

ORAL HEALTH OF PREGNANT WOMEN AND POSSIBILITIES FOR IMPROVING ORAL HEALTH PROPHYLAXIS IN LITHUANIA

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SUMMARY

Objectives: The aim of the study was to identify potential areas for improvement in the prevention of oral diseases in pregnant women by assessing their oral care habits and awareness regarding oral health.

Methods: An original, anonymous, web-based survey was conducted among women at any stage of pregnancy. The survey consisted of 23 questions regarding oral care habits, knowledge about oral health of mother and child, general and oral health changes, and attendance of oral healthcare services during pregnancy. The data analysis was performed using IBM SPSS 27.0 version software. Descriptive statistics, Chi-square and Wilcoxon signed-rank tests were used to analyse the data. The level of statistical significance was set at $p < 0.05$.

Results: A total of 714 pregnant women participated in the study, with a mean (SD) age of 30.2 (4.4) years. Majority of the respondents demonstrated acceptable oral health-related knowledge and habits. A lack of interdental care among pregnant women was discovered. Nearly a third (27.6%) of the respondents reported a decline in their oral health during pregnancy. The most commonly reported general and oral health issues during pregnancy were increased stomach acid levels (71.3%) and gum bleeding (43.3%). Pregnant women were most frequently informed about the importance of oral care by an obstetrician-gynaecologist (25.4%).

Conclusions: The study revealed the need for targeted interventions to enhance oral health awareness and practices among pregnant women in Lithuania. While overall oral hygiene habits were acceptable, deficiencies in interdental care and knowledge regarding oral health during pregnancy were evident. Higher level of education and urban residency were associated with superior oral care practices of pregnant women. In order to improve oral health of mother and child, interdisciplinary collaboration and dissemination of accessible, evidence-based information are essential.

Key words: oral health, pregnancy, health literacy, prevention, paediatric dentistry

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INTRODUCTION

Oral diseases are a major health issue affecting 3.5 billion people globally (1). While dental caries is the most common oral health condition, periodontal disease is also highly prevalent, affecting 20%–50% of the population (2). Pregnancy is one of the major factors which may alter oral health. Physiological changes during pregnancy are closely linked to the periodontal health status. The increased levels of oestrogen and progesterone, as well as other complex mechanisms, negatively affect the periodontium in pregnant women (3, 4). Studies report gingival inflammation in 30%–88% of pregnant women while 40% of them suffer from periodontitis (3, 5, 6). Due to the changes of dietary behaviours and saliva-related factors, pregnant women are at a higher risk of developing dental caries (7, 8). Research indicates a lack of awareness among pregnant women regarding pregnancy gingivitis and the importance of oral health during pregnancy (9–11).

Evidence suggests that oral health of a mother is linked to the offspring's health. Globally, nearly a half of preschool children suffer from early childhood caries (12). Studies report that early

childhood caries is positively related to the dental caries of the mother (13, 14). Prenatal oral health education may decrease the prevalence of early childhood caries as well as *Streptococcus mutans* among children (13, 15). Periodontal conditions of the mother can be related to preeclampsia, premature labour, and low birth weight (16). The greater focus on oral care during pregnancy may contribute to good oral and general health of both mother and child.

According to previous studies, around a half of 3-year-olds in Lithuania experience early childhood caries while the prevalence of dental caries among Lithuanian 18-year-olds is at 78.3% (17, 18). Parents still lack knowledge concerning oral health of the preschool children in Lithuania (19). A lack of studies on oral health of pregnant women in Lithuania impairs its proper evaluation. It is crucial to investigate the level of knowledge and attitude towards oral health among pregnant women in order to improve their and their children's oral health status.

The research aims to identify potential areas for improvement in the prevention of oral diseases in pregnant women by assessing their oral care habits and awareness regarding oral health.

MATERIALS AND METHODS

A web-based survey was conducted during the period from December 2022 to April 2023. Based on a three-year average birth rate in Lithuania, a minimum required sample size of 378 participants was calculated. The sample size calculation was performed with a confidence level of 95% and the margin of error of 5%. Pregnant women of any age and at any stage of pregnancy were eligible to participate in the study. Participants were recruited in online communities for pregnant women.

Respondents were asked to fill in an original, anonymous, web-based questionnaire consisting of 23 questions regarding general demographic data, an assessment of the oral care habits of the pregnant women, changes of the general and oral health during pregnancy, attendance of oral health services during pregnancy, and knowledge about the oral care of the child.

Statistical data analysis was performed using IBM SPSS 27.0 software. Shapiro-Wilk test was used to check the normality assumption. Wilcoxon signed-rank test was used for median comparison when distribution of the variables was non-normal. Frequency distributions between groups were compared using Chi-square test based on the expected frequencies. The level of statistical significance was set at $p < 0.05$.

RESULTS

Characteristics of Survey Respondents

In total, 714 pregnant women participated in the study. Mean (SD) age of the respondents was 30.2 (4.4) years, ranging from 19 to 51 years. Most participants ($n=456$, 63.9%) indicated metropolitan areas (more than 200,000 residents) as their place of residence. The majority of the respondents ($n=583$, 81.7%) reported having higher education (Table 1).

The demographic distribution of the respondents aligns with the overall distribution of the population of interest in Lithuania. Geographical representation of the respondents aligns to the distribution of newborns in Lithuania per year. In Lithuania, 69.5% of newborns are born in urban areas while only 30.5% are born in rural regions. This naturally represents residential distribution of pregnant women (20). Our study demonstrated a

similar distribution with around 60% of the respondents living in the largest cities in Lithuania. When delving into the educational backgrounds of the respondents, it is essential to provide a more detailed overview. In Lithuania, women with higher education represent approximately 30.6% of the total population. Every second Lithuanian woman aged 25 to 44 has higher education, highlighting a significant demographics that plays a crucial role in the country's educational attainment narrative (21). It can be inferred that around 50% of the women of childbearing age possess a university degree in Lithuania. In our study, around 80% of the respondents had higher education.

Oral Hygiene Habits among Pregnant Women

Out of all respondents, 123 (17.2%) were educated by a dentist and 240 (33.6%) by a dental hygienist on the basic principles of personal oral hygiene. The majority of the research participants ($n=311$, 43.6%) reported that they had not received any instruction from a specialist on personal oral hygiene principles, while 40 (5.6%) pregnant women obtained this information from other sources (internet, books, courses).

The majority of the respondents ($n=374$, 52.4%) indicated that they choose oral care products based on the recommendations of specialists. Most of the participants ($n=570$, 79.8%) reported brushing their teeth twice a day. Less than a half of the respondents ($n=304$, 42.6%) reported using a single toothbrush irregularly ($n=146$, 48.0%). In most cases, dental floss was also used irregularly ($n=266$, 37.3%) or once a day ($n=223$, 31.2%). The majority of the pregnant women ($n=418$, 58.5%) did not use interdental brushes. A significantly higher number of respondents who were educated on the basics of personal oral hygiene by an oral care specialist (a dentist or a dental hygienist) reported using a single toothbrush ($p < 0.001$), dental floss ($p = 0.001$) and an interdental brush ($p = 0.001$). Significantly more participants who attended professional oral hygiene services brushed their teeth twice a day ($p = 0.006$), regularly used dental floss ($p = 0.001$), interdental brush ($p < 0.001$), and a single toothbrush ($p < 0.001$).

Statistically significant differences were found when comparing respondent groups based on the level of education and a place of residence. More participants with higher education brushed their teeth regularly twice a day ($p < 0.001$), used a single toothbrush ($p = 0.004$), regularly used dental floss ($p = 0.023$) and an interden-

Table 1. Demographic characteristics of the respondents

Demographics					
Age groups, n (%)					
19–24 years	25–30 years	31–36 years	37 years and older	Total	
68 (9.5)	304 (42.6)	285 (39.9)	57 (8.0)	714 (100.0)	
Place of residence, n (%)					
Metropolitan areas (Vilnius and Kaunas cities)	Western Lithuania	Northern Lithuania	Southwestern Lithuania	Eastern Lithuania	Total
456 (63.9)	101 (14.1)	87 (12.2)	54 (7.6)	16 (2.2)	714 (100.0)
Education, n (%)					
Secondary	Vocational	Higher (non-university)	Higher (university)	Other	Total
52 (7.3)	65 (9.1)	117 (16.4)	466 (65.3)	14 (2.0)	714 (100.0)

tal brush ($p = 0.001$) compared to the respondents without higher education. More pregnant women living in metropolitan areas brushed their teeth regularly twice a day ($p = 0.033$) and used a single toothbrush ($p = 0.029$) compared to the participants living in other regions (Table 2).

General Health Changes during Pregnancy

The majority of the respondents ($n = 457$, 64.0%) indicated experiencing nausea or vomiting during pregnancy while 509 (71.3%) reported increased stomach acid levels (Table 3). Significantly more participants who experienced the symptoms of excessive stomach acid levels reported the development of ulcerated lesions of the oral mucosa ($p = 0.002$). Most of the research participants ($n = 473$, 66.3%) encountered sugar cravings. Significantly more respondents who reported sugar cravings experienced toothache during pregnancy ($p = 0.003$). Approximately a third of respondents ($n = 248$, 34.7%) reported craving acidic products while 279 (39.1%) pregnant women craved carbonated beverages.

Changes in Oral Health during Pregnancy

Nearly a third of all respondents (27.6%) reported a decline in their oral health during pregnancy. When research participants were asked to rate their personal oral health on a ten-point scale (1 – very poor oral health, 10 – excellent oral health) before and during pregnancy, median (IQR) scores were 8.0 (1.0) and 8.0 (2.0), respectively. This difference was statistically significant ($p < 0.001$).

Gum bleeding during pregnancy occurred in 309 (43.3%) participants and was significantly more common in pregnant women who did not use an interdental brush or used it irregularly ($p = 0.02$). A total of 119 (16.7%) respondents reported experiencing toothache during pregnancy, with a significantly higher prevalence observed among pregnant women who exhibited greater sugar cravings ($p = 0.003$).

Health Literacy of Pregnant Women

Pregnant women were most commonly informed about the importance of oral care during pregnancy by an obstetrician-gynaecologist ($n = 181$, 25.4%).

Table 2. Associations between various factors and oral health habits according to Chi-square statistics

	Teeth brushing twice a day n (%)	Use of a single toothbrush n (%)	Regular use of dental floss n (%)	Use of an interdental brush n (%)	Reliance on trust worthy sources of information regarding oral health n (%)
Higher education ($n = 583$, 81.7%)	481 (82.5)	263 (45.1)	291 (49.9)	144 (24.7)	455 (78.0)
No higher education ($n = 131$, 18.3%)	89 (67.9)	41 (31.3)	51 (38.9)	15 (11.5)	82 (62.6)
p-value	<0.001***	0.004**	0.023*	0.001**	<0.001***
Metropolitan areas as a place of residence ($n = 456$, 63.9%)	375 (82.9)	208 (45.6)	230 (50.4)	108 (23.7)	363 (79.6)
Other regions ($n = 258$, 36.1%)	195 (75.6)	96 (37.2)	112 (43.4)	51 (19.8)	174 (67.4)
p-value	0.033*	0.029*	ns	ns	<0.001***
Instructions on oral hygiene by an oral care specialist ($n = 363$, 50.8%)	297 (81.8)	184 (50.7)	196 (54.0)	99 (27.3)	279 (76.9)
No instructions on oral hygiene by an oral care specialist ($n = 351$, 49.2%)	273 (77.8)	120 (34.2)	146 (41.6)	60 (17.1)	258 (73.5)
p-value	ns	<0.001***	0.001**	0.001**	ns
Attendance of professional oral hygiene procedures ($n = 305$, 42.7%)	258 (84.6)	171 (56.1)	169 (55.4)	90 (29.5)	242 (79.3)
No attendance of professional oral hygiene procedures ($n = 409$, 57.3%)	133 (32.5)	173 (42.3)	173 (42.3)	69 (16.9)	295 (72.1)
p-value	0.006**	<0.001***	0.001**	<0.001***	0.027*

Chi-square statistics; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; ns $p > 0.05$

Table 3. General and oral health changes during pregnancy

General health changes during pregnancy	n (%)
Increased stomach acid levels	509 (71.3)
Sugar cravings	473 (66.3)
Nausea and/or vomiting	457 (64.0)
Cravings for carbonated drinks	279 (39.1)
Cravings for acidic products	248 (34.7)
Oral health changes during pregnancy	n (%)
Gum bleeding	309 (43.3)
Gum sensitivity	214 (30.0)
Xerostomia	135 (18.9)
Gum pain	122 (17.1)
Toothache	119 (16.7)
Ulcerated lesions of the oral mucosa	79 (11.1)
Bruxism	25 (3.5)

Among the respondents, 622 (87.1%) agreed that oral care during pregnancy should be more comprehensive. The majority of pregnant women in our study (n=497, 69.6%) reported a lack of information about oral care during pregnancy. It was found that most women prefer to receive such information in the maternity health card or in information leaflets (Table 4).

When faced with oral health problems, majority of pregnant women (n=438, 61.3%) would seek the help of an oral care specialist. Significantly more research participants without higher education (n=131, 18.3%) would inquire acquaintances about possible actions in the event of oral health problems or seek information online ($p<0.001$).

The vast majority of pregnant women (n=508, 71.1%) agreed that the statement claiming “one pregnancy costs a mother one tooth” is a myth. Significantly more respondents without higher education believed this saying to be true ($p<0.001$).

Dental Procedures during Pregnancy

A total of 174 (24.4%) respondents indicated that they did not visit an oral care professional for the required record in the maternity health card. Significantly more younger respondents (up to 30 years old) visited an oral care professional for a required record in the maternity health card ($p=0.03$).

Table 4. Preferable form of information about oral health

Form of information	n (%)
Handouts from the doctor/oral care specialist supervising the pregnancy	428 (59.9)
Information in the maternity health card	409 (57.3)
Verbal information provided by a doctor supervising the pregnancy	303 (42.4)
Information during seminars for pregnant women	293 (41.0)
Verbal information provided by an oral care specialist	202 (28.3)
Other	6 (0.8)

The majority of respondents underwent preventive oral examinations during the first trimester (n=228, 31.9%) and the second trimester (n=299, 41.9%). Professional oral hygiene was performed on 305 (42.7%) pregnant women. Significantly more study participants who underwent professional oral hygiene during pregnancy also visited the dentist for a record in the maternity health card ($p<0.001$). Significantly more pregnant women with higher education attended professional oral hygiene procedures ($p=0.003$).

Scheduled treatment of dental caries was done in 179 (25.1%) cases, while emergency treatment due to pain was performed in 66 (9.2%) cases.

Paediatric Oral Health

The majority of pregnant women (n=388, 54.3%) believed that information about oral care of the child should be provided during visits to the family doctor after the birth of the child. Almost a half of the respondents (n=300, 42.9%) believed that such information should be provided during pregnancy. The majority of respondents (n=602, 84.3%) stated that they were not given the information about oral care of the child.

Almost a half of the respondents (n=356, 49.9%) believed that the cleaning of the baby's oral cavity should begin after the first tooth erupts while 337 (47.2%) participants believed it should start before the teeth emerge. More than a half of pregnant women (n=452, 63.3%) did not seek information about the potential oral health issues the baby might face in the first few months. Almost one third of respondents (n=203, 28.4%) indicated that they sought this information online.

DISCUSSION

The study analysed habits and knowledge regarding oral health care among pregnant women, health changes during pregnancy, and awareness about oral health care of the child.

The research found that nearly a half of the study participants were not educated about the basic principles of personal oral hygiene by oral care professionals. Similar results have been observed in other countries. A 2020 study in Poland discovered that 65.4% of the respondents were not instructed on the basics of personal oral hygiene by dentists or dental hygienists (22). A study in Spain showed that the majority (67.6%) of pregnant women had moderate knowledge regarding oral care (23). According to the results of the current study, a significant relationship was found between superior oral care habits and oral health education provided by an oral care specialist. Greater involvement of oral care specialists in educating pregnant patients could possibly improve their oral hygiene habits and health.

This study elucidates the association between educational attainment and health literacy. Our findings indicate that pregnant women with higher levels of education possess greater knowledge regarding oral health. This association is supported by existing literature which suggests that well-educated women exhibit superior oral care practices and show greater engagement in maintaining their oral health (9). To enhance the oral health status among pregnant women, it is essential that healthcare professionals prioritize individuals with lower educational levels.

Studies indicate that mothers often lack knowledge regarding the oral health care of their children. It has been reported that 45% of mothers are unaware of how to properly care for their children's oral health (22). Additionally, systematic reviews and meta-analyses confirm the association between knowledge about oral care and a reduction in early childhood caries (13). Our study revealed that nearly a half of the respondents recognize the importance of initiating oral hygiene practices before the eruption of their child's teeth (47.2%) and as soon as the first tooth appears (49.9%). Furthermore, over 80% of the study participants indicated that they had not received information regarding infant oral care. To effectively prevent early childhood caries, it is essential to enhance parental awareness of the significance of their child's oral health.

Our study revealed that nearly 80% of the participants regularly brush their teeth twice a day. Only 42.9% of them use dental floss daily while 19.2% of the respondents use interdental brushes. Studies show that 44.2%–70.7% of pregnant women do not use interdental care products (22, 23–25). Pregnant women who visit oral care professionals more frequently are more likely to use interdental care products and possess greater knowledge of oral care (24). According to our study, respondents who had been educated about personal oral hygiene principles by an oral care specialist were significantly more likely to use a single toothbrush, dental floss and an interdental brush. Since the lack of interdental care exists not only among pregnant women, but also in general population, oral care specialists should actively emphasize the importance of interdental care (26, 27).

This study found that the majority of respondents were provided with the information about oral health by an obstetrician-gynaecologist which is consistent with the results of other studies. According to a study conducted in Lithuania, roughly 60% of the participants were informed about oral health by an obstetrician-gynaecologist (28). It is important to note that a record by an oral care professional is mandatory in the maternity health card in Lithuania. Therefore, obstetricians-gynaecologists are obliged to inform the patients about the required dental examinations during pregnancy. A 2022 study indicated that 71.7% of pregnant women were informed about the importance of oral health by gynaecologists, while 54.5% received this information from dentists (25). Furthermore, a recent study revealed that 99.6% of dentists and 92.4% of obstetricians-gynaecologists believe that oral health consultations can effectively improve the oral health of both mothers and children (29). The majority of them agreed that oral health training should be a part of pregnancy care; 74.3% of obstetricians-gynaecologists who participated in the study and 39.2% of dentists reported that they were too busy to educate patients about personal oral hygiene (29). Since pregnant women are less likely to visit a dentist than an obstetrician-gynaecologist during pregnancy, the latter can greatly contribute to oral health promotion.

Despite the widespread acknowledgment of the importance and safety of routine dental procedures during pregnancy, pregnant women exhibit a tendency to rarely seek oral care specialists' consultation (30). This study demonstrated that women with higher education were significantly more likely to engage in professional oral hygiene services during pregnancy. Additional research indicates that a markedly greater proportion of participants with higher education levels accessed professional oral hygiene procedures

during this period. Furthermore, a range of factors influencing the frequency of dental visits during pregnancy has been identified, including demographic, socioeconomic, psychological, behavioural, and 'symptomatic' factors (31, 32).

In our study, almost 60% of the respondents agreed that they would like to receive information about oral health in the form of leaflets or in a maternity health card. Information provided in a written form, especially by an obstetrician-gynaecologist who is the most frequently visited healthcare professional during pregnancy, could be an effective tool for raising awareness among pregnant women about oral health care issues.

Respondents indicated that they would prefer to receive valuable information about oral health in the form of leaflets from their family doctor. Based on this feedback, it is recommended to develop new incentives to promote oral health among the less informed individuals. These responses reflect a trust in the family doctor, suggesting that patients have a clear understanding of the health system. Therefore, it would be reasonable to empower family doctors with greater initiative and proactivity in encouraging oral health among pregnant women. The question of how to motivate family doctors to incorporate oral health into their responsibilities requires separate consideration. Teamwork between family doctors and dentists or oral hygienists could serve as an effective tool for enhancing this motivation.

Limitations of the Study and Further Research

This study represents a notable sample of pregnant women with higher education. This sample corresponds with the educational demographics of similarly aged pregnant women in Lithuania. However, additional research would be valuable to investigate vulnerable segments of the population, particularly those with lower levels of education and those from lower socioeconomic backgrounds. Targeted research focusing on specific population groups may provide insights that lead to practical solutions. Future investigations should consider survey results of women with diverse educational backgrounds. Additionally, it is important to explore differences in findings between participants who utilize public versus private healthcare services. While our study included participants at any stage of pregnancy, future research may document these stages to better capture the changes experienced throughout pregnancy.

CONCLUSIONS

This study highlights the importance of improving oral health awareness and practices among pregnant women in Lithuania. While most participants demonstrated acceptable oral hygiene habits, many lacked proper interdental care and sufficient knowledge about oral health during pregnancy. Higher education and urban residential areas were associated with superior oral care practices. Interdisciplinary collaboration and accessible sources of information are essential in order to improve the oral health of mother and child.

Conflicts of Interest

None declared

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