Dental care during pregnancy: knowledge and perceptions among Dentistry students

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ABSTRACT

Dental treatment during pregnancy is surrounded by myths and uncertainties, perpetuated by the fear of treating pregnant women. Few dental schools in Brazil include some disciplines, projects, programs, or actions that prepare undergraduate students for providing dental care to pregnant women. The aim of this study was to assess the knowledge of undergraduate dental students about the dental care of pregnant women and the needs of these students to learn about this topic. A semistructured questionnaire was applied to all students enrolled for the second semester of 2016 at the Dental School of Universidade Federal de Minas Gerais. The questionnaire contained questions about knowledge and expectations of dental treatment of pregnant women. The results were evaluated by content analysis and prevalence estimates were calculated. Among the 303 students who answered the questionnaire, only 14% attended to pregnant women during their undergraduate course. Only 43% of the students thought they were prepared to treat pregnant women and 62% reported having been given some guidelines on prenatal dental care during their undergraduate studies, with no formal syllabus dealt with in any discipline. Regarding technical qualification, the major problems were lack of knowledge about the use of medications, anesthetics, and procedures. In conclusion, students lacked knowledge about dental treatment of pregnant women, but they showed interest in improving their learning in this field. Undergraduate courses do not properly qualify students for prenatal dental care, strengthening the fears and aphorisms surrounding this healthcare service.

Descriptors: Pregnant Women. Dental Care. Knowledge. Students. Dental Education.

1 INTRODUCTION

Pregnancy is a very delicate period which requires special care with nutrition, weight gain, maintenance of general and oral health, administration of medications, exposure to environmental risk factors, emotional changes, among others[1]. In this period, a woman's body goes through numerous changes, both physiological and psychological, and some of these changes directly influence her oral health status[1-4].

The changes observed in this period represent normal physiological processes for the preparation of the female body for gestation. Patients usually have changes in the appearance of the gingiva, with a tendency towards the deterioration of gingivitis, which becomes more perceptible due to the presence of local irritants[2,3]. The possibility of a larger proliferation of microorganisms in the oral cavity during pregnancy predisposes to colonization by periodontopathogens[4].

The prevalence of periodontal disease, based on clinical evidence, has oscillated across trimesters of gestation, affecting 30 to 50% of pregnant women[5-8]. There is scientific evidence that periodontal disease during pregnancy is one of the predisposing factors for premature birth, albeit restricted to certain population groups[8]. Likewise, dental pain is quite recurrent during pregnancy, and caries is the main etiology of this pain[9].

Given the physiological changes during pregnancy and the temporary risks of oral disturbances, every pregnant woman should undergo prenatal dental care. However, dental fear proves a hindrance. Studies have shown pregnant women dread dental treatment and dental surgeons refuse to treat pregnant women[10-12].

Even though dental treatment of pregnant women is an integral part of the prenatal care protocol established by the Brazilian Unified Health System,[13] and despite the ample evidence concerning the safety of dental procedures during pregnancy,[14] several oral health professionals still have some fear of treating these patients[11]. Lack of knowledge and unpreparedness among dental surgeons are the main causes for not treating these patients[10-12]. Conversely, in the literature, there are few reports on undergraduate courses which offer syllabuses targeted at the dental care of pregnant women or which afford the opportunity to perform clinical procedures on these patients[15]. Therefore, one of the strategies to circumvent this problem is to invest in professional qualification at the undergraduate level.

Numerous studies have assessed the knowledge and attitudes of dental surgeons and assistants about the dental care of pregnant women, but little is known about the perception of dental students[16]. This is important to bring professional qualification up for discussion and to devise strategies for the qualification of undergraduate students, preparing them for the full and interdisciplinary care of pregnant women. Accordingly, the aim of this study was to assess the knowledge of dental students about the dental treatment of pregnant women and to evaluate the learning needs of these students.

2 METHODS

This is a cross-sectional, retrospective, qualitative and quantitative study carried out with dental students from Universidade Federal de Minas Gerais (UFMG). The undergraduate program consists of 10 semesters. A total of 480 students attending from the 4th to the 10th semesters were eligible for the study. These semesters were chosen because students are introduced to

clinical practice at these times, attending to adolescents and adults, thus including women of reproductive age. All participants had to sign a free informed consent form. The data were collected in the second half of 2016.

A self-administered semistructured questionnaire with opened-ended and closed-ended questions was used for data collection. The questions focused on the description of study participants and on their knowledge of prenatal dental care. The open-ended questions were used to assess the students' experience in the treatment of pregnant women, as well as the positive and negative aspects of the treatment. No predefined questions were used, since it was not possible to know all the answer choices beforehand, and also because there were no studies or validated instruments at the time we developed the questionnaire used herein. Therefore, open-ended questions were used to verify the possible answers students could come up with. In future research, answer choices can be categorized based on the findings of the present study.

The questionnaire was tested in a pilot study with students from different semesters attending an extension program at the same university. Cognitive questions were used to assess how well respondents could understand the questionnaire, using the survey methodology as theoretical background[17]. The respondents of the questionnaire applied in the pilot study were excluded from the final sample of the present study. One researcher (RCE) was trained in the pilot study and the questionnaire was redrafted after evaluating the reliability of the answers. Finally, the questionnaire was handed over to students in the classroom or prior to their clinical practice, after authorization by the professor who was conducting the class. It took students 10 minutes, on average, to answer the questionnaire.

A specific mask field for entering the data was developed in Epi Info™ 7 (version 7.2.1.0, CDC, Atlanta, GA, USA). The collected data were coded, checked, typed, and processed in this software program.

Qualitative analysis was used for questions that addressed the experience and the positive and negative aspects of the treatment of pregnant women and that were answered exclusively by students who provided dental care to pregnant women during their undergraduate studies. Despite the large number of respondents, this qualitative analysis was useful for the identification of answer categories. The answers to the open-ended questions were transcribed and assessed by the content analysis method[18]. According to Bardin,[18] this technique can be defined as a set of research techniques based on the notion of communication, which use systematic and objective procedures for the description of the manifest content of messages and establishment of quantitative or nonquantitative indicators that allow inferring information on the production/receiving end (inferred variables) of the messages.

Regarding the content analysis techniques, in this study, we used categorical analysis, which split the text into units and into categories according to analogous regrouping. The results were then described according to the distribution of the categories and according to the participants' utterances.

Prevalence estimates were calculated and bivariate statistical analyses at a 5% significance level were performed for the quantitative analysis of closed-ended questions. "Knowledge" was the dependent variable and students were classified as having

"adequate knowledge" and "inadequate knowledge," based on the answers to the questions on what would be allowed in the dental treatment of pregnant women. This variable was associated with the semester the student was enrolled in, the procedures performed on pregnant women, the difficulties inherent in the treatment, and the guidance provided during the undergraduate program. Epi Info™ version 7.2.1.0 and SPSS™ version 22.0 were used for these purposes.

This is a minimal risk study carried out in compliance with Resolution 466/2012 of the Brazilian National Health Council, which establishes rules for research with human subjects. The study protocol was approved by COEP/UFMG (CAAE 57662216.6.0000.5149 – process 1.717.344), and all participants signed a free informed consent form for their participation in the study.

3 RESULTS

In total, 303 students answered the questionnaires, which accounts for 63.1% of the sample. Sample loss was due to absence from class at the time the questionnaire was handed out and failure to contact the absent students (three attempts were made, including active search) and also due to refusal to participate in the study.

The students were evenly distributed across the evaluated semesters, except for the 9th semester, which had a larger sample loss. The percentage rates of participating students from each semester is as follows: 23% for the 10th semester, 15% for the 7th semester, 14% for the 4th semester, 14% for the 5th semester, 12% for the 6th semester, 14% for the 8th semester, and 8% for the 9th semester.

Most students (84.0%) did not treat pregnant women during their undergraduate program and a small percentage (2.0%) did not know whether they did or did not (either for harboring doubts or not knowing whether the patient was pregnant). Treatment, when performed, occurred mostly in the final semesters, even though the distribution was proportional to the number of respondents enrolled in each semester.

Figure 1 shows the procedures performed on the pregnant women at the dental clinics, including tooth restorations (37%) and hygiene and oral health care instructions (30%).

The open-ended questions about the experience with clinical care of pregnant women (14% of respondents) were classified into positive experience, negative experience, and indifference. Participants' answers are presented in chart 1. The utterances made about the treatment difficulties – described by 28% of students who attended to pregnant women – were grouped into three categories, which included dental procedures in general, proper position of the patient in the dental chair, and lack of confidence in the conduct of clinical practice (chart 2).

When asked about qualification for the dental care of pregnant women, more than half (57%) of the students said they did not find themselves prepared for that type of care. Of this total, 62% reported receiving guidelines on prenatal dental care during the undergraduate program, especially in disciplines that dealt with surgery and clinical practice. When asked about their interest in taking part in learning activities that involved prenatal dental care, e.g., as an extension research project, 83% said they would be willing to participate, which indicates a latent demand.

Table 1 shows the therapeutic approach recommended for the dental care of pregnant women, according to students' knowledge. A large number could not answer one or more

questions. Those who answered these questions mentioned that the dental care of pregnant women, preferably in the second trimester of gestation, could include tooth restorations, coronal scaling and polishing, prescription of amoxicillin and paracetamol (if needed), use of lidocaine as anesthetic, and use of dental X-rays.

No statistically significant association (chi-square test, 95% confidence interval) of students' knowledge about dental care was found with the semester they were enrolled in, with the procedures performed on pregnant women, with treatment difficulties, or with the instructions they were given during the undergraduate program ($p>0.05$).

4 DISCUSSION

This study assessed the knowledge of dental students from UFMG about the dental care of pregnant women. Students' professional qualification does not meet the minimum requirements for them to carry out prenatal dental care safely.

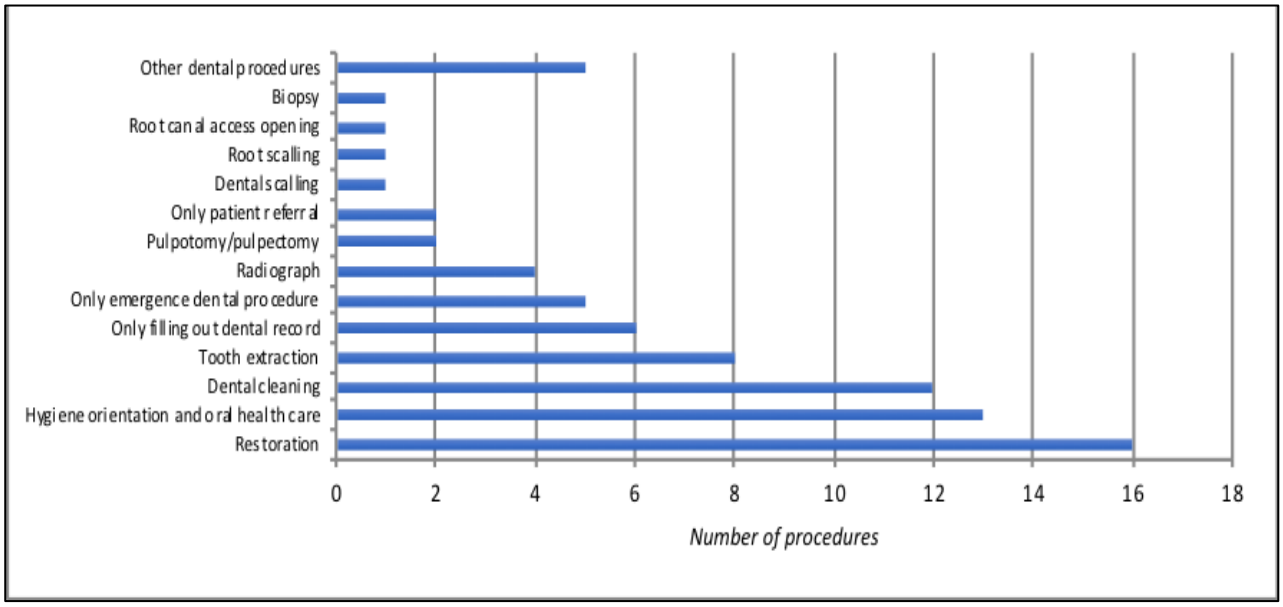

Figure 1. Dental procedures in pregnant patients conducted by students during attendance at dental clinics affiliated with the Dental School of UFMG.

Chart 1. Students' perception of their experience with the treatment of pregnant women at the dental clinics affiliated with the Dental School of UFMG

No. of answers	Experience (theme category)
25	1. Positive *"Good experience, I gained more confidence in indicating and performing dental care on pregnant women." "It was rewarding for me as I had little experience in the treatment of pregnant women. Now I have a better idea about when to intervene or not." "This is a good experience because we learn to deal with some unexpected events and precautions we should take."*
10	2. Negative *"Bad experience, because I didn't know how to treat pregnant women." "Complex. Fear of taking a radiograph, fear that the patient could feel unwell, the professor eventually performed the procedure." "I felt unprepared, the professors didn't give me confidence. It could have been better."*
5	3. Indifference *"Normal, just paying attention to be able to give some relevant information to the patient." "Didn't see any difference." "Same experience as in treating a nonpregnant patient."*

Chart 2. Difficulties reported by students while treating pregnant women at the dental clinics affiliated with the Dental School of UFMG

No. of answers	Difficulties (theme category)
07	1. Dental procedures *"Procedures that were allowed." "Unaware of treatment restrictions." "Anesthesia..." "... X-ray..." "One of the pregnant patients, the first one, had an abscess and associated pain. I had difficulty in prescribing the medication, but a dentist from the hospital eventually helped me."*
03	2. Positioning the patient in the dental chair *"Unsure about how to position the patient."*
02	3. Uncertainty over the treatment of the pregnant patient *"A bit apprehensive for not being sure that I wouldn't cause any harm."*

Less than one fourth of the students treated pregnant women during their undergraduate studies. Pregnant women tend to seek dental care only in emergency situations, because of dental pain. In a Canadian study with 740 pregnant women, approximately 50% of the patients did not undergo prenatal dental care, whereas 23% sought care only in emergency situations[19]. Rates for dental care during pregnancy have been too low (around 15%)[2]. This can be observed in the small number of students who had the opportunity to treat pregnant women. Among these students, 27% were attending the last semester. This may be due to the fact that students treated these patients as an integral part of the Dental Emergencies discipline taught in the 10th semester; in addition, they can participate in a dental emergency project at a local public hospital during the 9th semester. In this extension project, there are a large number of pregnant women in dental pain who seek care. With the small demand for elective dental care from pregnant women, it is necessary to adopt some strategies to allow contact of the students with these patients, by

Table 1. Therapeutic approach for the clinical care of pregnant women, based on undergraduate students' knowledge (n=303)

Therapeutic approach	n	%
Recommended anesthetic[§]		
Lidocaine	104	34.3
Any anesthetic without a vasoconstrictor	21	6.9
Prilocaine	12	4.0
Mepivacaine	07	2.3
Articaine	06	2.0
Bupivacaine	03	1.0
Other	01	0.3
Do not know/did not answer	161	53.1
Best period to treat pregnant women[§§]		
1st trimester	20	6.7
2nd trimester	168	56.6
3rd trimester	58	19.5
Do not know	51	17.2
Exposure to dental X-rays[§§§]		
OK	174	59.1
Not OK	76	26.0
Do not know	44	14.9
Medications allowed[§]		
Paracetamol	136	44.9
Amoxicillin	119	39.3
Diclofenac sodium	34	11.2
Metronidazole	28	9.2
Acetylsalicylic acid	18	5.9
Tetracycline	02	0.7
Do not know	140	46.2
Clinical procedures[§]		
Tooth polishing	262	86.5
Restoration	227	75,0
Crown and root scaling and planing	206	68.0
Topical application of fluoride	168	55.4
Preparation and placement of dental prosthesis	164	54.1
Tooth extraction	99	32.7
Root canal treatment	99	32.7
None	03	1.0
Do not know	32	10.6

[§]Total number of answers greater than 303, since the respondent could check more than one option; [§§]Total number of respondents: 297; [§§]Total number of respondents: 294

setting up institutional partnerships with public services where prenatal dental care is available or by creating specialized services at university-run clinics, with active search of pregnant women at the municipal level. Students should at least be provided with theoretical background for prenatal dental care during their undergraduate studies. Also, students demonstrated interest in participating in learning activities that deal with prenatal dental care, indicating the necessity of an educational action.

Interestingly, the procedures performed by students on pregnant women were less complex, such as tooth restorations, hygiene and oral health care instructions, and

prophylaxis. These less invasive procedures may be related to the low demand from pregnant women for dental care or to the refusal of dental students to perform some procedures. Curiously enough, while the literature demonstrates that periodontal diseases are one of the main oral problems affecting pregnant women,[4-8] there were a small number of gingival scalings. As the assessed data were obtained from the students and reflected their perception of dental care, it is not possible to determine the cause for the low rates of certain procedures.

During pregnancy, the fear associated with dental treatment increases as post-extraction hemorrhage and the use of medications are believed to have a harmful effect on the fetus and on gestation, leading pregnant women to discontinue the treatment or not to start it[20]. Currently, pregnant women are no longer considered to be high-risk patients for dental care, except those whose pregnancy is regarded as high risk[10-14,20-23]. Any dental treatment can be performed during pregnancy and, even though there is no recommendation against specific months, it is preferable to conduct the treatment in the second trimester of gestation[21]. On the other hand, extensive restorations and elective surgeries should be delayed until after childbirth, thereby avoiding the discomfort caused by long periods in a dental chair[14,22].

Seventy-two percent of the students reported having no difficulties in treating pregnant women and 43% said they felt prepared for such treatment. However, only a small percentage of the students knew about the precautions they should take during the dental treatment of pregnant women, such as drug prescription and use of anesthetics. Only 33% knew, for instance, which anesthetic was the safest, whereas 11% chose to prescribe diclofenac sodium, opposing the recommendation that anti-inflammatory drugs must be avoided throughout pregnancy. This analysis allows determining which of the students are prepared to treat pregnant women.

Scientific evidence demonstrates that 2% lidocaine plus epinephrine 1.100.000, with the maximum amount of 3.6 mL (two cartridges) per session, is the most widely indicated anesthetic[21,22]. A small percentage of the students said any anesthetic without the addition of a vasoconstrictor could be used. However, anesthetics without the addition of a vasoconstrictor should be used only in short and minimally invasive procedures. These anesthetics may be inefficient and their effect will probably wear off more quickly[23]. Some students indicated the use of prilocaine, but its administration close to childbirth may cause cyanosis due to the decrease in oxygen levels in the newborn infant's blood[24]. Regarding the use of mepivacaine, it has been suggested that further research be conducted since its effects on the fetus have not been described widely enough in the literature. Therefore, its use is not recommended[25].

More than 50% of the students said pregnant women could be subjected to dental X-rays. It is not necessary to avoid radiographic examination in the gestational period because the radiation to which a mother is exposed during periapical radiography is far lower than the dose necessary to cause congenital malformations as the fetus receives 2% of the radiation incident on its mother's head[26].

According to the British Columbia Ministry and Nuclear Regulatory Commission, the amount of radiation absorbed by the fetus should not exceed 5 rads. To reach this amount of radiation, it would be necessary to perform 500,000 dental

X-rays (periapical or interproximal radiographs)[27]. Only radiation greater than 250 rads, before 16 weeks of gestation, poses risks of fetal malformations, such as microcephaly, microphthalmos, mental retardation, and cataract. The American College of Obstetrics and Gynecology recognizes that limited exposure to X-rays for diagnostic purposes does not jeopardize fetal health[21].

Some precautions with the use of dental X-rays ensure the safety of mothers and their babies at any stage of pregnancy:[21] directing the beam to the mouth, away from the belly; advising that a lead apron and a thyroid collar be worn to neutralize the effects of radiation; choosing highly sensitive films, reducing exposure to radiation (0.2 to 0.3 s); and wearing an X-ray beam collimator.

The drug prescription pattern suggested by the students was similar to that used by physicians and dental surgeons, in line with the medications most widely prescribed in dental practice. A survey carried out at hospitals in the city of Rio Janeiro revealed that 2.3 medications, on average, were used during pregnancy, of which the most widely prescribed drugs were anesthetics, antibiotics, oxytocin, and analgesics, with significant differences in the drug categories, while the most frequently mentioned medications were ferrous sulfate, vitamins, scopolamine, and paracetamol[29]. In the present study, most students indicated paracetamol for pain management. This medication is the one most widely prescribed by dental surgeons and the first-line analgesic for pregnant women[28]. Regarding the class of antibiotics, 119 (39%) students recommended amoxicillin. Penicillins (same class of antibiotics as amoxicillin) are commonly used in pregnant women and have a broad margin of safety for both pregnant women and the fetuses[23]. Twenty-eight (9%) students indicated metronidazole as a possible option, but this antibiotic should not be used during pregnancy and lactation for being potentially teratogenic[12,14]. Only two students mentioned tetracycline as an option; however, when this medication is used up to the second half of gestation, it causes hypoplasia of the teeth and bones in the fetuses and has been associated with congenital cataract. Tetracycline, which is assigned to category D by the Food and Drug Administration (FDA),[23] easily crosses the placenta.

Moimaz *et al*. evaluated the perception of students from the Dental School of Araçatuba (UNESP) who participated in an extension program project dealing with dental care during pregnancy, with the efficacy of measures taken, and with the outreach of the proposed goals[30]. They observed that half of the students considered drug prescription to be the most difficult aspect in the dental treatment of pregnant women. This concurs with the findings of the present study, in which 46% of the students did not know what medications could be prescribed to pregnant women. In another study by the same group of researchers, 70.5% of the students correctly indicated the local anesthetic to be used in the dental care of pregnant women, compared to 33% in the present study[31]. There are also conflicting findings about the timeliness of dental treatment of pregnant women. In the study of Moimaz *et al*.,[31] 84.8% of the students said the second trimester of gestation would be the best time for treatment, compared to 56.5% in the present study. The Dental Care Program for Pregnant Women developed by the Dental School of Araçatuba is included in the undergraduate curriculum as an extension project and extramural discipline, giving students the opportunity to treat pregnant women at a clinic specifically created for that

purpose, and to participate in health education activities targeted at that public[30,31]. The impact of such qualification can be observed by comparing the number of right answers given by students from the Dental School of Araçatuba with those of the participants of the present study.

Popular beliefs that pregnant women should not undergo dental treatment since the mother or her baby could be harmed are still commonplace nowadays. It is the duty of dental surgeons or of any health professional to dispel these myths and aphorisms, providing care to pregnant women or referring them to oral healthcare services[10,24]. That requires proper qualification through undergraduate programs. Adequate qualification for the identification of systemic changes during pregnancy and of fetal health and development, in addition to information on medications and anesthetics indicated for this period, may contribute to undisturbed, efficient, and safe dental care, to a stronger bonding between dentists and patients, with positive consequences for health education and prevention measures, and to greater confidence of the pregnant woman in providing for her own health and the health of her baby[23].

The unique findings of this study are one of its strengths, given the paucity of studies on the topic. Moreover, the study has a remarkable impact on the formulation of educational policies that may improve the qualification of dental surgeons as far as prenatal dental care is concerned.

The limitations of this study are related to a response bias. Firstly, the loss of respondents could lead to a spurious result since it is not possible to know whether those students who did not participate could have been more cognizant of the issues associated with dental care during pregnancy. Secondly, as this was a retrospective study, participants were more prone to a recall bias, which might have led to a larger number of wrong answers, prompting them to perceive that the topic had not been addressed during their undergraduate studies. Dealing with large samples in university settings is a challenge because of students' academic mobility. Furthermore, it is not an easy task to know precisely to which semester students belong as many of them are enrolled in disciplines from other semesters.

5 CONCLUSIONS

Dental students in the present study showed poor knowledge of dental care of pregnant women, but they expressed interest in improving their learning. Students had few pregnant women to treat and many students did not feel prepared to treat these patients. Therefore, the findings of this study suggest that the undergraduate program of this school does not provide students with adequate qualification for the dental treatment of pregnant women, fueling the fears and aphorisms surrounding prenatal dental care. Hence, it is necessary that the curriculum be redesigned and that educational measures be established for the proper qualification of these students.

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RESUMO

Tratamento odontológico durante a gestação: conhecimentos e percepções de estudantes de Odontologia

O tratamento odontológico durante a gestação

envolve mitos e incertezas, perpetuados pelo medo dos profissionais em atender gestantes. Poucos cursos de odontologia no Brasil possuem algum tipo de disciplina, projeto, programa ou ação que proporcione a capacitação do graduando para o cuidado dessa paciente. O objetivo deste trabalho foi avaliar o conhecimento dos acadêmicos de um curso de graduação em Odontologia sobre o atendimento odontológico à gestante e conhecer as necessidades desse grupo quanto ao aprendizado desse tema. Foi aplicado um questionário semiestruturado a todos os alunos matriculados no segundo semestre de 2016 na Faculdade de Odontologia da Universidade Federal de Minas Gerais. O questionário abordou questões como conhecimentos e expectativas sobre o atendimento odontológico à gestante. Os resultados foram analisados pela técnica de Análise de Conteúdo, e calculadas estimativas de prevalência. Dentre os 303 alunos que responderam ao questionário, apenas 14% atenderam gestantes durante a graduação. Somente 43% dos estudantes consideraram-se preparados para atender gestante, e 62% relataram ter recebido alguma orientação sobre o pré-natal odontológico durante a graduação, não existindo um conteúdo formal associado a alguma disciplina. Quanto à técnica, os principais problemas encontrados referiram-se ao desconhecimento sobre o uso de medicamentos, anestésicos e procedimentos permitidos. Em conclusão, os estudantes apresentaram deficiências no conhecimento sobre o atendimento odontológico à gestante, e demonstraram interesse em melhorar seu aprendizado nessa área. O ensino da graduação não está preparando adequadamente os alunos para o pré-natal odontológico, reforçando o ciclo de medos e adágios que envolvem esse cuidado.

Descritores: Gestante. Assistência Odontológica. Conhecimento. Estudante. Educação em Odontologia.

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