

NUTRITIONAL ANALYSIS IN WOMEN DURING PREGNANCY

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ABSTRACT: *Nutrition during pregnancy is an important element for the development of the fetus and the mother's health because during this period the female organism experiences numerous metabolic, hormonal and psychological changes, which may be affected by nutrition. Adequate intake of energy and nutritionally adequate food during pregnancy ensures undisturbed mother's life, normal birth, normal development of the fetus in the womb, and the child, especially in the first years of life, whereby care must be taken to avoid excessive weight gain or loss and anemia. The paper will seek to show how important it is that in addition to regular energy intake (carbohydrates, fats) organism should receive the appropriate building (proteins) and biological substances (vitamins and minerals), and water with the aim to show the extent to which women in Novi Sad are familiar with the rules of nutrition during pregnancy and to what extent they adhered to known principles to them, and whether such a diet during pregnancy had positive or negative effects on their bodies and health of their children.*

Keywords: *food, nutrition, pregnancy*

INTRODUCTION

Proper nutrition during pregnancy is one of the most important elements for the development of the fetus and the mother's health because during this period the female organism experiences numerous metabolic, hormonal and psychological changes, which may be affected by food.

The quality and volume of food have particular importance. Adequate intake of energy and nutritionally adequate valuable food during pregnancy ensures undisturbed mother's life, normal birth, normal development of the fetus in the womb, and the child, especially in the first years of life, whereby care must be taken to avoid excessive weight gain or loss and anemia (Verbeke, de Bourdeaudhuij, 2007).

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Pregnancy as a normal physiological condition can be followed by complications, usually because of inadequate nutrition. Because of this, food is a very important factor for the pregnant woman and the fetus, which grows and develops in the womb. Adequate nutrition causes better health of the mother during pregnancy and a faster recovery after childbirth (Ninković, 1989; Plećaš et al., 2014; Banjari et al., 2014).

Given the fact that unfortunately the diet of pregnant women is still surrounded by many prejudices, this area has not been sufficiently investigated, and the available data are quite scarce. But there is growing interest in both proper nutrition, and healthy lifestyle, so there is expected expansion of knowledge in this field. Because of this, the paper will seek to show how important it is that in addition to regular energy intake (carbohydrates, fats) the organism receives the appropriate building (proteins) and biological substances (vitamins and minerals), and water in order to show the extent to which women in Novi Sad are familiar with the rules of nutrition during pregnancy and to what extent they adhered to known principles to them, and whether such a diet during pregnancy had positive or negative effects on their bodies and health of their children.

The task was to provide answers using the interview between the former pregnant women from the territory of Novi Sad to the following questions:

- What is the level of knowledge among women about proper nutrition during pregnancy?
- How much is this knowledge applied, or whether they complied with the basic principles of proper nutrition during pregnancy?
- How much did such a diet affect their health and the health of the child?

LITERATURE REVIEW

Nutrition of pregnant women

According to the recommendations of specialists, the pregnant women are often prohibited to consume certain foods and dishes. Some foods are even recommended in large amounts, in order to have more milk after birth.

Optimal weight gain during pregnancy is 11-12 kg, but it depends on many factors, which include, above all, genetics, age of women, the BMI before pregnancy, smoking habits, and whether it is a twin or multiple pregnancies.

When we talk about daily energy needs, it should be noted that they are dependent on several factors: age of pregnant woman, her physical activity, the BMI prior to conception and eating habits. Every pregnancy is "specific" in its own way. The authors note that depending on such factors needs range from 6700 kJ (1600 kcal/day) - for poorly physically active to 11 000 kJ (2600 kcal/day) - for very active pregnant women, in some cases even up to 12 000 kJ (2,900 kcal - in the case of low body weight before pregnancy (Simikić, Popov Rajčić, Tešanović and Pućo, 2011; Plećaš et al., 2014).

During the first two months, energy needs are growing very poorly, so a pregnant woman should be guided by appetite and not to be influenced that it is necessary to eat

for two. Needs for calcium grow in this period; it is an important vitamin for both mother and child, so it is necessary to incorporate into the diet, to consume a lot of milk, yogurt, dairy products, to eat plenty of fruits and vegetables. Second month of pregnancy brings huge changes in the body, including morning sickness. Food rich in proteins and carbohydrates is of great help. It is necessary to consume nuts, yogurt, hard-boiled eggs, lean meats—all these foods are a good source of protein, as well as baked potatoes, rice, vegetables, grains that are rich in carbohydrates.

During the third month, the internal structure of the baby has been completed, a proper diet allows its further development. For proper bone growth magnesium is extremely important. Vitamin A is needed for healthy skin as well as for mucosa of the gastrointestinal tract and lungs. In the first three months the baby provides a personal supply of vitamin A, so it is necessary to consume food rich in vitamin A, such as potatoes, carrots, pumpkin, spinach and others.

The second trimester of pregnancy is marked by increased energy and appetite, morning sickness is reduced. During fourth month of pregnancy, it is necessary that a proper diet has been already established, and that diet is varied because the baby needs plenty of nutrients to ensure its proper development. The most important at this stage are vitamin D and omega-3 fatty acids, which are essential for the development of the baby's brain and eyes. Fish and seafood are their best choice. During this period mother's needs are to eat foods rich in iron. The need for this element will be doubled in the second and third trimesters. It is also necessary to take foods rich in vitamin C as the body can not save it, it needs to be entered into the body on a daily basis.

The second and third trimesters are the period of fetal development during which there is multiplication of previously differentiated organs. The fetus begins to move and creates supplies of iron, calcium and fat for the early days after birth. During this period, the risk factors can damage the fetus less than in the first trimester (Elmadfa Meyer, 2012).

Recommended food in nutrition of pregnant women

Grains contain a great content of carbohydrates, which are an important factor in human nutrition. Starch, protein, fiber, iron, the vitamin B complex and E are important sources of energy. Cereal products must be combined with meat, dairy products, fruits and vegetables because they are poor in calcium and some essential amino acids.

Milk and dairy products are required because they contain essential ingredients: calcium and phosphorus (essential for tissue growth and cell function), vitamins A, E and B complex. Most of the nutrients in milk can be compensate from other foods or taking dietary supplements, but it is difficult for vitamin D, which is present in small amounts in any other food that is commonly consumed (Nikodinović, 2010).

Nutrition in pregnant women should be rich in “lean meat” i.e. meat of poultry, lean beef and lean pork. During pregnancy, it is important that women eat meat every day, because the body best exploit iron from these types of foods, and also it is recommended horsemeat. Pregnant women should avoid salty food and food full of artificial additives, fat and meat products. Also, the meat must always be well prepared, because pregnant

women are at increased risk of bacterial poisoning from inadequately prepared meat. Of all types of meat, the highest biological value is in proteins of beef, which are essential for fetal development. Lamb is easily digestible and very good meat for pregnant women. Lamb is source of proteins, which are in front of proteins from veal and chicken by quantity and quality. Pork is a source of proteins, as well as zinc. Pork is rich in potassium, which plays a major role in maintaining optimal blood pressure and proper cardiac rhythm. Chicken in high percentage provides the essential amino acids necessary for proper development of the fetus. Turkey is also an excellent source of protein and is enriched in potassium, phosphorus, magnesium, calcium, selenium and zinc. It also contains vitamins B complex. Turkey also contains the amino acid tryptophan, which helps the body to produce serotonin, a substance that has a calming effect. Liver is one of the best sources of vitamin A. In addition, it is rich in proteins and iron, and contains chromium, as well as folic acid, vitamin B 1 and biotin. However liver should be consumed in small amounts and should not be on the menu more often than once every two weeks, because higher amounts of vitamin A can cause birth defects.

Eggs are a very rich source of essential nutrients. One egg contains on average about 11g proteins, 9g fat, 1.8 mg iron, 56 mg calcium, vitamins A, E and B. It is recommended to prepare eggs as soft-boiled instead of fried in fat (Karanović, Petrik, 2003).

As an integral part of the diet, fish contributes to the overall intake of vitamins and minerals in particular. It is an excellent source of vitamins B3, B12, D and A; minerals calcium, iron, zinc, potassium, phosphorus and it is one of the most important sources of selenium. Moreover, there are potential dangers of consuming fish. Mercury pollution has turned some types of fish in potentially hazardous foods that may have adverse effects on the nervous system of the child and therefore are not recommended during pregnancy. Fish that is safe in this regard is all the small fish such as sardines, smelt, sprat, hake, shrimp, salmon and many other species of fish that do not reach a large mass throughout life (Marjanović, 2014).

At least 5 servings a day of fruits and vegetables can provide an adequate intake of vitamins and minerals, especially if the diet is dominated by fresh foods. The recommended amounts of vegetables range from 200 to 250 g per day. Desirable vegetables are carrots, all kinds of cruciferous vegetables, broccoli, spinach, greens, onions, potatoes and others. Recommended fruits are fresh fruit, depending on the season.

Fat in the diet of pregnant women should be represented up to 30%. Particularly important are polyunsaturated fatty acids which are essential for the growth and development of the fetus, for the development of the nervous system, some structures of the eye, as well as of the cardiovascular system.

For normal functioning of the body fluid is very important, especially for pregnant women. It is recommended that pregnant women should drink 1.5 liters of water a day, a couple of glasses of natural juices, soups, milk and dairy products.

Inadvisable foods in nutrition of pregnant women

It is necessary to take account of consumption during pregnancy. Certain foods can be harmful to the health of mothers and babies. It is very important that nutrition during pregnancy is proper and medically safe, thus pregnant women consume all the necessary ingredients for the development of the baby. There are foods which should be taken very carefully because they may adversely affect the pregnancy and these are: un-pasteurized dairy products, raw meat and meat products, seafood, raw or undercooked eggs, overly spicy foods, herbal teas, artificial sweeteners - saccharin, coffee, alcoholic beverages, sugars, refined oil, fried foods, “snacks”, and cigarettes should also be avoided (Karanović, Petrik, 2003).

METHODOLOGY

The survey was conducted among women who were pregnant in the period from 2009 to 2014. The survey includes women from the territory of Novi Sad.

Research on the importance of proper nutrition in women during pregnancy is carried out by interviews with 27 major questions formed in the form of a questionnaire. The interview was supposed to give information about:

- Demographic characteristics of the respondents;
- Body mass of women;
- The health status;
- Consumption of recommended foods and
- Consumption inadvisable foods.

The obtained data on nutrition of women during pregnancy were statistically analyzed using descriptive statistics with graphical representation.

RESULTS AND DISCUSSION

Description of the sample

For purpose of research, 38 former pregnant women from territory of Novi Sad were questioned. The questionnaire refers only to information relating to the first pregnancy.

Age at the time of the first pregnancy of participants was between 19 and 38 years. The American College of Obstetricians and Gynecologists argues that pregnancy is risky when a woman is over 35 years old. Only one respondent was over 35 years of age at the time of the first pregnancy, so it is concluded that the other respondents aged 19 to 35 years are excluded from the group of “risk pregnancies“.

These pregnant women have completed primary education. There are no pregnant women with primary education, there were 21 women with a high school education, 13

with college and university degrees, and 4 respondents who have completed a master degrees.

All respondents interviewed come from different places in Vojvodina, but all pregnant women maintained pregnancy in Novi Sad.

Analysis of body mass in women

Body mass in women was analyzed through some questions. When asked how much weight of woman was before pregnancy, responses ranged from 42 kg to 83 kg. Given the height we can conclude that some women before pregnancy had normal weight while some already then were prone to weight gain.

The next question referred to the weight of women before delivery. If we compare the weight before delivery and weight before pregnancy, we can calculate how much the body weight of women has increased during pregnancy. Of the 38 respondents, 7 subjects have increased body weight ranging from 7 to 10 kg. It is therefore considered that in 7 pregnant women weight was below the optimum ranging from 11 to 12 kg (or 15 kg according to other literatures). The optimal body weight was achieved by 16 respondents which is less than 50% of total respondents. 15 respondents had body weight above the optimum during pregnancy. The difference in body weight before pregnancy and before delivery ranged from 16 to as much as 34 kg.

The next question was related to weight of women after childbirth. Of the 38 respondents, only one woman after childbirth had weight as before the birth, 27 women after childbirth had 1 to 10 kg more. The other 11 women had body weight increased for 11-22 kg. Therefore, it can be concluded that most women fed improperly; they were inclined to obesity during pregnancy and the results show also during lactation. Figure 1 shows the variation of body weight among respondents.

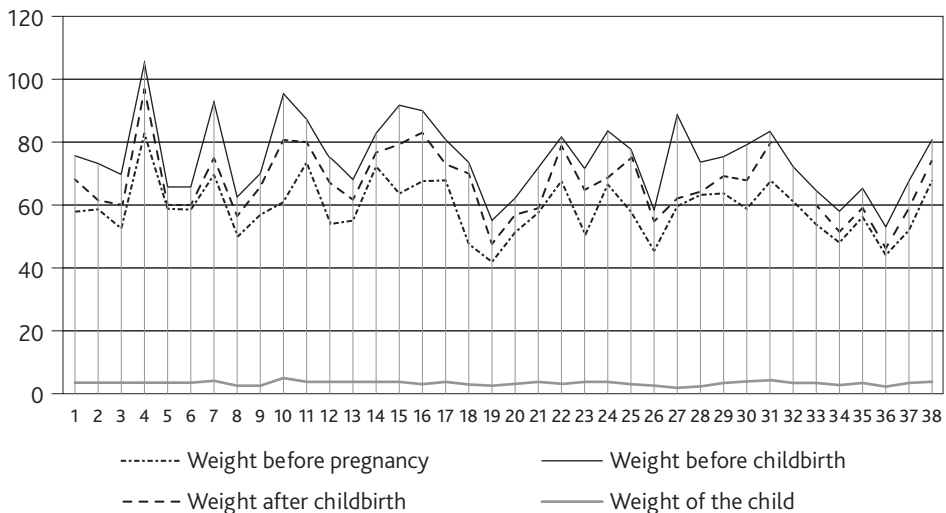


Figure 1. Analysis of body weight of pregnant women

Complications, disorders and illnesses during pregnancy

In analyzing whether the pregnant women had some complications, disorders and illnesses during pregnancy, only 24% of respondents said they had absolutely no problems, which does not mean that the results are unsatisfactory since the pregnancy of the woman mainly carries some of the answers. Some of the pregnant women had problems with nausea and also with anemia. These types of problems can be solved or visibly reduced by proper nutrition. A small number of pregnant women had the problem of the edema, which may also be associated with proper nutrition. Only a few pregnant women suffered from diabetes or gestational diabetes, which is often associated with inappropriate or excessive diet (Figure 2). These respondents had to specifically consult with doctors about special diet.

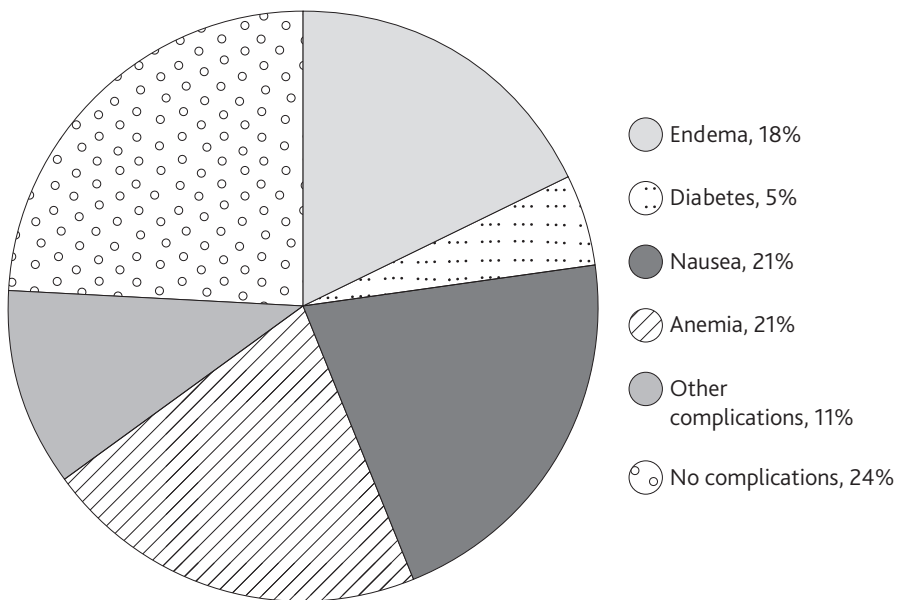


Figure 2. Complications, disorders and illnesses during pregnancy

Daily quantity of meals of respondents and their structure

Analyzing how many meals a day had pregnant women who were questioned it was found that for the most part they had 3 meals a day, 50% of respondents. Slightly less than half of the respondents had 5 meals a day which includes breakfast, lunch, dinner and 2 snacks. This quantity of meals is recommended in pregnancy and if meals are not consumed in large portions and if pregnant women adhere to diet that is recommended for them. More than 5 servings a day had only one pregnant woman and the same respondent when asked whether during the pregnancy should eat for two, she answered positively, what is faulty attitude.

The next question determined whether foods of milk origin, i.e. milk and dairy products were daily represented in nutrition of surveyed pregnant women. The largest number of pregnant women gave an affirmative answer. The structure of the answers to this question are mostly perceived as a positive because only one pregnant woman responded negatively, which is understandable given that this person is a vegetarian.

The next question during the interview provided the data, which meats and meat products, pregnant women usually consume. Pregnant women largely consume low-fat foods such as poultry. The results show that poultry meat is followed by pork and pork products which is not the best choice for pregnant women. It is not prohibited because it has a valuable source of nutrients, but pregnant women should opt more for responses such as beef and fish. Unfortunately beef is consumed by only 5% of respondents, while fish is largely consumed by 3% of respondents (Figure 3).

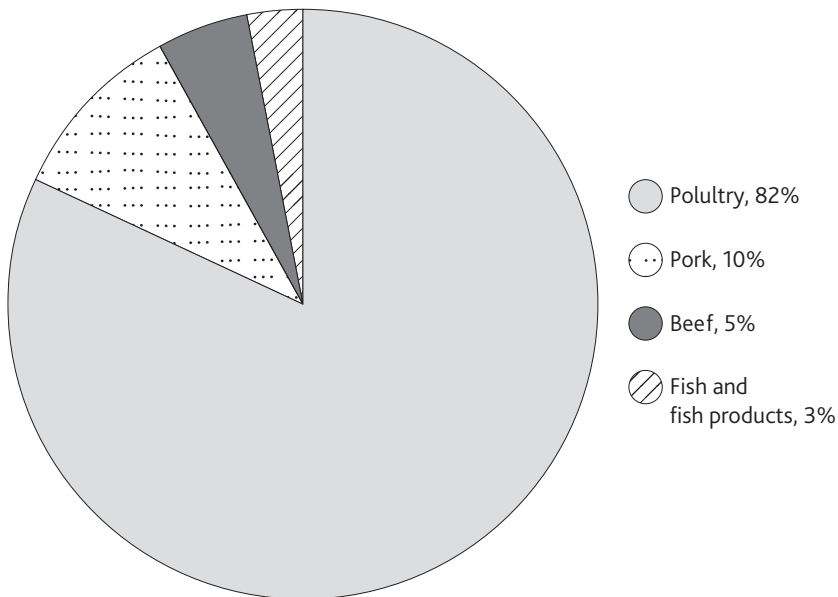


Figure 3. Consumption of meat and meat products

The next question of this segment of the interview determined the habit of consuming fruits and vegetables on a weekly basis. Half of pregnant women replied to this question with an affirmative answer, namely 52% consume at least one type of fruits and vegetables on a daily basis. Sugars that are essential for human body, pregnant women consume in the form of fruit, easily digestible sugars, as is recommended for pregnant women (Figure 4).

Then, pregnant women were questioned on daily quantity of fluid intake into the body. It is recommended that pregnant women during the day should drink 1.5 liters of water, a couple of glasses of natural juices, soups, milk and dairy products. The answers were satisfactory considering that the majority of pregnant women said they drank up to 1.5 liters of fluid a day, or 42% of respondents. Figure 5 shows other answers.

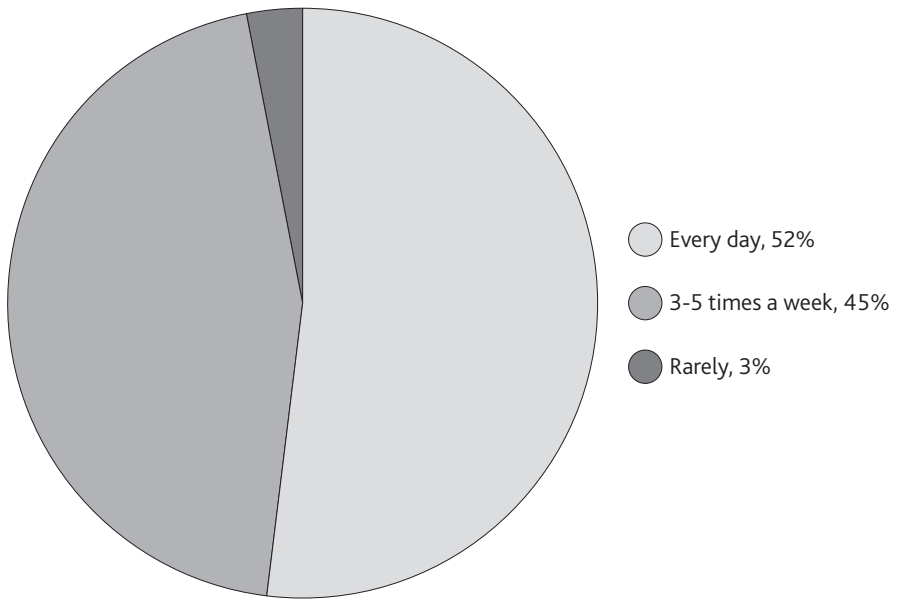


Figure 4. Consumption of fruits and vegetables

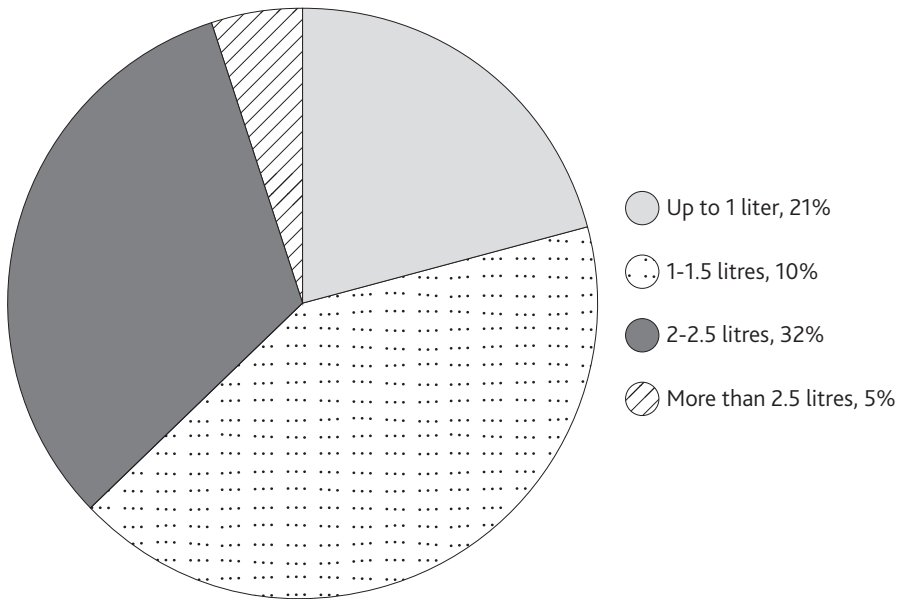


Figure 5. Daily fluid intake in pregnant women

CONCLUSION

Conducting research on the importance of proper nutrition in women during pregnancy in consultation with domestic and foreign literature in the field of food and nutrition of pregnant women we came to the following conclusions:

- Based on the results, more than half of pregnant women had weight above optimal and the problem with obesity, which can be caused by inadequate nutrition;
- Most pregnant women have proper awareness about nutrition during pregnancy but they did not realize it fully;
- The majority of respondents complained about certain disorders and illnesses during pregnancy that can be eliminated largely by proper nutrition;
- Milk and dairy products are consumed in sufficient quantities, but meat and meat products should be consumed more adequately, which also applies to fruits and vegetables;
- As for unapproved foods only alcohol was not consumed at all how as it is recommended for pregnant women, other bad habits such as smoking and coffee consumption are not eliminated and they are not at an adequate level;
- Pregnant women stated which foods they did not like during pregnancy, which confirms the accuracy of the investigated literature.

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LITERATURE

- Elmadfa, I., Meyer, A.L. (2012). Vitamins for the first 1000 days: preparing for life. *Int J Vitam Nutr Res*, 82(5): 342-7.
- Verbeke, W., de Bourdeaudhuij, I. (2007) Dietary behaviour of pregnant versus non-pregnant women. *Appetite*, 48(1): 78-86.
- Banjari, I., Matoković, V., Škoro, V. (2014). Pitanje je da li je unos folne kiseline samo ishranom u trudnoći dovoljan. *Medicinski pregled*, 67(9-10), 313-321.
- Blagojević, J., Brkanić, S., Stojić, M. (2002): Oralno zdravlje u trudnoći. *Medicinski pregled*, 55(5-6), 213-216.
- Draženčić, A., Rubinjoni Z. (1983): *Prehrana u trudnoći*, Zagreb.
- Ivanović, N., & Đorđević, B. (2014). Opravdanost upotrebe dodatka ishrani u populaciji trudnica. *Arhiv za farmaciju*, 64(5), 438-451.
- Karanović, B., Petrik, M. (2003): *Trudnoća-porođaj-beba, praktični priručnik*, Novi Sad.
- Lavrić, V., Matko, I. (1963): *Ishrana u fiziološkoj i patološkoj trudnoći*, Beograd.
- Lazarević, B., Ivanović, B., Ivanović, K. (1997): *Ishrana u trudnoći*, Beograd.
- Marjanović, A. (2014): *Značaj ishrane trudnica i dojlja*, Beograd.

- Nikodinović, B. (2010): Osnovne karakteristike ishrane u trudnoći, Novi Sad.
- Ninković, R. (1989): Materinstvo, Beograd.
- Novaković, B., Miroslavljev, M. (2002): Higijena ishrane, Univerzitet u Novom Sadu, Medicinski fakultet, Novi Sad.
- Plećaš, D., Plešinac, S., Vučinić-Kontić, O. (2014). Ishrana u trudnoći - osnovni principi i preporuke. Srpski arhiv za celokupno lekarstvo, 142 (1-2), 125-130.
- Radić, J. (1953): Kako žena treba da živi za vreme trudnoće, Beograd.
- Simikić, V., Popov Raljić, J., Tešanović, D., Pućo, A. (2011): Energetski vredna hrana u ishrani trudnica, No. 1-2, str. 28-34, Zbornik radova Visoke tehničke škole, Požarevac, Visoka tehnička škola strukovnih studija.
- Suvarčev, S. (2004). Uticaj nepravilne ishrane u trudnoći na nastanak gojaznosti i pothranjenosti. Medicina danas, 3(3-4), 224-229.
- Suvarčev, S.(2004). Uticaj ishrane u trudnoći na vrednost hematoloških parametara. Medicinski pregled, 57(5-6), 279-283.