and its affect on general and oral health of the women through diet counselling. Hence, the role of gynecologists is important in the prevention of developmental defects related to the dietary habits. In the present study, (63%) of the gynecologists performed dietary habit assessment of their patients which is lower than that reported by Shah et al. [22] and Subramanium et al. [25].

Identification of periodontal infections, an independent risk factor for adverse pregnancy outcomes is of public health importance because of its preventable and curable nature [26]. Since gynecologists are the first line of care provider during a woman's reproductive age, it gives them an opportunity to detect oral health problems at an early stages by performing oral health examination and appropriate referral to periodontist for needed care [7].

Traditionally, physician training in oral health has been limited, but there are several reasons why gynecologists as a medical practitioner should carry out oral health examinations. The associations between periodontal disease and systemic diseases, including adverse pregnancy outcomes, give an essential reason for medical practitioners and physicians, including gynecologists, enquire patients about their oral and periodontal health, and to screen them for oral diseases [27]. Sometimes, due to problems that can be faced in accessing dental care, patients may turn to other primary health care providers for their oral health needs, resulting in medical practitioners encountering patients presenting with oral and dental problems [28]. This is another reason why medical practitioners should possess basic dental knowledge; to uncover signs and symptoms of dental diseases from patients, to advice to these patients and to act as public health educators [29]. Whenever access to dental care is possible, cooperation between gynecologists and dentists in the care of pregnant women is highly encouraged. The introduction of mandatory dental examinations for women in early stage of pregnancy should motivate dentists to introduce a new approach of prevention services which result in closer cooperation with gynecologists in order to reduce the prevalence of delivery of pre-term low birth weight babies [30]. Regarding pregnancy guidelines, it was strongly suggested to include visits to the dentist as an integral part of antenatal checkups [31]. In the present study (24%) gynecologists carried out oral health examination of their patients at all times. This finding is considerably lower than that reported by Patil et al. [32] and Shah et al. [22]. Moreover, (39%) of gynecologists indicated that, they performed oral examination of the pregnant women during the first trimester of pregnancy and (65%) recommended every 6 months interval for the oral examination of their patients.

Despite the high prevalence of caries in women and children, dental decay is readily preventable or manageable through early and regular dental care, exposure to fluoridated water, use of appropriate topical fluorides including those in toothpastes, application of sealants to primary teeth and adoption of a health-promoting diet [33]. In the present study (60%) gynecologists advised fluoridated

tooth paste for their patients. This finding is higher than that reported by previous studies [22,25].

Fluoride supplementation has been used for many years in order to protect the teeth of the fetus. The mineralization of deciduous dentition has not advanced enough at birth so that fluoride can accumulate in the enamel [34]. More than half of the gynecologists in the present study did not prescribe any dietary supplement of fluoride to their patients and (64%) never enquired about the source of drinking water, (63%) did not modify fluoride prescription based upon community water fluoride content and (50%) advised topical application of fluoride to their patients. These findings reflect the lack of awareness among gynecologists about the role fluorides in the prevention of dental caries. About (68%) of gynecologists informed their patients about the importance of oral health. However, only (37.5%) could be able to provide oral health educational materials to their patients.

Ideally, the child's first dental visit should occur at 6 months of age and no later than at 1 year of age [35]. In the present study (55.5%) of gynecologists recommended first oral examination of the child at the age of one year and (74%) recommended that the parents should clean their children's teeth. This finding is suggestive of need for improving their awareness in this area.

Gynecologists exhibited relatively lower practice score of 7.13 towards prevention of oral diseases. However, gynecologists working in private sector showed significantly higher mean practice score indicating that they practiced prevention of oral diseases relatively better than those working in government hospitals. This could be due to the time constraints, as large number of patients seeking care in government hospitals make it difficult for the gynecologists to focus on the issues related to the oral health. Other possible barrier may be misunderstanding of oral health care during pregnancy [36].

This study provides evidence on the correlation between knowledge, attitudes and practices among gynecologists regarding prevention of oral diseases. This has enormous implications in provision of gynecologic care as the oral health is related to general health and wellbeing of women. It is evident that the knowledge score is the main predictor of the attitude score and practice score with linear positive correlation between knowledge-attitude scores as well as knowledge-practice scores. On the contrary, attitude scores alone did not predict practice score and the correlation between attitude and practice score was weak and negative. This shows that adequate knowledge is important to enable gynecologists to have better attitudes and practices in carrying out prevention of oral diseases. However, gynecologist's desire for need of further information regarding prevention of oral diseases is a positive finding towards increasing their knowledge.

Conclusion

Gynecologists considered in the present study showed inadequate oral health knowledge, attitude and practice towards prevention of oral diseases. However, Gynecologists expressed their need for further information regarding the prevention of oral diseases. Hence, there is a need to improve knowledge towards prevention of oral diseases by educating the gynecologists to develop positive attitudes so that the prevention of oral diseases should be an integral part of gynecologic practice.

References

1. WHO. International Classification of Diseases. Revision 1975, Volume 1. 1977; Geneva.
2. WHO. The incidence of low birth weight: an update. *WHO: Weekly Epidemiological Record*. 1984; **59**: 205–211.
3. Scannapieco F, Bush R, Paju S. Periodontal disease as a risk factor for adverse pregnancy outcomes: a systematic review. *Annals of Periodontology*. 2003; **8**: 70–78.
4. Dasanayake AP. Poor periodontal health of the pregnant woman as a risk factor for low birth weight. *Annals of Periodontology*. 1998; **3**: 206–212.
5. Offenbacher S, Kats V, Fertik G. Periodontal disease as a possible risk factor for preterm low birth weight. *Journal of Periodontology*. 1996; **67**: 1103–1113.
6. Wener ME, Lavigne SE. Can periodontal disease lead to premature delivery? How the mouth affects the body. *Association of Women's Health, Obstetric and Neonatal Nurses*. 2004; **8**: 422–431.
7. Patil SN, Kalbugri NB, Koregol AC, Warad SB, Patil S, et al. Female sex hormones and periodontal health awareness among gynecologists - a questionnaire survey. *Saudi Dental Journal*. 2012; **24**: 99–104.
8. Clemmens DA, Kerr AR. Improving oral health in women: nurse's call to action. *American Journal of Maternal/Child Nursing*. 2008; **33**: 10–14.
9. Almas K, Al-Jasser NM. Prevalence of dental caries and periodontal disease in a Saudi population. *Saudi Dental Journal*. 1996; **17**: 640–644.
10. Al-Nahedh N. Sociodemographic variable affecting the health seeking behaviour of mother in a Saudi community. *Journal of Family and Community Medicine*. 2004; **11**: 3–9.
11. Petersen PE. Global policy improvement of oral health in the 21st century - implications to oral health research of World Health Assembly 2007, World Health Organization. *Community Dentistry and Oral Epidemiology*. 2009; **37**: 1–8.
12. Ramirez JH, Arce R, Contreras A. Why must physicians know about oral diseases? *Teaching and Learning in Medicine*. 2010; **22**: 148–155.
13. Sheiham A, Watt RG. The common risk factor approach: a rational basis for promoting oral health. *Community Dentistry and Oral Epidemiology*. 2000; **28**: 399–406.
14. Californian Dental Association. Oral health in America: a report of the Surgeon General. *Journal of Californian Dental Association*. 2000; **28**: 685–95.
15. Hale KJ. American Academy of Pediatrics section on Pediatric Dentistry Oral health risk assessment timing and establishment of the dental home. *Pediatrics*. 2003; **111**: 1113–1116.
16. Zanata RL, Fernandes KB, Navarro PS. Prenatal dental care: evaluation of professional knowledge of obstetricians and dentists in the cities of Londrina/PR and Bauru/SP, Brazil, 2004. *Journal of Applied Oral Science*. 2008; **16**: 194–200.
17. Rocha JM, Chaves VR, Urbanetz AA, Baldissera Rdos S, Rosing CK. Obstetrician's knowledge of periodontal disease as a potential risk factor for preterm delivery and low birth weight. *Brazilian Oral Research*. 2011; **25**: 248–254.
18. Faul F, Erdfelder E, Lang AG, Buchner A (2007) G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavioral Research Methods*. 2007; **39**: 175–191.
19. Di Giuseppe G, Nobile CG, Marinelli A, Angellilo IF. Knowledge, attitude and practices of pediatricians regarding the prevention oral diseases in Italy. *BMC Public Health*. 2006; **6**: 176.
20. Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century--the approach of the WHO Global Oral Programme. *Community Dentistry and Oral Epidemiology*. 2003; Suppl 1: 3–23.
21. Viggiano D, Fasano D, Monaco G, Strohmenger L. Breast feeding, bottle feeding, and non-nutritive sucking: effects on occlusion in deciduous dentition. *Archives of Disease in Childhood*. 2004; **89**: 1121–1123.
22. Shah HG, Ajithkrishnan CG, Sodani V, Chaudhary NJ. Knowledge, attitude and practices among Gynecologists regarding Oral Health of expectant mothers of Vadodara City, Gujarat. *International Journal of Health Sciences*. 2013; **7**: 136–40.
23. Lamster IB, DePaola DP, Oppermann RV, Papapanou PN, Wilder RS. The relationship of periodontal disease to diseases and disorders at distant sites: communication to health care professionals and patients. *Journal of American Dental Association*. 2008; **139**: 1389–1397.
24. Leddy MA, Jones C, Morgan MA, Schulkin J. Eating disorders and obstetric-gynecologic care. *Journal of Women's Health*. 2009; **18**: 1395–1401.
25. Subramanium P, Babu G, Babu S. Oral health care of children: gynecologists and pediatricians' perspective. *Journal of Clinical Pediatric Dentistry*. 2008; **32**: 253–258.
26. Boggess, Kim A. Maternal oral health in pregnancy. *Obstetrics & Gynecology*. 2008; **11**: 976–86.
27. Eke PI, Dye BA, Wei L, Thornton-Evans GO, Genco RJ, et al. Prevalence of periodontitis in adults in the United States: 2009 and 2010. *Journal of Dental Research*. 2012; **91**: 914–920.
28. Ilm WU, NM King, JSJ Tsai, Wong HM. Dental knowledge and attitude of medical practitioners and caregivers of preschool children in Macau. *Hong Kong Journal of Paediatrics*. 2006; **11**: 133–139.
29. Naidu RS, Juman S, Rafeek RN, Singh R, Maharaj K. Oral and dental conditions presenting to medical practitioners in Trinidad and Tobago. *International Dental Journal*. 2008; **58**: 194–198.
30. Stupak A, Kwasniewska A (2013) Premature labor in pregnant women with periodontal diseases. *Archives of Perinatal Medicine*. 2013; **19**: 113–116.
31. Goepel E, Goepel K, Stock KH, Gunay H. The need for cooperation between the gynecologist and dentist in pregnancy. A study of dental health education in pregnancy. *Geburtshilfe und Frauenheilkunde*. 1991; **51**: 231–235.
32. Patil S, Thakur R, Madhu K, Paul ST, Gadicherla P. Oral Health Coalition: Knowledge, Attitude, Practice Behaviours among Gynaecologists and Dental Practitioners. *Journal of International Oral Health*. 2013; **5**: 8–15.
33. Fitzsimons D, Dwyer JT, Palmer C, Boyd LD. Nutrition and oral health guidelines for pregnant women, infants, and children. *Journal of American Dietetic Association*. 1998; **98**: 182–186, 189; quiz 187–188.
34. Thylstrup A. Is there a biological rationale for prenatal fluoride administration? *ASDC Journal of Dentistry for Children*. 1981; **48**: 103–108.
35. Moss SJ. The year 2000 Health objectives for the nation. *Pediatric Dentistry*. 1988; **10**: 228–233.
36. Russell SL, Mayberry LJ. Pregnancy and oral health: A review and recommendations to reduce gaps in practice and research. *American Journal of Maternal/Child Nursing*. 2008; **33**: 32–37.