



A cross-sectional study of the knowledge, attitudes, and behaviors of obstetricians, gynecologists, and dentists regarding oral health care during pregnancy

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Background: The aim of this study was to investigate the knowledge, attitudes, and behaviors of Beijing-based obstetricians, gynecologists, and dentists regarding oral health care during pregnancy and to analyze their influencing factors.

Methods: Questionnaires drawn from an existing research instrument and modified according to the current situation in China were distributed to obstetricians, gynecologists, and dentists in Beijing by mail or on-site. The questionnaire asked about the participants' knowledge, attitudes, and behaviors regarding oral health care. A χ^2 test was used to compare distributional differences of the participants' epidemiological characteristics, and Fisher's exact test was used to calculate the consent rate of consultations for oral health and pregnancy and the safety awareness rate of oral treatment and drug use during pregnancy. Logistic regression analysis was used to study the factors affecting the participants' knowledge of maternal oral health care.

Results: A total of 259 dentists and 146 obstetricians/gynecologists were included in the study. The results showed that 98.61% of obstetricians and gynecologists and 99.22% of dentists recognized the importance of oral health care during pregnancy. However, 79.17% of obstetricians and gynecologists thought they lacked knowledge of oral health care during pregnancy. All obstetricians, gynecologists, and dentists believed that the cost of treatment was one of the main barriers to offering oral health care during pregnancy. Dentists believed that medical disputes were their primary concern. Only a small number of doctors provided oral health care during pregnancy. The results of the logistic regression analysis showed that the professional title of doctor was negatively correlated with knowledge of maternal oral health care.

Conclusions: The findings suggest that there is still a lack of knowledge regarding oral health care during pregnancy, which impacts the attitudes and behaviors of obstetricians, gynecologists, and dentists. Industry authorities should issue unified guidelines to strengthen the continued education of medical staff.

Keywords: Pregnancy; oral health; dentists; obstetricians; gynecologists

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Introduction

Oral health is an important part of general health and affects the whole body. In 2010, the World Health Organization listed it among the ten most important standards of human health (1). However, some physiological changes during pregnancy, such as pregnancy gingivitis, benign oral masses (like pregnancy epulis), gomphiasis, dental erosion, tooth decay, pericoronitis, and periodontitis, may have a negative impact on oral health (2,3). Oral infection during pregnancy not only increases the incidence of preeclampsia, premature delivery, and low infant birth weight (4,5) but also causes the vertical transmission of cariogenic bacteria between mother and fetus (6), resulting in the occurrence of early dental tooth decay in the child. However, many pregnant women do not realize the significance of oral health to themselves and their fetuses and rarely seek the diagnosis and treatment of oral diseases during pregnancy. Previous studies in China have found that only a third of pregnant women have regular oral examinations (7,8). In other developed countries, the proportion of pregnant women using dental services is also low: in the United States only 23–49% of pregnant women seek oral health care, while, in the United Kingdom and Australia, this figure is 33–64% and 30.5–33%, respectively (9–12). There are many factors that influence whether a pregnant woman seeks oral health care, including difficulty accessing medical treatment, a lack of awareness of oral health care, lack of understanding of dental treatment during pregnancy, and fear that dental treatment will endanger fetal health. It is therefore important that pregnant women understand the changes to their gums and teeth that occur during pregnancy, strengthen their oral hygiene habits, and treat existing oral problems quickly in order to maintain good oral health during pregnancy and avoid prolonging any oral diseases.

The results of the present study show that the three main sources of oral health knowledge for pregnant women are mass media, advice from medical staff, and the experiences of their friends and relatives. This is slightly at odds with the main ways in which they expect to obtain knowledge: the guidance of medical staff, lectures, and mass dissemination. The results also show that pregnant women most frequently visit an obstetrics and gynecology department where, due to a lack of knowledge regarding oral hygiene during pregnancy, medical staff rarely recommend dental examinations and treatment. Furthermore, dentists often refuse to provide oral treatment services to pregnant women for a variety of reasons.

Previous studies have demonstrated that, while most health care professionals agree on the importance of oral health and acknowledge the need for oral health care during pregnancy, only a few dentists perform general dental care for pregnant women. Furthermore, while obstetricians were found to be more comfortable with their patients undergoing dental procedures during pregnancy but seldom advised pregnant women to visit a dentist (13–15). To date, no study has been conducted in China to evaluate health care providers' perceptions of oral health care during pregnancy.

The present study issued a questionnaire to obstetricians, gynecologists, and dentists in general hospitals, maternal and child health hospitals, stomatological hospitals, and dental clinics in Beijing in order to understand the knowledge, attitudes and behaviors of health care providers regarding the oral health care of pregnant women. The aim of the study was to provide a basis for strengthening the continued education of health care providers, thereby helping them to offer better health care to pregnant women. We present the following article in accordance with the SURGE reporting checklist (available at <http://dx.doi.org/10.21037/apm-20-1520>).

Methods

Research subjects

This study was conducted as a cross-sectional clinical investigation. Between February and June 2019, 300 obstetricians and gynecologists and 300 dentists at Beijing medical institutions (general hospitals, maternal and child health hospitals, stomatological hospitals, and dental clinics) were selected as subjects for cross-sectional investigation using the convenient sampling method.

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by ethics board of Beijing Tsinghua Changgung Hospital (No.:19196-0-01) and informed consent was taken from all individual participants.

Research methods

Researchers who had been trained in a uniform way conducted an anonymous questionnaire by mail and on-site distribution. The survey tool was based on the national consensus statement for oral health care during pregnancy introduced by the National Maternal and Child Oral Health

Resource Center (OHRC) and on the *Pregnant Women Survey* questionnaire published (16), which was adjusted to take into account the situation of medical institutions in China and the main purpose of the study (Appendix 1).

Research data

The main data of the study consisted of participants' basic data and data on oral health and pregnancy, oral health consultations for pregnant women, and oral treatment and drug use among pregnant women. In the questionnaire, the five-point Likert scale (strongly agree, somewhat agree, neither agree/disagree, somewhat disagree, strongly disagree) was adopted for questions regarding oral health and pregnancy and oral health consultations for pregnant women. Questions regarding the frequency of oral care provided by doctors to pregnant women used a scale of "often," "sometimes," "rarely," and "never." Knowledge-based questions were scored based on correct and incorrect answers: a correct answer was given one point, while an incorrect answer was given zero. A total of 20 knowledge-based questions were asked (maximum score 20), and participants were placed into two groups based on their score: group I (<10) failed, while group II (≥ 10) passed.

Statistical analysis

Fisher's exact test was used to evaluate the awareness rate of respondents regarding questions on oral health and pregnancy and the dental treatment and safety of drug use for pregnant women. A percentage was used to describe respondents' knowledge, attitudes, and behaviors, and a χ^2 test was used to compare differences. Logistic regression analysis was conducted to further explore potential influencing factors related to knowledge of oral health during pregnancy.

All statistical analyses were carried out using a two-sided test. $P < 0.05$ was considered statistically significant.

Results

General data

A total of 600 questionnaires were sent out, of which 405 were returned (response rate 67.5%). Women, staff with a bachelor's degree or higher, staff in public hospitals, and staff with less than 10 years' work experience made up the largest proportion of respondents. The percentage of

subjects who had undergone professional training in oral health for pregnant women was relatively low. There were significant differences between dentists and obstetricians and gynecologists in gender, place of practice, number of years of work, number of working hours per week, and opinions on whether training in oral health care for pregnant women should be conducted (all $P < 0.05$, Table 1).

Obstetricians', gynecologists', and dentists' knowledge of oral health care during pregnancy

To investigate obstetricians', gynecologists', and dentists' knowledge of oral health care during pregnancy and the safety of oral treatment for pregnant women, the study proposed five categories of associated knowledge: (I) oral health affects general health; (II) changes in hormone levels during pregnancy increase the risk of periodontal disease in pregnant women; (III) changes in dietary structure and lifestyle habits during pregnancy increase the risk of cavities in pregnant women; (IV) cariogenic bacteria can be transmitted vertically between the mother and fetus; (V) periodontal disease during pregnancy is associated with preeclampsia, premature birth, and low infant birth weight. For (I), (II), and (III), obstetricians, gynecologists, and dentists all demonstrated a good understanding, with the range of correct answers being 91.1–98.84%. For (IV) and (V), however, the cognitive accuracy of all respondents decreased: the range of correct answers for dentists was 79.15–82.24%, while that of obstetricians and gynecologists was only 44.52–54.79%. The difference was statistically significant ($P < 0.05$, Table 2).

Obstetricians', gynecologists', and dentists' awareness of the safety of oral treatment during pregnancy

The overall knowledge level of obstetricians, gynecologists, and dentists regarding the safety of dental treatment for pregnant women was low: the rate of correct answers was lower than 50% in all cases except for the question regarding oral examinations, where dentists achieved a score of 82.24% and obstetricians and gynecologists achieved a score of 65.07%. Obstetricians, gynecologists, and dentists also placed different emphasis on oral indicators. Regarding basic oral treatments or operations, such as supragingival scaling, subgingival scaling, root surface leveling, single-tooth extraction, and nitrous oxide sedation, the cognitive accuracy of obstetricians and gynecologists was significantly

Table 1 Baseline characteristics of participants

Index	Dentist (n=259)	OB/GYN (n=146)	χ^2	P value
Sex			30.911	<0.001
Male	78	10		
Female	172	134		
Education			9.1875	0.027
Associate	29	4		
Bachelor	91	57		
Master	71	46		
PhD	59	36		
Work sector			26.0054	<0.001
Public setting	210	143		
Private setting	41	0		
Years of experience			5.5435	0.019
<10 years	165	77		
≥10 years	84	65		
Title			10.9833	0.004
Residency	129	58		
Attending	88	54		
Professor	25	31		
Working hours per week			101.1642	<0.001
≤30 h	44	98		
>30 h	202	44		
Training received on oral health care during pregnancy			13.7158	<0.001
Yes	58	12		
No	191	131		

OB/GYN, obstetrician-gynecologists. The number of respondents does not total 259 dentists and 146 OB/GYNs because of missing data.

higher than that of dentists. However, for dental film radiography and other complex oral procedures, including crown repair, abscess incision and drainage, and pulp filling, the cognitive accuracy of dentists was significantly higher than that of obstetricians and gynecologists ($P < 0.05$, *Table 3*).

Obstetricians', gynecologists', and dentists' attitudes and barriers to offering oral health services during pregnancy

It was found that almost all dentists (99.22%), obstetricians, and gynecologists (98.61%) believed it important to carry out oral health care consultations, including diet

consultations, for pregnant women. Furthermore, 99.61% of dentists and 92.37% of obstetricians and gynecologists believed that oral health care consultation during pregnancy could improve maternal and infant oral health. A total of 96.85% of dentists and 88.89% of obstetricians and gynecologists agreed that advice from obstetricians and gynecologists would improve the willingness of pregnant women to see a doctor for oral health care, and 78.83% of dentists believed they had the ability to provide oral health care to pregnant women. However, only 57.81% of dentists believed it was safe for pregnant women to undergo oral treatment, compared to 72.92% of obstetricians and

Table 2 Percentage of correct responses to perinatal oral health knowledge

Index	Dentist, n (%)			OB/GYN, n (%)			χ^2	P value
	Agree	Not sure	Disagree	Agree	Not sure	Disagree		
Oral health affects general health	256 (98.84)	1 (0.39)	2 (0.77)	143 (97.95)	2 (1.37)	1 (0.68)	1.23	0.54
Cariogenic bacteria can be transmitted from mother to infant	205 (79.15)	26 (10.04)	28 (10.81)	65 (44.52)	38 (26.03)	43 (29.45)	50.28	<0.001
Hormonal changes during pregnancy increase the risk of periodontal disease	255 (98.46)	2 (0.77)	2 (0.77)	133 (91.10)	12 (8.22)	1 (0.68)	15.48	<0.001
Modification in diet, frequency of eating and emesis increases the risk of caries	249 (96.14)	5 (1.93)	5 (1.93)	133 (91.10)	10 (6.85)	3 (2.05)	6.34	0.042
Periodontal disease may associate with preeclampsia, preterm birth and low birth weight	213 (82.24)	34 (13.13)	12 (4.63)	80 (54.79)	42 (28.77)	24 (16.44)	36.44	<0.001

OB/GYN, obstetrician-gynecologists.

Table 3 Percentage of correct responses to dental procedures

Dental procedures	Dentist		OB/GYN		χ^2	P value
	Number	Percentage (%)	Number	Percentage (%)		
Clinic						
Oral examination	213	82.24	95	65.07	15.08	<0.001
Prophy	30	11.58	48	32.88	27.16	<0.001
Scaling and Root Planning	9	3.47	29	19.86	29.42	<0.001
Single periapical X-ray	43	16.6	38	26.03	5.17	0.023
Full mouth X-ray & panoramic radiograph	17	6.56	22	15.07	7.74	0.005
Injection of local anesthetics (e.g., lidocaine)	33	12.74	36	24.66	9.36	0.002
Single tooth extraction	9	3.47	27	18.49	25.94	<.0001
filling	34	13.13	22	15.07	0.29	0.587
Root canal therapy	23	8.88	14	9.59	0.06	0.812
Crown	46	17.76	16	10.96	3.32	0.068
Nitrous oxide	5	1.93	12	8.22	9.16	0.003
Emergency						
Single tooth extraction	23	8.88	40	27.4	24.31	<0.001
Injection of local anesthetics	33	12.74	47	32.19	22.23	<0.001
Open and broach	49	18.92	–	–		
Abscess incision and drainage	64	24.71	62	42.47	13.7	<0.001
Temporary filling	114	44.02	43	29.45	8.32	0.004

OB/GYN, obstetrician-gynecologists.

gynecologists.

Exploration and analysis of the potential barriers to providing oral health care during pregnancy showed that dentists believed the main factors were fear that oral treatment complications in pregnant women would lead to medical disputes (75.69%), that obstetricians were more likely to consult on oral health care for pregnant women (68.75%), and that the cost of treatment would reduce the willingness of pregnant women to seek it (40.23%). Obstetricians and gynecologists, however, believed that the main factors were a lack of knowledge of oral health care (79.17%), that it was the role of dentists to provide oral health care consultations for pregnant women (75.52%), and that the outpatient department was too busy to offer oral health care to pregnant women (74.31%, *Table 4*).

Obstetricians', gynecologists', and dentists' provision of oral health care to pregnant women

While 70.63% of dentists stated that they had provided oral examinations to pregnant women, only 16.79% of obstetricians and gynecologists stated that they had. It was stated that dental cleaning was often provided during pregnancy, and about a quarter of dentists said that they had used resin filling for pregnant women. Around 10% of all respondents stated that they had carried out local anesthesia and root canal therapy on pregnant women, while more than 90% had never used nitrous oxide sedation during pregnancy (*Table 5*).

Multivariate logistic regression analysis of obstetricians', gynecologists', and dentists' knowledge of oral health during pregnancy

The questionnaire included 20 questions related to oral health during pregnancy. Each correct answer was given one point, with a maximum possible score of 20. The respondents were divided into two categories based on their score: group I (<10) failed, while group II (≥10) passed. Using group II (≥10) as the dependent variable, binary logistic regression analysis was used to further explore the factors affecting obstetricians, gynecologists', and dentists' knowledge of oral health care for pregnant women.

The results of the univariate analysis showed that the professional title of doctor was negatively correlated with the knowledge of oral health care for pregnant and post-partum women (OR =0.517, 95% CI: 0.315–0.848). After further adjusting for factors like gender, education

level, number of hours worked, number of years of work experience, and whether or not they had received professional training, the correlation was still statistically significant (OR =0.444, 95% CI: 0.236–0.836). However, in univariate and multivariate analysis, there was no statistical correlation between the respondents' level of knowledge and their gender, education level, number of hours worked, number of years of work experience, and whether or not they had received professional training.

Discussion

The results showed that 98.61% of obstetricians and gynecologists and 99.22% of dentists recognized the importance of oral health care during pregnancy. However, 79.17% of obstetricians and gynecologists thought they lacked knowledge of oral health care for pregnant women. All respondents believed that the cost of treatment was one of the main barriers to offering oral treatment to pregnant women, although dentists also believed that medical disputes were a significant barrier. A small number of obstetricians and gynecologists provided oral health care during pregnancy. The results of logistic regression analysis showed that the professional title of doctor was negatively correlated with knowledge of oral health care for pregnant women.

Oral health problems in pregnant women have recently attracted the attention of scholars both in China and abroad. New York, California, OHRC, and the American College of Obstetricians and Gynecologists (ACOG) have released oral health care guidelines during pregnancy and a national census (17,18). The Chinese census data projections in 2010 stated that there would be around 346 million women of childbearing age in China by 2018 and that around 16 million women of childbearing age would be pregnant each year. The theme of 2016's Dental Day in China was "Oral Health, General Health," which advocated paying attention to oral health care throughout life. Its first slogan was "Mom stays away from dental disease and gives birth to a healthy baby." The National Health Commission of the People's Republic of China issued the *Oral Health Action Programme [2019–2025]* and emphasized that oral health services should cover the whole population and the whole life cycle. Oral health knowledge is also a key part of the pre-marital physical examination, maternal health management, and the pregnant women's school curriculum. Obstetricians, gynecologists, and dentists therefore all play a key role in preventing oral disease and encouraging the

Table 4 attitude and barriers for oral health care of pregnant patients

Index	Dentist			OB/GYN			χ^2	P value
	Agree (%)	Not sure (%)	Disagree (%)	Agree (%)	Not sure (%)	Disagree (%)		
Oral health counseling is important for pregnant women	99.22	0.39	0.39	98.61	0.69	0.69	0.31	0.579
Oral health counseling can improve the oral health of mothers and babies	99.61	0.39	0	92.37	6.94	0.69	15.91	<0.001
I'm too busy to provide oral health counseling for pregnant women	39.22	12.94	47.84	74.31	13.19	12.5	54.12	<0.001
I have the knowledge and ability to provide oral health care for pregnant women	78.83	13.73	7.45	–	–	–		
When the first baby tooth erupt, mother should consult a dentist	87.89	8.2	3.91	63.63	29.37	7	23.45	<0.001
Dietary counseling for pregnant women is necessary	93.36	5.47	1.17	90.28	9.03	0.69	0.62	0.429
Oral health counseling and treatment should be a part of prenatal care	98.43	1.18	0.39	84.72	13.89	1.39	24.08	<0.001
OB/GYN are better able than dentists to counsel pregnant women about oral health	68.75	15.63	15.63	51.38	27.78	20.13	7.42	0.006
It is the dentists' duty to counsel pregnant patients	91.77	7.06	1.17	75.52	13.99	10.49	24.68	<0.001
Pregnant patients are more likely to seek dental care if their OB/GYN recommends it	96.85	2.76	0.39	88.89	8.33	2.08	9.39	0.002
I know little about oral health care for pregnant women	39.45	15.23	45.31	79.17	12.5	8.33	66.74	<0.001
There is little I can do to affect a pregnant woman's oral health	36.87	19.61	43.53	63.38	22.54	14.09	36.74	<0.001
Dental treatment for healthy pregnant women is safe	57.81	19.92	22.27	72.92	25.69	1.39	21.84	<0.001
The cost of dental treatment reduces the willingness of pregnant women to undergo oral treatment	40.24	28.91	30.86	56.25	28.47	15.28	13.71	<0.001
The disagreement to dental treatment of pregnant women among dentists and OB/GYN	20.7	23.44	55.86	65.28	24.31	10.42	97.79	<0.001
I'm concerned about possible legal action when something goes wrong in a pregnancy after dental treatment	75.69	14.9	9.41	48.61	29.17	22.22	27.54	<0.001

OB/GYN, obstetrician-gynecologists.

oral hygiene education of pregnant women.

The present study is the first in China to examine dentists', obstetricians', and gynecologists' knowledge, attitudes, and behaviors regarding oral health care for

pregnant women. The results of the study found that the knowledge level of dentists with respect to oral health was significantly higher than that of obstetricians and gynecologists. Only around half of obstetricians

Table 5 Frequency of perinatal oral health practices

Index	Always, n (%)	Sometimes, n (%)	Never, n (%)
Dentist			
Oral examination	178 (70.63)	57 (22.62)	17 (6.75)
Prophy	63 (25.00)	80 (31.75)	109 (43.25)
Scaling and Root Planning	16 (6.35)	34 (13.49)	202 (80.16)
Single periapical X-ray	12 (4.77)	39 (15.48)	201 (79.76)
Full mouth X-ray & panoramic radiograph	5 (1.98)	19 (7.54)	228 (90.48)
Injection of local anesthetics (e.g., lidocaine)	29 (11.51)	75 (29.76)	148 (58.73)
Single tooth extraction	13 (5.16)	41 (16.27)	198 (78.57)
Amalgam filling	13 (5.16)	41 (16.27)	198 (78.57)
Composite resin filling	60 (23.91)	80 (31.87)	111 (44.22)
Root canal therapy	30 (11.91)	76 (30.16)	146 (57.94)
Crown restoration	16 (6.35)	58 (23.02)	178 (70.63)
Nitrous oxide	6 (2.38)	7 (2.78)	239 (94.84)
OB/GYN			
Oral examination	24 (16.79)	70 (48.95)	49 (34.27)

OB/GYN, obstetrician-gynecologists.

and gynecologists correctly answered the questions on knowledge categories (IV) and (V) (“cariogenic bacteria can be transmitted vertically from mother to child” and “periodontal disease during pregnancy is related to preeclampsia, premature birth, and low infant birth weight”). Almost all obstetricians and gynecologists (98.61%) and dentists (99.22%) agreed on the importance of oral health care during pregnancy. The results of this study are similar to those of studies from the United States and Australia (13-15,19,20).

In the present study, 79.17% of obstetricians and gynecologists stated that they felt they lacked knowledge of oral health care for pregnant women, which was the most significant barrier to them providing oral health care services to pregnant women. For dentists, medical disputes were their primary concern. All respondents agreed that the cost of treatment was one of the main barriers to offering oral treatment to pregnant women. Similarly, an American study found that insurance payments and the cost of oral health care were common reasons for patients avoiding visiting a doctor of stomatology; the same study also found that doctors were unwilling to provide oral health treatment to pregnant women (13).

In the present study, respondents’ knowledge level

regarding the safety of oral treatment for pregnant women was very low. Dentists gave more conservative estimates of the level of safety, while obstetricians and gynecologists were less concerned about medical risks, possibly because obstetricians and gynecologists understand the overall condition of pregnant women and assess the risk of disease more accurately. Obstetricians and gynecologists also provided more counseling and referrals. Therefore, oral treatment, which has a high clinical risk, was greatly reduced.

Regarding the provision of oral treatment to pregnant women, most of the dentists interviewed in the present study were limited in the extent to which they provided oral examinations to pregnant women (70.63%). Very few obstetricians and gynecologists provided oral treatment, such as cleaning, local anesthesia, and root canal therapy, to pregnant women. The proportion of comprehensive oral health care for pregnant women in this survey was much lower than that of previous surveys: a study conducted in North Carolina, U.S., showed that 48.3% of the subjects were provided with more comprehensive dental services (15).

In order to understand the factors affecting dentists’, obstetricians’, and gynecologists’ knowledge of oral health

care for pregnant and post-partum women in this study, logistic regression analysis was carried out. This identified a negative correlation between the professional title of doctor and knowledge of oral health care for pregnant and post-partum women (OR =0.517, 95% CI: 0.315–0.848). This correlation highlights the importance of continued education on oral health care for pregnant women.

Conclusions

The study showed that there is still a lack of knowledge of oral health care for pregnant women in China, which influences the attitudes and behaviors of dentists, obstetricians, and gynecologists. One of the reasons for this lack of knowledge could be that there are few relevant treatment norms in the sector and that medical staff consider the medical risks of oral treatment more carefully, with most doctors adopting a “stay away” approach towards the treatment of oral diseases in pregnant women. As such, it is suggested that basic and continued education on oral health care for pregnant women should be strengthened for dentists, obstetricians, and gynecologists, which would reduce the occurrence of oral diseases and establish oral health management during pregnancy. Another recommendation is to increase social security support and medical insurance for pregnant women’s oral treatment in order to reduce medical and patient costs. Relevant authorities may also be able to increase awareness of oral health care during pregnancy and improve treatment practices by issuing unified treatment guidelines as soon as possible.

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Footnote

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Questionnaire of oral health care during pregnancy

1. Demographics

1.1 Gender: 1. Male 2. Female

1.2 Workplace: _____

1.3 Age: _____

1.4 Occupation: 1. Obstetrician 2. Gynecologist 3. Midwife 4. Assistant

1.5 Time in practice: _____ Years

2. Oral Health and Pregnancy

	Strongly Agree	Somewhat Agree	Neither Agree/ Disagree	Somewhat Disagree	Strongly Disagree
Oral health can affect systemic health.	1	2	3	4	5
Bacteria that causes caries is transmissible from mother to baby.	1	2	3	4	5
Hormonal changes in pregnant women increase their risk of gum disease.	1	2	3	4	5
Modification in diet, frequency of eating and emesis can increase the risk of developing caries.	1	2	3	4	5
Periodontal disease may increase preterm birth, preeclampsia and low birth weight.	1	2	3	4	5

3. Counseling Pregnant Patients

	Strongly Agree	Somewhat Agree	Neither Agree/ Disagree	Somewhat Disagree	Strongly Disagree
Counseling pregnant women about oral health is important.	1	2	3	4	5
Counseling a pregnant woman about oral health can improve the oral health of her baby.	1	2	3	4	5
I am too busy to provide counseling about oral care for pregnant women.	1	2	3	4	5
I have the knowledge to counsel pregnant patients.	1	2	3	4	5
A pregnant woman should be counseled to have a dental visit when their baby's first baby tooth erupts.	1	2	3	4	5
It is necessary to counsel pregnant patients about their diet.	1	2	3	4	5
Dental treatment should be a part of woman's prenatal care.	1	2	3	4	5
OB/GYN are better able than dentists to counsel pregnant patients about oral health.	1	2	3	4	5
It is the dentists' duty to counsel pregnant patients.	1	2	3	4	5
Pregnant patients are more likely to seek dental care if their OB/GYN recommends it.	1	2	3	4	5
There is little I can do to affect a pregnant woman's oral health.	1	2	3	4	5
It's safe to provide dental treatment to a pregnant woman.	1	2	3	4	5

	Often	Sometimes	Rarely	Never
Do you provide oral health instruction to pregnant patients?	1	2	3	4
How often do you provide oral exam for pregnant patients?	1	2	3	4
Do you refer pregnant patient to see a dentist if she complains teeth problem?	1	2	3	4
Will you suggest pregnant patient to see a dentist after delivery if she complains teeth problem?	1	2	3	4

4. Dental Treatment during Pregnancy

During which period of pregnancy do you believe it is appropriate to provide each of the following services?

Routine	Anytime during pregnancy	1 st Trimester	2 nd Trimester	3 rd Trimester	Never
Oral examination	1	2	3	4	5
Prophy	1	2	3	4	5
Scaling and root planning	1	2	3	4	5
Single periapical x-ray	1	2	3	4	5
Full mouth x-rays & panoramic radiograph	1	2	3	4	5
Injection of local anesthetic (e.g., lidocaine)	1	2	3	4	5
Single tooth extraction	1	2	3	4	5
Amalgam restoration	1	2	3	4	5
Composite restoration	1	2	3	4	5
Root canal therapy	1	2	3	4	5
Crown					
Nitrous oxide and oxygen sedation	1	2	3	4	5
Emergency	Anytime during pregnancy	1 st Trimester	2 nd Trimester	3 rd Trimester	Never
Single tooth extraction	1	2	3	4	5
Injection of local anesthetic	1	2	3	4	5
Incision and draining and abscess	1	2	3	4	5
Temporary filling	1	2	3	4	5

Do you believe it can be used safely during pregnancy with indication and supervision?

Analgesics	Anytime during pregnancy	Short duration	Never
Acetaminophen	1	2	3
Non-steroidal, anti-inflammatory agents, NSAIDS (e.g., Ibuprofen)	1	2	3
Antibiotics	Anytime during pregnancy	Short duration	Never
Amoxicillin	1	2	3
Cephalosporins	1	2	3
Clindamycin	1	2	3
Metronidazole	1	2	3
Ciprofloxacin	1	2	3

Levofloxacin	1	2	3
Moxifloxacin	1	2	3
Clarithromycin	1	2	3
Tetracycline	1	2	3
Anesthetic	Anytime during pregnancy	Short duration	Never
Local anesthetics with epinephrine (e.g., lidocaine)	1	2	3
Nitrous oxide (30%)	1	2	3
Antimicrobials	Anytime during pregnancy	Short duration	Never
Chlorhexidine (Without alcohol)	1	2	3
Xylitol	1	2	3

*Short duration: 48-72 hours

5. Education and Information

	Strong Agree	Somewhat Agree	Neither Agree/Disagree	Somewhat Disagree	Strongly Disagree
Interdisciplinary approach between OB/GYN and dentist should be built	1	2	3	4	5
Information about a Continuing Ed program on care for pregnant patients is needed	1	2	3	4	5
Provide oral health instruction and service is necessary.	1	2	3	4	5

Questionnaire of oral health care during pregnancy

1. Demographics

1.1 Gender: 1.Male 2.Female

1.2 Workplace: _____

1.3 Age: _____

1.4 Major: 1. General dentist 2. Endodontist 3. Periodontist 4. Oral Surgeon 5. Pediatric dentist 6. Prothodontist
7. Orthodontist 8. Dental Assistant 9. Dental hygienist 9. others

1.5 Time in practice: _____ Years

2. Oral Health and Pregnancy

	Strongly Agree	Somewhat Agree	Neither Agree/Disagree	Somewhat Disagree	Strongly Disagree
Oral health can affect systemic health.	1	2	3	4	5
Bacteria that causes caries is transmissible from mother to baby.	1	2	3	4	5
Hormonal changes in pregnant women increase their risk of gum disease.	1	2	3	4	5
Modification in diet, frequency of eating and emesis can increase the risk of developing caries.	1	2	3	4	5
Periodontal disease may increase preterm birth, preeclampsia and low birth weight.	1	2	3	4	5

3. Counseling Pregnant Patients

	Strongly Agree	Somewhat Agree	Neither Agree/Disagree	Somewhat Disagree	Strongly Disagree
Counseling pregnant women about oral health is important.	1	2	3	4	5
Counseling a pregnant woman about oral health can improve the oral health of her baby.	1	2	3	4	5
I am too busy to provide counseling about oral care for pregnant women.	1	2	3	4	5
I have the knowledge to counsel pregnant patients.	1	2	3	4	5
A pregnant woman should be counseled to have a dental visit when their baby's first baby tooth erupt.	1	2	3	4	5
It is necessary to counsel pregnant patients about their diet.	1	2	3	4	5
Dental treatment should be a part of woman's prenatal care.	1	2	3	4	5
OB/GYN are better able than dentists to counsel pregnant patients about oral health.	1	2	3	4	5
It is the dentists' duty to counsel pregnant patients.	1	2	3	4	5
Pregnant patients are more likely to seek dental care if their OB/GYN recommends it.	1	2	3	4	5
There is little I can do to affect a pregnant woman's oral health.	1	2	3	4	5
It's safe to provide dental treatment to a pregnant woman.	1	2	3	4	5
OB/GYN will be critical of the dentist to provide dental treatment to pregnant patients.	1	2	3	4	5
I am concerned about possible legal action if something goes wrong in a pregnancy after dental treatment.	1	2	3	4	5

4. Dental Treatment during Pregnancy

During which period of pregnancy do you believe it is appropriate to provide each of the following services?

Routine	Anytime during pregnancy	1 st Trimester	2 nd Trimester	3 rd Trimester	Never
Oral examination	1	2	3	4	5
Prophy	1	2	3	4	5
Scaling and root planning	1	2	3	4	5
Single periapical x-ray	1	2	3	4	5
Full mouth x-rays & panoramic radiograph	1	2	3	4	5
Injection of local anesthetic (e.g., lidocaine)	1	2	3	4	5
Single tooth extraction	1	2	3	4	5
Amalgam restoration	1	2	3	4	5
Composite restoration	1	2	3	4	5
Root canal therapy	1	2	3	4	5
Crown	1	2	3	4	5

Nitrous oxide (30%)	1	2	3	4	5
Emergency	Anytime during pregnancy	1 st Trimester	2 nd Trimester	3 rd Trimester	Never
Single tooth extraction	1	2	3	4	5
Injection of local anesthetic	1	2	3	4	5
Incision and draining and abscess	1	2	3	4	5
Open and broach	1	2	3	4	5
Temporary filling	1	2	3	4	5

Do you believe it can be used safely during pregnancy with indication and supervision?

Analgesics	Anytime during pregnancy	Short duration	Never
Acetaminophen	1	2	3
Non-steroidal, anti-inflammatory agents, NSAIDS (e.g., Ibuprofen)	1	2	3
Antibiotics	Anytime during pregnancy	Short duration	Never
Amoxicillin	1	2	3
Cephalosporins	1	2	3
Clindamycin	1	2	3
Metronidazole	1	2	3
Ciprofloxacin	1	2	3
Levofloxacin	1	2	3
Moxifloxacin	1	2	3
Clarithromycin	1	2	3
Tetracycline	1	2	3
Anesthetic	Anytime during pregnancy	Short duration	Never
Local anesthetics with epinephrine (e.g., lidocaine)	1	2	3
Nitrous oxide (30%)	1	2	3
Antimicrobials	Anytime during pregnancy	Short duration	Never
Chlorhexidine (Without alcohol)	1	2	3
Xylitol	1	2	3

*Short duration: 48-72 hours

How often do you prescribe the following pharmaceuticals for?

	Often	Sometimes	Rarely	Never
Non-steroidal, anti-inflammatory agents, NSAIDS (e.g., Ibuprofen)	1	2	3	4
Acetaminophen	1	2	3	4
Chlorhexidine	1	2	3	4
Oral Antibiotics	1	2	3	4

How often do you perform each of the following procedures on pregnant women?

	Often	Sometimes	Rarely	Never
Oral examination	1	2	3	4
Prophy	1	2	3	4
Scaling and root planing	1	2	3	4
Single periapical x-ray	1	2	3	4
Full mouth x-rays & panoramic radiograph	1	2	3	4
Injection of local anesthetic	1	2	3	4
Single tooth extraction	1	2	3	4
Amalgam restoration	1	2	3	4
Composite restoration	1	2	3	4
Root canal therapy	1	2	3	4
Crown	1	2	3	4
Nitrous oxide (30%)	1	2	3	4

5. Education and Information

	Strong Agree	Somewhat Agree	Neither Agree/Disagree	Somewhat Disagree	Strongly Disagree
Interdisciplinary approach between OB/GYN and dentist should be built	1	2	3	4	5
Information about a Continuing Ed program on care for pregnant patients is needed	1	2	3	4	5
Provide oral health instruction and service is necessary.	1	2	3	4	5

The survey questions drawn from an existing research instrument*. Some changes were made according to the current situation in China.

*Huebner C, Milgrom P, Conrad D, Lee R. Providing dental care to pregnant women: a survey of Oregon general dentists. *J Am Dent Assoc.* 2009;140:211-22.