

## Obstetricians' knowledge of periodontal disease as a potential risk factor for preterm delivery and low birth weight

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**Abstract:** There is little information about the knowledge and attitudes of physicians regarding oral care. This study aimed to assess the knowledge and attitudes of obstetricians about the relationship between periodontal disease and preterm/low birth weight. A questionnaire was emailed to members of the Brazilian Federation of Gynecology and Obstetrics (FEBRASGO). The questionnaire elicited both personal information and knowledge and attitudes regarding the relationship between periodontal diseases and preterm labor. A total of 875 obstetricians responded to the questionnaire. The majority of respondents were female (54.1%), resided in the Southeast (45.6%), worked in both the public and private sectors (61.4%), and had over 15 years of experience in obstetrics (48.9%). A large proportion of obstetricians (93.4%) stated that bacteria were associated with periodontal disease, and 94% reported that periodontitis was a condition more severe than gingivitis. In total, over 80% of participating obstetricians reported smoking, preeclampsia, bacterial vaginosis and periodontal disease as risk factors or possible risk factors for preterm birth or low birth weight. A correlation between the experience of the obstetricians and referral of their patients for dental examinations ( $p < 0.001$ ) was observed. Also, obstetricians who had had their own dental visits more recently were more likely to recommend the same for their patients ( $p < 0.001$ ). It is concluded that, although obstetricians were aware of the association between gingival inflammation and adverse obstetric outcomes, the attitudes of these professionals were not in agreement with their apparent knowledge regarding periodontal diseases and their possible repercussions.

**Descriptors:** Oral Health; Periodontitis; Health Knowledge, Attitudes, Practice; Pregnancy; Questionnaires.

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### Introduction

Hospitalization of newborns is responsible for higher expenditures in health systems. The proportion of children hospitalized at least once during the first year of life is almost 20%; and, the frequency of hospitalization is higher among children who were born weighing less than 2000 g.<sup>1</sup> Despite intensive research and advances in medicine, the mechanisms causing preterm delivery still are not completely understood. One

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possible pathway for this is linked to inflammatory processes.<sup>2</sup>

One set of conditions that is responsible for a chronic, inflammatory challenge in the body is periodontal disease.<sup>3</sup> This group of diseases has, as an etiological factor, an organized biofilm present on tooth surfaces. It releases substances that activate the immunoinflammatory system of the host.<sup>4</sup> This challenge could trigger inflammatory mechanisms associated with preterm birth outcomes.<sup>5</sup> Furthermore, another important factor associated with pregnancy is that hormonal changes can result in an exacerbation of gingival inflammation.<sup>6</sup>

Associations between periodontal inflammation and preterm delivery / low birth weight infants have been described in both cross-sectional as well as clinical studies.<sup>7-10</sup> Animal models have also been used to study this association, however, without showing any clear tendency.<sup>11</sup> Despite the conflicting results, health practitioners need to be aware of the possibility of periodontal disease having an impact of negative outcomes on pregnancy.

Few studies have evaluated the knowledge and attitudes of physicians regarding oral health care and its relation to preterm delivery. In the United States, Wilder *et al.*<sup>12</sup> found that physicians know about the possible association between periodontal disease and prematurity / low birth weight, but the incorporation of this knowledge into practice is limited. The same tendency was found in the study by Morgan *et al.*<sup>13</sup> Neves *et al.*<sup>14</sup> demonstrated a low incorporation by obstetricians of attitudes concerning oral health care into their practices. They suggested that obstetricians' attitudes should be more consistent with the knowledge they have. Later, Zanata *et al.*<sup>15</sup> evaluated other aspects of oral health care among Brazilian gynecologists and observed that their knowledge is limited, and is not consistent with established guidelines. These studies were performed with small samples, in limited regions. No larger study, comparing the knowledge of obstetricians with their attitudes toward their patients' periodontal health, has been performed in Brazil. The purpose of this study was to describe the knowledge and attitudes of Brazilian obstetricians regarding the possible association between periodontal diseases

and preterm / low birth weight.

## Methodology

### Subjects

This cross-sectional study utilized an online questionnaire, the link to which was emailed to the members of the Brazilian Federation of Societies of Gynecology and Obstetrics (FEBRASGO). The survey was done through the Internet by providing an email containing a link to the site on which the questionnaire was located, which could be answered only once by each obstetrician. The submission process was carried out by FEBRASGO, since the registration data should not be made available to the researchers. The survey period was from March 2009 to May 2009.

### Instrument

The questionnaire used was validated in a study conducted in North Carolina, and its use was authorized by the authors.<sup>12</sup> The questionnaire contained a total of 19 questions to elicit information about the personal characteristics of the obstetricians and their knowledge and attitudes, especially in regard to the relationship between periodontal disease and preterm labor. Questions were presented in four sections:

1. personal data,
2. experiences with their own health,
3. knowledge of possible changes during pregnancy and possible risk factors for preterm labor / low birth weight, and
4. their conduct toward their patients.

Care to ensure linguistic equivalence was taken. The original questionnaire was translated into Portuguese by a dentist with proficiency in English. After the initial translation, the resulting questionnaire was re-translated back into English by another dentist who was also proficient in the language. Finally, a third person evaluated the agreement between the translations and, if necessary, final changes were made. These final changes comprised only two minor changes in phrasing order. This process is considered reliable to provide a valid translation into Portuguese of a previously validated questionnaire.

## Ethical Considerations

The protocol was approved by the Ethics Committee of the Federal University of Rio Grande do Sul. Each subject electronically signed a consent form.

## Statistical analysis

Data from the questionnaire were analyzed using SPSS (SPSS Inc., Chicago, USA); frequency distributions were used together with Chi-square tests. Answers were grouped according to frequency of occurrence of positive/negative responses. The alpha level was set at 0.05.

## Results

A total of 875 obstetricians responded to the questionnaire. Table 1 shows that the majority of respondents reside in the Southeast (45.6%), work in both the public and private sectors (61.4%), and have over 15 years of experience in obstetrics (48.9%). The majority of obstetricians reported that they underwent their last dental visit less than one year ago (83.9%), and a smaller percentage (76.2%) underwent periodontal examination in this period. Among the interviewed group, 284 obstetricians were informed by their dentists that they have gingival inflammation.

Regarding the knowledge reported by the interviewees, a large proportion of obstetricians (93.4%) stated that bacteria are associated with periodontal disease and 94% reported that periodontitis is a condition more severe than gingivitis.

Table 2 presents the knowledge of obstetricians regarding dental problems during pregnancy and risk factors for preterm birth or low birth weight. A high percentage of obstetricians reported that situations such as gingival swelling and bleeding happens, or can happen, during pregnancy (93.7% and 93.3%, respectively). 72.5% and 45.6% of obstetricians, respectively, believed that pregnancy may be associated with increased tooth decay and tooth loss. Furthermore, over 95% of participants identified smoking and preeclampsia as risk factors for preterm birth or low birth weight. 76.5% and 60.9% of obstetricians, respectively, also identified bacterial vaginosis and periodontal disease as risk

**Table 1** - Characteristics of participants, Brazil 2009.

	N	%
Gender		
Male	402	45.9%
Female	473	54.1%
Work Sector		
Public	150	17.1%
Private	183	20.9%
Public and private	537	61.4%
Retired	5	0.6%
Place of residence		
South	179	20.6%
Southwest	397	45.6%
Midwest	74	8.5%
Northeast	172	19.8%
North	48	5.5%
Years of obstetric practice		
Less than 5 years	169	19.5%
5 to 15 years	273	31.6%
More than 15 years	423	48.9%
Last dental visit		
Less than one year	730	83.9%
More than one year/Never	140	16.1%
Last periodontal examination		
Less than one year	662	76.2%
More than one year/Never	217	23.8%
Have you ever been told that you have gingival inflammation?		
Yes	284	32.5%
No	572	65.8%
I don't know	15	1.7%

factors for low birth weight / preterm birth.

Table 3 describes the frequency with which obstetricians recommend guidance on breastfeeding, classes on childbirth, nutritional consultations, dental examinations and genetic tests for their patients during prenatal care, even if they had not been concerned with these situations. Over 95% of participants always or occasionally recommend lactation consultation, childbirth classes and nutritional consultation. This percentage is lower than the recommendations for dental examination and genetic screening, which are 72% and 28.6%, respectively.

**Table 2** - Obstetricians' knowledge about dental problems and risk factors related to preterm birth or low birth weight, Brazil 2009.

How certain are you that the following changes occur or become worse during pregnancy?					
	Definitely happens	May happen	Uncertain	Probably doesn't happen	Definitely doesn't Happen
Excess decay	123 (14.4%)	496 (58.1%)	100 (11.7%)	92 (10.8%)	42 (4.9%)
Swollen gums	339 (39.1%)	473 (54.6%)	33 (3.8%)	21 (2.4%)	0 (0%)
Bleeding gums	215 (24.8%)	564 (68.5%)	17 (2.0%)	35 (4.0%)	6 (0.7%)
Tooth loss	27 (3.2%)	362 (42.4%)	128 (15.0%)	232 (27.2%)	104 (12.2%)
How certain are you that each of the following is a risk factor that may contribute to preterm birth or low birth weight?					
	Definite Risk	Possible risk	Uncertain	Probably no risk	Definitely no risk
Maternal smoking	837 (96.8%)	25 (2.9%)	1 (0.1%)	1 (0.1%)	1 (0.1%)
Bacterial vaginosis	657 (76.5%)	165 (19.2%)	3 (0.3%)	24 (2.8%)	10 (1.2%)
Periodontal disease	524 (60.9%)	195 (22.7%)	118 (13.7%)	20 (2.3%)	3 (0.3%)
Preeclampsia	823 (95.5%)	34 (3.9%)	0 (0%)	2 (0.2%)	3 (0.3%)

**Table 3** - Obstetricians' attitudes about dental problems and risk factors for preterm birth or low birth weight, Brazil 2009.

In your practice, which of the following do you recommend during prenatal care?					
	Always	Occasionally	Usually	Rarely	Never
Lactation consultation	830 (95.7%)	31 (3.6%)	5 (0.6%)	1 (0.1%)	0 (0%)
Childbirth classes	525 (60.6%)	231 (26.7%)	65 (7.5%)	34 (3.9%)	11 (1.3%)
Nutrition consultation	522 (60.6%)	244 (28.3%)	81 (9.4%)	12 (1.4%)	3 (0.3%)
Dental examination	385 (44.4%)	239 (27.6%)	117 (13.5%)	89 (10.3%)	37 (4.3%)
Genetic screening	34 (4.0%)	211 (24.6%)	179 (20.9%)	391 (45.6%)	42 (4.9%)
In your practice, would you make a referral if the patient had concerns about the following issues? Frequency of referral:					
	Always	Occasionally	Usually	Rarely	Handle myself
Nutrition	591 (68.2%)	162 (18.7%)	61 (7.0%)	7 (0.8%)	45 (5.2%)
Dental Health	767 (88.2%)	76 (8.7%)	18 (2.1%)	9 (1.0%)	0 (0%)
Childbirth techniques	342 (39.7%)	135 (15.7%)	37 (4.3%)	22 (2.6%)	326 (37.8%)
Lactation	457 (52.9%)	74 (8.6%)	21 (2.4%)	26 (3.0%)	286 (33.1%)
Genetic Screening	301 (34.9%)	221 (25.6%)	128 (14.8%)	182 (21.1%)	31 (3.6%)

The attitudes of the obstetricians, related to these issues, are also described. In these circumstances, the situation in which the highest percentage of obstetricians refers their patients to other professionals is when they are concerned with their oral health status (88.2%).

The length of time in the practice of obstetrics was positively correlated with the frequency of recommendation for dental examinations during pregnancy ( $p < 0.001$ ). More experienced obstetricians

recommended dental examinations more frequently to their patients (Table 4).

Table 5 shows that obstetricians who underwent a dental visit in the last year most often referred their patients to a dentist ( $p < 0.001$ ).

## Discussion

This study sought to assess the knowledge and attitudes of obstetricians about the relationship between periodontal disease and preterm birth / low

**Table 4** - Correlation between practice in obstetrics and recommendation for dental examinations during pregnancy, Brazil 2009.

		Time of practice in obstetrics			Total
		Less than 5 years	5 to 15 years	More than 15 years	
Recommendation for dental examinations during pregnancy	Always	50 (30.1%)	109 (39.9%)	222 (52.7%)	381
	On occasion	49 (29.5%)	75 (27.5%)	112 (26.6%)	236
	Sometimes	32 (19.3%)	43 (15.8%)	42 (10%)	117
	Rarely	24 (14.5%)	31 (11.4%)	34 (8.1%)	89
	Never	11 (6.6%)	15 (5.5%)	11 (2.6%)	37
Total		166	273	421	860

\* Chi square –  $p < 0.001$

**Table 5** - Correlation between last dental visit and recommendation for dental examinations during pregnancy, Brazil 2009.

		Last dental visit		Total
		Less than a year	More than a year / Never	
Recommendation for dental examinations during pregnancy	Always / On occasion	346 (47.5%)	37 (27%)	383
	Some-times / Rarely / Never	382 (52.5%)	100 (73%)	482
Total		728	137	865

\* Mann-Whitney –  $p < 0.001$

birth weight. Participating obstetricians demonstrated their knowledge of the significance of periodontal inflammation, the possible changes present during pregnancy and the factors that may contribute to the occurrence of adverse obstetric outcomes. These findings corroborate previous studies.<sup>12,14</sup>

The research instrument was previously validated in the United States. One could think that a complete validation process should be necessary in Brazil. This is subject to discussion, since complete validation is mandatory for instruments that provide scores/measurements, which is not the case in the present study<sup>16,17</sup>. Thus, the translation-retranslation process adopted for the present approach should suffice. Additionally, the questions in the instrument do not have regional connotations, which reinforces the possibility of accepting the responses “as is”. On the other hand, if one still holds that a complete validation process is necessary, this can be seen as a possible limitation of the present study.

The dissemination of the questionnaire through the internet enabled the inclusion of a larger number of obstetricians, located in all regions of the country. In this study, it was not possible to calculate

a response rate because the number of emails that were actually delivered could not be counted. This fact was due to the confidentiality of the data of members of FEBRASGO. Nevertheless, the proportion of respondents from each region of the country is in accordance with the number of obstetricians in those regions.<sup>18</sup> 875 respondents is considered an adequate number, especially for the associations made with the adequate completion of contingency tables.

The main factors that obstetricians believe to be associated with preterm birth were smoking and pre-eclampsia, followed by bacterial vaginosis and periodontal disease. These factors were classified as factors or possible risk factors by more than 80% of study participants, a fact that is consistent with the epidemiology of preterm births.<sup>19</sup> During pregnancy, hormonal changes can cause exacerbation of periodontal/gingival clinical characteristics,<sup>6</sup> especially swelling and bleeding. These changes are expected by more than 90% of respondent obstetricians. The distribution of responses, with regard to the knowledge of obstetricians about the possibility of tooth loss during pregnancy, reflects that the popular belief “a tooth for a baby” is still present, albeit

in a low proportion of the study participants. These findings are in accordance with the results of a study conducted in Jordan,<sup>20</sup> which found that physicians still believe that women lose teeth due to gestation.

Lamster *et al.*<sup>21</sup> recommended that communication among health professionals themselves, as well as with patients, is a key attitude toward health promotion. Hence, Gonzaga *et al.*<sup>22</sup> highlighted the importance of oral health care for pregnant women, both for establishing oral habits as well as for possibly giving an integrated model of prevention.

As far as we know, this is the first study to evaluate the influence of length-of-time in practice on physicians' attitudes toward their own oral health and to that of their patients. No previous studies have evaluated these aspects in different regions of Brazil, which are socioeconomically different. The results do not demonstrate differences in the attitudes of obstetricians residing in different regions about recommending dental examinations for their patients.

A correlation was found between experience in obstetrics and referral of patients for dental examinations ( $p < 0.001$ ). Although it could be expected that more recently trained physicians would give greater attention to interdisciplinary and multi-professional processes, this was not the finding in the present study. One possible explanation for this may be the incorporation of attitudes due to the experience gained during practice. This could mean that, in spite of the fact that medical education has not

emphasized this aspect, the learning process which continues during health care practice was responsible for the incorporation of additional knowledge.

Also, obstetricians who had had their own dental visits more recently showed greater likelihood to recommend the same for their patients ( $p < 0.001$ ). It can be suggested that such an attitude shows that the health care of patients is a reflection of the attitudes of obstetricians toward their personal oral health. In this sense, it is also relevant to stress the importance of self-care to each member of the healthcare team, since they are the disseminators of knowledge to those under their care.

The present study demonstrated that obstetricians have a relatively high degree of knowledge with respect to the relationship of periodontal disease to premature birth / low birth weight. Discrepancies between knowledge and attitudes were observed, which points to the need for further interdisciplinary academic training, as well as continuing education, concerning integrated approaches to health care.

## Conclusion

We conclude that, although the interviewed Brazilian obstetricians have reasonable knowledge about the association between gingival inflammation and adverse obstetric outcomes, the attitudes of these professionals is not consistent with their apparent knowledge.

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