

Dental prophylaxis and treatment in pregnant women. Opinion of the working group of the Polish Alliance for a Cavity-Free Future on dental prophylaxis in pregnant women

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KEYWORDS

caries prevention, pregnancy, dental care

SUMMARY

Introduction. Pregnancy is a special period in the life of a woman, when she cares not only for her own health, but also for that of her unborn child. Prenatal care is defined as comprehensive and multidisciplinary care provided to a pregnant woman, developing foetus, and then a newborn. The aim of caries prevention in pregnancy is not only to protect the future mother from caries, but also to prevent the disease in the child.

Aim. The aim of the paper was to present the recommendations on preventive and therapeutic dental management in pregnant women with regard to oral diseases in the mother and her child.

Material and methods. Electronic search for literature in medical databases (Pubmed, EMBASE, MEDLINE) and manual search for literature on primary-primary prevention of dental caries and dental care in pregnancy.

Results. The available literature indicates the safety of preventive and therapeutic activities during pregnancy, including the use of local anaesthesia and dental diagnostic radiology. Although dental treatment requires some modifications due to pregnancy-related changes, it may be safely used for the benefit of the mother's and the child's health.

Conclusions. Dental care in pregnancy should be primarily dedicated to education, prevention and treatment, if needed. Future mothers should be made aware that the child's oral health can and should be taken care of already in the prenatal period.

INTRODUCTION

Many studies on oral colonisation by cariogenic bacteria in children have demonstrated that the child's parents, mothers in particular, are the source of these pathogens. It was found that maternal caries increases the risk of early-childhood caries (1-3).

Early colonisation of poorly mineralised deciduous teeth by *Streptococcus mutans* increases the risk of dental caries (2).

Based on these observations, "primary-primary prevention of dental caries" also known as "pre-prevention of dental caries" was developed to define procedures and instructions for pregnant women aimed at limiting the future severity of caries intensity in the unborn child. The risk of infection in the child may be estimated by assessing maternal oral health and hygiene, especially the severity of dental caries, including the number of active carious lesions (primary and secondary caries), as well as by collecting detailed history of dietary and hygiene habits. Salivary tests to measure maternal titres of cariogenic bacteria and dental plaque staining may be also helpful (1).

Women undergo many changes during pregnancy, mainly hormonal, immune and dietary changes as well as they experience gastrointestinal disorders. All these increase the risk of oral diseases and have an impact on the mode of dental treatment (4-10). Comprehensive dental treatment before pregnancy is most beneficial for the future mother and her child. Dental care of women at childbearing age should therefore include preparation for changes that occur in the oral cavity during pregnancy by educational, preventive and therapeutic activities as well as by providing information essential for the oral health care of newborns. Dentists or dental hygienists should be responsible for providing information on the prevention against dental caries and periodontal diseases, while the implementation of these guidelines and their incorporation in everyday life will depend on the level of understanding of the problem and the conscientiousness of the patients (11-13). Factors that have an impact on the global dental attendance include regular use of dental care before pregnancy, the level of knowledge on oral health and its impact on both pregnancy and child, as well as the conviction about the safety of dental treatment in pregnancy (14-18).

AIM

The aim of the paper was to present guidelines on dental preventive and therapeutic management in pregnant women with regard to oral diseases in the mother and her child.

MATERIAL AND METHODS

A review of literature and the recommendations of the World Health Organisation and teams of experts

on dental care in pregnancy was performed. Medical databases such as Pubmed, EMBASE, MEDLINE were searched using the following keywords: "primary-primary prevention", "dental care in pregnan", "oral health in pregnan", "dental treatment in pregnan". The following filters were used: English and Polish language, original papers, review papers, recommendations, and guidelines. Based on literature analysis, recommendations for pregnant women on dental prevention and treatment were developed.

The literature review was performed by the working group of the Polish Alliance for a Cavity-Free Future on dental prophylaxis in pregnant women.

RESULTS

Dental care in pregnancy focuses on three main aspects: preventive measures, therapeutic measures, health promotion.

Collaboration between the gynaecologist and dentist should be the leading principle of health care for pregnant women as health protection in pregnancy requires continuous dental care combined with periodic prenatal check-ups. A questionnaire conducted among 3,439 Polish women up to 5 years after childbirth has demonstrated the important role of the attending obstetrician in increasing the proportion of pregnant women using dental care; a referral from the doctor increased the probability of visiting a dentist (OR = 5.20 (4.05-6.67); $p < 0.001$). Even higher effectiveness was shown when a written feedback on oral health was required from the dentist (OR = 2.19 (1.3-3.66); $p = 0.003$) (17, 18). Health education of women, which may help change inappropriate behaviours that promote caries, periodontal and oral mucosa diseases both in women and their future offspring, is equally important. Pregnant women should be informed on this fact as soon as possible to reach an adequate level of awareness and motivation to improve oral hygiene (16, 19, 20).

If inflammatory lesions are found in the oral cavity, these should be eliminated before or during pregnancy.

The following dental aspects should be considered when planning pregnancy:

- elimination of infection foci – the teeth without vital pulp should either be subject to appropriate endodontic treatment or removed,
- elimination of active carious lesions (through the use of fluoride-releasing materials, such as glass-ionomer cements, as long-term temporary fillings for high activity),
- elimination of gingival and oral mucosa inflammatory lesions,
- professional removal of dental deposits,
- fluoride prophylaxis,
- implementation of appropriate eating and hygiene habits.

Preventive actions

Dental prophylaxis in pregnant women involves preventing dental caries, acid erosion of enamel and periodontal diseases (4, 6, 13, 21-23).

Preventive measures in pregnancy are aimed at reducing the levels of cariogenic bacteria and delaying colonisation of the child's oral cavity with cariopathogens by:

- oral rinsing with 0.12% chlorhexidine solution for 2 weeks, 10-15 mL, twice daily for 30 seconds,
- local application of fluoride compounds (the use of 1450 ppm fluoride toothpaste twice daily, daily use of an oral rinse containing 225 ppm F (0.05% NaF)) – endogenous fluoridation is not recommended (23),
- the use of soft tooth brushes and mild cleaning agents,
- cleaning the surface of the tongue (the deposit on the tongue contains microbes and exfoliated epithelial cells, which are a reservoir for dental plaque),
- the use of xylitol chewing gum 2-3 times daily after meals (5 minutes) (24),
- promoting healthy behaviours, such as avoiding behaviours increasing the risk of transmission of cariogenic bacteria to the child's oral cavity,
- professional procedures: removal of dental deposits, application of chlorhexidine-containing varnish or fluoride-containing compounds (foams, varnishes, gels),
- implementation of appropriate eating and hygiene habits,
- the use of alkaline oral rinses and enamel remineralisation agents to reduce the risk of acidic enamel erosion.

Dental treatment in pregnancy

At least two dental visits should take place during pregnancy followed by regular visits every 6 months after delivery in the absence of therapeutic needs. The first visit should be planned at 3-4 months of pregnancy, the second one at 8 months of pregnancy. Considering the risk of toxicity of certain medications during organogenesis and the physical state of the pregnant woman (somnolence, nausea, vomiting) in the first trimester (until 12-13 weeks), an assessment of oral health and the risk of caries along with the estimation of patient's therapeutic needs is recommended. It is also the right time for education about changes occurring in the woman's body, appropriate hygiene and controlling dental plaque, as well as prevention of periodontal diseases and local application of fluoride compounds.

The second trimester of pregnancy (14-27 weeks) is an optimal period for dental procedures (if needed).

In this period, the woman's body is adapted to physiological hormonal changes, the organogenesis is completed, and the risk of premature birth is relatively low.

The recommendations are as follows:

- instructions on hygiene and dental plaque control,
- professional removal of dental deposits in accordance with indications,
- control over disease activity,
- treatment of dental caries and pulp diseases, tooth extractions (4, 6, 7, 22, 25).

These activities should be continued in the first half of the third trimester, however, in the second half stressful situations should be avoided, due to the increasing discomfort resulting from increasing uterine size due to the growing foetus and the risk of inferior vena cava syndrome.

Regardless of the stage of pregnancy, a pregnant woman should be provided with maximum comfort by reducing the time of procedure, ensuring appropriate body position and the possibility to change the position or use the toilet during the visit, as well as by avoiding stressful situations, e.g. by eliminating pain (the use of local anaesthetics, nitrous oxide) (26-28).

Prosthetic and orthodontic treatment, as well as scheduled surgical procedures (implants, gouging of impacted teeth) and teeth whitening procedures should be delayed until after delivery.

Prevention of periodontal diseases

Chronic periodontal diseases may be one of the risk factors for premature birth and low birth weight. Studies have demonstrated that bacteria associated with the etiopathogenesis of periodontal diseases (*Actinobacillus actinomycetemcomitans*, *Porphyromonas gingivalis*, *Bacteroides forsythus*, *Treponema denticola*) are statistically more common in the subgingival microflora of mothers whose children were born preterm or with low body weight. These microbes can induce increased production of proinflammatory cytokines (IL-1 β , IL-6, TNF- α), thus indirectly accelerating the synthesis of prostaglandins (PGE₂, PGF₂), which play an important role in inducing labour. Additionally, inflammatory mediators secreted into mother's bloodstream contribute to abnormal placental absorption of nutrients, lipids in particular, which may result in low birth weight (< 2500 g) (29). Pregnancy gingivitis requires professional hygienisation treatment in the form of regular scaling, dental crown polishing and adjuvant pharmacotherapy in the form of anti-inflammatory agents. For more advanced inflammation, conservative periodontal treatment is only a prelude to surgical treatment. If pharmacotherapy is necessary, the risk for the foetus should be considered and drugs recommended by the Food and Drug Administration (FDA) should be used; A and B class drugs should be used in pregnant women; C class agents may be used

only if the benefit outweighs the risk (30). Since pregnancy is a period requiring the use of agents that are safe for the foetus, potentially harmful effects on pregnancy and foetal development should be considered before prescribing agents for caries prevention. Chlorhexidine is pregnancy category B, i.e. animal studies did not show a risk to the foetus, but for obvious reasons this was not confirmed in studies in pregnant women. Dental chlorhexidine-based preparations are applied locally and it is recommended that their professional use be delayed until after organogenesis. Given the fact that they bring clear benefits to the mother and child, their safety should raise no concern provided that the indications are complied with (27, 28). It is important to recommend non-alcoholic mouthwashes.

The use of agents for local anaesthesia

Antibiotics and analgesics, including local anaesthetics, are the main agents used in dentistry (tab. 1 and 2). Lidocaine (class B) is considered safe for use in pregnant and breastfeeding women. Benzocaine and mepivacaine (class C) should be avoided due to their prolonged action and increased risk of methemoglobinemia. The use of articaine should be consulted with a gynaecologist (it is classified as category C due to the lack of available studies). Anaesthesia with vasopressors is preferred to limit the risk of complications associated with local anaesthesia. These are commonly added to local anaesthetics to delay absorption, increase efficacy and prolong anaesthetic action. Epinephrine concentration in anaesthetics does not exceed 0.01 or 0.005 mg/mL for concentrations of 1:100,000 and 1:200,000, respectively. When using an appropriate technique of anaesthesia administration (syringe aspiration must be performed every time) the cumulative dose of 0.1 mg epinephrine can be safely administered to pregnant women. This corresponds to 5 anaesthetic ampoules of 1:100,000 or 10 ampoules of 1:200,000. Sedation with nitrous oxide is allowed in the second and third trimester, with nitrous administration limited to 30 minutes and using a concentration of 50%.

It should be remembered that sedation in pregnant women requires lower doses of nitrous oxide.

Diagnostic radiology

When deciding on the use of radiology in a pregnant patient, it should be always considered whether the benefits of a given radiological procedure outweigh the risk of exposure to X-rays. Also, all precautions should be taken. X-rays should be taken only when absolutely necessary for diagnostic/therapeutic purposes and with the lowest possible exposure. This is in accordance with the basic principle of global radiology known as the ALARA (As Low As Reasonably

Tab. 1. The use of antibacterial agents in pregnancy in accordance with FDA classification

Antibiotics			
Amoxicillin	B		
Penicillin	B		
Erythromycin	B	Allowed to be used	
Cephalosporins	B		
Clindamycin	B		
Metronidazole	B	24-72 hrs (II, III)	Y
Tetracyclines	D	N	N
Other			
Chlorhexidine	B	Y	Y
Nystatin	B	Y	Y
Clotrimazole	B	Y	Y
Fluconazole	C	With caution	With caution
Ketoconazole	C	With caution	N
Nitrous oxide	C	Y (II, III)	Y

Tab. 2. The use of analgesics for local anaesthesia in pregnancy according to FDA classification

Analgesics			
Paracetamol	B		
Codein + P	C		
Oxycodone + P	B	Allowed to be used	
Hydrocodone + P	C		
Morphine	B		
Aspirin	C	48-72 hrs	N
Ibuprofen	B	avoid in the first and the third trimester	Y
Naproxen	B		Y
Local anaesthesia			
Lidocaine	B	Y	Y
Mepivacaine	C	With caution	Y
Articaine	C	With caution	Y
Prilocaine	B	Y	Y
Bupivacaine	C	With caution	Y

Achievable) principle, which was established by the International Commission on Radiological Protection (ICRP). Radiological examination performed using modern equipment and in compliance with the principles of radiation protection is currently considered safe, and exposure to < 0.05-0.1 Gy (or 5 rads) causes no adverse effects on the foetus. Intraoral images are usually used in dentistry, with a single radiation dose of 1-2 mGy, dental status of 18 images, which in total do not exceed the safe dose (31, 32).

Management in pregnant women during dental treatment

During dental procedure, it is recommended that the pregnant woman is placed in a semi-supine position on her left side, with her right hip elevated 10 to 12 cm, with a 12-15° tilt using a supporting pillow placed on her right side, or in a sitting position. In a supine position (placing a pregnant woman on the back), compression of the uterus on the inferior vena cava occurs, limiting venous blood flow to the heart, which may lead to hypotonia, cerebral ischemia, fainting and reduced placental blood flow and foetal anoxia. Dyspepsia and gastric reflux may increase during the first months of pregnancy, which increases the risk of aspiration. Attention should be also paid to the temperature and odours in the room due to altered sensitivity to temperature, taste and odour in pregnancy. Therefore, substances with intense smell or unpleasant taste or odour should be avoided. It is also recommended that a pregnant woman consume a small meal and drink before the appointment to avoid dehydration or fainting due to hypoglycaemia. It should be remembered that treatment during the first trimester of pregnancy is associated with a greater risk of miscarriage and adverse effects on organogenesis, while in the third trimester it may lead to premature labour between 32-36 weeks of pregnancy. In such situations, the dentist should collaborate with the attending gynaecologist, assessing the risk and potential benefits of continuing or discontinuing treatment. Therefore, the beginning of the second trimester is the best period for dental treatment,

while acute inflammation should be treated immediately at any stage of pregnancy (4, 7, 22, 25).

Health education

The following information should be provided to pregnant women:

1. Child's teeth begin to develop at 4-6 months of foetal life.
2. Increased serum levels of sex hormones, altered salivary secretion and changes in the composition of gingival fluid contribute to dental plaque formation and affect periodontal health status.
3. Poor oral hygiene and periodontal diseases may in some cases pose a risk of premature birth and low birth weight.
4. Dental caries is a disease caused by bacteria, which colonise the oral cavity already at birth, usually through parental transmission.
5. Mothers should reduce risk factors for complications by everyday regular hygiene practices, avoiding tobacco and other stimulants, compliance with well-balanced diet and regular check-up visits at the dentist's.
6. The child's first dental visit should take place at the age of 6-12 months to determine an individualised caries prevention strategy.

CONCLUSIONS

Dental care in pregnancy should be primarily dedicated to education, prevention and treatment if needed. Future mothers should be made aware that the child's oral health can and should be taken care of already in the prenatal period. Pregnant women should be encouraged to have a healthy and well-balanced diet (high in fruit, vegetables and dairy products), regular oral hygiene practices, as well as healthy and peaceful lifestyle so that the therapeutic management is limited to preventive measures, taking into account the safety of materials, anaesthetics and drugs used, limiting the duration of dental visit due to uncomfortable body position, especially for a woman in advanced pregnancy.

CONFLICT OF INTEREST

None

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