

*ANGELIKA KOBYLIŃSKA¹, NICOLE SOCHACKI-WÓJCICKA², DARIUSZ GOZDOWSKI³, DOROTA BOMBA-OPOŃ², MIROSŁAW WIELGOŚ², DOROTA OLCAK-KOWALCZYK¹

Dental care in pregnancy in Poland. A postnatal questionnaire study

¹Department of Pediatric Dentistry, Medical University of Warsaw

Head of Department: Professor Dorota Olczak-Kowalczyk, MD, PhD

²1st Chair and Department of Obstetrics and Gynecology, Medical University of Warsaw

Head of Chair and Department: Professor Mirosław Wielgoś, MD, PhD

³Department of Experimental Design and Bioinformatics, Faculty of Agriculture and Biology, Warsaw University of Life Sciences

Head of Department: Krzysztof Pawłowski, PhD

KEYWORDS

dental care, pregnancy, prevention,
socio-demographic factors, gynaecologist

SUMMARY

Introduction. Pregnancy is a period of increased risk of oral diseases that affect both the course of pregnancy and child's health. Pregnant women should pay particular attention to dental and periodontal health by implementing intensified preventive and therapeutic activities.

Aim. An evaluation of the reasons for dental visits and the types of dental services among pregnant women, with reference to the impact of the socio-demographic factors such as place of residence and the type of medical facility.

Material and methods. An electronic survey was conducted among women up to 5 years postpartum (consent of the bioethical committee of Medical University of Warsaw). Socio-demographic data as well as information on the course of pregnancy, dental appointments during pregnancy, the type of dental procedures and the type of attended healthcare facilities were collected. The chi-square test and Spearman's rank correlation coefficient were used for statistical analysis. A $p \leq 0.05$ was accepted as statistically significant.

Results. A total of 3,439 questionnaires completed 2 weeks to 5 years after delivery by women aged between 13.1 – 45.4 years, including 40.9% of urban residents, 74.8% of women with higher education, and 41% of women in good economic situation, were analysed. A total of 62.3% of respondents reported attending dental appointments (usually private) during pregnancy. The need for treatment was the most common reason for the visit. The attendance and the reasons for dental visits depended on the age, economic status, professional activity, place of residence, level of education, dental care before pregnancy and gynaecologist's recommendations. A total of 63% of women who reported to the dentist received dental care. The most common procedures included dental caries treatment (53.7%), dental scaling (13.6%) and endodontic treatment (9.5%). Dental radiography was less common (2.5%). Except for tooth extraction and endodontic treatment, all procedures were usually performed in private practices rather than those having a contract with the Polish National Health Fund.

Conclusions. Dental attendance among pregnant women, which is modified by socio-demographic factors, is associated with the need for dental treatment and a referral from a gynaecologist. The limited use of preventive procedures and avoiding diagnostic radiology during pregnancy indicate the need to educate both future mothers and dentists on dental care in pregnancy.

INTRODUCTION

Changes occurring in the woman's body during pregnancy, especially those having effects on the endocrine and immune system, salivary quantity and quality, as well

as gastrointestinal disorders, may have negative effects on the quality of life, the overall health status of the woman, the course of pregnancy and child's health. A relationship was demonstrated between periodontitis in a pregnant

woman and low birth weight and premature delivery as well as between high cariogenic bacterial count and primary dental caries in the child (1-5). Dental care in pregnancy should be enhanced and comprehensive (the concept of a whole mouth therapy), i.e. it should include intensive prevention of oral diseases, treatment of dental caries and its complications, periodontal diseases and oral mucosa (6-9).

In Poland, pregnant and puerperal women are entitled to a greater range of therapeutic and preventive procedures reimbursed by the National Health Fund, which allows for regular check-up visits at 3-month intervals, necessary preventive and therapeutic procedures, as well as individual health education. The Ordinance of the Minister of Health of 23 September 2010 (which was replaced with the ordinance of 20 September 2012) additionally introduced standards for the management in pregnancy and puerperium, which emphasise the need for dental care and the importance of maintaining oral health during pregnancy. These include healthy lifestyle promotion, including oral health (until 10 weeks pregnant), oral health monitoring (at pregnancy weeks 11-14, 21-26, and 33-37) as a part of prevention provided by a doctor or midwife as well as dental check-up visits, including oral health assessment, determination of preventive and therapeutic needs and setting a treatment plan by the 10th week of pregnancy. Promotional and educational activities targeting oral health are also implemented, among other things, during parentcraft classes, by regional authorities, scientific associations and the Ministry of Health.

AIM

The aim of the study was to assess the reasons for dental appointments and the types of dental services among pregnant women, considering socio-demographic factors, such as the place of residence and the type of medical facility.

MATERIAL AND METHODS

This was an anonymous, electronic survey including women whose pregnancy was terminated within 5 years before the date of completing the questionnaire. The study was conducted in April and May 2017. The questionnaire included questions regarding age at pregnancy termination and at questionnaire completion, the place of residence (large/small urban or rural region), level of education, family financial situation, professional activity, the course of pregnancy and delivery (comorbidities, date and type of delivery), child's birth weight, the use of dental care in pregnancy, reasons for dental appointments, as well as preventive and therapeutic procedures performed. Incorrect or incomplete questionnaires were excluded from the analysis. The questionnaire regarding the period of pregnancy was approved by the Bioethics Committee of the

Medical University of Warsaw (approval no. KB/93/2015 dated May 5, 2015).

The obtained data were analysed statistically with the chi-square test and a correlation analysis using the Spearman rank correlation coefficient. Statistica 12 (Statsoft) was used in the analysis and a $p \leq 0.05$ was accepted as statistically significant.

RESULTS

A total of 3,439 of 3,455 completed questionnaires were included in the analysis. The socio-demographic characteristics of respondents are shown in table 1. The questionnaires were completed 2 weeks to 5 years after termination of pregnancy (on average after 1.78 ± 1.44 years). Maternal age ranged between 13 and 43 years (mean age 26.79 ± 4.06 years) at delivery and between 13.1 and 45.4 years (mean age 28.84 ± 4.04 years) at the time of questionnaire completion. A total of 2,524 (73.4%) women were primiparas. General disorders were experienced during pregnancy by 1,019 (29.6%) respondents. The most commonly reported anomalies included the risk of premature delivery (16.1%), thyroid disease (18.17%), hypertension (8.5%) and diabetes (7.7%). Preeclampsia (2.0%) and gestational cholestasis (1.7%) were less common. Full-term delivery was reported by 92.9% of women, with the dominance of vaginal delivery (61.8%). Emergency and elective caesarean section was performed in 22.1 and 16.1% of respondents, respectively. A total of 170 (4.9%) children had birth weight below 2500 g (mean birth weight $3,389 \pm 532$ g).

A total of 2,142 (62.3%) respondents used dental care during pregnancy, with lower attendance among women from rural (58.6%) and smaller urban (60.6%) vs. larger urban (66.0%) areas. In addition to the place of residence ($r = 0.047$), the use of dental care was also associated with the financial situation (Spearman's rank correlation coefficient [r] = 0.076), level of education ($r = 0.090$), professional activity during pregnancy ($r = 0.068$), referral from a gynaecologist ($r = 0.287$), as well as the use of dental care before pregnancy ($r = 0.249$). Factors associated with the general maternal health condition, pregnancy and delivery had no effects on dental attendance.

The majority of appointments took place in the middle (47.9%) and the first (37.9%) trimester. A total of 87 women did not remember the trimester of their first dental visit. Among women who attended dental appointments, 529 (24.7%) were referred by their gynaecologists, including 255 (48.2%) women required to present a written feedback on their oral health status. The reasons for reporting to the dentist during pregnancy and the types of procedures performed are shown in table 2 and figure 1.

Urban respondents statistically significantly more often attended dental visits for the prevention of oral diseases than their rural counterparts. The impact of other socio-demographic factors is shown in table 3. Significant

Tab. 1. Socio-demographic characteristics of respondents

	Total number of respondents	3439 (100%)
Age at delivery (years)	≤ 20	200 (5.8%)
	21-25	1104 (32.1%)
	26-30	1551 (45.1%)
	> 30	584 (17%)
Age at questionnaire completion (years)	≤ 20	62 (1.8%)
	21-25	620 (18.0%)
	26-30	1633 (47.5%)
	> 30	1124 (32.7%)
Place of residence	rural area	911 (26.5%)
	small town	1122 (32.6%)
	large city	1406 (40.9%)
Education	primary/middle/basic vocational	117 (3.4%)
	secondary	750 (21.8%)
	incomplete higher/higher	2574 (74.8%)
Professional activity during pregnancy		2750 (80.0%)
Financial situation	bad	316 (9.2%)
	average	1713 (49.8%)
	good or very good	1410 (41%)
	when needed	1625 (47.3%)
The use of dental care before pregnancy	once a year	1139 (33.1%)
	more than once a year	607 (17.7%)

correlations were also reported between the risk of pre-term delivery and reporting to dental offices due to gingival bleeding ($r = 0.068$) and dental pain ($r = 0.044$).

Preventive or therapeutic procedures were performed in 63% of women who reported to dental offices. Except for scaling, the frequency of these procedures was not significantly correlated with the place of residence (tab. 2). This procedure was also positively correlated with the age, professional activity during pregnancy and the level of education. The same factors were negatively correlated with tooth extraction (tab. 3). No relationship was found between implementing these procedures and factors associated with the general maternal health condition, pregnancy or delivery.

Among women attending dental offices, 65.9% used private dental care, 18.0% attended both private offices

and those having contract with the National Health Fund, and 16.1% reported to the latter one only (tab. 4). The frequency of preventive and therapeutic procedures depended on the type of medical facility ($r = 0.051$ for private practice; $r = -0.051$ for dental offices having a contract with the National Health Fund). Endodontic treatment and tooth extractions were performed with similar frequency in all types of healthcare facilities. Other dental procedures were more often performed in private dental offices rather than those having a contract with the National Health Fund.

DISCUSSION

A dental check-up should be considered a crucial element of medical care in pregnant women. However, our study showed that one in four women do not attend dental

Tab. 2. Reasons for dental appointments and types of performed procedures among pregnant women depending on the place of residence

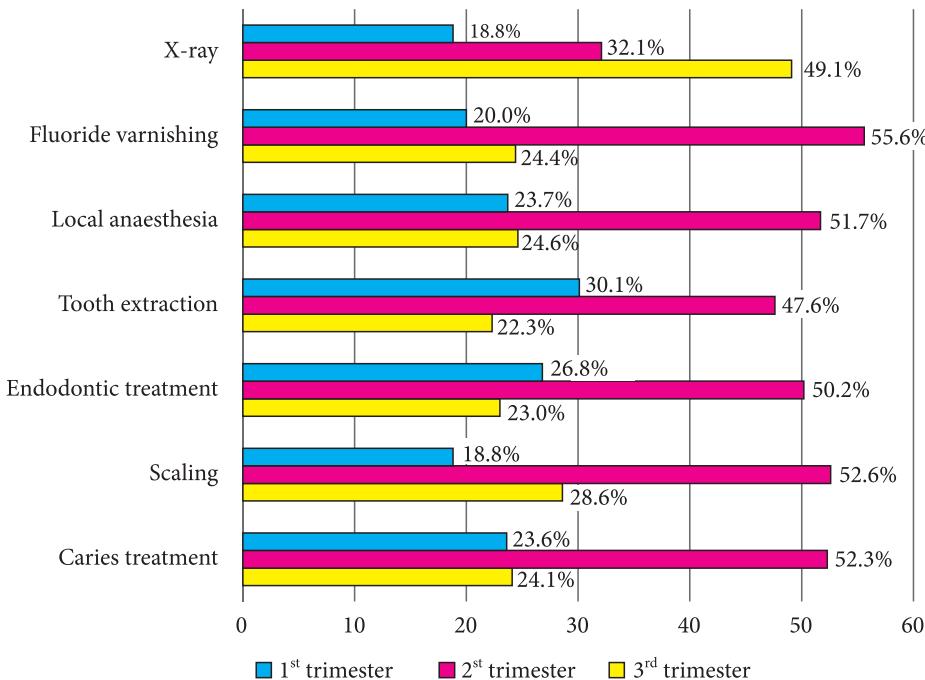
	Rural area 100%	Small town 100%	Large city 100%	p	Total 100%
	n (%)				
Dental appointment	534 (100)	680 (100)	928 (100)	-	2142 (100)
Reason for dental appointment					
referral from a gynaecologist	108 (20.2)	128 (18.8)	175 (18.9)	0.722	411 (19.2)
– need for prevention	141 (26.4)	215 (31.6)	301 (32.4)	0.002*	657 (30.7)
– caries prevention	44 (8.2)	57 (8.4)	108 (11.6)	0.005*	209 (9.8)
tartar removal	119 (22.3)	178 (26.2)	253 (27.3)	0.007*	550 (25.7)
– need for treatment	403 (75.5)	528 (77.6)	642 (69.2)	0.445	1573 (73.4)
– gingival bleeding	62 (11.6)	98 (14.4)	102 (11.0)	0.218	262 (12.2)
– caries treatment	335 (62.7)	400 (58.8)	501 (54.0)	0.830	1236 (57.7)
– dental pain	151 (28.3)	192 (28.2)	240 (25.9)	0.939	583 (27.2)
– tooth extraction	32 (6.0)	36 (5.3)	46 (5.0)	0.924	114 (5.3)
Types of dental procedures					
dental caries treatment	294 (55.1)	375 (55.1)	481 (51.8)	0.627	1150 (53.7)
scaling	47 (8.8)	103 (15.1)	142 (15.3)	< 0.001*	292 (13.6)
endodontic treatment	60 (11.2)	64 (9.4)	80 (8.6)	0.622	204 (9.5)
tooth extraction	30 (5.6)	35 (5.1)	44 (4.7)	0.970	109 (5.1)
local anaesthesia	160 (30.0)	205 (30.1)	275 (29.6)	0.454	640 (29.9)
fluoride varnishing	28 (5.2)	42 (6.2)	71 (7.7)	0.049*	141 (6.6)
radiography	18 (3.4)	16 (2.4)	20 (2.2)	0.517	54 (2.5)

*statistical significance p ≤ 0.05

appointments. Although the retrospective nature of the study and the time that has elapsed could have influenced the results, they correspond with the findings presented in the report from a nationwide survey assessing the incidence of alcohol, tobacco and psychoactive substance dependence in pregnant women. Among 2,749 respondents, only 51.2% women reported for a dental visit immediately after delivery (10).

A similar, low attendance among pregnant women (12.6-58%) was also observed in other regions of the world despite the high awareness of women on the importance of oral health check-ups during pregnancy (6, 10-17). Researchers attempting to define barriers in the access to dental care point to the importance of cultural, ethnic and socio-demographic factors, emphasising the low level of education, low economic status and the age of

women (11, 13, 16, 17). Our results confirmed the effects of socio-demographic factors on the use of dental care among pregnant women. However, correlation coefficients for such factors as age, place of residence or economic status were significantly lower compared to a referral from a gynaecologist or regular dental visits before pregnancy. According to U.S. research, the risk factors for the lack of dental care include ethnic factors, age over 36 years, an annual income of less than \$30,000, secondary or lower education and the lack of private insurance (12). The lack of regular dental care before pregnancy was considered the most common risk factor. Similar research in Canada confirmed the importance of the above listed factors and, at the same time, pointed to the great role of access to dental health (13). In contrast to the cited studies, the low Spearman's correlation coefficient between the economic

**Fig. 1.** The frequency of preventive and therapeutic dental procedures throughout pregnancy trimesters**Tab. 3.** Spearman's correlation coefficients illustrating the relationships between socio-demographic factors and the reasons for dental visits as well as the types of procedures among pregnant women

Socio-demographic factors	Reasons for dental visits						Procedure performed	
	caries prevention	scaling	gingival bleeding	caries treatment	dental pain	tooth extraction	scaling	tooth extraction
age	0.034	0.123*	-0.015	0.016	-0.190*	-0.076	0.156*	-0.095*
education	-0.003	0.047*	-0.026	0.009	-0.113*	-0.119	0.067*	-0.136*
professional activity	0.083*	0.091*	-0.036	-0.030	-0.123*	-0.054	0.120*	-0.060*
financial situation	0.006	0.027	0.004	0.026	-0.070*	-0.030	0.049	-0.032

status and dental visits in our study indicates minor importance of this factor, which is probably due to the availability of free dental care in Poland. We also noticed a positive impact of women's age, which corresponds with the findings of other authors (13, 16).

There was also a correlation between socio-demographic factors and the reasons for dental visits as well as the types of procedures among pregnant women. Urban residence, high level of education, higher age and professional activity were positively correlated with the willingness to perform scaling and negatively correlated with appointments due to dental pain or tooth extraction. In contrast to the U.S. research, we did not confirm the relationship between preventive dental visits and high incomes (16). Also, prevention was not the main reason for

dental appointments. The need for caries treatment was the most common reason for a dental visit in our study. Only 12.2% of women reported to the dentist due to gingival bleeding. Similar reporting rates for gingival bleeding were observed by Thomas et al. The authors also observed relatively high reporting rates due to the need for caries treatment (32%) and a two-fold increase in the proportion of women requiring tooth extraction (11%) compared to our findings (15). In contrast to these observations, many authors consider gingival bleeding to be the main reason for dental appointments among pregnant women (12, 14, 18).

Studies devoted to the types of dental procedures in pregnant women are limited. Caries treatment and scaling were the most common procedures among our

Tab. 4. Types of healthcare facilities attended by pregnant women and types of dental procedures performed

	Private office	Offices having a contract with the National Health Fund	Private office having a contract with the National Health Fund	p private vs. National Health Fund office
	n (%)			
Dental appointment	1413 (100)	343 (100)	386 (100)	
Dental procedures performed:				
- preventive and/or therapeutic procedures (total)	909 (64.3)	188 (54.8)	252 (65.3)	0.001*
- treatment of dental caries	776 (54.9)	159 (46.4)	215 (55.7)	0.004*
- scaling	208 (14.7)	30 (8.7)	54 (14.0)	0.004*
- endodontic treatment	132 (9.3)	25 (7.3)	47 (12.2)	0.232
- tooth extraction	64 (4.5)	18 (5.2)	27 (7.0)	0.572
- local anaesthesia	451 (31.9)	75 (21.9)	114 (29.5)	< 0.001*
- fluoride varnishing	108 (7.6)	13 (3.8)	20 (5.2)	0.012*
- X-ray	43 (3.0)	2 (0.6)	9 (2.3)	0.010*

respondents. Unfortunately, fluoride varnish application was rare. Prophylactic treatments were more often performed in private practices, with similar rates for rural and urban residents. Importantly, no correlation was observed between tooth extraction and parameters for the general condition of a pregnant woman, the course of pregnancy or gestational age at delivery. At the same time, a relationship was found between the risk of preterm birth and reporting to the dentist due to gingival bleeding and dental pain. Although the study design, which was based on a self-assessment of oral health among women, does not allow for a conclusion that oral inflammation may be one of risk factors for preterm birth, the findings point to such a relationship. A research conducted in a group of 870 pregnant women with gingival inflammation showed that periodontal treatment, including scaling and oral rinsing with 0.12% chlorhexidine mouthwash, combined with daily oral hygiene significantly reduced the risk of premature birth and low birth weight (4).

However, the implementation of dental treatment, relatively high rates of endodontic treatment and tooth extractions do not correspond with the rates of diagnostic radiology. This may be due to the concerns of both dentists and future mothers about the potential foetal exposure to X-rays. Epidemiological research in the UK in a group of 7,375 mothers did not confirm the relationship between dental radiography in pregnancy and premature birth or

low birth weight (19). Other researchers demonstrated that the use of significantly higher radiation doses in pregnant women compared to doses in dental radiography does not induce brain tumors (20). It should be noted that ionizing radiation at a dose < 0.05-0.1 Gy or 5 R does not increase the risk of developmental disorders or premature birth. Therefore, there are no contraindications to diagnostic radiology in pregnancy if it is necessary for dental treatment (7).

The increased reporting for the first dental visit in the first and middle trimester is a positive phenomenon. It should be also noted that most procedures were performed in the middle trimester, which is in line with the current guidelines for dental care in pregnant women.

CONCLUSIONS

The use of dental care among pregnant women is still insufficient. It is mainly associated with the need for oral disease treatment and modified by socio-demographic factors. A referral from a gynaecologist is a strong predictor of a pregnant woman's visit to the dentist; therefore it seems advisable to raise doctors' awareness on their significant impact on the oral health of their patients. Insufficient preventive procedures and avoiding diagnostic radiology during pregnancy point to the need for educating future mothers and dentists on dental care in pregnancy.

CONFLICT OF INTEREST

None

CORRESPONDENCE

*Angelika Kobylińska
Zakład Stomatologii Dziecięcej
Warszawski Uniwersytet Medyczny
ul. Miodowa 18 00-246 Warszawa
tel. +48 (22) 502 20 31
kobylinska.angelika@gmail.com

REFERENCES

1. Offenbacher S, Lieff S, Boggess KA et al.: Maternal periodontitis and Prematurity. Part I: Obstetric outcome of prematurity and growth restriction. *Ann Periodontol* 2001; 6: 164-174.
2. Dasanayake A: Poor periodontal health of the pregnant woman as a risk factor for low birth weight. *Ann Periodontol* 1998; 3: 206-212.
3. Davenport E, Williams C, Sterne J et al.: The East London study of maternal chronic periodontal disease and preterm low birth weight infants: study design and prevalence data. *Ann Periodontol* 1998; 3: 213-221.
4. López NJ, Da Silva I, Ipinza J, Gutiérrez J: Periodontal therapy reduces the rate of preterm low birth weight in women with pregnancy-associated gingivitis. *J Periodontol* 2005; 76(11 suppl.): 2144-2153.
5. Mitchell SC, Ruby JD, Moser S et al.: Maternal transmission of *Mutans Streptococci* in Severe-Early Childhood Caries. *Pediatr Dent* 2009; 31(3): 193-201.
6. Hartnett E, Haber J, Krainovich-Miller B et al.: Oral Health in Pregnancy. *JOGNN* 2016; 45: 565-573.
7. Kurien S, Kattimani VS, Sriram RR et al.: Management of Pregnant Patient in Dentistry. *JIOH* 2013; 5(1): 88-97.
8. Petersen PE: World Health Organization global policy for improvement of oral health – World Health Assembly 2007. *Int Dent J* 2008; 58(3): 115-121.
9. Cigna Corporation: Healthy smiles for mom and baby: Insights into expecting and new mothers' oral health habits. 2015; <https://www.cigna.com/assets/docs/newsroom/cigna-study-healthy-smiles-for-mom-and-baby-2015.pdf>.
10. Zwoliński J, Paprzycki P: Badania ankietowe rodzących kobiet. [W]: Żukiewicz-Sobczak W, Paprzycki P (red.): Raport „Zachowania zdrowotne kobiet w ciąży”. Instytut Medycyny Wsi im. Witolda Chodźki, Lublin 2013: 103-145; http://zdrowiewciazy.pl/pdf/publikacje/raport_zachowania_zdrowotne_kobiet_w_ciazy.pdf.
11. George A, Johnson M, Blinkhorn A et al.: The oral health status, practices and knowledge of pregnant women in south-western Sydney. *Aust Dent J* 2013; 58: 26-33.
12. Boggess KA, Urlaub DM, Massey KE et al.: Oral hygiene practices and dental service utilization among pregnant women. *J Am Dent Assoc* 2010; 141(5): 553-561.
13. Amin M, ElSalhy M: Factors affecting utilization of dental services during pregnancy. *J Periodontol* 2014; 85(12): 1712-1721.
14. Lydon-Rochelle MT, Krakowiak P, Hujuel PP, Peters RM: Dental Care Use and Self-Reported Dental Problems in Relation to Pregnancy. *AJPH* 2004; 94(5): 765-771.
15. Thomas N, Middleton P, Crowther C: Oral and dental health care practices in pregnant women in Australia: a postnatal survey. *BMC Pregnancy Childbirth* 2008; 21(8): 13.
16. Azofeifa A, Yeung LF, Alverson CJ et al.: Oral health conditions and dental visits among pregnant and nonpregnant women of childbearing age in the United States, National Health and Nutrition Examination Survey, 1999-2004. *Prev Chronic Dis* 2014; 11: E163.
17. Hullah E, Turok Y, Nauta M, Yoong W: Self-reported oral hygiene habits, dental attendance and attitudes to dentistry during pregnancy in a sample of immigrant women in North London. *Arch Gynecol Obstet* 2008; 277(5): 405-409.
18. Keirse MJNC, Plutzer K: Women's attitudes to and perceptions of oral health and dental care during pregnancy. *J Perinat Med* 2010; 38: 3-8.
19. Daniels JL, Rowland AS, Longnecker MP et al.: Maternal dental history, child's birth outcome and early cognitive development. *Paediatr Perinat Epidemiol* 2007; 21(5): 448-457.
20. Michalowicz BS, DiAngelis AJ, Novak MJ et al.: Examining the safety of dental treatment in pregnant women. *J Am Dent Assoc* 2008; 139(6): 685-695.

submitted/nadesłano:

12.02.2018

accepted/zaakceptowano do druku:

5.03.2018