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Knowledge of supplemental folic acid during pregnancy

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Knowledge of folic acid supplementation during pregnancy

Objective. To identify the use of folic acid during pregnancy, as well as the new mothers´ knowledge about folic acid. **Methodology.** Quantitative, descriptive exploratory, and prospective study. A total of 198 mothers were interviewed in the pediatric outpatient service of Hospital de Base Sao José do Rio Preto, Brazil. They have taken their children for neonatal screening and formally consented to participating in the study. The research project was approved by the Research Ethics Committee (350,287). A specific instrument was used for data collection. The data were entered into an appropriate spreadsheet and later statistically analyzed. Pearson´s chi-squared test, $p < 0.15$, was used. **Results.** On average, the interviewed mothers were 25 years old and received less than two minimum wages. Most had prenatal in the first quartile and a mean of seven appointments, starting the use of folic acid from the 7th to the 9th week of gestational age. However, when asked about the importance of folic acid and its action, almost the majority was not able to answer. **Conclusion.** Although daily acid supplementation is recommended in prenatal care, this study found that consumption is inadequate, contributing to the increased risk of fetal malformation. Healthcare professionals, especially nurses, should develop educational activities for women about the use of folic acid in the pre-gestation period and in the first pregnancy trimester.

Key words: knowledge; public health; folic acid; neural tube; midwifery.

Conocimiento de la suplementación de ácido fólico en la gestación

Objetivo. Identificar el conocimiento y el uso durante el embarazo del ácido fólico**. Metodología.** Cuantitativo, exploratorio descriptivo y prospectivo. Se entrevistaron un total de 198 madres en el servicio de consulta externa de pediatría del Hospital de Base de Sao José do Rio Preto, Brasil quienes se habían llevado a sus hijos para el cribado neonatal y aceptado participar del estudio por consentimiento formal. El proyecto de investigación fue aprobado por el Comité Ético de Investigación (350.287).

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Se utilizó un instrumento específico para la recolección de datos. Asimismo, una hoja de cálculo para la transcripción de datos; después, se analizaron estadísticamente. Prueba Person's Chi-cuadrado se utilizó p <0,15. **Resultados.** Las puérperas entrevistadas tuvieron una media de 25 años, el 61.5% ganaba menos de dos salarios mínimos. El 96.5% realizó control prenatal; el 18.2% de las gestantes inició control tardíamente, entre el segundo y tercer trimestre de embarazo. El 81.3% de las mujeres consumió ácido fólico en la gestación; cuatro de cada cinco en los tres primeros meses de embarazo. Cuando se preguntó sobre la importancia del ácido fólico y de su acción, la mayoría de las mujeres no supo responder. **Conclusión.** Aunque la suplementación diaria con ácido fólico sea recomendada en el control prenatal, se verificó en este estudio que su consumo es inadecuado, lo que contribuye al aumento del riesgo de malformación fetal. El profesional del área de la salud y, especialmente, el enfermero deben desarrollar actividades educativas para las mujeres en cuanto al uso de ácido fólico en el período pregestacionacional y durante el primer trimestre del embarazo.

Palabras clave: conocimiento; salud pública; ácido fólico; tubo neural; matrona.

Conhecimento da suplementação de ácido fólico na gestação

Objetivo. Identificar o uso do ácido fólico durante a gestação e o conhecimento de puérperas sobre o ácido fólico. **Metodologia**. Estudo quantitativo, descritivo exploratório e prospectivo. Entrevistou 198 puérperas, no ambulatório da pediatria do Hospital de Base, São José do Rio Preto, Brasil, que trouxerem seus filhos para triagem neonatal e aceitaram por escrito participar da pesquisa. O projeto de pesquisa foi aprovado pelo comitê de ética em pesquisa (350.287). A coleta de dados foi realizada com um instrumento específico. Os dados foram transcritos para uma planilha e analisados estatisticamente. Utilizou o teste de Qui-Quadrado de Person, p<0,15. **Resultados.** Em média, as puérperas entrevistadas possuem 25 anos e ganham menos de dois salários mínimos. A maioria realizou o pré-natal, no primeiro trimestre e tiveram uma media de sete consultas, com o início do uso de ácido fólico na idade gestacional de sete a nove semanas. Contudo quando questionadas sobre a importância do ácido fólico e sua ação, quase que a maioria significativa não soube responder. **Conclusão.** Embora a suplementação com ácido fólico diária seja recomendado no pré-natal, verificou-se que seu consumo foi inadequado, contribuindo para o aumento do risco de malformação fetal. O profissional da área da saúde, especialmente os enfermeiros, devem desenvolver atividades educativas para as mulheres quanto ao uso de ácido fólico de durante o período pré-gestacional e primeiro trimestre da gravidez.

Palavras chave: conhecimento; saúde pública; ácido fólico; tubo neural; enfermagem obstétrica.

Introduction

Every woman who desires to have a child needs to pay special care to her diet and lifestyle habits. Caring for pregnancy should start from the moment she decides she wishes to become pregnant, as good planning throughout pregnancy decreases the chances of congenital anomalies in babies. Hence, good prenatal care is fundamental. One such care concerns the use of folic acid, folate or vitamin B9, which is a B-complex water-soluble vitamin. Whereas the term folate encompasses all forms of this vitamin, including both its many naturally-occurring compounds and folic acid, the term folic acid (pteromonoglutamic acid) refers to the synthetic form found in vitamin supplements and fortified food.[1] Folic acid is usually associated with the intracellular vitamin B12, also known as cobalamin, which presents itself in two forms of active coenzymes: methylcobalamin and desoxyadenosylcobalamin. Cobalamin is used to denote the structure of a corrin nucleus;

methylcobalamin and adenosylcobalamin act as cofactors in the body, while the others are therapeutic methods of food consumption.[2,3] Folate interferes with the increased volume of erythrocytes, the enlargement of the uterus, and the growth of the placenta and fetus, as well as with the prevention of respiratory diseases in infancy and Down's syndrome. It acts as a coenzyme in the metabolism of amino acids, and in the synthesis of purines and pyrimidines and of nucleic acids (deoxyribonucleic acid - DNA and Ribonucleic Acid - RNA), which are vital for cell division and protein synthesis, thereby playing a fundamental role in the process of cell multiplication.[4,5]

Folic acid is predominantly found, among other sources, in organ meats, green vegetables, legumes, beans, citrus fruits such as spinach, lentils, chickpeas, asparagus, broccoli, peas, cabbage, corn, peanuts and orange.[5,6] Its deficiency is associated with high levels of homocysteine in the serum, can be found associated with hypertensive pregnancy syndrome, recurrent spontaneous abortions, premature births, low birth weight, chronic cardiovascular and vascular brain diseases, dementia, and depression.[7] As to congenital anomalies, folic acid replacement prevents open neural tube defects (ONTD). The neural tube closure defects are congenital malformations resulting from incorrect or incomplete closure of the neural tube between the third and fourth week of embryonic development and include anencephaly, encephalopathy and spina bifida, most cases of which today are due to a lack of folic acid.[7-9]

The low consumption in the diet, gene disorders, smoking, chronic use of oral hormonal contraceptives, diabetes, and use of anticonvulsant medications are some factors related to a decreased folic acid serum level.[10] In an attempt to reduce the problems caused by deficiency of folic acid in pregnant women, Brazil's National Health Surveillance Agency (ANVISA) made it mandatory for wheat flour and maize sold in the country to be fortified with iron and folic acid by Resolution 344 of December 12, 2002, implemented as of July 2004. ANVISA provides that each 100g of flour and maize be fortified with 0.15 mg of folic acid. Added to food, this has a bioavailability 85-100% , while folate, in its natural form, present in fresh food, has a bioavailability of 50%, and is more susceptible to destruction in the preparation.[11,12] A daily dosage of 0.4 mg of folic acid is recommended for all women who plan to become pregnant; for those who have had children with problems or who use medications that interfere with folate levels in the body, such as anticonvulsants, the recommend dose is 4mg.[12] For lactating and pregnant women, an additional daily dose of 0.1 mg and 0.2 mg of folic acid is recommended, respectively. The use of folic acid is recommended three months prior to gestation through the 12th week of gestation.[7]

In our literature review we found that daily supplement doses of 5 mg/day of folic acid reduced by 75-91% the incidence of neural tube defects, compared with a reduction of 23-66% when using 0.4 mg to 0.8 mg daily, allowing us to observe a direct relationship between dose and effect for neural tube defects.[6] More than a third of women worldwide are considered to be deficient in folic acid. Its concentration decreases during pregnancy due to plasma volume expansion, when hemodilution occurs.[13] One study found folic acid supplementation in 31.8% of women during pregnancy and 4.3% in the preconception period, which further demonstrates the lack of knowledge of the use of folic acid at the right time during pregnancy. Among patients in the 30th week of pregnancy, it was found that 20% used folic acid. This result was influenced by the following factors: low education and socioeconomic status, lower maternal age, absence of a partner, and the lack of pregnancy planning. The lack of knowledge about the essential drugs used in the pregnancy cycle is still significant.[4]

Another factor that increases the use of folic acid is the prenatal medical appointment, according to Brazil's Ministry of Health (MOH); a 5 mg prescription is made from the first prenatal appointment up to 14 weeks of gestation. There is

a need for promotion and continuous dissemination of the importance of periconceptional folic acid supplementation among health professionals involved in prenatal care, especially nurses, who in Brazil provide prenatal care to low-risk pregnant women.[14] However, because folic acid in doses above 5 mg can mask pernicious anemia and B12 deficiency anemia, it is therefore not recommended for strict vegetarians.[15] Excess folic acid intake destabilizes the relationship with vitamin B12 and boosts chromosomal breakage and mitotic disorders, which could account for the high incidence of colon and rectal cancer in these women. Changes in the mammary glands of newborns whose mothers have been exposed to high doses of folic acid also raise doubts. There has also been an association with a slightly increased risk of early respiratory infections in newborns, and the risk is most particularly observed in the first trimester.[16] In view of the above, this research aimed to identify the use of folic acid during pregnancy and the knowledge about folic acid among postpartum women.

Methodology

This was a quantitative, descriptive, and exploratory study, carried out in the pediatric outpatient center of Base Hospital, a teaching hospital in the city of São José do Rio Preto, in northwestern São Paulo state, Brazil. Receiving about 300 newborns per month, the outpatient unit performs newborn metabolic screening (Guthrie test or heel pick test), which can be standard, conducting examinations such as TSH, T4, and phenylketonuria and cystic fibrosis; or extended, including examinations such as: G.6P.D Deficiency, aminoacidopathies, congenital toxoplasmosis, biotinidase deficiency, galactosemia, and 17OH. The study's population included 198 mothers who brought their children for neonatal screening at the location described above, with their prenatal record card, and agreed to participate by signing the Instrument of Consent, after the needed clarifications were made. Exclusion criteria encompassed those who did not agree to participate. A data collection followed, using a specific instrument containing questions regarding socio-demographic information and gynecological and obstetric data, which were supplemented with prenatal record card data. The data were then transcribed into an spreadsheet in Excel 2010 and statistically analyzed. Initially, an analysis by descriptive statistics was performed for the results obtained from the instrument application. Next, Pearson's chi-square test was used with a significance level of 0.15, with the objective of verifying the possible candidate variables for composing the logistic regression model, which was conducted using the stepwise method to find the best selection of predictor variables. Statistical analysis of the data was performed with the aid of the GraphPad InStat 3.0 and Prism 1.6 software. The Brazilian ethical guidelines for research with human beings, Resolution of the National Council of Health (CNS) / Ministry of Health (MOH) 196/96, in force at the time of approval of the research project, were met, and the study was evaluated by the Research Ethics Committee of the Faculty of Medicine of Sao Jose do Rio Preto [Faculdade de Medicina de São José do Rio Preto), FAMERP, under approval Nº 350.287.

Results

The postpartum women were on average 25 years of age, with a standard deviation of 5.17; 58.08% identified as white; 81.31% had a partner; 56.85% lived in rented accommodations; 65.15% reported a family income below 2 minimum wages; and 52.02% of the pregnant women did not perform paid work. The average schooling duration was 11 years, with a standard deviation of 2.15. Table 1 shows the socioeconomic characteristics of postpartum mothers.

Table 1. Distribution of the 198 postpartum mothers according to socioeconomic information. Sao Jose do Rio Preto, 2014

Variables	n	%
Age range (years)		
Below 19	35	17.68
20 to 24	63	31.81
25 to 29	54	29.80
30 to 34	42	21.21
34 or over	4	2.02
Color		
White	115	58.08
Black	23	11.62
Brown	54	27.27
Yellow	6	3.03
Marital status		
With a partner	161	81.31
Without a partner	37	18.69
Education (years)		
Below 6	4	2.02
6 to 10	34	17.44
11 to 15	130	66.67
16 to 20	30	15.38
Type of housing		
Own	68	34.34
Rented	112	56.85
Borrowed	14	7.11
Other	4	2.03
Paid activity		
No	103	52.02
Yes	95	47.98
Family income (MS*)		
Below 2	129	65.15
2 to 3	52	26.26
4 to 5	15	7.58
Over 5	2	1.01

(*) MS: equal to US $306

According to Table 2, 60.02% of the postpartum mothers had their first sexual intercourse between the ages of 15-16 years, the average being 16 years with a standard deviation of 2.33, while 65.15% indicated that “sometimes I make use of condom,” and 55.56% had had more than one partner during their sex life.

Table 2. Distribution of 198 postpartum women according to gynecological data. Sao Jose do Rio Preto, 2014

Variables	N	%
Age of first sexual relationship		
Below 15 y.o.	45	22.72
15 to 16 y.o.	62	60.02
17 to 18 y.o.	46	23.23
18 to 19 y.o.	30	15.15
over 20 y.o.	15	7.57
Use of condoms		
Sometimes	129	65.15
Never	22	11.11
Always	47	23.74
More than one partner		
No	68	34.34
Prefer not to answer	20	10.10
Yes	110	55.56

Obstetric and prenatal care data are described in Table 3. According to the number of pregnancies, 50.51% were primiparous and 81.81% had never had an abortion; 96.46% had prenatal care, and 81.82% started it in the 1st trimester of pregnancy; 45.96% had 7-8 prenatal appointments, the average being 7 appointments, with a standard deviation of 1.44. Folic acid was prescribed to 81.31% of the pregnant women, but 19.87% of these prescriptions occurred after the 13th week of pregnancy; when added to the 18.69% who had no prescription, it was found that 38.56% had no prescription, or had it after the stage recommended for consumption. It is noteworthy that 24.1% of the women with a prescription for folic acid mentioned not having been counseled on the importance of taking it, and thus didn't. Out of the 18.69% of women who did not have a prescription, 67.57% reported ignorance about the need for the use of folic acid during pregnancy. None of the interviewees began the use of folic acid before pregnancy. Moreover, 4.55% had a child with malformations. It turned out that 2.00% of the women used folate antagonist, concomitant with folic acid. It draws attention that 6.00% are diabetic, of whom 81.81% are insulin dependent.

As for knowledge, 54.55% of the mothers said they did not know about folic acid, but 94.57% indicated it to be a vitamin B complex. It was found that the mothers did not have the following knowledge: 95.96%, that folic acid is found in foods; 60.29%, that its consumption is related to fetal development, preventing malformation; and 66.16%, that it brings benefits to pregnancy. After applying the statistical tests, we identified significance in relation to the profession (p = 0.08426), i.e. women exercising remunerated activity had greater knowledge; and the type of housing (p <0.0001) of the mother, i.e. women renting their residence had less knowledge.

Discussion

The socioeconomic characteristics were similar to those found in a study about mothers in Romania in 2010, which found that non-use or low use of folic acid was directly related to low socioeconomic condition.[17] Researchers reported similar rates in the number of pregnancies, and the predominance of early prenatal care in the first gestational quartile.[18] Regarding the number of appointments, all the nutritional care of pregnant women, use of vitamin and mineral supplementation, maternal health, and other important factors to mother's and child's well-

being must be employed during the prenatal period. The Health Ministry recommends its beginning in the first trimester, totaling at least six visits by the end of the gestation.[14] The average of adequate prenatal appointments or even some with more appointments is not proved to be a quality factor for the proper pre-natal care relative to folic acid supplementation.[18,19] It was observed that the use of folic acid occurred between the 7th and 9th week of gestation, as described by other researchers.[18,19]

Table 3. Distribution of postpartum mothers according to obstetric data. Sao Jose do Rio Preto, 2014

Obstetric Data	**n**	**%**
Number of pregnancies		
1	100	50.51
2	64	32.32
3	29	14.65
4 or more	5	2.52
Number of abortions		
None	162	81.81
1	33	16.67
2	3	1.52
Pre-Natal		
Yes	191	96.46
No	7	3.53
Pre-natal start		
1st Trimester	162	81.82
2nd Trimester	35	17.68
3rd Trimester	1	0.51
Number of consultations		
≤ 7	38	19.19
7 to 8	91	45.96
9 to 10	66	33.33
11 to12	3	1.52
Folic acid start (weeks)	**(n=161)**	
before 6	25	15.53
7 to 9	46	28.57
10 to 12	58	36.03
13 to 15	13	8.07
16 or more	19	11.80

Table 4. Distribution of 198 postpartum women according to their knowledge about folic acid. Sao Jose do Rio Preto, 2014

Variables	Yes		No	
	n	%	n	%
Stated that they know FA*	90	45.55	108	54.55
Noted presence of FA in foods	8	4.04	190	95.96
Understood the importance of FA to fetus formation	75	37.87	123	62.12
Presented benefits to the pregnancy from FA consumption	67	33.84	131	66.16

(*) FA=Folic Acid

Corroborating the results described, studies have investigated the occurrence of deficient folic acid supplementation, since the correct use is from at least 3 months prior to conception until the 12th week of gestation.[18-20] In developed countries such as the United States, Canada, the Netherlands, and the United Kingdom, a correlation was shown between women who planned pregnancies and performed appropriate treatment with folic acid.[4] Another problem is the lack of knowledge about foods that contain folic acid, and the importance of its consumption.[15-20]

Regarding the lack of knowledge about folic acid, there exists a significant number of women who used folic acid without knowing what this vitamin is and its importance, especially in the prevention of neural tube defects, and the appropriate time period for taking it.[4,20] Health professionals, especially nurses who have educational practices in their assignments, play an extremely important role in guiding patients and prescribing folic acid in order to achieve better preventive results.[14] The professionals, obstetric physicians and midwives, know the role of folic acid in the prevention of neural tube malformation, but do not know the time of use, the start of the supplementation and optimal dosing, which are relevant points in this prevention. Thus, public policies are needed that focus on the training of professionals who work in women's care to minimize the risk of such anomalies.[17]

Although daily supplementation of folic acid is recommended and provided as a public health intervention in Brazil during prenatal care to prevent the occurrence of neural tube closure defects in the fetus, the inadequacy of its use has been proven. The conclusion is that health professionals, especially nurses, should be required to develop educational activities for women, individually or in groups, on the use of folic acid during pre-pregnancy and the first trimester of pregnancy.

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