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Knowledge about folic acid supplementation before and during pregnancy among female medical fields students

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Abstract:

Pregnancy is a period when optimal supply of vitamins and micro and macro elements is necessary to ensure proper fetal development and maternal health. One of the substances that has been shown to have a positive effect on the fetus is folic acid. Deficiency of this compound is

associated with an increased risk of neural tube defects in the fetus. As a consequence, the awareness of women about the role of folic acid and necessity of its supplementation in the preconception period and during pregnancy is crucial. In order to obtain information on the knowledge of women regarding the need to take folic acid and the benefits associated with it, an anonymous questionnaire was carried out. The survey containing 28 original questions in an online form was sent to participants. The study showed deficiencies in the knowledge of female students of reproductive age regarding folic acid supplementation and the need to promote it. Therefore, it is necessary to include as many young women as possible to The Primary Prevention Program of Neural Tube Defects.

Abstrakt:

Ciąża to okres, w którym konieczna jest optymalna podaż witamin oraz mikro i makroelementów, aby zapewnić prawidłowy rozwój płodu i zdrowie matki. Jedną z substancji, której pozytywny wpływ na płód jednoznacznie udowodniono jest kwas foliowy. Niedobór tego związku wiążę się ze zwiększonym ryzykiem wystąpienia wad cewy nerwowej u płodu. Dlatego tak ważna jest wiedza kobiet na temat roli kwasu foliowego oraz jego suplementacja już w okresie przedkoncepcyjnym oraz w trakcie ciąży. W celu uzyskania informacji na temat wiedzy kobiet dotyczącej konieczności przyjmowania kwasu foliowego i korzyści z tego płynących przeprowadzono anonimowy kwestionariusz. Ankieta zawierała 28 oryginalnych pytań w formie elektronicznej i została przesłana uczestnikom. Badanie wykazało braki w wiedzy na temat suplementacji kwasu foliowego u studentek oraz konieczność jej propagowania. W tym celu należy objąć jak największą ilość młodych kobiet Programem Pierwotnej Profilaktyki Wad Cewy Nerwowej.

Introduction:

Folic acid (vitamin B9) belongs to the group of vitamins B and is crucial due to its active participation in many processes that occur in the body [1]. There are two potential ways to increase the level of folic acid in the blood. One of them is the increase of its quantity through food intake, as folic acid occurs naturally in food products. Its main sources are lentils, beans and leafy vegetables such as spinach, lettuce and cabbage. Eggs, liver, cheese, nuts and whole grain cereals are also rich in folates [2, 3]. The second available route of administration is supplementation with suitably prepared preparations.

A correlation between low levels of folic acid in the pregnant blood and increased risk of nerve tube defects in their children was found [4]. Its low concentration may also be associated with elevated plasma homocysteine levels, which may lead to serious health consequences such as increasing the risk of stroke and cardiovascular incidents [5, 6]. Lack of this vitamin also leads to megaloblastic anaemia and severe mood disorders [1]. In turn, increased levels of this amino acid, resulting from demetilation of methionine, favour the development of Alzheimer's disease and dementia [7, 8]. However, it should be noted that supplementing only folic acid can perfectly mask vitamin B12 deficiencies. This is due to the similarity of anaemia caused by the lack of both vitamin B12 and folic acid [8]. Therefore, there is a large number of preparations containing both of these components [8].

Scientists have demonstrated the beneficial effect of folic acid supplementation in reducing the incidence of neural tube defects (NTDs) [9, 10]. In the study published in 1991, women took folic acid in dose 4mg, that is ten times more than actually recommended. The therapy period lasted from the first day of the last menstrual period up to 12 weeks of pregnancy [11]. It has been shown that folic acid supplementation reduces the risk of NTDs by 72% [10, 11].

According to the latest guidelines published by the Polish Gynaecological Association, it is recommended to take folic acid at least 12 weeks before your planned pregnancy and to continue supplementation throughout your pregnancy and lactation period. The daily dose for low-risk women is 0.4 mg, but some medical situations require higher doses [3]. Vitamin B9 at the highest dose of 5 mg is dedicated exclusively for women from the high-risk group, i.e. those in whom congenital defects of the nerve tube occurred in the patient, the father of the child and their children [3]. Despite the clear benefits, many women do not follow doctor's recommendations. Research conducted in the United States has shown that only every 3 women supplement folic acid during pregnancy, and one month before the planned pregnancy, 68.5% of women do not intake this vitamin. The main reason for not taking folic acid is the lack of pregnancy planning and knowledge about the need for supplementation [12]. Therefore, fortification of basic food products such as flour in folic acid has been introduced in more than 50 countries, which has reduced the number of cases of congenital malformations of the nerve tube [2, 9, 13].

It is very important to spread the knowledge about the necessity of vitamin B9 supplementation during pregnancy planning [13]. In Poland, since 1997, there has been the Primary Prevention Programme for Neuroveal Defects. Among other things, it aims to raise awareness about the effects of the folic acid deficiency and the benefits of its regular use. An additional assumption of the programme is to shape the habit of taking folic acid in a dose of 0.4 mg by each woman of reproductive age [14]. The medical community is a particular group on which many young patients rely, and therefore people from it should have the necessary knowledge on this extremely important subject.

Aim of the study: The aim of the study is to analyse the knowledge regarding the folic acid among female students and whether it is necessary to put more emphasis on education of women of childbearing age studying medical subjects.

Material and method: The study was conducted among 125 young women who filled the questionnaire widespread via Internet. The questionnaire contained 28 questions both single and multiple choice, regarding the knowledge and awareness about vitamin B9 with emphasis on such information as main source, dose, benefits and the importance of folic acid supplementation before and during pregnancy.

Results:

The study involved 125 women aged 19-38 (the average age was 21.3, and 80% of the respondents were 23 or younger). All participants studied medical faculties. The vast majority (63.2%) were in their first year of studies [Fig. 1]. 97.6% of the participants were never pregnant, and 2.4% were pregnant before.

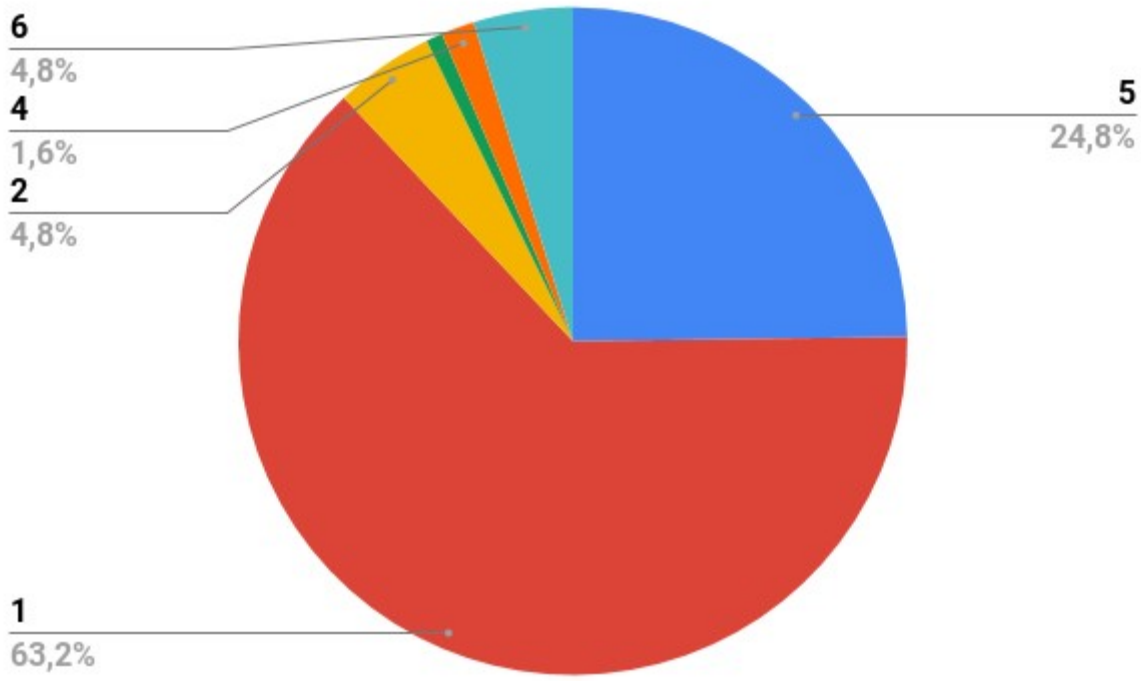

Figure 1. Years of study among responders.

The most common answer to a question “From where you get health information?” was health professionals (105 participants, 84%). It shows how important it is for medical staff to be suitably qualified and to have the latest information. Other frequently reported answers were books and magazines, Internet and family [Fig. 2].

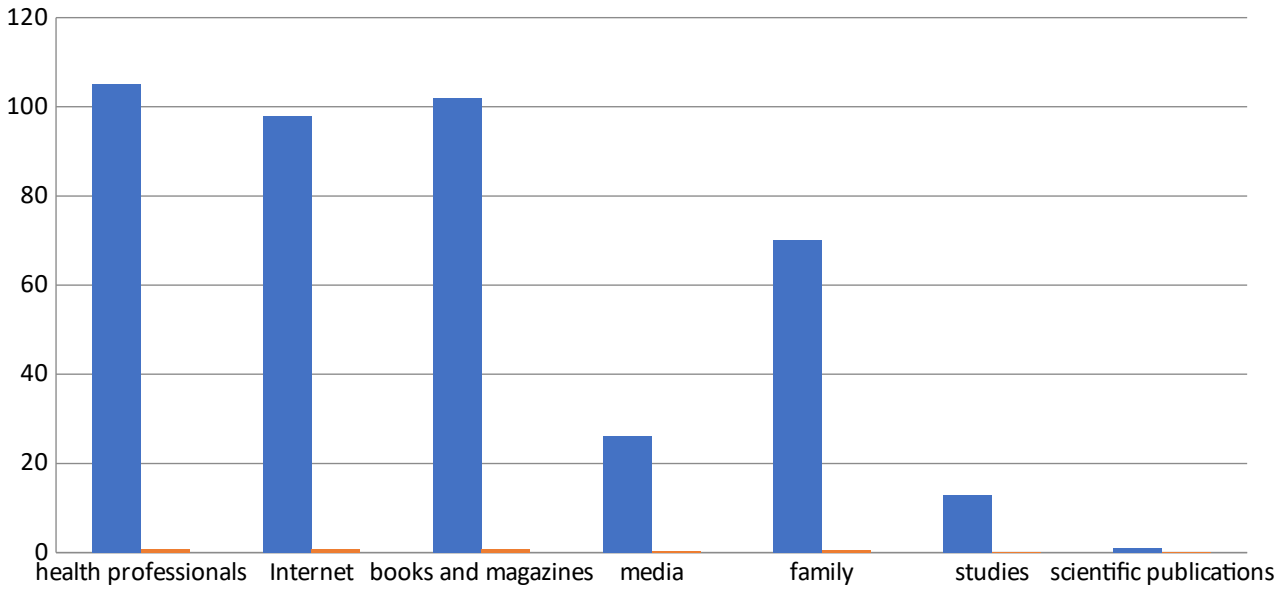

Figure 2. From where you get health information?

It is alarming that more than half of the medical students have never heard about the Primary Prevention Program of Neural Tube Defects [Fig. 3].

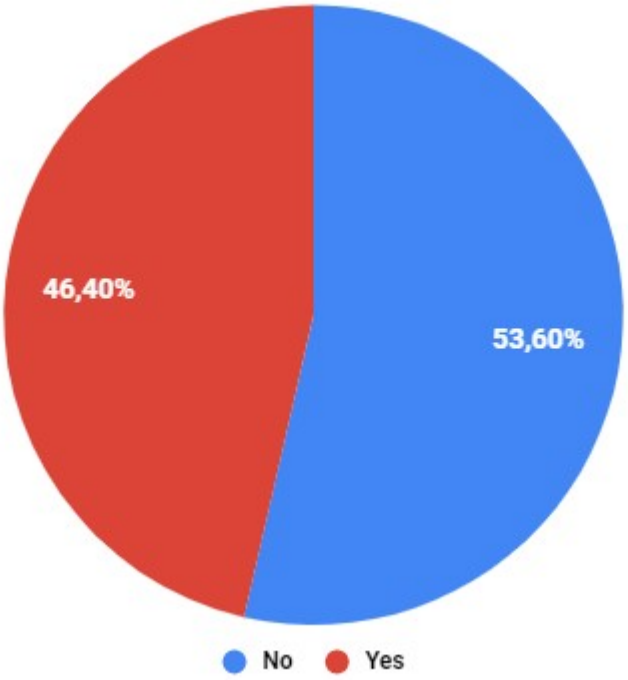

Figure 3. Have you heard about the Primary Prevention Program of Neural Tube Defects?

94,4% of women do not supplement folic acid, and 5,6% supplement it. 28% of participants know some supplement products and 72% don't know any of those products. The participants of the study were familiar with products rich in folic acid. The most common answer to the question concerning foods rich in this component was green leafy vegetables (97 participants, 77,6%), seeds of legumes (87 participants, 69,6%), broccoli and cauliflower (76 participants, 60,8%) [Fig. 4].

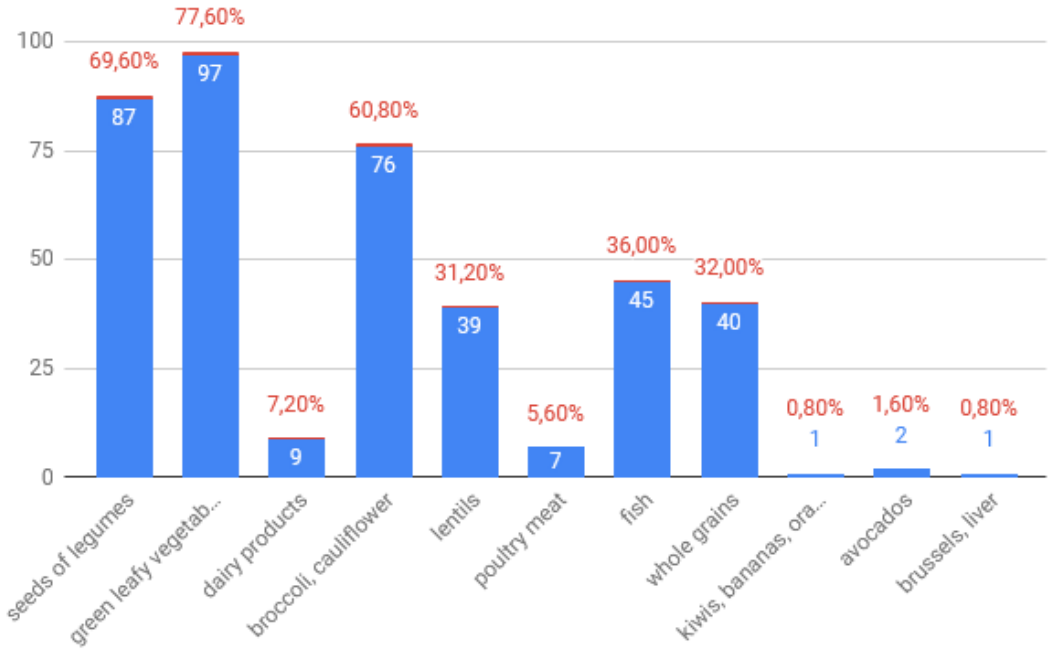

Figure 4. Which natural sources of folic acid you know?

In a study conducted by Sicińska et al. in 2011, over 200 products enriched with folic acid were available in Poland [15]. More than half of the participants (53.7%) of our study did not know any food product that would be enriched with folates. Other people most often mentioned breakfast cereals (41 participants, 32,8%), yoghurts and baby cereals (20 participants, 16%) as examples of such products.

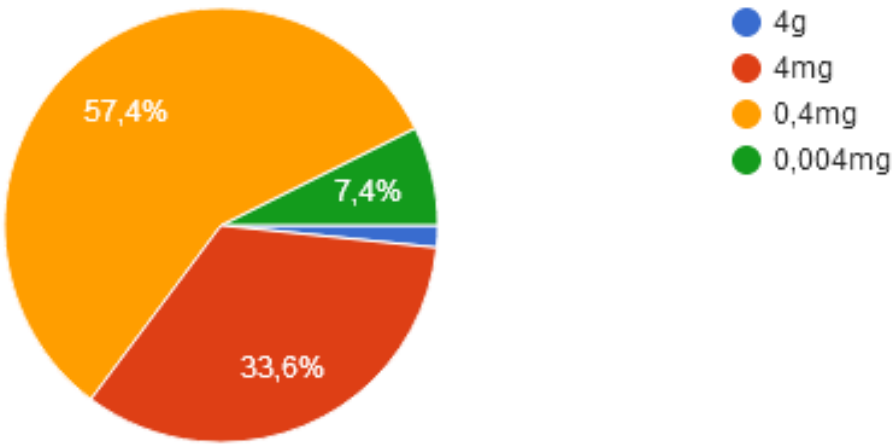

Figure 5. What is the recommended supplemental dose of folic acid?

Only 57,4% of responders know the recommended supplemental dose of folic acid (0,4 mg) [16]. One third of women (33,6%) believe that this dose is ten times higher (4 mg), and 7,4% think that this dose is ten times lower (0,004 mg) [Fig. 5].

Interestingly, three medical students believe that folic acid should not be supplemented before pregnancy. Two of them were from the first year of their studies and one person from the 5th year. Two of them indicated in a previous question that they have never heard of The Primary Prevention Program of Neural Tube Defects, and none of them knew any product enriched with folic acid.

In the next question we asked if folic acid is available for purchase over the counter. 73.4% of respondents answered this question correctly, 25.8% said they do not know and one person indicated that folic acid is available only on prescription.

97.6% of respondents knew that the most important benefit of using folic acid in the prenatal and early pregnancy period was to reduce the risk of neural tube defects among children. However, 3 women (2,4%) thought that the biggest benefit was to reduce the risk of genetic defects in the offspring. It is not true as folic acid does not prevent the occurrence of genetic defects. Among these 3 people, two were from the first year, and one was from second year of their studies, and none of them heard about The Primary Prevention Program of Neural Tube Defects.

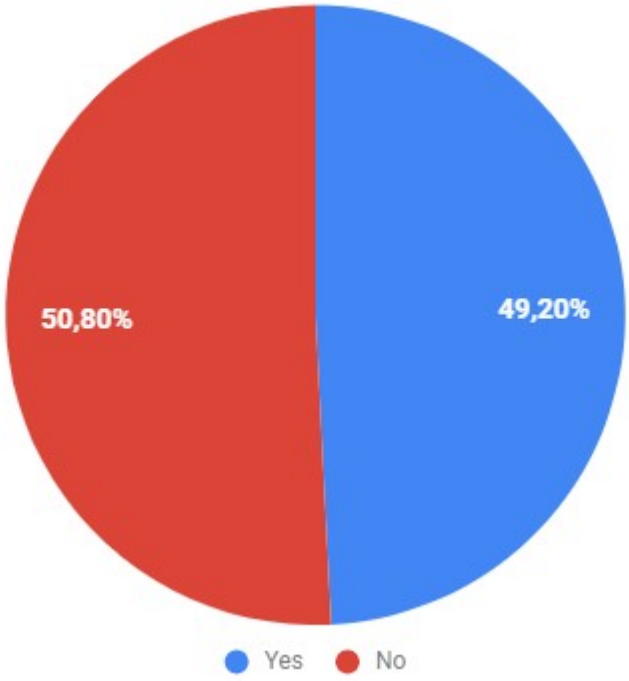

Figure 6. Do you think that the necessary ingredients in the optimal amount during pregnancy can be obtained only from a diet?

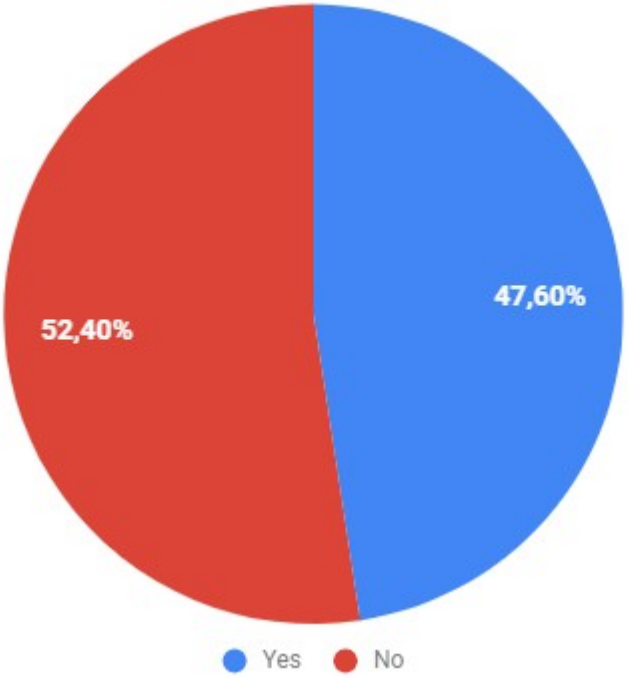

Figure 7. Do you think that the use of food supplements during pregnancy is necessary for its proper course?

About half of the respondents believe that the necessary ingredients in the optimal amount during pregnancy can only be obtained from a diet [Fig. 6]. This coincides with the next question, and also about half of women think that the use of dietary supplements during pregnancy is not necessary for its proper course [Fig. 7].

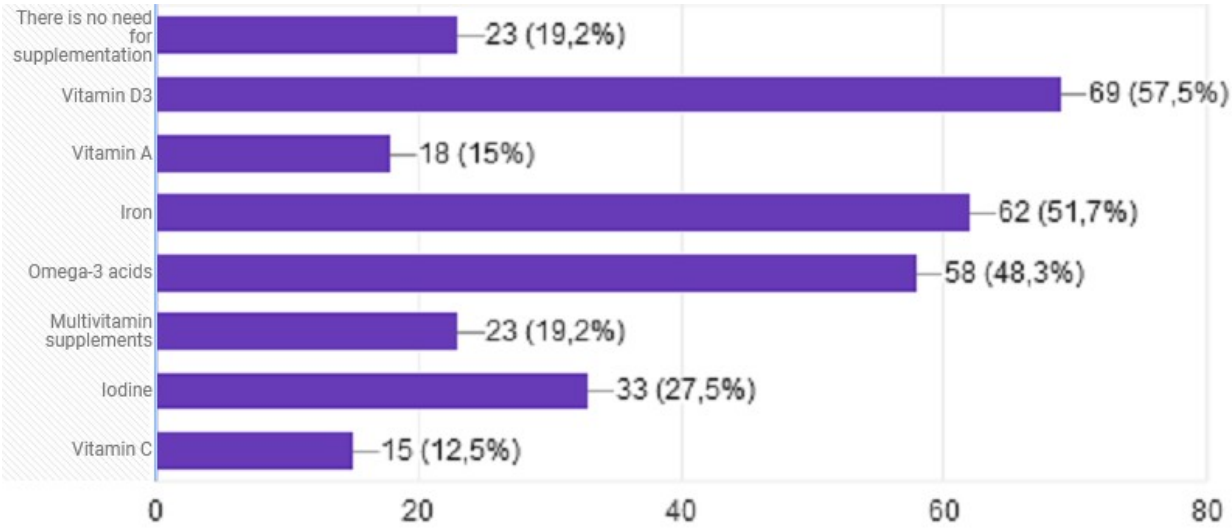

Figure 8. What vitamins and microelements should be supplemented in pregnancy?

57.5% of the surveyed women are aware of the importance of vitamin D3 supplementation (reduces the frequency of disturbances in mineral metabolism, has immunomodelling effects and reduces the frequency of bacterial vaginose favouring complications during pregnancy) [17]. Iron is very important for the development of the nervous system during the development of the foetus. It is used to build the myelin sheath in the developing brain [18]. Of the surveyed women, 62 (49,6%) believe that these substances should be supplemented during pregnancy. The next components, which according to the respondents should be supplemented are Omega-3 fatty acids, which reduce the risk of premature delivery, improve brain development, reduce the risk of depression, hypertension disease, allergies or diabetes [10, 17]. 19.2% of women believe that there is no need for any kind of supplementation during pregnancy. As many as 15% of the participants indicated that vitamin A should be supplemented during pregnancy. However, deficiencies of this vitamin occur sporadically and its increased amount can be harmful for the foetus [Fig. 8, 17].

8.9% of responders do not know what the difference between a registered medicine and a dietary supplement is. Of the 91.1% who think they know the difference, 5 women (4%) in the survey answered that the drug is only available on prescription. Almost half of the respondents use dietary supplements, and the most commonly used are magnesium (21 participants), vitamin D (21 participants) and vitamin C (11 participants). The causes are deficiencies, lack of dietary attention, muscle tremors, improving health and low exposure to the sun.

Discussion:

The result of our study coincides with the result of research carried out by Boykin et al. 147 pharmacy students from Ohio took part in it. 59% of them knew the recommended dose of supplementation. In our study, this result was similar and amounted to 57.4%. The study also showed insufficient knowledge of students as only 86% of them knew that folic acid prevents neural tube defects [19]. In our study, this percentage was higher and amounted to 97.6%. In another study conducted on pharmacy students, the percentage of those who knew the recommended dose of supplementation was also similar, as 55.4% [20]. In addition, it was observed that women's awareness of the important role of folic acid is still growing. In a study published in 1999, only 13% of women knew that folic acid prevents fetal malformations [21]. In both studies women presented satisfactory knowledge about natural folic acid sources. The respondents most often mentioned seeds of legumes and green leafy vegetables [Fig. 4, 22] The analysis of these data indicates the existence of a significant problem among women regarding knowledge about folic acid.

No preventive actions are effective if they are not implemented. That is why education is so important, especially of the medical staff and pharmacists, who are supposed to promote the latest recommendations for young women of childbearing age. The survey showed that the knowledge of women studying medical faculties is incomplete and insufficient.

An element that appeals to the benefit of the respondents in our study and others, is the fact that health professionals are the most popular source of knowledge they choose [9, Fig. 2, 23]. However, it is worrying that women are very likely to use the knowledge obtained from the Internet, where they can find a lot of incorrect and outdated information [Fig. 2, 23]. Only one person uses scientific publications, in which latest recommendations and reliable knowledge supported by scientific research can be found.

Kari et al. examined the knowledge of women about folic acid supplementation before and after the teaching course. The results show how extremely important education of women of childbearing age is. The questionnaire completed by women before starting the educational program showed that only 12% of them were aware of the role of vitamin B9 in the prevention of neural tube defects. After the education course 84% could indicate the correct dose of folic acid and 78% knew the optimal time of taking it before pregnancy [23]. The extended knowledge influenced the attitude of patients, as many as 82.9% declared that they would take folic acid before the planned pregnancy and 98.6% women showed the willingness to spread the knowledge they had acquired to others [23].

Educational programs should focus on improving the knowledge of future medical staff and its promotion at early stages of young women's lives at school, during studies and at the doctor’s office. During education, special attention should be paid to healthy, balanced nutrition and familiarizing women with food products rich in natural folic acid sources, as well as the possibility of choosing from a range of products enriched with folic acid. The next element should be the dissemination of knowledge about the causes and symptoms of congenital neural tube defects. It is important to emphasize the possibility of their prevention by supplementation with appropriately prepared pharmacological preparations rich in folic acid. It is also necessary to emphasize the influence of factors that reduce the effect and absorption of folates.

Adequate education of young women would improve the prevention of neural tube defects in the future, by disseminating knowledge and applying the majority of patients planning pregnancy to the latest recommendations, taking folic acid at a dose of 0.4 mg at least 12 weeks before the planned pregnancy. A wide problem of unplanned pregnancies would solve the habit of eating foods rich in vitamin B9 as well as fortified foods by every woman of childbearing age [3]. Such action would reduce the number of cases of children with neural tube defects and reduce disability and the number of neonatal deaths.

Conclusions:

1. Not surprisingly, health professionals, books and magazines are the main sources of information about health for medical students. It is worth highlighting that internet also plays an important role in acquiring knowledge about health. These observations could be useful in searching for an effective way to promote health.
2. The worrying fact is that more than half of the respondents have never heard about The Primary Prevention Program of Neural Tube Defects. The information about this program should be provided already in high school and during the studies, not only at medical universities.
3. Despite the fact that the study group included women in reproductive age, many of them did not know which products contain folic acid. However, most of respondents indicated correct answer to question about food sources of folic acid. These findings show that young women have some knowledge about folic acid sources but it remains insufficient. This also applies to information about folic acid supplements.
4. Almost half of the respondents had difficulties with correct indication of the recommended supplemental dose. On the other hand, most students knew that folic acid

is available for purchase over the counter and benefits of using folic acid in the prenatal and early pregnancy period. That indicates that participants are aware of the role folic acid has in women' health, but this knowledge is incomplete.

5. Opinions about the necessity of using food supplements during pregnancy are divided. According to the majority of students, pregnant women should supplement vitamin D, iron and Omega-3 fatty acids, while gynaecologists, apart from folic acid, also recommend vitamin D3 and iodine.

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