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Nutritional behavior in pregnancy

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ABSTRACT

Objectives: The aim of the study was to characterize nutritional behavior in pregnancy.

Material and methods: The survey study included 250 pregnant women. The survey concerned dietary behavior reffered to the type of diet, the number of meals per day, snacking between meals, consumption of meat, fish, dairy products, bread, fruits and vegetables.

Results: 88.8% of the respondents were not on a special diet. The most of the women ate more than three times a day. The women usually ate fruits and vegetables, yogurt and sweets as snacks between meals. The majority of respondents consumed meat and sliced meats twice or once a day with the preference of poultry. Only 17.6% of them ate fish with the recommended frequency and as much as 21.2% chose not-recommended species. Almost 29.6% of patients consumed 3 to 4 servings of milk or milk products a day and 16.8% of them excluded milk. Half of the respondents declared eating wheat bread and 24% of them chose wheat roll during pregnancy. Despite the large number of women who consumed wheat baking, a considerable amount of women chose wholemeal bread and wholemeal rolls. Nutritional behaviors were correlated with on education level and weight gain during pregnancy.

Conclusions: The frequency of meals was adequate for the most of pregnant women as well as recommended consumption of meat with poultry preference. However, the inappropriate nutrition was also observed in a low consumption of fish and dairy products, a high consumption of wheat breadstuff and sweets, as well as in a small intake of milk. Education level and weight gain during pregnancy were associated with nutritional behaviors.

Key words: nutritional behavior; proper diet; eating habits; healthy lifestyle; body mass index; weight gain

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INTRODUCTION

Proper nutrition in pregnancy is one of the public health concerning problem. The malnutrition affects more than a half of women in many low- and middle-income countries with the highest risk among the poorest [1].

Both among underweight as well as overweight women, the risk of small for gestational age fetuses (SGA) and prematurity is increased [2]. Moreover, maternal obesity can lead to many consequences such as pregnancy induced hypertension, preeclampsia, gestational diabetes, increased rate of cesarean sections and delivering large for gestational age infants (LGA) [3].

Leonard SA. et al. reported that high maternal body weight in the reproductive period increases the risk of childhood obesity. Furthermore, the high pre-pregnancy BMI influences more on the postpartum weight retention than weight gain during pregnancy [4].

According to the Academy of Nutrition and Dietetics statement, reproductive-aged women should implement a healthy lifestyle, which reduces the risk of fetal defects, inappropriate fetal development and chronic diseases of both mother and newborn. The factors affecting the perinatal outcomes include correct pre-pregnancy weight, appropriate weight gain and physical activity during gestation, consumption of a wide variety of food, vitamins and minerals supplementation, elimination of alcohol and smoking [5].

Objectives

The aim of the study was to characterize nutritional behavior in pregnant women in Poland.

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MATERIAL AND METHODS

The survey study included 250 women who gave birth in the Obstetric-Gynecological Hospital, University of Medical Sciences in Poznan. All patients signed informed consent and fulfilled a questionnaire prepared by authors (Supp. file 1). Then the women were divided into two groups- those with lower and higher education level and the nutritional behaviors were analyzed. Independently, they were divided for three groups according to pre-pregnancy BMI and gestational weight gain recommended by the Institute of Health [6]. The first group was composed of women with lower weight gain than recommended, the second group consisted of females with proper weight gain and the third group included respondents who put on weight more than recommended**.**

The questions referred to general information, such as age, pregestational and actual weight, place of residence, education, marital status, employment before and during pregnancy, the period of working during pregnancy and the type of pregnancy (singleton or multiple). Moreover, the questions also concerned diseases and complications during pregnancy. The part of dietary behaviours referred to the type of diet and the number of meals per day. It also concerned snacking between meals, consumption of meat, fish, dairy products, bread, fruits and vegetables.

The general characteristics of the study group is presented in the Table 1. The coexisting diseases and pregnancy complications are shown in the Table 2. The data are expressed as a percentage or as mean (M) and standard deviation (SD).

The calculations were performed using Microsoft Excel 2010 and Statistica StatSoft 13.1. The data in interval scale were assessed using nonparametric Mann-Whitney test and the data in nominal scale were analyzed using the Fisher's exact test. The significance level was assumed as p-value below 0.05. The data do not add up because of multiple choice questions.

RESULTS

88.8% of the respondents were not on any special diet. Only 7.2% of women were on diabetic diet and 0.8% on gluten-free diet. The same number of women were on low-salt diet and 0.4% on low-fat diet. Only 1.2% of pregnant women were vegetarians or vegans. High protein food responded 0.8% women. When assessing the frequency of meals, it was noticed that only 33.6% of women ate 5 times a day or more often. Pregnant women consumed meals 4 (36.0%) or 3 (26.0%) times a day, and up to 4.4% ate less than 3 times a day. Especially often they ate fruits and vegetables (84.8%) and yoghurt (68.8%). Almost half of them ate sweets (46.8%) between meals. According to fruits and vegetables, the most often chosen were apples, bananas, oranges, and among vegetables tomatoes, carrots, cucumber and potatoes.

Table 1. The general characteristics of survey respondents

Characteristics	Pregnant women
Age [years] (Mean ± SD)	30 ± 5
BMI [kg/m^2] (Mean ± SD)	22.8 ± 4.4
Place of residence [%]	
rural areas	33.2
urban areas	66.8
Education [%]	
lower	29.2
higher	70.8
Marital status [%]	
unmarried	16.0
married	81.2
divorced	2.8
Work activity [%]	
before pregnancy	86.4
during pregnancy	59.6
Term of gestational work activity discontinuation [weeks] (Mean ± SD)	20 ± 10
Type of pregnancy [%]	
singleton	91.2
multiple	8.8

Table 2. The diseases and pregnancy complications of survey respondents

Diseases and pregnancy complications	Number of pregnant women [%]
Chronic arterial hypertension	4.4
Pregnancy induced arterial hypertension	4.4
Gestational diabetes mellitus	9.6
Anaemia	7.6
Hypothyroidism	8.4
Hyperthyroidism	1.2
Polyhydramnion	2.0
Oligohydramnion	2.0
Premature membrane rupture	4.0
Intrauterine growth restriction	3.6
Fetal defect	2.0
Cervical insufficiency	4.8
Threatening preterm delivery	18.8
Vaginal bleeding in pregnancy	8.8
Spine pain	30.4

The majority of respondents consumed meat and sliced meats twice (38.8%) or once (34.8%) a day. As for meat, most of them consumed poultry (73.2%). Much less women consumed beef (13.2%) and pork (8.8%). Even less pregnant women ate veal (3.2%) and rabbit meat (0.4%) that are considered very healthy. Only 17.6% of women ate fish with the recommended frequency. 75.6% of them chose fish

called „fish of best choices" (salmon, cod, zander, herring, pollock, hake, blue hake, trout, sole) and even 21.2% chose not-recommended species such as mackerel, panga, and tuna. The majority of women (65.6%) consumed fish only once a week, and 12.4% did not eat fish at all. Almost 29.6% of patients consumed three to four servings of milk or milk products a day. However, 16.8% of patients excluded milk completely. Half of the respondents declared eating wheat bread and 24% of them chose wheat roll during pregnancy. Despite the large number of women who consumed wheat baking, a considerable amount of women chose wholemeal bread (49.2%) and wholemeal rolls (35.6%).

The high-educated women ate significantly more often five (34% vs 12%, p = 0.0002) or more than five (8% vs 0%, p = 0.0068) meals a day in comparison to women with lower education level. Additionally, women with lower education consumed two dishes a day statistically more often (7% vs 2%, p = 0.0491). The high-educated respondents declared eating vegetables (92% vs 74%, p = 0.0002), yoghurt (75% vs 55%, p = 0.0020), beef (18% vs 3%, p = 0.006) and „fish of best choices" (80% vs 64%, p = 0.0096) significantly more often than the rest of respondents. Taking into account the frequency of meat consumption, high-educated respondents declared eating meat and sliced meats once a day (39% vs 25%, p = 0.0206) significantly more often. Statistically the greater group of women with lower education consumed dairy products four or more times a day (15% vs 5%, p = 0.0107) but they also declared significantly more often eating dairy products occasionally (10% vs 2%, p = 0.0078) or not eating at all (4% vs 0%, p = 0.0242). The wholemeal bread (59% vs 25%, p < 0.0001) and wholemeal rolls (40% vs 26%, p = 0.0285) were eaten significantly more often by high-educated women in comparison to those with lower education, who preferred wheat bread (66% vs 44%, p = 0.0010). Considering fruits and vegetables, the respondents with higher education chose apples (78% vs 63%, p = 0.0123), raspberries (21% vs 8%, p = 0.0077), grapefruits (18% vs 5%, p = 0,0077), asparagus (14 vs 1%, p = 0,0013), tomatoes (76 vs 53%, p = 0,0004), onions (14 vs 5%, p = 0.0469) significantly more often but they also ate potatoes (35 vs 58%, p = 0.0009) and broccoli (28% vs 42%, p = 0.0175) statistically less often than those with lower education.

According to pre-pregnancy BMI and gestational weight gain the women with lower weight gain than recommended declared consumption of wheat bread (62.8% vs 45.7%, p = 0.0329), watermelon (15.3% vs 4.3%, p = 0.0250) and beef (17% vs 6.6%, p = 0.0410) significantly more often than women with proper weight gain. Moreover, the females, who put on weight too low than recommended declared significantly more often consumption of watermelon (15.3% vs 2.7%, p = 0.0448) and statistically less often eating between meals (1.2% vs 8.1%, p = 0.0462), consumption of cod (23.9% vs 43.6%, p = 0.0250) and herring (14.8% vs 33.3%, p = 0.0167) than females with higher weight gain than recommended. Furthermore, women with higher weight gain ate herring (33.3% vs 10.5%, p = 0.0027) and avoided eating meat (10% vs 0%, p = 0.0044) significantly more often than those with proper weight gain.

DISCUSSION

Proper nutritional behavior in pregnancy is important for the wellbeing of both mother and fetus, because well-balanced diet supports maternal health during gestation, delivery and breastfeeding [7–11]. Most of our respondents were not on a diet similar to the results observed by Mielnik [12]. A special type of diet was implemented mostly as a consequence of pregnancy complications, forcing them to change the diet.

The Institute of Medicine recommends eating of three meals and two or more snacks a day [13]. Siega-Riz et al. [14] observed that women, who consumed main meals and snacks less often, had a higher risk of preterm delivery. In our study, only 26% of females followed the recommendations and consumed three main meals a day. Moreover, the most of our respondents declared eating four (36%) or five (28%) meals a day. The similar results were obtained by Mielnik [12]. Furthermore, Pieszko et al. [15] observed the increasing frequency of consumed meals in comparison to the pre-pregnancy period.

In the study of Kobiołka et al. the most often eaten snacks between meals were fruits (80%). Consecutively, pregnant women as snacks chose yogurt (61%), sweets (54%) and vegetables (19%) [16], what was compatible with the results of our study.

During pregnancy, the main recommended source of animal protein should be lean meat and its products, skimmed milk and its products, as well as fish and eggs. The consumption of pork due to the high content of saturated fats should be limited [17]. The consumption of meat and its products allows to cover the increasing iron demand for the prevention of anaemia and preterm delivery [18, 19]. According to Szostak-Węgierek and Cichocka [20] study, the pregnant women should consume one portion (about 150 grams) of poultry a day in the first trimester and one and a half servings of poultry a day in the second and third trimester, interchangeably with fish two to three times a week. In our study, most women followed the recommendations and consumed meat and sliced meats twice (38.8%) or once (34.8%) a day, which was comparable with results of Mielnik. Moreover, she presented a similar number of non-eating meats women as it was found in our study (3.4%). Similarly to Mielnik's research, pregnant women preferred poultry [12].

During gestational period pregnant women should also eat fish meals. It is recommended to eat one portion of fish (about 150 grams) in the first trimester and one and a half portion of fish during the second and third trimester with the frequency of two to three times a week [20]. In accordance with the Food and Drug Administration recommendations [21], the pregnant women should consume two to three servings of fish of best choices a week or one serving of fish of good choices a week. Only about one fifth (17.6%) of our patients ate fish with the recommended frequency. Moreover, even 21.2% of the respondents chose not-recommended species of fish. Kobiołka et al. [16] noticed that the majority of pregnant women consumed fish once or twice a week (74%), three to four times a week (18%) and 8% of them declared not eating fish at all.

Furthermore, it is recommended to consume three servings of milk or milk products a day in the first trimester and four servings a day in the second and third trimester of pregnancy. One glass of milk, yogurt, kefir, 100 grams of curd cheese or 2 slices of cheese is considered as one serving [20]. Our study revealed that only less than one third of patients followed these recommendations (29.6%). This means that pregnant women eat dairy products in an insufficient amount, which may have an undesirable adverse effect on the course of pregnancy. Similar eating habits in relation to dairy products were presented by Kobiołka et al. [16]. Moreover, only about one fifth of pregnant patients consumed milk every day (23.2%). Furthermore, 16.8% of our patients did not drink milk. Similarly, in the Mielnik's study [12] as much as 33% of women did not drink milk during gestation. Contrary, Kobiołka et al. [16] revealed that only 1% of pregnant respondents declared drinking of milk.

The basic products recommended in the daily diet of pregnant women are cereal products, being the main source of carbohydrates and minerals [22, 23]. Wholemeal bread, rich in fiber, regulates the motility of the digestive tract, gives a sense of satiety, which prevent snacking between meals, and thus creates a greater opportunity to maintain proper weight. Half of our respondents declared eating wheat bread and 24% of them chose wheat roll during pregnancy. Despite the large number of women who consumed wheat baking, a considerable amount of females chose wholemeal bread (49.2%) and wholemeal rolls (35.6%). Slightly worse nutritional habits were observed by Mielnik. The most of survey respondents chose wheat bread (48.9%) and wheat roll (46.6%). The rest of pregnant respondents ate wholemeal bread (29.5%), wholemeal roll (20.5%), wheat-rye bread (19.3%), rye bread (14.8%) and toasted bread (3.4%) [12].

The positive association between consumption of fruit and vegetables and a birthweight was observed in previous studies [24–26]. Our respondents ate the most often apples, bananas and oranges, and the most often chosen vegetables were tomatoes, carrots and potatoes. The similar preferences were observed by Mielnik [12].

A lot of dietary behaviors were associated with education level. That's why education of pregnant patients regarding healthy nutrition is so important. Interestingly, only a few dietary preferences differed between patients after taking into account BMI and gestational weight gain. We assumed that differences between groups may not be statistically significant because all groups were composed of patients whose pre-pregnancy BMI was too low, normal or too high, therefore the differences of nutritional behaviors may be unnoticeable. In addition, the questionnaire referred to the consumption of food in pregnancy without specifying the consumed quantity. Dietary intake is difficult to measure but the meals quantity is one of the most important factors of the appropriate weight gain during pregnancy. The larger meal portions contribute to higher weight gain in pregnant women. The method of measurement of the food consumption should be easy and clear for all pregnant women. According to Nöthlings study [27], measuring food intake by cups, servings and grams is effective and adequate for most analyzes. Taking into account cups and servings may be much easier for most surveyed patients. In our study we decided that it would be difficult to determine because of probable differences between gestational trimesters, even within the same trimester and seasonal changes in meals composition. Anyway, the calculation of food intake should be consider in further studies.

Analyzing the dietary preferences data in pregnancy, it should be stated that many pregnant women do not follow the food recommendations. It has to be underline that there is a lot to do in this area. The principles of healthy eating based on the pyramid of healthy nutrition should be promoted among reproductive-aged women. Doctors and health professionals should be obliged to implement proper dietary behavior and inform about harmful effects of both malnutrition as well as overeating in pregnancy.

CONCLUSIONS

The study revealed that the most pregnant women consumed meals with adequate frequency. Moreover, we noticed the recommended consumption of meat with poultry preference. However, the dietary habits revealed nutritional mistakes such as low consumption of fish and dairy products, consumption of wheat breadstuff and sweets, as well as small intake of milk. The high education level was related with greater consumption of vegetables, yoghurt, beef„fish of best choices", wholemeal bread and eating five meals a day. The weight gain during pregnancy was associated with consumption of wholemeal bread, beef, herring, watermelon, eating between meals and eating meat in general. Therefore, there is still a considerable need to expand nutritional education and to develop mother awareness in the perinatal care programs.

REFERENCES

1. Balarajan Y, Ramakrishnan U, Ozaltin E, et al. Anaemia in low-income and middle-income countries. Lancet. 2011; 378(9809): 2123–2135, doi: 10.1016/S0140-6736(10)62304-5, indexed in Pubmed: 21813172.
2. Ramakrishnan U, Grant F, Goldenberg T, et al. Effect of women's nutrition before and during early pregnancy on maternal and infant outcomes: a systematic review. Paediatr Perinat Epidemiol. 2012; 26 Suppl 1: 285–301, doi: 10.1111/j.1365-3016.2012.01281.x, indexed in Pubmed: 22742616.
3. Gaillard R, Durmuş B, Hofman A, et al. Risk factors and outcomes of maternal obesity and excessive weight gain during pregnancy. Obesity (Silver Spring). 2013; 21(5): 1046–1055, doi: 10.1002/oby.20088, indexed in Pubmed: 23784909.
4. Leonard SA, Rasmussen KM, King JC, et al. Trajectories of maternal weight from before pregnancy through postpartum and associations with childhood obesity. Am J Clin Nutr. 2017; 106(5): 1295–1301, doi: 10.3945/ajcn.117.158683, indexed in Pubmed: 28877895.
5. Procter SB, Campbell CG. Position of the Academy of Nutrition and Dietetics: nutrition and lifestyle for a healthy pregnancy outcome. J Acad Nutr Diet. 2014; 114(7): 1099–1103, doi: 10.1016/j.jand.2014.05.005, indexed in Pubmed: 24956993.
6. Institute of Health. Nutrition during pregnancy. Washington DC 1990.
7. Arkkola T. Arkkola T. Diet during pregnancy. Dietary patterns and weight gain rate among Finnish pregnant women. Acta Universitatis Ouluensis. D, Medica 2009.
8. Bręborowicz GH, Ropacka-Lesiak M. Żywienie w czasie ciąży i połogu. In: Bręborowicz GH. ed. Położnictwo i ginekologia. Tom 1. Położnictwo. PZWL, Warszawa 2015: 73–83.
9. Bręborowicz GH, Ropacka-Lesiak M. Żywienie w czasie ciąży i połogu. In: Bręborowicz GH, Markwitz W. ed. Położnictwo. Tom 1. Fizjologia ciąży. PZWL, Warszawa 2012: 153–167.
10. Bręborowicz GH, Ropacka M. Żywienie kobiet ciężarnych i karmiących. In: Grzymisławki M, Gawęcki J. ed. Żywienie człowieka zdrowego i chorego. Tom 2. Wyd. 2. PWN, Warszawa 2010: 62–79.
11. Ropacka M. Żywienie kobiet ciężarnych. In: Bręborowicz GH. ed. Położnictwo i ginekologia. PZWL, Warszawa 2005: 67–75.
12. Mielnik A. Stężenie kwasu foliowego i homocysteiny w surowicy krwi pępowinowej w zależności od wybranych czynników środowiskowych. Rozprawa doktorska 2017.
13. Institute of Medicine. Nutrition During Pregnancy and Lactation. 1992, doi: 10.17226/1984.
14. Siega-Riz AM, Herrmann TS, Savitz DA, et al. Frequency of eating during pregnancy and its effect on preterm delivery. Am J Epidemiol. 2001; 153(7): 647–652, doi: 10.1093/aje/153.7.647, indexed in Pubmed: 11282791.
15. Pieszko M, Ciesielska-Piotrowicz J, Skotnicka M, et al. Behaviour health pregnant women with secondary and higher education – preliminary studies. Pediatria i Medycyna Rodzinna. 2017; 13(1): 94–102, doi: 10.15557/pimr.2017.0009.
16. Kobiołka A, Goraus M, Mężyk I, et al. Wpływ ciąży na zmianę nawyków żywieniowych kobiet w wieku rozrodczym. Zdrowie i dobrostan. 2015; 2(13): 187–205.
17. Krzyszycha R, Bień AM, Grudzińska M. Dieta kobiety ciężarnej. Zapotrzebowanie na składniki odżywcze i ich rola w organizmie kobiety ciężarnej. In: Bień AM. ed. Opieka nad kobietą ciężarną. PZWL, Warszawa 2009: 225–230.
18. Rekomendacje Zarządu Głównego Polskiego Towarzystwa Ginekologicznego w zakresie opieki przedporodowej w ciąży o prawidłowym przebiegu. Ginekol Dypl. 2008; 10: 191–196.
19. Kułaga Z, Grajda A. Profilaktyka otyłości od poczęcia. Standardy medyczne/ Profilaktyka zdrowotna. 2015; 1: 23–40.
20. Szostak-Węgierek D, Cichocka A. Żywienie kobiet ciężarnych. 2nd ed. PZWL, 2012 .
21. US Food and Drug Administration & US Environmental Protection Agency. Eating fish: what pregnant women and parents should know. http://www.fda.gov/ downloads/Food/FoodborneIllnessContaminants/Metals/ UCM537120.pdf (10.2017).
22. Szostak-Węgierek D. Znaczenie prawidłowego żywienia kobiety w czasie ciąży. Żyw Człow. 2004; 31(2): 160–171.
23. Raczyński P, Kubik P, Niemiec T. Zalecenia dotyczące suplementacji diety u kobiet podczas planowania ciąży, w ciąży i w czasie karmienia piersią. Ginek Prakt. 2006; 14(4): 2–7.
24. Mikkelsen TB, Osler M, Orozova-Bekkevold I, et al. Association between fruit and vegetable consumption and birth weight: a prospective study among 43,585 Danish women. Scand J Public Health. 2006; 34(6): 616–622, doi: 10.1080/14034940600717688, indexed in Pubmed: 17132595.
25. Ramón R, Ballester F, Iñiguez C, et al. Vegetable but not fruit intake during pregnancy is associated with newborn anthropometric measures. J Nutr. 2009; 139(3): 561–567, doi: 10.3945/jn.108.095596, indexed in Pubmed: 19158218.
26. Rao S, Yajnik CS, Kanade A, et al. Intake of micronutrient-rich foods in rural Indian mothers is associated with the size of their babies at birth: Pune Maternal Nutrition Study. J Nutr. 2001; 131(4): 1217–1224, doi: 10.1093/jn/131.4.1217, indexed in Pubmed: 11285330.
27. Nöthlings U, Murphy SP, Sharma S, et al. A comparison of two methods of measuring food group intake: grams vs servings. J Am Diet Assoc. 2006; 106(5): 737–739, doi: 10.1016/j.jada.2006.02.006, indexed in Pubmed: 16647334.

Supplemental file 1. The questionnaire

Part I — demographic data (please highlight the correct answers)			
Age			
Body weight before pregnancy			
Current body weight			
Height			
Place of residence			
	rural area less than 5000 people		
	small city less than 20,000 people		
	city more than 20,000 people		
Monthly household income without taxes			
	less than 1,000 PLN		
	1,100–3,000 PLN		
	3,100–6,000 PLN		
	6,100–10,000 PLN		
	more than 10,000 PLN		
Education			
	primary		vocational
	high school		higher
Marital status			
	unmarried		married
	divorced		other .....
Did you work professionally?			
	before pregnancy		
	yes		no
	during current pregnancy		
	yes		no
If yes, until which week of pregnancy did you work?			
Type of professional work (describe)			
	physical work		
	mental work		
	housewife		
	other		

In which area are you employed?			
	agriculture		food industry
	textile industry		construction
	hotel and gastronomy		transport
	finance and banking		media, publishing
	advertising		
	information technology, telecommunications		
	public administration		education
	health service		social assistance
	culture, entertainment		recreation
	other		
Type of the work (you can choose more than one answer)			
	sitting, about 4 hours per day		
	sitting, about 8 hours or more per day		
	physical, less than 4 hours per day		
	physical, about 8 hours or more per day		
	work mostly related with driving		
	student		
	unemployed		
What is the main source of the stress for you in your work ? (choose maximum 3 answers)			
	conflicts between employees		
	conflicts with management		
	problems with defining the responsibilities		
	sense of control		
	workload		
	possibility of self-realization and the use of own potential		
	conflict of values		
	health		
	physical working conditions		
What is the main source of the stress for you in your family life? (choose maximum 3 answers)			
	conflicts with your spouse/partner		
	conflicts with other family members		
	health of family members		
	financial problems		
	work		
	division of duties (cleaning, babysitting)		
	conflict of values		
	political views		
	other		
Part II — questions about general health and obstetric history (please write or highlight the correct answer)			
Obstetric history			
	labors		
	period between current and last pregnancy (years)		
	miscarriages		
Week of gestation			

Type of pregnancy	
	single
	multiple
Did you suffer from (you can choose more than one option)	
	chronic arterial hypertension
	pregnancy induced arterial hypertension
	coronary heart disease
	pregestational diabetes mellitus
	gestational diabetes mellitus
	asthma
	anaemia
	hyperthyroidism
	hypothyroidism
	viral hepatitis (typ B or C)
	renal failure
	liver diseases (which) .....
	other ....
Did you suffer from any other pregnancy complication: (several answers are possible)	
	polyhydramnion
	oligohydramnion
	premature rupture of membranes) (which week of pregnancy? .....
	intrauterine growth restriction
	complications of multiple pregnancy (twin-to-twin transfusion syndrome, selective intrauterine growth restriction)
	fetal defect .....
	genetic fetal defect .....
	cervical insufficiency, did you have cervical suture? If yes, in which week of pregnancy? .....
	threatening preterm delivery
	threatened miscarriage
	intrauterine infection
	bleeding
	abdominal pain
	abnormality of placenta or umbilical cord: placenta increta, vasa previa, umbilical cord collision
	other .....
Did you have the back pain during pregnancy?	
	yes
	no
When did the back pain occur first time? (week of gestation)	
In which part of spine did a pain occur? (multiple choice)	
	cervical
	thoracic
	lumbar
	pelvic
	all

Did a pain awake you?			
	yes		
	no		
Did you have hands oedema?			
	yes, in which week of pregnancy?		
	no		
Did you have legs oedema?			
	yes, in which week of pregnancy?		
	no		
Was there a time during the day when the back pain was stronger? (Multiple choice)			
	morning, just after awake		morning
	early afternoon		afternoon
	evening		whole day
	at night		
Part III — nutritional behaviors during pregnancy (please highlight the correct answer)			
Were you on any special diet?			
	no		
	vegetarian		
	vegan		
	other, what?		
How many meals did you have every day (without sweets)			
	one		two
	three		four
	five		more than five
What did you eat between main meals?			
	fruits, vegetables		
	yoghurt		
	sweets		
	sandwiches		
	sweet buns		
	other, what?		
	I don't eat between meals		
What kind of bread did you eat the most often (choose maximum 2 answers)			
	wheat bread		
	wholemeal bread		
	rye bread		
	wheat rolls		
	wholemeal rolls		
	crispy bread		
	I don't eat bread		
What fruits were you most likely to eat (choose maximum 3 options)			
	apples		strawberries
	grapes		plums
	raspberries		cherries
	bananas		oranges
	peaches or apricots		watermelons
	lemons		grapefruits
What vegetables were you most likely to eat (choose maximum 3 options)			
	potatoes		carrots
	parsley		broccoli
	cauliflower		asparagus
	celery		tomatoes
	cucumbers		onions
What kind of meat did you eat most often during pregnancy?			
	poultry		
	beef		
	veal		
	other, what?		
	I didn't eat meat during pregnancy		
What kind of fish did you eat most often during pregnancy?			
	salmon		
	carp		
	cod		
	zander		
	mackerel		
	herring		
	pollock		
	panga		
	hake		
	other, what?		
	I didn't eat fish during pregnancy		
How often per week did you eat fish as main meal?			
	once a week		
	twice a week		
	3 times a week		
	4 times a week		
	five or more than 5 times a week		
	I didn't eat fish at all		
How often did you eat meat and sliced meats?			
	once a day		
	twice a day		
	3 times a day		
	4 or more than 4 times a day		
	I didn't eat meat and sliced meats at all		
	occasionally		
How often did you eat dairy products?			
	once a day		
	twice a day		
	3 times a day		
	4 or more than 4 times a day		
	I didn't eat dairy products		
	occasionally		