

# Important nutritional and social factors to pregnancy outcomes in women followed at primary care network of Juiz de Fora

## *Fatores nutricionais e sociais de importância para o resultado da gestação, em mulheres em acompanhamento na rede de atenção primária de Juiz de Fora*

Bárbara Danelon Andrade<sup>1</sup>, Ana Carolline Pereira Silva<sup>1</sup>, Marcela Thiago Mendes dos Santos<sup>1</sup>, Thais Campos<sup>1</sup>, Sheila Cristina Potente Dutra Luquetti<sup>2</sup>, Ana Paula Carlos Cândido<sup>3</sup>, Renata Maria Souza Oliveira<sup>4</sup>, Aline Silva de Aguiar Nemer<sup>5</sup>, Michele Pereira Netto<sup>6</sup>

DOI: 10.5935/2238-3182.20150069

### ABSTRACT

**Introduction:** pregnancy requires elevated nutritional needs and, due to its high vulnerability, various conditions can interfere in the normal course of pregnancy; therefore, medical follow-up is important. **Objectives:** to evaluate the nutritional and health status, analyze food intake and investigate the socioeconomic profile of pregnant women attending the Juiz de Fora Health Units (MG). **Methods:** this was a descriptive observational study. The longitudinal monitoring began in the third trimester of pregnancy and lasted until the first postpartum month. Data collection was carried out in the network of primary health care in eight basic units in the western and southern regions of Juiz de Fora through questionnaires and anthropometric evaluations. **Results:** 111 women participated in the study; most were eutrophic before the pregnancy; more than half began the prenatal care up to the third month of pregnancy and attended to more than seven consultations in total. Gestational anemia was detected in 20% of women. The sample was predominantly made up of low-income women – half the minimum wage or less. The average intake of macronutrients was within the recommended ranges, being adequate. An inadequate diet consumption of the calcium, iron, and folic acid micronutrients was observed. **Conclusions:** the evaluated pregnant women had access to prenatal services. However, a lack of nutritional monitoring and provision of guidelines for pregnancy care were observed.

**Key words:** Pregnant Women; Prenatal Care; Nutritional Status; Food Consumption; Postpartum Period.

### RESUMO

**Introdução:** a gestação requer elevadas necessidades nutricionais e, devido à sua alta vulnerabilidade, várias condições podem interferir na evolução normal da gestação, por isso o seu acompanhamento médico é importante. **Objetivos:** avaliar o estado nutricional e de saúde, analisar o consumo alimentar e investigar o perfil socioeconômico de gestantes atendidas em Unidades de Saúde de Juiz de Fora (MG). **Métodos:** trata-se de estudo observacional descritivo. O acompanhamento longitudinal iniciou-se no terceiro trimestre da gestação e durou até o primeiro mês pós-parto. A coleta de dados foi realizada na rede de atenção primária de saúde, em oito unidades básicas das regiões oeste e sul de Juiz de Fora, por meio de aplicação de questionários e avaliação antropométrica. **Resultados:** participaram do estudo 111 mulheres; a maioria apresentava-se eutrófica antes da gestação; mais da metade iniciou o pré-natal até o terceiro mês de gestação e realizou mais que sete consultas no total. Verificou-se que 20% apresentavam anemia gestacional. A amostra foi predominantemente constituída de população de baixa renda – meio salário mínimo ou menos. A ingestão média de macronutrientes estava entre as faixas de recomendação,

Submitted: 2014/03/25  
Approved: 2015/07/26

Institution:  
Federal University of Juiz de Fora,  
Biological Sciences Institute, Department of Nutrition  
Juiz de Fora, MG – Brazil

Corresponding Author:  
Michele Pereira Netto  
E-mail: michele.netto@ufjf.edu.br

Financial support:  
Financial support: PROEX (Pro-Dean of Extension) and  
PROPEQS (Pro-Dean of Research) – Federal University  
of Juiz de Fora – MG. Type of support: Scientific Initiation  
and Extension Scholarships.

*sendo adequada. Observou-se consumo de dietas inadequadas em relação aos micronutrientes cálcio, ferro e ácido fólico. Conclusões: as gestantes avaliadas tinham acesso aos serviços de pré-natal, porém notou-se falta de acompanhamento nutricional e de orientações em relação aos cuidados com a gestação.*

*Palavras-chave: Gestantes; Cuidado Pré-Natal; Estado Nutricional; Consumo de Alimentos; Período Pós-Parto.*

## INTRODUCTION

Pregnancy is characterized by a period of intense growth and development of mother and fetus, with high nutritional requirements resulting from physiological adjustments. It's high vulnerability and the various conditions that can interfere with its evolution are associated with its prognosis.<sup>1,2</sup>

Clinical monitoring during pregnancy is essential to promote, protect, and restore the health of the pregnant women and fetus.<sup>3</sup> The Prenatal and Birth Humanization Program (PHPN) implemented by the Ministry of Health in 2000, was dedicated to the gradual improvement of this assistance.<sup>4</sup> The number of prenatal consultations that resulted in deliveries performed at SUS increased from 1.2 per delivery in 1995 to 5.45 per delivery in 2005.<sup>5</sup>

There are some risk factors associated with a compromised pregnancy outcome. Maternal age is one of them, considering teens and over 35 years old women at risk during pregnancy. Nutritional status is mainly determined by the ingestion of micro and macronutrients, and therefore, changes such as malnutrition or obesity during pregnancy affect fetal growth.<sup>6</sup> Parity is also a risk factor, especially when associated with advanced age or overweight. Studies show that increased body mass index (BMI) occurs in the proportion to the number of children.<sup>7</sup> The interval between pregnancies, when less than 24 months or more than 60 months, is another factor for gestational involvement.<sup>8</sup> Complications during pregnancy are also related to risk factors. It is known that diseases such hypertension, diabetes mellitus, heart disease, and anemia can harm the health of both mother and fetus. The use of smoking and alcohol affects fetal growth and development, as observed<sup>9</sup> in 150 puerperae, highlighting the influence of these substances on weight, length, and head circumference of newborns.

Another important factor is the socioeconomic condition. The level of education, occupation, marital status, and personal and family income are factors that directly influence the health of women.<sup>10</sup>

The assessment of dietary intake and supplementation during the pregnancy process are important to detect nutritional deficiencies and poor habits in order to adapt the nutrient requirements during this period and avoid changes in nutritional status, allowing a favorable prognosis for the health of mother and child.

This study is justified by the scope in the Juiz de Fora municipality, comprising two regions with a representative sample value. In addition, it provides relevant data that can subsidize intervention actions, improvement, and promote work that will benefit pregnant women attended in the public health service.

Therefore, the aim of this study was to evaluate the nutritional and health status, analyze food intake, and investigate the socioeconomic profile of pregnant women assisted in the Juiz de Fora health units (MG).

## METHODS

This is a descriptive observational study. The longitudinal follow-up consisted of two evaluations: the first, in the third trimester of pregnancy; and the second in the first postpartum month. The interval between evaluations varied according to the initial date of study inclusion. Data collection was performed in all the basic health units (UBS) in the western and southern regions of the municipality of Juiz de Fora – MG, totaling eight units. The study period was from September of 2011 to February of 2013.

The study sample consisted of 111 women who were invited to participate in the moments awaiting some procedure at UBS, therefore, making this a convenience sample. Thus, the inclusion criterion was acceptance to participate, and there were no exclusion criteria.

In the first stage of the study, pregnant women who agreed to participate, signed the informed consent and responded to a questionnaire prepared by the researchers containing socioeconomic information (maternal education, family income, and marital status among others), variables related to the pregnancy (maternal age, initiation of prenatal care, number of prenatal consultations, complications during pregnancy, pre-pregnancy IMC, use of tobacco and alcohol during pregnancy, use of supplements during pregnancy as the result of blood test performed during the prenatal period, among others), and obstetrical history (parity, interval, and abortion, among others).

The reported complications such as hypertension, anemia, heart disease, and diabetes mellitus were referred by the pregnant women according to the medi-

cal diagnosis made in the basic health unit. Thus, for such information, some biochemical examination or systemic arterial pressure measurements (PA) were not required in this study.

The nutritional status assessment took into account the anthropometric measurements of pre-pregnancy height and weight applying the IMC obtained by the pre-pregnancy weight ratio (kg)/[height (m)<sup>2</sup>]. The classification was based on parameters established by the Institute of Medicine (IOM), which considers IMC < 19.8 as underweight; between 19.8 and 26.0 as normal weight; between 26 and 29.0 as pre-obese or overweight; and above 29 as obesity.

The 24-hour food recall was collected in the first meeting using a photo album containing pictures of often consumed foods in order to obtain accurate information on food intake on the day before the interview. Subsequently, the consumed foods were converted into grams using the Table for the Evaluation of Food Consumption in Domesticated Measurements. The chemical composition of diets was analyzed in relation to macronutrients (carbohydrate, protein, and lipid), vitamins (vitamin A, C, and folate), and minerals (calcium and iron) adopting the Brazilian Food Composition Table (TACO) and Food Composition Table – support for the nutritional decision.

The average consumption of pregnant women was compared to the nutritional recommendations. AMDR was used for macronutrients; the Estimated Average Requirement (EAR) of the Dietary Reference Intakes (DRIs) was used for micronutrients.

In the second stage, which took place in the first post-partum month, nursing mothers were evaluated through telephone contact and asked about the total weight gain during pregnancy and number of total consultations during the prenatal period. The sample size was reduced to 85 people at this stage due to loss of contact with some women and follow-up withdrawal of others.

Descriptive statistics used for data analysis such as frequency, mean, and dispersion measures using the SPSS software version 15.0.

This study was approved by the Ethics Committee of the University Hospital of the Federal University of Juiz de Fora.

## RESULTS

Initially, 111 women agreed to participate in the study. Of these, 24.32% were teenagers, aged ≤ 19 years; and 11.71% were 35 years old or older. Age ranged between 14

and 40 years. The pre-pregnancy IMC ranged from 16.41 to 36.98 kg/m<sup>2</sup>, averaging 24.23 ± 4.32 kg/m<sup>2</sup>; more than half (53.33%) presented changes in nutritional status.

Most women were multiparous; however, there was a high percentage of primiparous. The inter-pregnancy interval was less than 24 months in most of the cases, which is considered a risk factor for pregnancy. In contrast, 32.26% of women presented this interval greater than 60 months, which is also a risk factor. More than half of women began the prenatal care in the first trimester of pregnancy and had more than seven consultations. The average total number of consultations during the prenatal care in this population was 7.35 ± 2.56, with a minimum of one and maximum of seven consultations (Table 1).

**Table 1 - Gestational variables of women evaluated in eight health units in the western and southern regions of Juiz de Fora, MG, 2011-2012**

Gestational variables	N	%
<b>Maternal age</b>		
≤ 19 years old	27	24.3
> 19 ≤ 30 years old	58	52.3
> 30 years old	26	23.4
<b>Pre-gestational IMC<sup>1</sup></b>		
Low weight	19	18.09
Eutrophic	49	46.67
Overweight	20	19.04
Obesity	17	16.2
<b>Parity</b>		
Primiparous	49	44.1
Multiparas	62	55.9
<b>Abortions</b>		
Yes	15	13.5
No	96	86.5
<b>Interval between deliveries<sup>2</sup></b>		
≤ 24 months	18	29.03
> 24 ≤ 60 months	24	38.71
> 60 months	20	32.26
<b>Prenatal care start</b>		
By the 3rd month	62	55.9
4 <sup>th</sup> month onwards	49	44.1
<b>Total number of consultations<sup>3</sup></b>		
< 7 consultations	32	37.6
≥ 7 consultations	53	62.4
<b>Anemia during pregnancy</b>		
Yes	105	94.6
No	6	5.4

Continue...

... continuation

**Table 1** - Gestational variables of women evaluated in eight health units in the western and southern regions of Juiz de Fora, MG, 2011-2012

Gestational variables	N	%
<b>Anemia<sup>4</sup></b>		
Yes	21	20
No	84	80
<b>Children &lt;5 years old in the same household</b>		
Yes	51	45.9
No	60	54.1
<b>Smoking during pregnancy</b>		
Yes	15	13.5
No	96	86.5
<b>Alcohol use during pregnancy</b>		
Yes	17	15.3
No	94	84.7
<b>Exercise during pregnancy</b>		
Yes	32	28.8
No	79	71.2

<sup>1</sup> Six women were not able to inform pre-pregnancy weight and height; the calculation the pre-pregnancy IMC was not possible; <sup>2</sup> primiparous excluded; <sup>3</sup> no information on the number of total prenatal consultations for 26 women due to the absence of second evaluation; <sup>4</sup> six women did not undergo a blood test.

The prenatal data on blood count, required at the UBS, revealed that 20% evidenced gestational anemia, with no description of its etiology. Most of the women were using ferrous compound supplementation (92.8%) and vitamin complex (58.6%) (Table 1).

Although the use of alcohol and tobacco is strongly discouraged during pregnancy, some of the studied women confirmed consuming these substances. Regular physical exercise during pregnancy is recommended, although it requires some care, however, a low percentage of women reported performing some physical activity during this period (Table 1).

Because the second contact was by telephone in the first month after birth, some follow-up losses occurred, and the sample size was reduced to 85 women. It is believed that in most of these cases the main cause was a change in the telephone number reported by the woman. At that time, the total weight gain during pregnancy was questioned. The mean was 13.08 kg ± 6.42; some pregnant women lost up to 8 kg and others gained up to 31.5 kg.

Table 2 describes the analyzed socioeconomic variables. In relation to maternal and paternal education, the majority had low education level in both cases (≤ 8 years). However, this relationship was op-

posite in the current working condition, i.e., the minority of mothers had a job, and about 80% of the fathers were employed. It can be observed that the studied sample consists mainly of the low-income population because most of the interviewees earned up to one minimum wage.

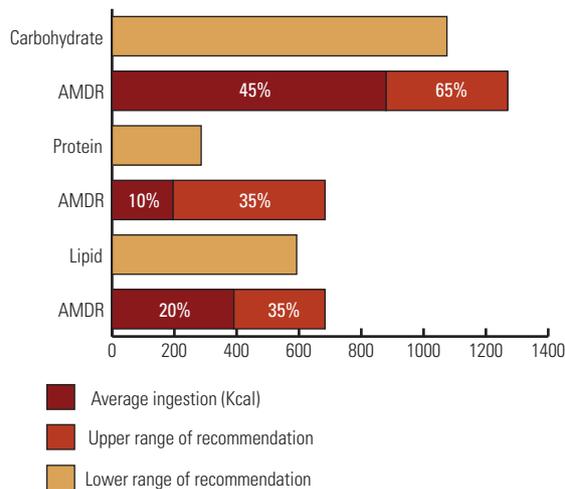
**Table 2** - Socioeconomic variables of women evaluated in eight health units in the western and southern regions of Juiz de Fora, MG, 2011-2012

Socioeconomic variables	N	%
<b>Maternal education</b>		
≤ 8 years	58	52.25
> 8 years	53	47.75
<b>Current mother's work status</b>		
Employed (formal and informal)	34	30.6
Unemployed	77	69.4
<b>Marital status</b>		
Married (formal and informal)	70	63.1
Single	37	33.3
Separated	3	2.7
Widow	1	0.9
<b>Father's education<sup>1</sup></b>		
≤ 8 years	61	58.1
> 8 years	44	41.9
<b>Current father's working condition<sup>2</sup></b>		
Employee (formal and informal)	93	84.55
Unemployed	16	14.55
Retired	1	0.9
<b>Family income<sup>3</sup></b>		
< 1 minimum wage	51	47.2
1 to 2 minimum wages	36	33.3
2 to 3 minimum wages	15	13.9
> 3 minimum wages	6	5.6
<b>Income per capita<sup>4</sup></b>		
≤ ½ minimum wage	61	57
> ½ minimum wage	46	43

<sup>1</sup> Six women were unable to inform the father education; <sup>2</sup> one woman could not inform the current working condition of the father; <sup>3</sup> three women could not inform the family income; <sup>4</sup> four women could not inform the family income or the number of people who depend on it, making it impossible to calculate the per capita income.

Some complications such as heart disease, hypertension, and diabetes mellitus were evaluated as occurring during pregnancy. However, more than half of women reported not suffering any irregularity (59%). Some of the women (28%) had some other type of complication such as urinary tract infection, bleeding, dizziness, contraction, or depression.

Figure 1 shows the comparison of the mean daily intake of nutrients in all pregnant women evaluated and the recommended ranges indicated by AMDR. The average intake of carbohydrate, protein and lipid was within the recommended ranges in the studied pregnant women, and therefore, adequate. It can also be noted that, despite the consumption of protein and lipid to be within the recommended range, the mean protein intake was near the lower range while the average fat intake was close to the upper range.



**Figure 1** - Comparison between the recommendation established by the AMDR and the average daily intake of macronutrients in women evaluated in eight health units of the western and southern regions of Juiz de Fora – MG, from 2011 to 2012.

The comparison of micronutrient intake in the evaluated pregnant women to the DRIs recommendations showed the consumption of inadequate diets in relation to calcium and iron intake, with an average intake of  $516.86 \text{ mg} \pm 9.02 \text{ mg}$  and  $379.89 \pm 4.02$ , respectively. A similar behavior was verified in the average folate intake of  $138.93 \pm 98.02 \text{ ug}$ .

As for the consumption of vitamins A and C, an adequate intake average was observed. The average consumption of vitamin A was  $967.87 \text{ ug} \pm 3608.06$  and vitamin C was  $186.54 \pm 284.29 \text{ mg}$ .

## DISCUSSION

Maternal age is a factor that influences the outcome of pregnancy. In this study, the sample consisted of pregnant adolescents and women over 35 years old comprising a group vulnerable to perinatal risk.<sup>11</sup>

In the official records of 39,285 live births in Fortaleza<sup>12</sup>, pregnancy at the extreme ages of reproductive life was associated with less efficient prenatal care, prematurity, anoxia, and low weight.

As well as maternal age, the pre-pregnancy nutritional status also influences the outcome of the pregnancy. Most women were eutrophic. However, some others presented some nutritional disorder, either deficit or excess. The inappropriate maternal nutritional status has a great impact on the growth and development of newborns, compromising postnatal growth with a high risk of morbidity in the first year of life.<sup>13</sup> Excess weight can bring consequences such as gestational diabetes and/or pregnancy hypertension syndrome while maternal underweight and specific micronutrient deficiencies can result in anemia and deficits of vitamin A.<sup>14</sup>

In this sample, most women were between 20 and 35 years old. There was a high percentage of primiparous, which can be explained by the fact that this is an optimal reproductive age.

Among the multiparous women, the interval between pregnancies was equal to or less than 24 months in almost one-third of them. It is known that a short interval between deliveries is inadequate because it is associated with depletion of maternal reserves and consequent low birth weight, prematurity, neonatal and child mortality, and malnutrition in childhood.<sup>15</sup>

The beginning of prenatal care and the total number of consultations are related to improved maternal and children health indicators.<sup>16</sup> In Pelotas<sup>17</sup>, women with high family income attended more pre-natal consultations than those with low income. The average number of prenatal consultations obtained in this study is higher than what is recommended by the Ministry of Health<sup>5</sup>, which is, at least, six. This fact contradicts the statement in the study in Pelotas because this sample refers to predominantly low-income pregnant women.

It is known that anemia caused by iron deficiency is a public health problem in Brazil and worldwide, affecting mainly pregnant women.<sup>18</sup> Some factors, such as low dietary intake, low reserves, and high needs contribute to iron deficiency, thus resulting, in anemia.<sup>19,20</sup>

The prevalence of anemia in the pregnant women in this study amounts to 20%, which is higher than the result found by Hedrich et al.<sup>1</sup>. Thus, this demonstrates the importance of preventive and treatment because they are associated with adverse conditions such as risk of maternal death, low birth weight, and pre-term births.<sup>21</sup>

The Ministry of Health recommends using ferrous compound supplementation beginning in the second trimester and until the third post-partum month<sup>5</sup>, even in women without anemia, prophylactically, and in order to reduce the risk of pregnancy and perinatal complications.<sup>21</sup> The supplementation with the ferrous compound was reported by 92.8% of women, a result similar to that found by Fonseca et al.<sup>22</sup>. Nonetheless, even with supplementation, part of the studied pregnant women exhibited anemia; that may have resulted from poor adherence to treatment, inadequate dose, low consumption frequency, and late prophylaxis start.<sup>19</sup>

The multivitamin complex or folic acid are indicated even before pregnancy, within 60 to 90 days before conception, and maintained use during the first trimester.<sup>5</sup> The importance of folate is clear during the phase of fetal development and growth acting in cell proliferation and differentiation, DNA and RNA synthesis, and contributing to the perfect formation of the neural tube.

The percentage of pregnant women who used folic acid accounted for 58.6%, well below the expected value because ideally the full range of the recommended supplementation should be present considering that this medication is distributed free in the UBS.

Smoking has a profound impact on the outcome of pregnancy. According to Vitolo<sup>2</sup>, the nicotine present in tobacco promotes a series of alterations in the normal physiology of pregnancy, reducing placental blood flow and promoting vasoconstriction. These changes may affect fetal growth, increase the risk of prematurity and perinatal mortality, and prevent adequate fetal nutrition. The smoking prevalence of 13.5% among the pregnant women in this study reinforces the importance of guidance on prenatal care to discourage this practice.

Similarly to smoking, alcohol use is strongly discouraged, as having a direct impact on fetal alcohol syndrome (SAF)<sup>23</sup> characterized by damage to the central nervous system. Even children who suffered prenatal exposure to alcohol and who do not have SAF characteristics have behavioral and emotional difficulties that interfere with their social life. In this study, 15.3% of women used alcohol, more than twice of what was found in Rio de Janeiro with 433 puerperae.<sup>24</sup>

Physical exercise influences maternal weight gain and fetal growth and is associated with prevention and control of various diseases contributing to proper gestational outcome.<sup>25</sup>

It is known that a low number of women practice physical exercise during pregnancy, as stated by Nochieri et al.<sup>14</sup>, who found similar data, 18.5%. This fact was confirmed in this study, which found a small proportion of pregnant women who have practiced some physical exercise. The encouragement of this practice during prenatal care can help change these results.

The socioeconomic profile outlines a population that remains predominantly with less than half a minimum wage as income, therefore, constitutes a sample with unfavorable socioeconomic status. A high percentage of women reported being unemployed, which contributes to low per capita income and more financial dependence on their families. It is known that low-income people have poor access to health care, nutrition, and leisure, harming, in general, the pregnancy and fetus. Thus, the low purchasing power can act influencing minimum access to food in quantity and quality, resulting in the consumption of energy-dense foods, which, in turn, are cheaper<sup>14</sup> and contribute to excessive weight gain during pregnancy.

Coupled with low economic status, there is also the predominance of low education. This association may hinder access to information about care during pregnancy and newborn care, or compromise the understanding of what is informed, both affecting the health of the binomial mother and child.<sup>26</sup>

The presence of a partner can support the woman financially and psychologically during pregnancy.<sup>14,27</sup> Most women in this study reported being married, which is beneficial because unmarried women are more likely to provoke abortions<sup>27</sup> and have a late start on prenatal care and breastfeeding.<sup>28</sup>

Many of the studied women reported having children under five years old in the household. This result is relevant because other children in low socioeconomic environments can be detrimental to the health care and nutrition for both newborn and these children themselves as they may share the family care.<sup>8</sup>

The evaluation of the dietary intake during pregnancy is very important as it can support future nutrition interventions, and thus, improve the quality of care and guidance. The 24-hour dietary recall was used in this study to evaluate the caloric and nutrient intake. While not considered as the best method for evaluating the usual food intake of an individual because it refers only to one day, it has advantages such as short time application and low cost, in addition to being the most used in studies.

The average carbohydrate intake in this study was approximately 55% of the total caloric value, and it was considered adequate according to the recommendations for pregnant women (AMDR). Similar to this result, Fazio et al.<sup>29</sup> found that the proportion of carbohydrates ranged from 55 to 59%. In Rio de Janeiro<sup>30</sup>, the average consumption amounted to 65% of the total energy; this proportion was greater than that evaluated in this study. It is known that the adequate consumption of this macronutrient during pregnancy plays an important role in fetal growth because it is the main source of energy during pregnancy. Therefore, the finding in this study is considered positive.

In relation to proteins, it was observed that the average intake by the evaluated pregnant women approached the lower recommended range (AMDR). It is noteworthy that this nutrient plays essential roles in the formation of fetal and maternal tissues, and its deficiency is associated with intrauterine growth retardation and development of pre-eclampsia.<sup>2</sup>

The fact that the lipids average consumption identified was near the top of the recommendation limit may be disturbing because the typical Brazilian diet is generally predominantly rich in saturated and trans fats, which are detrimental to the cardiovascular system and can also lead to excessive weight gain during pregnancy. This result was similar to that found in the study developed in a philanthropic institution of São Paulo<sup>14</sup> where lipid intake was also close to the recommended maximum limit.

In terms of micronutrients, it was verified that the diets of the pregnant women evaluated in this study lacked calcium, iron, and folate. This corroborates the results of another study in which nutritional disorders presented by pregnant women were primarily related to these micronutrients.<sup>1</sup>

The average calcium intake in this study reached only half of what is recommended according to the DRIs. This result is probably related to reduced frequency in the intake and quantity of this mineral, mainly found in dairy products.

The iron intake was also inadequate in all evaluated pregnant women. It is indisputable that it is difficult to reach the recommendation established for this micronutrient due to its high demand in pregnant women. Nevertheless, more than 90% of women reported using iron supplements, which can minimize potential nutritional deficiencies. Concerning the importance of folate during pregnancy, it is worrying that in addition to the inadequate intake of this vita-

min, many women did not use folic acid supplements. This can increase the risk of deficiencies in this population, which can harm the health of the fetus.

Vitamins A and C were adequately consumed, which can be explained by the high consumption and easy access to food sources with these vitamins, which is confirmed in other studies.<sup>29</sup>

This study presented longitudinal monitoring, and due to this fact, some limitations were encountered mainly related to loss of follow-up and participant abandonment. Telephone contact with some women was lost between evaluations, which made the sample size small and without continuity on all data collected in the first evaluation. Furthermore, there were communication difficulties with participants, which may have had a negative influence on the reliability of the reported data because the increased time between the two contacts may have led to confusion or forgetfulness about what has happened.

The lack of education about food and its importance during pregnancy and postpartum period was evident based on the findings of the social and nutritional status of women evaluated in this study. Therefore, improvements and expansion of public policies supporting adequate feeding in these groups are suggested, which will be relevant for changes in dietary and health patterns. The obtained data can support discussions for the improvement of actions toward this population.

## CONCLUSION

Most of the evaluated pregnant women earned up to one minimum wage as income, attended prenatal consultations, and used vitamins and iron sulfate supplementation. Nonetheless, some of them presented gestational anemia, and about 10% continued consuming alcohol and tobacco during pregnancy. On average, the gestational weight gain was satisfactory, and the average intake of macronutrients was adequate. However, the consumption of the micronutrients calcium, iron, and folate was inadequate.

Despite the access to prenatal services, it was noted that there are flaws in this system such as the lack of nutritional monitoring and guidelines for care during pregnancy and postpartum. Therefore, the importance of the inclusion of professionals encouraging such activities and the improvement of public policies aimed at this population are highlighted.

## REFERENCES

- Hedrich A, Novello D, Ruviaro L, Alves J, Quintiliano DA. Perfil alimentar, estado nutricional, de saúde e condições sócio-econômicas de gestantes assistidas por centros de saúde do município de Guarapuava- PR. *Rev Salus-Guarapuava*. 2007; 1(2):139-46.
- Vitolo MR. *Nutrição: da gestação ao envelhecimento*. Rio de Janeiro: Rubio; 2008.
- Malfatti CRM, Assunção AN, Moura R, Burgos MS, Ehle LD. Perfil das gestantes cadastradas nas equipes de saúde da família da 13ª Coordenadoria Regional de Saúde do Estado do Rio Grande do Sul. *Texto Contexto Enferm*. 2006; 15(3):458-63.
- Brasil, Ministério da Saúde. *Informações de saúde. Maternidade. Gestação. A importância do pré-natal*. [Cited 2013 Apr 23]. Available from: <http://www.brasil.gov.br/sobre/saude/maternidade/gestacao/a-importancia-do-pre-natal>.
- Brasil. Ministério da Saúde. *Pré-natal e puerpério: atenção qualificada e humanizada*. Brasília: Ministério da Saúde; 2005.
- Melo ASO, Assunção PL, Amorim MMR, Cardoso MAA. Determinantes do crescimento fetal e sua repercussão sobre o peso ao nascer. *Femina*. 2008; 36(11):683-9.
- Ferreira RAB. *Influência da paridade sobre o Índice de Massa Corpórea de mulheres brasileiras [dissertação]*. São Paulo: Faculdade de Saúde Pública da Universidade de São Paulo; 2010.
- Olinto MTA, Victora CG, Barros FC, Tomasi E. Determinantes da desnutrição infantil em uma população de baixa renda: um modelo de análise hierarquizado. *Cad Saúde Pública*. 1993; 9(1):14-27.
- Freire TM, Machado JC, Melo EV, Melo DG. Efeitos do consumo de bebida alcoólica sobre o feto. *Rev Bras Ginecol Obstet*. 2005; 27(7):376-81.
- Almeida SDM, Barros MBA. Equidade e atenção à saúde da gestante em Campinas (SP), Brasil. *Rev Panam Salud Publica*. 2005; 17(1):15-25.
- Matheus M, Sala MA. Crescimento intra-uterino normal. In: Matheus M, Sala MA. *Aspectos obstétricos e perinatais*. São Paulo: Guanabara Koogan; 1992.p.9-24.
- Aragão FMX, Oliveira MCR. A influência da idade materna sobre as condições perinatais. *Rev Bras Promoção Saúde*. 2004; 1:1756-60.
- Accioly E, Saunders C, Lacerda EMA. *Nutrição em obstetrícia e pediatria*. Rio de Janeiro: Cultura Médica; 2002.
- Nochieri ACM, Belmonte FAL, Assumpção MF, Leung MCA. Perfil nutricional de gestantes atendidas em primeira consulta de nutrição no pré-natal de uma instituição filantrópica de São Paulo. *Mundo da Saúde*. 2008; 32(4):443-51.
- Franceschini SCC, Priore SE, Pequeno NP, Silva DG, Sigulem DM. Fatores de risco para o baixo peso ao nascer gestantes de baixa renda. *Rev Nutr*. 2003; 16(2):171-9.
- Kotelchuck M, Schwartz J, Anderka M, Finison KS. WIC participation and pregnancy outcomes: Massachusetts statewide evaluation project. *Am J Pub Health*. 1984; 74(1):1086-92.
- Halpern R, Barros FC, Victora CG, Tomasi E. Atenção pré-natal em Pelotas, Rio Grande do Sul, Brasil. *Cad Saúde Pública*. 1998; 14(3):487-92.
- Bresani CC, Souza BAI, Batista Filho M, Figueiroa JN. Anemia e ferropenia em gestantes: dissensos de resultados de um estudo transversal. *Rev Bras Saúde Matern Infant*. 2007; 7(1):S15-22.
- Vitolo MR, Boscaini C, Bortolini GA. Baixa escolaridade como fator limitante para o combate à anemia entre gestantes. *Rev Bras Ginecol Obstet*. 2006; 28(6):331-9.
- Silva LSV, Thiapó AP, Souza GG, Saunders C, Ramalho A. Micronutrientes na gestação e lactação. *Rev Bras Saúde Matern Infant*. 2007; 7(3):237-44.
- Paixão GPN, Sena CD, Santos TCS, Gomes NP, Carvalho MRS. A importância do uso do ácido fólico e sulfato ferroso em mulheres no ciclo gravídico – puerperal: revisão integrativa da literatura. *Rev APS*. 2012; 15(2):214-9.
- Fonseca MRCC, Fonseca E, Bergsten-Mendes G. Prevalência do uso de medicamentos na gravidez: uma abordagem farmacoepidemiológica. *Rev Saúde Pública*. 2002; 36(2):205-12.
- Moraes CL, Reichenheim ME. Rastreamento de uso de álcool por 15 gestantes de serviços públicos de saúde do Rio de Janeiro. *Rev Saúde Pública*. 2007; 41(5):695-703.
- Freire K, Padilha PC, Saunders C. Fatores associados ao uso de álcool e cigarro na gestação. *Rev Bras Ginecol Obstet*. 2009; 31(7):335-41.
- Matsudo VKR, Matsudo SMM. Atividade física e esportiva na gravidez. In: Tedesco JJ, editor. *A grávida*. São Paulo: Atheneu; 2000.p.53-81.
- Griz SMS, Barbosa CP, Silva ARA, Ribeiro MA, Menezes DC. Aspectos demográficos e socioeconômicos de mães atendidas em um programa de triagem auditiva neonatal. *Rev Soc Bras Fonoaudiol*. 2010; 15(2):179-83.
- Kac G, Silveira EA, Oliveira LC, Araujo DMR, Sousa EB. Fatores associados à ocorrência de cesárea e aborto em mulheres selecionadas em um centro de saúde no município do Rio de Janeiro, Brasil. *Rev Bras Saúde Matern Infant*. 2007; 7(3):271-80.
- Venâncio SI, Escuder MML, Kitoko P, Rea MF, Monteiro CA. Frequência e determinantes do aleitamento materno em municípios do Estado de São Paulo. *Rev Saúde Pública*. 2002; 36(3):313-8.
- Fazio ES, Nomoura RMY, Dias MCG, Zugaib M. Consumo dietético de gestantes e ganho ponderal materno após aconselhamento nutricional. *Rev Bras Ginecol Obstet*. 2011; 33(2):87-92.
- Lacerda EMA, Kac G, Cunha CB, Leal MC. Consumo alimentar na gestação e no pós-parto segundo cor da pele no município do Rio de Janeiro. *Rev Saúde Pública*. 2007; 41(6):985-94.