

Nutritional behaviours of pregnant women in rural and urban environments

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Abstract

Introduction. Monitoring of the environmental differences in the mode of nutrition is especially important in pregnant women, for whom normal body weight gain is especially important for both the course of pregnancy and the normal development of the foetus, and is inseparably associated with rational nutrition.

Objective. The objective of the study was evaluation of the mode of nutrition of pregnant women according to the place of residence.

Materials and methods. The investigation comprised 704 women. Information was collected by means of an anonymous survey concerning place of residence, consumption of selected products and beverages, and taking folic acid and other vitamin and/or mineral dietary supplements.

Results. In the urban environment, pregnant women more frequently consumed vegetables, milk and dairy products, sea fish and wholemeal cereal products, drank more liquids, as well as more fruit and/or vegetable juices, and more often used the supplementation with folic acid, even before becoming pregnant. No significant differences were found in the consumption of fruits, pulses, products which are the source of complete proteins, confectionery products and sweets, according to the place of residence.

Conclusions. The diet of pregnant women from the rural environment compared to that of women from urban areas, was characterized by worse quality. It is necessary to carry out health education in the area of adequate nutrition among pregnant women, and those who plan pregnancy, directed primarily to all women from the rural environment.

Key words

pregnant women, nutritional behaviours, place of residence

INTRODUCTION

Socio-economic status is among the factors which considerably determine human health-related behaviours, the indicators of which are most frequently the amount of income and level of education [1, 2, 3, 4, 5]. In many countries, an important factor which also decides the mode of nutrition is place of residence [6, 7, 8]. The differences in nutritional behaviours between urban and rural inhabitants are also observed in Poland [9, 10, 11, 12]. Monitoring of the environmental differences in the mode of nutrition is especially important in pregnant women, for whom normal body weight gain is of great importance for both the course of pregnancy and the normal development of the foetus, and is inseparably associated with rational nutrition.

Objective. The objective of the study was evaluation of the mode of nutrition of pregnant women according to the place of residence. Analysis also covered the nutritional status before pregnancy and average amounts of body weight gain during pregnancy.

MATERIALS AND METHOD

The study was conducted in 2012 in gynaecological-obstetric consultation rooms and outpatient departments in the Kielce

Region of Poland, and covered 704 pregnant women. Data concerning 677 women were qualified for further analysis; 12.4% of them were in the first trimester of pregnancy, 25.4% in the second, and 62.2% in the third trimester of pregnancy. Information was collected by means of an anonymous survey concerning education, place of residence, age, consumption of selected products and beverages, and taking folic acid and other vitamin and/or mineral dietary supplements. The items in the questionnaire pertained to the number of portions of individual products consumed. The size of portions was specified according to the principles presented in literature [13]. From among the women in the study, 51% came from the rural environment and 49% were urban inhabitants; 21.0% possessed elementary education (elementary or elementary vocational), 37.7% secondary school, and 41.3% higher education (licentiate or university Master's Degree). The highest percentage of women in the study were aged 25–34 (62.6%), 26.3% of respondents were aged under 25, including 2.4% of those under 18. The remainder (11.1%) were pregnant women aged 35 and over, including 1.3% of those aged 40 and over. No significant differences in the distribution of age groups were observed between women living in rural and urban areas.

The respondents' nutritional status prior to pregnancy was evaluated using the declared data concerning body weight and height, based on which the BMI values were calculated. The present body weight of women in the 2nd and 3rd trimester of pregnancy served for the calculation of average amounts of weekly body weight gain. For pregnancies shorter than 38 weeks, the average weekly body weight gain was calculated by dividing body weight gain in pregnancy by the duration of pregnancy in weeks, whereas for pregnancies

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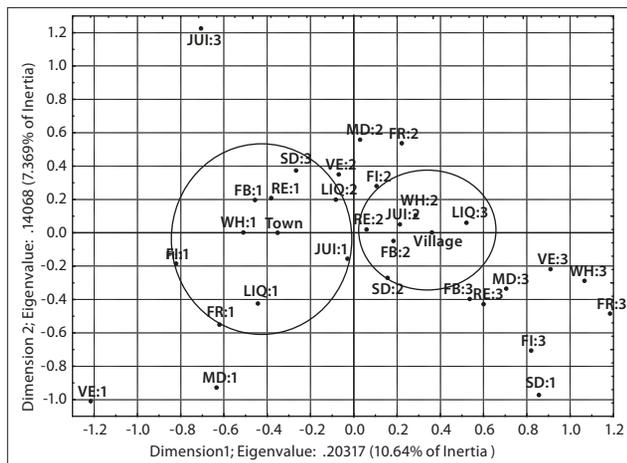


Figure 1. Relationship between mode of nutrition of pregnant women and place of residence – results of correspondence analysis

Place of residence – Town, Village; RE (regularity): 1 – yes, 2 – sometimes, 3 – no; FR (fruit): 1 – ≥ 3 servings daily, 2 – 1–2 servings daily, 3 – < 1 serving daily; VE (vegetables): 1 – ≥ 3 servings daily, 2 – 1–2 servings daily, 3 – < 1 serving daily; MD (milk and dairy products): 1 – ≥ 3 servings daily, 2 – 1–2 servings daily, 3 – < 1 serving daily; FI (sea fish): 1 – ≥ 1 serving daily, 2 – < 1 serving daily, 3 – not at all; WH (wholemeal products): 1 – ≥ 1 serving daily, 2 – < 1 serving daily, 3 – not at all; LIQ (liquids): ≥ 2 litres, 2 – ca. 1.5 litres, 3 – < 1.5 litres; JUI (juices): 1 – yes, 2 – sometimes, 3 – not at all; SD (sweet carbonated drinks): 1 – yes, 2 – sometimes, 3 – not at all; FB (beginning of taking folic acid): 1 – before pregnancy, 2 – at 1–12 weeks of pregnancy, 3 – after week 12 of pregnancy

longer than 38 weeks, by dividing body weight gain by 38 [14]. Subsequently, weekly amounts of body weight gain were categorized based on the distribution of this variable obtained in the representative studies of Polish women conducted by Borkowski and Mielniczuk [15]. Three categories of weight gain were distinguished: low (from 0.29 kg/week), mediocre (0.29–0.44 kg/week), and high (over 0.44 kg/week). Statistical analysis was performed using correspondence analysis (Fig. 1), and non-parametric chi-square test (χ^2) test (Tab. 1, 2, 3, 4, 5). The p values $p < 0.05$ were considered statistically significant.

RESULTS

More than 47% of the women in the study consumed 5 or more meals daily, and over 74% snacked between meals at least once daily (Tab. 1). No differences were observed according to the place of residence, or in the number of meals consumed during the day, nor the frequency of snacking between meals; however, regular consumption of meals in

Table 1. Characteristics of nutritional habits of the women examined (%)

Nutritional habits	category	Place of residence		
		rural	urban	total
No. of meals during the day $p = 0.6837$	≤ 3	16.9	18.4	17.6
	4	33.4	36.6	35.0
	≥ 5	49.7	45.1	47.4
Regular consumption of meals $p = 0.0008$	yes	31.0	44.7	37.7
	sometimes	43.5	37.2	40.4
	no	25.5	18.1	21.9
	no	9.6	13.0	11.2
Snacking between meals $p = 0.5104$	more rarely than once daily	14.2	15.1	14.6
	once daily	29.6	28.4	29.0
	several times daily	46.7	43.5	45.1
	several times daily	46.7	43.5	45.1

Table 2. Consumption of selected food products according to place of residence (%)

Products	Frequency of intake	Place of residence		
		rural	urban	total
Fruit $p = 0.5647$	< 1 serving daily	10.4	12.7	11.5
	1 – 2 servings daily	53.9	47.7	50.9
	3 servings daily	24.4	26.3	25.3
	4 or more servings daily	11.3	13.3	12.3
Vegetables $p = 0.0046$	< 1 serving daily	29.0	19.2	24.1
	1 – 2 servings daily	60.8	58.1	59.6
	3 servings daily	7.0	15.0	10.9
	≥ 4 servings daily	3.2	7.7	5.4
Pulses $p = 0.3268$	not at all	32.8	29.9	31.4
	< 1 serving in a week	51.3	49.9	50.6
	≥ 1 serving in a week	15.9	20.2	18.1
Meat, fish, eggs total $p = 0.4834$	< 1 serving daily	20.3	15.7	18.1
	1 – 2 servings daily	58.8	61.9	59.9
	3 servings daily	16.2	16.9	16.6
	≥ 4 serving daily	5.5	5.4	5.5
Milk and dairy products $p = 0.0338$	< 1 serving daily	22.0	17.6	19.7
	1 – 2 servings daily	55.9	50.3	53.6
	3 servings daily	11.9	17.1	14.6
	≥ 4 servings daily	9.2	15.0	12.1
Sea fish $p = 0.0005$	not at all	22.0	12.4	17.3
	< 1 serving in a week	57.4	57.7	57.5
	≥ 1 servings in a week	20.6	29.9	25.2
Wholemeal cereal products $p = 0.0048$	not at all	17.1	9.9	13.6
	< 1 serving daily	40.6	36.6	38.6
	1 serving daily	27.3	29.0	28.1
	≥ 2 servings daily	15.1	24.5	19.7
Confectionery and sweets $p = 0.2648$	not at all	7.8	9.1	8.4
	several servings in a week	54.5	55.9	55.2
	1 serving daily	24.1	19.3	21.8
	≥ 2 servings daily	13.6	15.7	14.6

pregnancy was significantly more often declared by urban inhabitants.

In the urban environment, pregnant women more frequently consumed vegetables, milk and dairy products, sea fish and wholemeal cereal products (Tab. 2). No significant differences were found in the consumption of fruits, pulses, products which are the source of complete proteins, confectionery products and sweets, according to the place of residence. Six from among the women examined (0.89%) did not consume meat and cold cuts, including 2 living in rural (0.58%) and 4 in urban environments (1.20%).

No significant differences were observed in the consumption of alcoholic beverages, strong tea and coffee, as well as fizzy drinks containing caffeine, according to the place of residence (Tab. 3). Urban inhabitants generally drank more liquids, more fruit and/or vegetable juices, and also reported that in pregnancy they avoided the consumption of sweetened fizzy drinks, and more often used the supplementation with folic acid even before becoming pregnant (Tab. 4).

The results of correspondence analysis showed that the urban place of residence was most strongly related with the

Table 3. Consumption of selected beverages according to place of residence (%)

Intake of beverages		Place of residence		
		rural	urban	total
Liquids total p = 0.0075	<1.5 litres	33.6	23.9	28.9
	ca. 1.5 litres	44.6	46.5	45.6
	≥2 litres	21.7	29.6	25.6
Fruit and/or vegetable juices p = 0.0284	yes	58.0	67.2	62.7
	seldom	33.5	27.9	30.7
	not at all	8.5	4.9	6.7
Sweetened fizzy drinks in general p = 0.0372	yes	10.9	10.3	10.6
	seldom	42.8	33.8	38.4
	not at all	46.3	55.9	51.0
Fizzy drinks containing caffeine p = 0.8716	yes	7.0	6.9	7.0
	seldom	39.4	37.5	38.4
	not at all	53.6	55.6	54.6
Coffee p = 0.6944	yes	12.5	13.0	12.8
	seldom	30.0	32.7	31.4
	not at all	57.4	54.2	55.9
Strong tea p = 0.2601	yes	20.9	17.0	19.0
	seldom	42.4	40.7	41.6
	not at all	36.8	42.3	39.5
Alcoholic beverages p = 0.3231	yes	15.0	17.8	16.4
	not at all	85.0	80.2	83.6

Table 4. Taking folic acid and other dietary supplements (%)

Taking of supplements		Place of residence		
		rural	urban	total
Folic acid p = 0.0770	yes	85.2	89.7	87.4
	no	14.8	10.3	12.6
Commencement of taking folic acid p = 0.0085	before pregnancy	28.2	40.3	34.3
	at 1–12 weeks of pregnancy	60.5	50.7	55.6
	after week 12 of pregnancy	11.2	9.1	10.1
Other supplements p = 0.4903	yes	39.1	36.6	37.9
	no	60.9	63.4	62.1
Polyunsaturated fatty acids n-3 p = 0.0680	yes	29.8	38.3	34.1
	no	70.2	61.7	66.0

Table 5. Nutritional status before pregnancy and average amounts of body weight gain in pregnancy (%)

Nutritional status and amounts of body weight gain		Place of residence		
		rural	urban	total
Nutritional status before pregnancy (BMI kg/m ²) p = 0.2305	underweight (< 18.5)	6.4	8.2	7.3
	normal weight (18.5–24.9)	71.5	74.5	73.0
	overweight (≥ 25.0)	22.1	17.3	19.7
Average amounts of body weight gain (kg/week) p = 0.9975	low	39.6	39.8	39.7
	mediocre	32.8	32.8	32.8
	high	27.5	27.4	27.5

regular consumption of meals, taking folic acid even before becoming pregnant, high consumption of wholemeal cereal products, drinking a greater amount of liquids, including more frequent consumption of fruit and/or vegetable juices,

and avoidance of sweetened fizzy drinks, and also with a high consumption of fruits and sea fish (Fig. 1). The rural place of residence was most strongly related with taking folic acid at 1–12 weeks of pregnancy, lower consumption of wholemeal cereal products, drinking small amounts of liquids in general, including more rare consumption of fruit and/or vegetable juices, a slightly more frequent consumption of sweetened fizzy drinks, and also less regular consumption of meals.

In addition, the respondents' nutritional status before pregnancy and the amounts of average body weight gain in pregnancy were analyzed according to the place of residence (Tab. 5). However, no significant differences were found between the urban and rural inhabitants. It was only noted that the percentage of pregnant women with an excessive body weight was slightly higher in the rural than urban environment; nevertheless, this difference was statistically insignificant.

DISCUSSION

The results of many studies confirm that the diet of pregnant women with low socio-economic standard is characterized by a poorer quality [16, 17, 18, 19, 20, 21]. Low education level and lack of sufficient financial resources for the purchase of the necessary food products significantly limited the consumption by pregnant women of vitamin and/or mineral dietary supplements, and products such as: fruits, vegetables, milk and dairy products, sea fish, wholemeal cereal products, and products which are the source of animal proteins. In contrast, the consumption of sweetened fizzy drinks was higher in the group of women with a lower education level and declared financial deficits [19]. The analysis performed indicated that pregnant women in the rural environment in the Kielce Region more rarely consumed vegetables, milk and dairy products, sea fish, and wholemeal cereal products, drank less liquids in general and less fruit and/or vegetable juices, compared to pregnant women from the urban environment, and also more rarely avoided the consumption of sweetened fizzy drinks. These results are in accordance with the results of all-Polish studies which showed that rural pregnant women considerably less frequently consumed meat, raw and boiled salads, fruits, milk, dairy products and eggs, more rarely drank water, whereas more often – tea [11]. Despite differences in the mode of nutrition between urban and rural women, no analogous differences in haematological parameters after delivery were noted. However, babies of mothers from the urban environment had a higher level of haemoglobin [22]. In addition, the results of own studies indicate that urban inhabitants consumed meals more regularly than rural women, and more often used the supplementation with folic acid even before becoming pregnant.

Thus, the results of the presented study confirmed that the diet of women from the rural environment was poorer from the aspect of quality, compared to the diet of pregnant women living in the urban areas. The differences in the mode of nutrition among the inhabitants of urban and rural areas in Poland, on the one hand, are due to a greater attachment to the traditional way of nutrition and smaller susceptibility to the beneficial nutritional changes [23], and on the other hand, greater impoverishment in rural areas and, in consequence, smaller possibilities to satisfy

nutritional needs [10]. Rural inhabitants more frequently than urban inhabitants mentioned the necessity to resign, for financial reasons, from the purchase of such groups of foods as: fish and fish products (24% of rural households), confectionery (18%), stimulants (17%), meat and poultry (16%), as well as fruits and fruit products (14%) [10].

In the Kielce Region, the percentage of rural women who consumed alcohol in pregnancy reached 15%, and that of urban women – 17.8%, which is similar to that obtained in the all-Polish study, in which drinking alcohol was admitted by 12% rural women, 20% of women living in cities with a population of over 100,000, and more than 15% of inhabitants of small towns [24]. Also, Wojtyła et al. confirmed that 15% of Polish women consumed alcohol during the entire period of pregnancy [25]. The review of literature performed by Skagerström et al. [26] confirmed that high income and/or high social status are conducive to drinking alcohol during pregnancy.

Age is among the factors which may modify the mode of nutrition of pregnant women. The results of the presented study, analysed generally, showed that women aged 35 and over, compared to younger women, in pregnancy, more often consumed sea fish, wholemeal products, and sweets, and were more often overweight (32% of respondents), while they less frequently consumed coffee (data not shown). Women aged 25–34, most often started to take folic acid before becoming pregnant. No significant differences were observed in the frequency of consumption of the remaining products and beverages. Nevertheless, the distribution of age groups of rural and urban women did not significantly differ; therefore, this factor had no effect on the differences in the mode of nutrition of pregnant women from both environments compared.

Despite the differences in the frequency of consumption of many products and beverages, no differences were observed among the women in the study in the average amounts of body weight gain in pregnancy according to the place of residence. This partially results from the fact that the amounts of body weight gain depend on body weight before pregnancy [14], and the pregnant women in both environments did not significantly differ from the aspect of the frequency of occurrence of both deficit and excess of body weight. In addition, the amounts of body weight gain depended primarily on the energy value of the diet, and not its quality. Nevertheless, the effect of a diet which is worse from the aspect of quality are usually deficient in many nutrients (vitamins, mineral components, unsaturated fatty acids), and an excess of, among others, monosaccharides, unsaturated fat with trans-isomer fatty acids and fat in general [5], which exerts a negative effect on the course of pregnancy, development of the foetus and health of the woman. A lower level of knowledge concerning food and nutrition, and consumption of diet worse from the aspect of quality may also result in the lower health safety of food, and may be the cause of bacterial or parasitic infections. Both the occurrence of infection and the treatment applied may also have a negative effect on the course of pregnancy and development of the foetus [27]. Therefore, the promotion of an adequate diet should become an integral part of the medical services provided for pregnant women, and women who plan pregnancy, and constitute one of the priority goals of the health policy of the State.

CONCLUSIONS

The diet of pregnant women from the rural environment, compared to that of women from urban areas, was characterized by worse quality, resulting primarily from the lower consumption of milk and dairy products, sea fish, wholemeal cereal products, vegetables, and fruit and/or vegetable juices. It was also noted that rural women more rarely took folic acid, even before becoming pregnant, and consumed meals less regularly.

No significant differences in nutritional status were observed before pregnancy and the amounts of average body weight gain during pregnancy, according to the place of residence.

It is necessary to carry out health education in the area of adequate nutrition among pregnant women, and those who plan pregnancy, directed primarily to all women from the rural environment.

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