Prevention in Pregnancy

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Abstract

Aim To evaluate the oral health, oral hygiene, and dietary habits of pregnant women, as well as the health status and habits of their children in their first few months of life. This project, implemented through an agreement between the Pescara Local Health Authority and the "G. d'Annunzio" University of Chieti and Pescara, enabled these investigations to be carried out and assessed satisfaction with pre-/post-partum courses.
Study design This is a descriptive statistical analysis conducted on a sample of participants from a maternal and child oral health education project.
Methods The project was conducted from June 2023 to December 2024 and enabled 500 pregnant women to participate in pre- and post-partum courses. Of these participants, 105 underwent a free dental examination and agreed to complete a first questionnaire. Subsequently, 53 of these women responded to a second questionnaire regarding the post-partum period. The questionnaires aimed to collect data on general and oral health, dietary and oral hygiene habits, and information about the newborn, their birth, and their first few months of life.
Results From the first questionnaire, it was found that 52.4% of women reported gum bleeding during pregnancy and 40% reported gum swelling. 51.4% had a dental check-up in the previous year, and 58.1% did not use interdental cleaning aids. The second questionnaire revealed that 51.9% of mothers experienced oral problems after childbirth, but of these, only 34.6% underwent a dental check-up. Regarding family habits, 51.9% of parents stated that they engaged in salivary exchange with the child, and 7.69% of newborns had a dental check-up after birth. 88.5% of mothers found the courses useful.
Conclusions The study confirms the prevalence of gum problems during pregnancy and, at the same time, the low level of interest in oral health and, consequently, in dental check-ups. The need to increase awareness about the risks of certain habits, such as salivary exchange, is evident. However, the high satisfaction rate with the courses and the interest shown by most of the project participants—who are still in contact with the dental facilities—demonstrate the effectiveness of the courses. It is therefore hoped that the study can be expanded on a larger scale and that the role of the paediatric dentist can be included in pre-/post-partum pathways.

KEYWORDS pregnancy, oral health, maternal prevenIon, paediatric denIstry, perinatal pathways.

Introduction

Pregnancy brings about several changes in the mother's body, which must be accommodated to ensure optimal foetal development and favourable perinatal outcomes. Various scientific studies have shown that maternal health is the primary determinant of foetal well-being. Therefore, all habits—both good and bad—play a crucial role in reducing complications during gestation, delivery, and the postpartum period. Just as with systemic health, maternal oral health is closely correlated with infant health. Any alterations, therefore, represent a risk not only for oral problems but also for the course and outcome of the pregnancy itself. As the body undergoes significant changes, the gestational and postpartum periods involve various physiological and hormonal modifications in the woman, which, in turn, influence her oral health. For example, increased levels of oestrogen and progesterone can cause "pregnancy gingivitis" — a very common condition — as an inflammatory response to bacterial plaque. Numerous studies in the literature highlight the correlation between periodontal disease and complications such as preterm birth, low birth weight, and pre-eclampsia [Figuero et al., 2013]. These changes do not affect only the gestational period. The habits and oral health status of the mother during and after pregnancy directly influence the child's future health through the vertical transmission of cariogenic bacteria. Early Childhood Caries (ECC) are very early-onset cavities whose development can also be influenced by the vertical transmission of Streptococcus mutans from mother to child, occurring mainly through the exchange of saliva. Behaviours such as kissing the child on the mouth or sharing the same utensils (for example, using the same cutlery during meals, drinking from the same glass, or touching the baby's bottle with one's mouth to check the milk temperature) can cause pathogenic microorganisms to colonise the infant's oral cavity prematurely. Despite the scientific evidence regarding the influence of oral health on maternal and foetal well-being during this delicate period, the figure of the dentist is still not included in childbirth preparation classes or postpartum consultations. Often, expectant mothers are not informed about the risks associated with oral health or the preventive practices to be adopted, thereby limiting opportunities for early intervention. To address this gap, a project was launched through an agreement between the Local Health Authority of Pescara and the Department of Medical, Oral, and Biotechnological Sciences of the "G. d'Annunzio" University of Chieti and Pescara. This pioneering initiative in Italy saw the School of Specialisation in Paediatric Dentistry of Chieti, in collaboration with doctors from Pescara Hospital, take the lead in integrating maternal–infant dentistry into perinatal care pathways. The initiative offered pre- and postpartum training courses and free dental check-ups.The objective of this study was to conduct a descriptive statistical analysis of the oral health status, as well as the dietary and hygiene habits, of a sample of women participating in the project. It also evaluated the children's habits in the postpartum period and the perceived impact of the training courses.

Materials and methods

The study was based on data collected between June 2023 and December 2024 as part of the "Prevention and Health of

the Pregnant Woman, Foetus, and Child" project. The monthly courses were held online using the Webex platform, allowing expectant mothers outside the Chieti–Pescara area to participate. Participants were invited to complete two questionnaires—one related to pregnancy and one to the postpartum period—and to undergo a dental examination at the Paediatric Dentistry Unit of the Odontostomatological Clinic at the "G. d'Annunzio" University in Chieti.

During meetings with pregnant women in the first trimester, topics covered included proper nutrition, the effects of smoking and alcohol, oral health, the formation of the stomatognathic system, the microbiome, and permissible maternal dental care. It was emphasised that a balanced diet and the intake of micronutrients such as folic acid, iron, and calcium are essential for maintaining good systemic and oral health. Additionally, participants were taught why it is important to avoid frequent snacking and the use of alcohol, tobacco, and harmful substances. Expectant mothers learned that, from a dental perspective, there is an increased risk of gingivitis, epulis, and dental erosion caused by reflux during pregnancy. They were also informed that during the first trimester, it is advisable to limit care to check-ups and professional cleanings, while more invasive treatments are recommended in the second trimester. The microbiome, which forms as early as the gestational period, is strongly influenced by the mother's lifestyle, medications taken, type of birth, and type of breastfeeding. In the second- and third-trimester meetings, nutrition and the role of the type of delivery on the microbiome were discussed again.

In the postpartum period, topics included breastfeeding, weaning, infant oral hygiene, pathological lingual frenulum, and carious disease. Breastfeeding provides numerous benefits in terms of cognitive development and a reduced risk of obesity, diabetes, and chronic diseases. However, certain conditions can hinder its initiation, such as the early introduction of a dummy or a short lingual frenulum, which, in symptomatic cases, may require a frenulotomy. Early Childhood Caries can be prevented through proper oral and dietary hygiene and early dental visits beginning with the eruption of the first deciduous tooth at around six months of age. Finally, expectant mothers were informed about several ongoing research studies showing that the frequent use of plastic objects and products can be harmful to health.

A total of 500 people—both mothers and fathers—actively followed the courses. Of these, 105 agreed to undergo the dental examination and complete at least the first questionnaire, thus forming the study sample. Two distinct questionnaires were used for data collection.

The first, administered during pregnancy, consisted of 35 questions divided into four main sections:

- General health status and pre — and during — pregnancy pathologies (11 questions)
- Dietary habits (7 questions)
- Smoking and alcohol habits (4 questions)
- Home oral hygiene and health (13 questions)

Six months postpartum, participants were re-contacted to complete the second and final questionnaire. Fifty-three women were available, making up the sample for the second phase of the study. The second questionnaire consisted of 24 questions concerning childbirth, newborn health, infant oral hygiene practices, breastfeeding, weaning, habits during the first months of life, and an evaluation of the courses attended.

Data from all responses were transcribed and stored in Excel spreadsheets (Microsoft Corporation, Redmond, WA) for processing and were analysed descriptively, indicating absolute and percentage frequencies for each variable. Due to the small sample size and the observational nature of the study, inferential statistical tests were not performed.

Results

The data analysis provided a detailed overview of the oral health status and habits of the sample of women and newborns. The results were divided according to the data obtained from each questionnaire.

Pre-delivery Questionnaire

Regarding the demographic and general health characteristics of the sample, the following information emerged:

- 70% of participants were over 30 years of age.
- In terms of education, 40% of the sample had a university degree, while 39% had a high school diploma, indicating a medium-to-high level of education.
- 73.3% of participants were employed.
- From a medical–health perspective, 97.1% reported being in good health, although 16.2% had chronic diseases.

To better characterise the sample—as represented in Figure 1—the distribution of participants by gestational period was analysed. The results showed a prevalence of participation in the third trimester (59%), followed by the second trimester (36.2%) and the first trimester (4.76%).

Investigations regarding oral problems during pregnancy revealed that 52.4% of the women experienced bleeding gums, 40% had gingival oedema, and 30.5% reported halitosis. Furthermore, approximately 44.8% of them suffered from pregnancy-related emesis (nausea and vomiting) (Figure 2).

Regarding home oral hygiene habits, 52.4% of participants reported brushing their teeth more than twice a day, but 58.1% did not use adjuncts such as dental floss, interdental brushes, or mouthwash. In terms of dietary habits, 44.8% consumed unhealthy snacks, and 46.7% drank sugary beverages daily.

Finally, concerning alcohol and smoking habits, 22.9% of the expectant mothers stated that they had a smoking habit before pregnancy; of these, 6.67% reported continuing to smoke during pregnancy.

Post-Partum Questionnaire

The responses to the questionnaire administered after childbirth highlighted the following data:

- 66% of participants had a natural birth.
- 15.1% of the babies were born preterm.
- 7.55% of the newborns had a short lingual frenulum, which was also found in their mothers during the dental examination. Of these, 50% underwent neonatal frenulotomy at the Paediatric Dentistry Operative Unit of the University of Chieti–Pescara Dental Clinic, which resulted in improved breastfeeding suction (Figure 3).

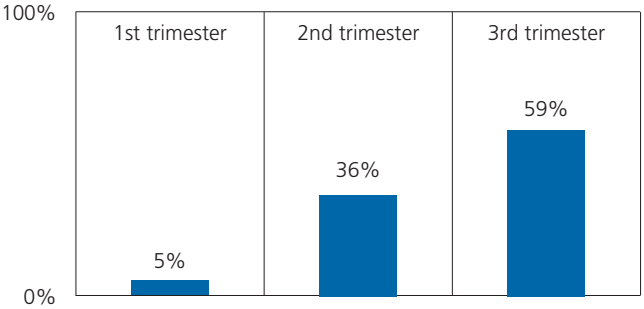

FIG. 1 Gestational period of the project partecipants.

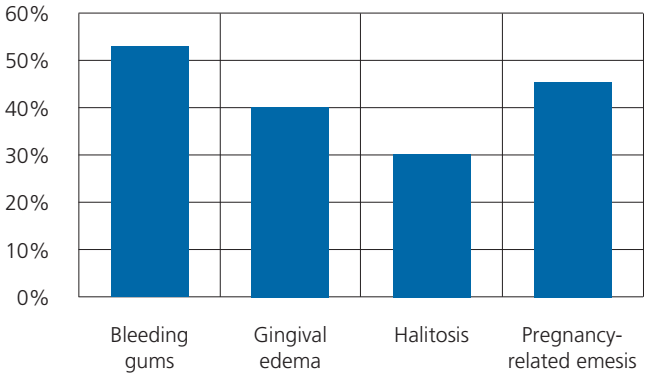

FIG. 2 Oral problems during pregnancy

• 60% of the mothers breastfed their child.

Post-birth habits revealed critical information for infant oral health. Specifically, 51.9% of parents reported performing actions involving saliva exchange with their child, such as kissing on the lips, sharing the same cutlery, or attempting to clean the dummy with their own mouth.

Only 34.6% of mothers had a dental check-up after childbirth, and just 7.69% of the children had a specialist visit upon eruption of their first tooth, as recommended by the [AAPD Guidelines, 2023]. Notably, 88.5% of mothers rated the preventive pre-delivery courses as very useful. One year later, 56% of project participants requested one or more dental consultations for themselves and their child and will continue to be followed from the start of any future pregnancies.

Discussion

The results of this study confirm that oral health during pregnancy requires attention. Gingival problems are, in fact, very common during this period, with over half of the participants reporting bleeding and swelling. This finding aligns with studies by González-Jaranay et al., who attribute these phenomena to the combined action of pregnancy hormones and bacterial plaque. The high percentage of women who do not use interdental aids during hygiene routines suggests that, despite an apparently good brushing frequency, home oral hygiene may be lacking, leading to plaque accumulation and, consequently, inflammatory processes. A systematic review by Figuero et al. [2013] emphasizes the role of dental plaque in gingival inflammation during pregnancy and reinforces the principle that meticulous plaque management significantly reduces the risk of complications (miscarriage, preterm birth, pre-eclampsia). The SIdP (Italian Society of Periodontology and Implantology), in its guidelines, also provides recommendations on the importance of oral health in pregnancy, advising the use of dental floss as part of an effective home oral hygiene routine to prevent gingivitis and periodontitis, and therefore, the risks to the pregnancy.

Smoking is a very widespread habit in the female population, as evidenced by the fact that 22% of the women in the study smoked before becoming pregnant. Both in the pre-conception phase and during pregnancy, smoking represents a serious risk factor. Recent studies by Zhang et al. [2020] show that maternal smoking can compromise fetal development and increase the likelihood of adverse pregnancy outcomes (preterm birth and low birth weight). It is therefore essential to continue raising awareness among women of childbearing age about the risks associated with this habit, promoting smoking cessation even before trying to conceive. The fact that many study participants revealed they changed their diet during pregnancy to include more sugary foods highlights the need for greater public information about the importance of proper nutrition. A good diet not only supports the healthy development of the baby but also helps maintain good maternal oral health, reducing the risk of caries and dental erosion [Gomes Alves et al., 2023]. The questionnaire also showed that most of the participants have a university degree or at least a high school diploma. Several studies, including those by Kharrazi et al. [2018], demonstrate that a higher level of education is associated with a greater propensity for prevention and the adoption of healthy habits in general, including oral hygiene. This correlation underscores the need to introduce educational programs that overcome cultural and social barriers, reaching all segments of the population to ensure that information on perinatal health is accessible to all future families, and not just mothers. The analysis of the questionnaires administered postpartum provides a basis for further considerations. A significant finding is the high frequency of salivary exchange between parents and children (51.9%). This habit is the main mechanism for transmitting Streptococcus mutans, the quintessential cariogenic bacterium, from mother to child. Such actions, which seem harmless, drastically increase the risk of Early Childhood Caries, with serious consequences for the child's health. Despite mothers reporting the onset and/or persistence of oral problems postpartum, oral health is often neglected in favor of immediate care for the newborn. The low percentage of postpartum dental visits for mothers and children (34.6% and 7.69%, respectively) highlights a significant gap in primary prevention and a certain reluctance to move past outdated behaviors (e.g., only going to the dentist in case of pain). The fact that most of the pregnant women who participated in the courses were in their third trimester underscores that the path to prevention is still long and challenging. To prevent oral, and consequently, systemic and gestational problems, individuals should undergo a dental check-up and maintain good oral and dietary hygiene habits even in the pre-conception period,

FIG. 3A Pathological lingual frenulum.

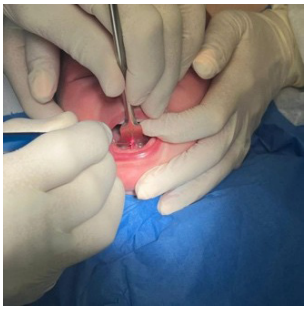

FIG. 3B Frenulotomy.

FIG. 3C Post-operative frenulum.

FIG. 3D Breastfeeding post-frenulotomy.

and not just at the end of the pregnancy. In this regard, it is interesting to note that knowledge about prenatal prevention is still lacking among the project's target audience. A growing number of studies have shown that the health of the fetus and, subsequently, the newborn is the result not only of maternal behavior and conditions during pregnancy but also of the habits and health status of both parents before conception. It is important to emphasize that this also concerns the father: he transmits both his genetic and epigenetic makeup to the offspring, and this is related to his age, exposure to smoking, alcohol consumption, a possibly high Body Mass Index (BMI), and systemic and oral diseases. The fact that our study included fathers in its initial phase is an extremely encouraging finding. The high satisfaction rate with the courses among the expectant mothers is also a reassuring result. This data suggests that expectant and new mothers are receptive to information about oral health, especially in an easily accessible context and with guidance from experts. The integration of the dentist's role into these perinatal pathways, alongside obstetricians, gynecologists, and pediatricians, has proven effective in transferring fundamental knowledge and motivating behavioral change. The main limitations of this study lie in its non-randomized nature and small sample size. Furthermore, the fact that participants voluntarily joined may have introduced a "selection bias," as the sample could be composed of women already more sensitive to the topic of prevention. Additionally, the low percentage of participants in the postpartum questionnaire (53 out of 105) limits the generalizability of the results from this phase. In conclusion, this analysis highlighted a series of problems and risks related to oral health in the perinatal period that deserve greater clinical attention. The data obtained support the need to integrate pediatric dentistry into pre- and postpartum services to improve the oral health of mothers and children and to prevent diseases that can have long-term consequences..

Conclusion

This project confirmed a strong correlation between pregnancy and the onset of oral health problems and highlighted how frequent salivary exchanges between parents and newborns represent a concerning reality. At the same time, the low percentage of postpartum dental visits reveals a clear need for education and awareness. However, the success and high satisfaction rate among participants demonstrate that integrating dental topics—addressed by specialists such as pediatric dentists—into childbirth education courses is a highly valuable initiative. This approach could play a crucial role in improving the oral health of the population, both in the short and long term.

Currently, this project is unique in Italy, and the goal is for it to serve as a model for other regions, promoting and disseminating the importance of oral health during pregnancy and early childhood. It is essential that the dentist becomes an integral part of the multidisciplinary team supporting families, ensuring a comprehensive and preventive healthcare service that lays the foundation for optimal oral health from the earliest age.

Conflicts of Interest

The authors declare no conflict of interest.

Authors' Contribution

A. Cosi: Manuscript development; M.T. Petricca: implementalon of courses, data analysis; F. Marziali, M.P. Rongione, M.L. Scaramazza, R. Valloreo: contribulon to the implementalon of courses and dental visits; D. Tripodi: development of the research protocol and manuscript review.

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