

Evaluation of knowledge concerning nutrition of breastfeeding women during first days after labor

Ocena poziomu wiedzy na temat żywienia wśród kobiet karmiących piersią w pierwszych dobach po porodzie

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Abstract

Background. Breastfeeding is the best way to feed newborns and infants. The composition of breast milk is adapted to the needs of the child. The benefits of breastfeeding can be noticed both in the children and their mothers. The diet of a breastfeeding mother is a very important issue. It is crucial to properly cover the energy requirement and provide an appropriate proportion of proteins, fats and carbohydrates. Their origin is of great significance as well. Another essential thing is the type and amount of liquids consumed per day.

Objectives. Assessment of the level of knowledge concerning nutrition among breastfeeding women in the first days after labor.

Material and methods. The study was conducted in the period from July to September 2016. An original, anonymous questionnaire verifying the level of knowledge concerning nutrition among breastfeeding women was the research tool.

Results. The level of knowledge regarding the recommended number of meals per day, the right amount of liquids and the inadvisable methods of thermal treatment was high. Approximately half of respondents knew the rate of energy requirement increase within the first 6 months of lactation. The respondents correctly indicated the source of complete proteins, but the level of their knowledge regarding the types of fats and carbohydrates which were not recommended was average. A vast majority of the women surveyed indicated correct answers to the questions concerning the recommended beverages and alcohol consumption during lactation; however, the level of acceptance of alcohol consumption was significantly higher in families with several children and those residing in the country. The level of knowledge regarding food allergies was high in the study group. The respondents with secondary or higher education and students knew significantly more about nutrition than women with primary and vocational education. The age of the mother and her place of residence predisposed the choice of vegetables in the diet. Mothers who gave birth 3 or more times were significantly more willing to breastfeed for more than 6 months, while younger mothers and mothers residing in the country indicated the impact of such form of feeding on the future health of the child.

Conclusions. The women surveyed showed rather high level of nutritional knowledge, and it mostly depended on their education.

Key words: breastfeeding, nutritional knowledge, diet in breastfeeding women, food allergies in infants

Streszczenie

Wprowadzenie. Karmienie piersią jest najlepszym sposobem żywienia noworodka i niemowlęcia. Skład mleka matki jest dostosowany do potrzeb dziecka. Korzyści z karmienia piersią są zauważalne zarówno u dziecka, jak i u matki. Sposób odżywiania się matki karmiącej piersią jest bardzo istotnym zagadnieniem. Ważne jest odpowiednie pokrycie zapotrzebowania energetycznego, właściwa proporcja pomiędzy białkiem, tłuszczami i węglowodanami oraz ich pochodzenie. Istotne są również rodzaj i ilość wypijanych dziennie płynów.

Cel pracy. Ocena wiedzy żywieniowej kobiet karmiących piersią w pierwszych dobach po porodzie.

Materiał i metody. Badanie przeprowadzono w okresie lipiec–wrzesień 2016 r. Narzędziem badawczym była autorska anonimowa ankieta sprawdzająca poziom wiedzy żywieniowej kobiet karmiących piersią.

Wyniki. Wiedza na temat zalecanej liczby posiłków w ciągu dnia, odpowiedniej ilości płynów i niewskazanego sposobu obróbki termicznej kształtowała się na wysokim poziomie. Około połowa ankietowanych wiedziała, o ile zwiększa się zapotrzebowanie energetyczne w pierwszych 6 miesiącach laktacji. Ankietowane prawidłowo wskazywały źródło pełnowartościowego białka, ale wiedza na temat niezalecanych rodzajów tłuszczów i węglowodanów była na przeciętnym poziomie. Zdecydowana większość badanych kobiet zaznaczyła prawidłowe odpowiedzi na pytania o zalecane napoje oraz picie alkoholu w trakcie laktacji, jednak przyzwolenie na spożycie alkoholu było znamienne częstsze w rodzinach wielodzietnych i zamieszkujących na wsi. Wiedza o alergii pokarmowej w badanej grupie była na wysokim poziomie. Ankietowane z wykształceniem średnim, wyższym lub studiujące miały istotnie większą wiedzę żywieniową od kobiet z wykształceniem podstawowym lub zawodowym. Na dobór warzyw w diecie miały wpływ wiek matki oraz miejsce zamieszkania. Matki rodzące 3 lub więcej razy istotnie częściej zgłaszały chęć karmienia piersią >6 miesięcy, natomiast młodsze matki oraz zamieszkujące wieś wskazywały na wpływ takiego karmienia na zdrowie dziecka w przyszłości.

Wnioski. Badane kobiety miały wiedzę żywieniową raczej na wysokim poziomie, przy czym była ona zależna przede wszystkim od wykształcenia matki.

Słowa kluczowe: karmienie piersią, wiedza żywieniowa, żywienie kobiet karmiących, alergia pokarmowa u niemowląt

Background

Mother's milk is the best food for newborns and infants. It contains all the nutrients necessary for the development of a newborn body.¹ Its composition is adjusted to the child's age, changes with the time of day and depends on the way of suckling; it can also be adjusted to the climate in which the child is growing up.^{2,3} Studies show that breastfed children are at a significantly lower risk of many diseases, such as acute otitis media or infections of the lower respiratory tract.^{4,5} Overweight, obesity and type 1 and 2 diabetes also occur much more rarely in breastfed children.^{6–11} The relationship between breastfeeding and the decreased incidence of respiratory allergies as well as atopic dermatitis has also been confirmed.⁴

The benefits of breastfeeding start to occur in the early postnatal period. Oxytocin, a hormone released during breastfeeding, among other things, decreases postnatal blood loss, accelerates the shrinking of the uterus⁴ and protects from postnatal depression.^{12,13} It has also been shown that in breastfeeding mothers, the risk of breast and ovarian cancer as well as osteoporosis development in the post-menopausal period was decreased.^{14–17} The risk of developing diabetes and elevated blood pressure is also decreased.^{12,18}

Breast milk, thanks to both its qualitative and quantitative composition, is adjusted to the needs of infants until 6th month of their life, provided that the mother maintains a proper diet.¹⁹ It is important to ensure that the meals are of right caloric density and that all the

necessary nutrients are provided in proper proportions. It is recommended that the energy value of all the food consumed in a day is higher than the values established for women of the same age who are not breastfeeding.^{20,21} It is justified by the energy expenditure necessary for the production of milk. The consumed proteins should be complete (lean meat, fish, eggs, dairy, seeds of legumes), and the ratio of animal vs plant protein should be 60%:40%.^{20,22} The recommended fats include those of plant origin, such as sunflower oil, rapeseed oil, olive oil and nuts, as well as polyunsaturated omega-3 fatty acids, which can be found in fish, crustaceans, tofu, almonds, and walnuts.²³ Carbohydrates should only complement the diet – the best source of energy are complex carbohydrates (coarse-grained groats, wholegrain bread, brown rice, vegetables), because excess consumption of simple carbohydrates may cause metabolic disorders or significant weight gain in the mother.²⁰ Dietary recommendations for breastfeeding women should be based on the food pyramid of the Food and Nutrition Institute.²⁴

A breastfeeding woman should consume approx. 3 L of liquids per day. It is necessary for proper hydration of the body and the production of a sufficient amount of milk.²³ It is forbidden to consume even the smallest amounts of alcohol. Alcohol decreases the amount of milk produced and affects development of the child. It may result in damaging and distorting the function of child's and mother's brain cells, and even lead to their death.²⁵

According to the definition, food allergies are considered to be abnormal (pathological) reactions of the body

to the consumed food, conditioned by the immune mechanisms.²⁶ The most characteristic symptoms include: rash (skin lesions are observed on the face, in the area of the crooks of the elbow and knee), diarrhea, colic, spitting or vomiting, runny nose, and coryza caused by swollen nasal mucosa.²⁷

If a child cannot be breastfed, appropriate milk replacers should be introduced. These include hydrolysates of whey proteins and casein (with slight or considerable level of hydrolysis).²⁸

In Poland, basic counselling on breastfeeding and lactation is provided by family midwives during their 4 visits immediately after birth. In addition, a KIK/34 project entitled *Prevention of overweight and obesity and chronic diseases through social education concerning nutrition and physical activity* was conducted as part of the Swedish-Polish Cooperation Programme in the years 2011–2017.²⁹ It was addressed to pregnant and breastfeeding women, and it particularly focused on the prophylaxis of overweight and obesity among pregnant and breastfeeding women as well as studying its influence on the selected parameters of nutriture.²⁹ Within the framework of the project, women could seek free advice on nutrition and physical activity during the pregnancy and breastfeeding.

The aim of this study was to assess the level of knowledge regarding nutrition during breastfeeding period in breastfeeding women in the first days after giving birth.

Material and methods

The study was conducted between July and September 2016 with the use of an original questionnaire. The study group consisted of 252 breastfeeding women aged 16–45, who were staying at the maternity ward of B. Hager Multi-Specialist Poviast Hospital (Wielospecjalistyczny Szpital Powiatowy SA NZOZ im. B. Hagera) in Tarnowskie Góry.

The survey contained 26 questions and concerned personalized metric data, nutritional knowledge in the period of breastfeeding, knowledge regarding food allergies, and the willingness to make changes in one's lifestyle. The respondents received 1 point for each correct answer to a question concerning nutritional knowledge. They could score from 0 to 24 points total. The following scores were established: 0–7 points indicated low level of knowledge, 8–15 points indicated average level of knowledge, while 16–23 points – high level of knowledge.

The analyses were conducted with regard to: mother's education (primary/vocational; secondary/higher/attending university); mother's age (<30 years; ≥30 years); the number of children (1–2 children; 3 children and more); and mother's place of residence (city; country).

The statistical analysis was conducted with the use of STATISTICA v. 12 software (StatSoft Poland, Cracow, Poland). The database was developed with the use of Mi-

crosoft Excel 2016 (Microsoft Corp., Redmond, USA). The nominal data were presented using a percentage score, and the assessment of dependence was conducted with the χ^2 test and Yates's correction when the expected number exceeded 5. Statistical significance was assumed at the level of $p < 0.05$.

Results

The study group consisted of 252 respondents whose mean age was 30 (± 5 years). Women attending university or with higher education constituted the largest group ($n = 141$; 56%), next were women with secondary education ($n = 74$; 29.4%) and, finally, women with primary or vocational education ($n = 37$; 14.6%). The vast majority, as many as 186 women (73.8%), indicated a city as their place of residence. Similarly, also the parents of the respondents more frequently lived in a city ($n = 173$; 68.6%). Most women (215; 85.3%) had 1 or 2 children, the rest ($n = 37$; 14.7%) – 3 or more.

Most information regarding nutrition during breastfeeding is drawn from TV, press and the Internet ($n = 199$; 79%), the least – from the attending gynecologist ($n = 30$; 11.9%). Only 6.3% of the respondents ($n = 16$) followed dietician's advice during pregnancy.

When asked about the number of meals consumed per day, the highest number of women ($n = 182$; 72.2%) indicated the answer "5" or "6". More than a half of the respondents ($n = 160$; 63.5%) stated that >2 L of liquids should be consumed every day, which was the correct answer. In the opinion of 125 women ($n = 4$; 9.6%), the appropriate increase in energy requirement in the first 6 months of lactation is 500–650 kcal. A vast majority, as many as 96% of the respondents ($n = 242$), considered frying as an inadvisable method of thermal treatment of food in the period of breastfeeding (Table 1).

There is a correlation between mother's education and the number of consumed meals. The percentage of women consuming 5–6 meals a day was the highest in the group of women with higher education or attending university ($n = 108$; 76.6%).

A correlation between the amount of consumed liquids and mother's education was found. Answer ">2 L" was marked most often in the groups of women with higher education or attending university ($n = 98$; 69.5%).

No correlation was shown between the age of the mother and the number of children in terms of basic knowledge regarding nutrition.

There is a correlation between mother's place of residence and the knowledge regarding the inadvisable methods of thermal treatment of food during the first period of breastfeeding. The correct answer was more often indicated by the women living in a city ($n = 182$; 97.9%). No correlation was proved between the remaining questions concerning basic knowledge about nutrition.

Table 1. Knowledge regarding basic information on diet during breastfeeding
Tabela 1. Wiedza na temat podstawowych informacji o żywieniu w okresie karmienia piersią

Metric/social factors			Mother's education						Mother's age						Number of children						Mother's place of residence														
			Total			primary/ vocational			secondary			attending university/ higher			p-value			1-2			≥3			p-value			city			countryside			p-value		
						n	%		n	%		n	%																						
1-2	1	0.4	0	0	0	1	1.4	0	0	0	1	0.8	1	0.5	0	0	1	0.6	0	0															
Recommended number of meals	65	25.8	18	48.7	17	22.9	30	21.3					32	26.7	33	25.0		56	26.0	9	24.3	0.55				46	24.7	19	28.8			0.86			
	182	72.2	18	48.7	56	75.7	108	76.6					87	72.5	95	71.9	NS	155	72.1	27	73.0	NS				136	73.1	46	69.7			NS			
	>6	4	1.6	1	2.6	0	0	3	2.1					1	0.8	3	2.3		3	1.4	1	2.7				3	1.6	1	1.5						
Recommended amount of liquids	92	36.5	25	67.6	24	32.4	43	30.5					45	37.5	47	35.6	0.64	78	36.3	14	37.8	0.78				69	37.1	23	34.9			0.74			
	160	63.5	12	32.4	50	67.6	98	69.5					75	62.5	85	64.4	NS	137	63.7	23	62.2	NS				117	62.9	43	65.1			NS			
	does not increase	18	7.1	5	17.3	7	9.9	6	4.3					10	9.0	8	6.3		15	7.4	3	8.6				14	7.9	4	6.6						
Increase in energy demand	69	27.4	9	31.0	17	23.9	43	31.1					31	27.9	38	29.9	0.90	60	29.5	9	25.7	0.22				48	27.1	21	34.4			0.75			
	125	49.6	9	31.0	37	52.1	79	57.3					57	51.4	68	53.6	NS	109	53.7	16	45.7	NS				95	53.7	30	49.2			NS			
	700-1000 kcal	26	10.3	6	20.7	10	14.1	10	7.3					13	11.7	13	10.2		19	9.4	7	20.0				20	11.3	6	9.8						
Not recommended culinary treatment	5	2.0	1	2.7	2	2.7	2	1.4					2	1.7	3	2.3		4	1.9	1	2.7				3	1.6	2	3.0							
	242	96.0	36	97.3	68	91.9	138	97.9					117	97.5	125	94.7	0.42	207	96.2	35	94.6	0.89				182	97.9	60	90.9			<0.05			
	boiling in water	5	2.0	0	0	4	5.4	1	0.7					1	0.8	4	3.0	NS	4	1.9	1	2.7	NS				1	0.5	4	6.1					

n – quantity of the studied characteristic in the sample; NS – statistically insignificant result.
^a Correct answer.

In the opinion of almost 85% of women ($n = 213$), fish constituted a source of complete proteins, while 36.9% ($n = 93$) of the respondents indicated hard margarines as fats which were not recommended in the diet of breastfeeding women. Approximately 30% of the respondents ($n = 73$) believed that soft margarines were a bad type of fat. Even though the question concerning bad fats was a single-choice question, 29.4% respondents marked both answers: hard and soft margarines ($n = 74$). According to 137 studied women (54.4%), croissants were a wrong choice while composing menu during breastfeeding; 1/4 of the respondents indicated buckwheat groats as recommended (Table 2).

A correlation was found between indicating the best source of protein and the level of education. The highest percentage of women ($n = 124$; 88.6%) who indicated fish as the correct answer belonged to the group of women with higher education or attending university. The results showed a correlation between mother's education and the knowledge regarding inadvisable fats. In the group of women with primary or vocational education, hard margarines were the most frequently given answer ($n = 18$; 48.7%).

Analyzing the percentage of the respondents who gave the correct answer concerning bad carbohydrate sources, namely croissants, it can be concluded that most of the correct answers were given by women with higher education or attending university ($n = 92$; 67.6%).

No correlation was found between the knowledge regarding basic nutrients in the diet and the age of the mothers as well as the number of children.

A correlation was found between the place of residence of the mother and the knowledge concerning the fats which are not recommended in the diet of a breastfeeding woman. Hard margarines as a kind of fat not recommended in the period of breastfeeding were indicated by 50% of women ($n = 33$) living in the country and 32.2% of women ($n = 60$) living in the city. On the other hand, no such correlation was found between the place of residence of the mother and the knowledge concerning protein and carbohydrate sources.

Table 2. Knowledge regarding basic nutrients
Tabela 2. Wiedza na temat podstawowych składników odżywczych

Metric/social factors		Total			Mother's education								Mother's age						Number of children						Mother's place of residence					
					primary/ vocational		secondary		attending/ university/ higher		p-value		<30 years		≥30 years		p-value		1-2		≥3		p-value		city		countryside		p-value	
		n	%	n	%	n	%	n	%	n			%	n	%	n			%	n	%	n			%	n	%	n		
Recommended source of protein	fish ^a	213	84.5	29	78.4	60	81.1	124	88.6	101	84.2	112	85.5	183	85.5	30	81.1	158	85.4	55	83.4									
	wholegrain bread	31	12.3	4	10.8	12	16.2	15	10.7	16	13.3	15	11.5	25	11.7	6	16.2	23	12.4	8	12.1						0.74			
	figs	4	1.6	2	5.4	2	2.7	0	0.0	2	1.7	2	1.5			1	2.7	2	1.1	2	3.0						NS			
	rapeseed oil	3	1.2	2	5.4	0	0	1	0.7	1	0.8	2	1.5			3	1.4	0	0.0	2	1.1	1	1.5							
Not recommended fats	hard margarines ^a	93	36.9	18	48.7	28	37.8	47	33.3	45	37.5	48	36.4	76	35.4	17	46.0	60	32.3	33	50.0									
	soft margarines	73	28.9	12	32.4	24	32.4	37	26.2	40	33.3	33	25.0	68	31.6	5	13.5	55	29.6	18	27.3						<0.05			
	soft-hard margarines	74	29.4	2	5.4	19	25.7	53	37.6	27	22.5	47	35.6	60	27.9	14	37.8	62	33.3	12	18.2									
	olive oil	12	4.8	5	13.5	3	4.1	4	2.9	8	6.7	4	3.0	11	5.1	1	2.7	9	4.8	3	4.5									
Not recommended carbohydrates	buckwheat	63	25.0	15	42.9	26	36.6	22	16.2	36	30.8	27	21.6	56	26.9	7	20.6	44	24.6	19	30.2									
	graham bread	42	16.7	8	22.9	12	16.9	22	16.2	20	17.1	22	17.6	33	15.9	9	26.5	30	16.7	12	19.1						0.55			
	croissants ^a	137	54.4	12	34.2	33	46.5	92	67.6	61	52.1	76	60.8	119	57.2	18	52.9	105	58.7	32	50.7									

^a Correct answer.

The highest number of respondents indicated carrots ($n = 246$; 97.6%), potatoes ($n = 236$; 93.7%) and parsley ($n = 209$; 82.9%) as vegetables recommended in the first period of breastfeeding. According to 9 women (3.6%), cabbage was recommended and according to 17 (6.7%) – beans. As many as 90.5% of the respondents ($n = 228$) believed that apples were recommended for breastfeeding women. Only 20 (7.9%) of them thought that oranges were a good choice (Table 3).

No significant correlations were found between the level of education, age, the number of children or the place of residence and the selected answers concerning the recommended types of fruit and vegetables.

The correct kind of the recommended liquid was indicated by 94.4% of the respondents ($n = 238$). For 96% of them ($n = 242$), alcohol was absolutely inadvisable during breastfeeding. A total of 8 women (3.2%) believed that a glass of wine or beer per day could be drunk during the period of breastfeeding (Table 4).

No correlation was found between the recommended kind of liquid as well as the amount of alcohol which can be consumed in a day during breastfeeding and the level of education as well as the age of the studied women.

Women with 1–2 children indicated still mineral water as a liquid recommended during breastfeeding more often ($n = 205$; 95.4%) than women raising 3 or more children ($n = 33$; 89.2%). Women raising 1–2 children ($n = 32$; 88.8%) constituted a similarly higher percentage of respondents who stated that alcohol was absolutely inadvisable during breastfeeding ($n = 210$; 98.2%).

Still mineral water as a recommended beverage was selected by 95% of women living both in the city and in the country. Most women believe that alcohol is absolutely prohibited during breastfeeding. Women living in the city indicated such answer more often ($n = 181$; 98.4%).

Among foods which are potentially allergenic, the answer “all listed” was given by 209 women ($n = 209$; 82.9%). Skin lesions may be a characteristic symptom of food allergy in infants according to 97.2% ($n = 245$) of the respondents. Approximately 1/3 of the studied women ($n = 84$) associated respiratory symptoms, such as rhinitis or coryza, with allergy. According to the respondents, informing the attending physician about the occurrence of allergy symptoms was most important ($n = 236$;

Table 3. Knowledge regarding the recommendations concerning fruit and vegetables
Tabela 3. Wiedza na temat wskazań dotyczących warzyw i owoców

Metric/social factors		Mother's education						Mother's age						Number of children						Mother's place of residence																															
		Total			primary/ vocational			secondary			attending university/ higher			p-value			≤30 years			≥30 years			p-value			1-2			≥3			p-value			city			countryside			p-value										
					n	%		n	%		n	%		n	%		n	%		n	%		n	%		n	%		n	%		n	%		n	%		n	%												
Recommended vegetables	potatoes ^a	236	93.7	33	89.2	67	90.5	136	96.5	0.12 NS	113	94.2	123	93.2	0.75 NS	202	94.0	34	91.9	0.63 NS	174	93.6	62	93.9	0.91 NS	Recommended fruit	cabbage	9	3.6	1	2.7	2	2.7	6	4.3	0.80 NS	7	5.8	2	1.5	0.07 NS	8	3.7	1	2.7	0.76 NS	5	2.7	4	6.1	0.20 NS
	cauliflower	57	22.6	7	18.9	23	31.1	27	19.2	0.12 NS	37	30.8	20	15.2	<0.01	48	22.3	9	24.3	0.79 NS	43	23.1	14	21.2	0.75 NS																										
	celery ^a	171	67.9	29	78.4	58	78.4	84	59.6	<0.01	91	75.8	80	60.6	<0.01	150	69.8	21	56.8	0.12 NS	127	68.3	44	66.7	0.81 NS																										
	parsley ^a	209	82.9	30	81.1	62	83.8	117	83.0	0.94 NS	104	86.7	105	79.6	0.13 NS	182	84.7	27	73.0	0.08 NS	157	84.4	52	78.8	0.30 NS																										
	carrot ^a	246	97.6	35	94.6	73	98.7	138	97.9	0.40 NS	116	96.7	130	98.5	0.34 NS	209	97.2	37	100.0	0.30 NS	183	98.4	63	95.5	0.18 NS																										
Recommended fruit	beans	17	6.7	3	8.1	4	5.4	10	7.1	0.84 NS	9	7.5	8	6.1	0.65 NS	14	6.5	3	8.1	0.72 NS	8	4.3	9	13.6	<0.01																										
	pumpkin ^a	109	43.3	10	27.0	27	36.5	72	51.1	<0.05	55	45.8	54	40.9	0.43 NS	94	43.7	15	40.5	0.72 NS	78	41.9	31	47.0	0.48 NS																										
	apples ^a	228	90.5	31	83.8	71	96.0	126	89.4	0.09 NS	107	89.2	121	91.7	0.50 NS	193	89.8	35	94.6	0.36 NS	169	90.9	59	89.4	0.73 NS																										
	oranges	20	7.9	1	2.7	6	8.1	13	9.2	0.43 NS	11	9.2	9	6.8	0.49 NS	17	7.9	3	8.1	0.97 NS	13	7.0	7	10.6	0.35 NS																										
	cherries	25	9.9	0	0.0	8	10.8	17	12.1	0.08 NS	9	7.5	16	12.1	0.22 NS	23	10.7	2	5.4	0.32 NS	19	10.2	6	9.1	0.79 NS																										
Recommended fruit	bananas ^a	184	73.0	24	64.9	55	74.3	105	74.5	0.48 NS	90	75.0	94	71.2	0.50 NS	156	72.6	28	75.7	0.69 NS	135	72.6	49	74.2	0.79 NS																										

^a Correct answer.

Table 4. Knowledge regarding the recommended liquids
Tabela 4. Wiedza na temat zalecanych płynów

Metric/social factors		Total				Mother's education								Mother's age						Number of children						Mother's place of residence															
						primary/ vocational				secondary				attending university/ higher				p-value				<30 years				≥30 years				p-value				city				countryside			
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%								
Recommended liquids		238	94.4	35	94.6	69	93.2	134	95.0	116	96.7	122	92.4	205	95.4	33	89.2	176	94.6	62	93.9																				
		3	1.2	1	2.7	2	2.7	0	0.0	0.61	1	0.8	2	1.5	1	0.5	2	5.4	0.50	2	1.1	1	1.5																		
		8	3.2	1	2.7	2	2.7	5	3.6	NS	2	1.7	6	4.6	6	2.7	2	5.4	NS	7	3.8	1	1.5																		
		3	1.2	0	0.0	1	1.4	2	1.4		1	0.8	2	1.5	3	1.4	0	0.0		1	0.5	2	3.1																		
Allowed amount of alcohol		4	1.6	1	2.8	2	2.7	1	0.7													2	0.9	2	5.6																
		4	1.6	1	2.8	2	2.7	1	0.7	0.51	1	0.8	3	2.3	2	0.9	2	5.6	<0.05	1	0.5	3	4.6																		
														NS	116	97.5	126	96.2																							
		242	96.0	34	94.4	69	94.6	139	98.6													210	98.2	32	88.8	181	98.4	61	92.4												

^a Correct answer.

93.6%). Most women decided to follow their menus and introduce an elimination diet ($n = 213$; 84.5%). Only 16.7% ($n = 42$) of the respondents thought that allergy tests should be performed in the child's first month of life. For 8 women (3.2%) replacing breast milk with cow's milk was an adequate action to be taken during the treatment of allergy in an infant (Table 5).

A correlation was found between the level of education and the knowledge regarding the symptoms of food allergy in infants. The level of knowledge was higher in women with higher education. Women with primary or vocational education had less knowledge on the subject. In terms of allergy management, no such correlation was found.

There is no correlation between the age and the knowledge on food allergies in infants.

No correlation was found between the number of children and the knowledge regarding the most common allergens occurring in food. Women with 1–2 children knew more about the subject ($n = 182$; 84.7%). No correlation was found between the number of children and the actions taken in the case of allergy occurrence in an infant. According to the respondents, informing the attending physician about the symptoms was most important.

No correlation was found between the place of residence of the mother and her knowledge concerning food allergies in infants. Knowledge concerning allergens occurring in food is similar in women residing in the city and in the country. Most frequently indicated action in the case of the occurrence of food allergy is informing the attending physician about its symptoms. This answer was selected by a higher percentage of the women living in the city compared to the women residing in the country ($n = 177$; 95.2%).

Approximately a half of the studied women declared the intention to breastfeed exclusively (that is, without introducing supplementary foods into the child's diet) until the 6th month of the child's life. The responses concerning breastfeeding until the 3rd month of life and after the 6th month of life were similar. As much as 94.8% of the studied women ($n = 239$) believed that breastfeeding had an impact on the health of the child in the future, while 89.7% of the respondents ($n = 226$) admitted that they were going to change their diet during breastfeeding (Table 6).

A correlation was shown between the education of the mothers and the planned length of exclusive breastfeeding. The highest percentage of women ($n = 84$; 60.0%) planning to breastfeed their children until the 6th month of their life was found in the group of respondents with higher education. A vast majority of women, regardless of their education, believed that breastfeeding had an impact on the health of their children. There was no correlation between the mother's age and the intention to change the diet during breastfeeding.

The highest percentage of the respondents ($n = 79$; 60.8%) planning to breastfeed the infant until the age of

Table 5. Knowledge regarding allergies
Tabela 5. Wiedza na temat alergii

Metric/social factors		Mother's education								Mother's age				Number of children				p-value				Mother's place of residence				p-value		
		Total		primary/ vocational		secondary		attending university/ higher		p-value		≤30 years		≥30 years		p-value		1-2		≥3		p-value		city			countryside	
				n	%	n	%	n	%			n	%	n	%			n	%	n	%			n	%		n	%
Allergens	nuts, honey	13	5.2	3	8.1	7	9.5	3	2.1			5	4.2	8	6.1	10	4.7	3	8.1			11	5.9	2	3.0			
	chocolate	13	5.2	4	10.8	5	6.8	4	2.8	0.05		4	3.3	9	6.8	9	4.1	4	10.8	0.26		10	5.4	3	4.6	0.79		
	citrus fruits	17	6.7	4	10.8	4	5.4	9	6.4			11	9.2	6	4.5	14	6.5	3	8.1	NS		13	7.0	4	6.1	NS		
	all of the above ^a	209	82.9	26	70.6	58	78.3	125	88.7			100	83.3	109	82.6	182	84.7	27	73.0			152	81.7	57	86.3			
Symptoms of allergy	skin lesions ^a	245	97.2	35	94.6	71	96.0	139	98.6	0.31 NS		116	96.7	129	97.7	210	97.7	35	94.6	0.29 NS		182	97.9	63	94.5	0.31 NS		
	gastrointestinal tract ^a	226	89.7	28	74.7	64	86.5	134	95.0	<0.01		105	87.5	121	91.7	198	92.1	28	75.7	<0.01		167	89.8	59	89.4	0.93 NS		
	respiratory system ^a	84	33.3	8	21.6	19	25.7	57	40.4	<0.05		37	30.8	47	35.6	70	32.6	14	37.8	0.53 NS		62	33.3	22	33.3	1.00 NS		
	tearfulness ^a	120	47.6	8	21.6	36	48.7	76	53.9	<0.01		55	45.8	65	49.2	101	47.0	19	51.4	0.59 NS		87	46.8	33	50.0	0.65 NS		
Actions to be taken	following the menu + elimination diet ^a	213	84.5	23	62.2	60	81.1	130	92.2	<0.0001		98	81.7	115	87.1	180	83.7	33	89.2	0.23 NS		156	83.9	57	86.4	0.63 NS		
	informing the physician about the symptoms ^a	236	93.6	32	86.5	71	96.0	133	94.3	0.14 NS		108	90.0	128	97.0	202	94.0	34	91.9	0.63 NS		177	95.2	59	89.4	0.10 NS		
	allergy tests in the first month of life	42	16.7	8	21.6	12	16.2	22	15.6	0.68 NS		24	20.0	18	13.6	38	17.7	4	10.8	0.30 NS		35	18.8	7	10.6	0.12 NS		
	replacement with cow's milk	8	3.2	1	2.7	1	1.4	6	4.3	0.51		4	3.3	4	3.0	8	3.7	0	0.0	0.23 NS		5	2.7	3	4.6	0.46 NS		

^a Correct answer.

Table 6. Behavior and habits of breastfeeding women
Tabela 6. Postępowanie matek podczas karmienia piersią

Metric/social factors	Total			Mother's education						Mother's age						Number of children						Mother's place of residence					
				primary/ vocational		secondary		attending/ university/ higher		p-value		<30 years		≥30 years		1-2		≥3		p-value		city		countryside		p-value	
	n	%		n	%	n	%	n	%			n	%	n	%	n	%	n	%			n	%	n	%		
Duration of breastfeeding	56	22.2	<3 months	12	32.4	14	19.5	30	21.4			33	27.2	23	17.7	52	24.5	4	10.8			40	21.7	16	24.6		
	130	51.6	<6 months	14	37.9	32	44.4	84	60.0	<0.05		51	42.9	79	60.8	109	51.4	21	56.8	<0.05		97	52.7	33	50.8	0.89	NS
	63	25.0	>6 months	11	29.7	26	36.1	26	18.6			35	29.4	28	21.5	51	24.1	12	32.4			47	25.6	16	24.6		
Impact of breastfeeding on the future health of the child	239	94.8	yes	34	94.4	72	97.3	133	94.3	0.21		118	98.3	121	92.4	205	95.4	34	94.4	0.81		173	93.5	66	100.0	<0.05	
	12	4.8	no	2	5.6	2	2.7	5	5.7	NS		2	1.7	10	7.6	10	4.6	2	5.6	NS		12	6.5	0	0.0		
Change of diet	226	89.7	yes	34	91.9	64	88.9	128	91.4	0.96		107	90.7	119	90.9	195	92.0	31	83.8	0.11		163	89.1	63	95.5	0.12	
	23	9.1	no	3	8.1	8	11.1	12	8.6	NS		11	9.3	12	9.1	17	8.0	6	16.2	NS		20	10.9	3	4.5		

^a Correct answer.

6 months was observed in the group of women aged ≥30. By comparison, in the group of respondents aged <30, less than 43% (*n* = 51) of women were planning to breastfeed the infant until the age of 6 months. The knowledge regarding the impact of breastfeeding on the future health of the child as well as the intention to change the diet were comparable in both age groups.

A correlation was demonstrated between the number of children and the planned length of exclusive breastfeeding. The highest percentage of women (*n* = 21; 56.8%) planning to breastfeed until the age of 6 months were the women with 3 and more children. Approximately 95% of the respondents, regardless of the number of children they had, believed that breastfeeding had an impact on the health of their children. A higher percentage of women planning to change their diet (*n* = 195, 92.0%) was found in the group of respondents with 1–2 children.

Approximately a half of the respondents, regardless of their place of residence, was planning to breastfeed exclusively until the child reaches the age of 6 months. There is a correlation between the place of residence and the knowledge regarding the impact of breastfeeding on the health of the child in the future. All women living in the country (*n* = 66; 100%) believed that breastfeeding was of relevance to the health of their children in the future; 93.5% of the respondents (*n* = 173) residing in a city shared this belief. It was observed that women residing in the country (*n* = 63; 95.5%) were more willing to change their diet than those living in a city (*n* = 163; 89.1%).

Considering the percentage of the highest number of correct answers, it can be stated that women have rather good knowledge regarding nutrition during breastfeeding.

Comparing the level of knowledge of the respondents determined based on the number of correct answers with the assessment of their own level of knowledge, several conclusions can be drawn. More than 3/4 of the respondents showed high level of knowledge, and only 8 women assessed their level of knowledge as high.

Discussion

The results of the conducted study showed that the vast majority of the studied women (79.4%) had very good knowledge regarding nutrition in the first weeks after giving birth.

A survey study conducted in 2006 by the Clinic of Neonatology and Intensive Neonatal Care of the Medical University of Białystok concerned, among other things, the knowledge of the mothers regarding lactation.³⁰ The level of knowledge regarding the diet during breastfeeding was assessed in the survey. All respondents stated that breastfeeding women cannot eat everything, 83% that they should not be consuming bloating foods and 72% that they should refrain from alcohol consumption. Avoiding the following products was indicated: hot spices



Fig. 1. Level of knowledge and its self-assessment

Ryc. 1. Poziom wiedzy i samoocena stanu wiedzy

by 61% of the respondents, coffee by 55%, products which are hard to digest by 54%, cocoa and chocolate also by 54%, nuts by 50%, and citrus fruit by 50%. According to 40% of the respondents, the reaction of the child to new components which it receives with breast milk should be observed. According to 32% of the respondents, breastfeeding women should eliminate full-fat milk and cream from their diet, and 14% thought that they should not consume marine fish.

In the authors' own study, beans constituted an example of bloating food. More than 90% of the respondents, regardless of their education, age, number of children, and place of residence of their parents, indicated the vegetable as not recommended in the first period of breastfeeding. According to 96% of the respondents, alcohol was absolutely prohibited for breastfeeding mothers. Interestingly, women who had 1–2 children more often (98.2%) selected this answer than women with 3 and more children (88.8%). Only 3.2% of the respondents indicated coffee as a beverage recommended for quenching thirst. Fried food was indicated as not recommended by 95% of the respondents. Women living in the country or whose parents lived in the country less often indicated frying as a type of processing which is not recommended for women in the first period of breastfeeding.

In one of the studies,³¹ women were asked about the products, which should be eliminated from the diet during breastfeeding: 72% of them indicated alcohol, 65% bloating foods, 64% fast food, 62% raw meat, 58% raw fish, 54% hot spices, 53% foods difficult to digest, 51% citrus fruit, 43% foods with characteristic taste, 40% nuts, 39% coffee/tea/soda, 36% chocolate/cocoa, 35% unpasteurized milk, 33% fruit with small seeds, and 26% pasteurized milk. The reasons for eliminating the abovelisted foods were most often: prevention of baby colic (38%), preven-

tion of allergy (31%), improvement in the quality and quantity of the produced milk (15%), and improvement in well-being (12%). Only 1% of women eliminated certain foods due to allergy. The same percentage of women stated that the reason for elimination was health-related diet.

In the authors' own study, women most often stated that they consumed 5–6 meals a day. Mothers with higher and secondary education as well as those attending university had significantly better knowledge concerning the number of meals suitable for breastfeeding women. Comparing the above results to those obtained by Kamelska, similar conclusions can be drawn. In this study, 52% of the respondents stated that they consumed 4 meals a day, 28% consumed 5 meals per day and 20% admitted that they ate 3 meals a day.³² At this point, it should be also noted that 70% of the respondents ate snacks between meals.

The results of the presented study indicate that almost a half of the women in the study group had sufficient knowledge regarding the necessity of increasing energy supply in the first 6 months of lactation. It particularly pertained to women with secondary or higher education and those attending university. In a study assessing energy consumption by breastfeeding women, it was reported that the energy value of meals was compliant with the norm in only 9% of the studied women.²⁰ Worryingly, as much as 91% of breastfeeding women consumed meals of energetic value below the norm.

In another available study, the results were similar.³¹ Based on the assessment of menus, it was found that their mean energetic value was insufficient. Only 13% of women consumed the right amount of calories and 79% of them consumed less calories than required. It can be concluded that the surveyed women were not aware what number of calories was right for them and education in this respect is necessary.

In the authors' own study, it was found that women knew a lot about the sources of complete protein. More than 80% of respondents chose the correct answer, regardless of their education, age, number of children, or place of residence of surveyed mothers or their parents. Hard margarines were considered as an example of fats which are not recommended by 36.9% of respondents. This option was selected more frequently by respondents with primary or vocational education and those who had 3 and more children. Women living in the country or those whose parents resided in the country had better knowledge in this respect. On the other hand, carbohydrate sources, which should not be consumed too often by nursing women – croissants – were selected by 54.4% of respondents, most frequently women with primary or vocational education.

In the report from the study entitled *Assessment of the diet and nutritional state of women breastfeeding children older than 2 months*, one can find information concerning the consumption of particular nutrients.³¹

Fifty-nine percent of women consumed protein within the norm (10–15%), 34% below the norm and 7% above it. Total consumption of fat was above 30% (the norm is up to 30%) of total energy value. Excessive consumption of saturated fats and insufficient consumption of mono- and polyunsaturated fatty acids was also shown. Carbohydrate supply was assessed as very low – below the norm in 82% of respondents, while within the norm only in 15%. In summary, it can be concluded that the proportions of particular nutrients in the diets of the mothers participating in the study were wrong.

In another study assessing the consumption of basic nutrients, the authors came to similar conclusions.²⁰ It was found that 64% of women consumed protein within the norm, 30% below it and 6% above the norm. The main source of protein were eggs and dairy. Analyzing the consumption of fats, it was found that 45% of the studied women consumed them within the norm, 48% consumed too little fats and 7% too much. The main sources of fats comprised plant oils, milk and dairy products, as well as butter and cream. In the authors' own study, the proportion of saturated fatty acids was also excessive. It was observed that women too frequently consume sweets, which are the main source of bad trans fatty acids. To some extent, the diet in the preconception period and during the pregnancy has an impact on the content of particular fatty acids in breast milk. Excessive consumption of unsaturated trans fatty acids (TFA) may decrease the amount of long-chain polyunsaturated fatty acids.³³ Carbohydrate consumption was within the norm in 36% of the respondents, and in 64% of them consumed insufficient amounts of sugars. The most important source of carbohydrates were cereals, potatoes, vegetables, fruit, sugar, and sweets.

In this study, more than 60% of the respondents believed that during the period of breastfeeding, women should consume >2 L of liquids, and 30% of the respondents stated that less than 2 L of liquids was sufficient for them. It was observed that the level of knowledge regarding this subject was higher in the group of women with secondary and higher education as well as those attending university. In one of the studies conducted by Warsaw University of Life Sciences, it was observed that only 3% of the studied women consumed the recommended amounts of fluids, and 1% consumed more than the norm required. A vast majority of the respondents consumed an insufficient amount of fluids.²⁰

Almost 90% of the respondents declared willingness to change their diet during breastfeeding (most frequently women with 1–2 children). In a study from 2014,³¹ most women (77%) were planning to increase water consumption, 67% of them wanted to consume less fried food, 38% declared willingness to consume more vegetables and fruit, and 34% wanted to consume more products supporting lactation.

In this study, almost 95% of the respondents believed that breastfeeding could have an impact on the health

of the child in the future. The results obtained in other studies are varied. In a study concerning the knowledge regarding the benefits of breastfeeding, which involved women with only 1 child, 77% of respondents gave a positive answer to the question whether breastfeeding had positive effects on the children in the following years of their life.¹⁹ On the other hand, the authors' own study did not show a correlation between the number of children and the opinion regarding the effects of breastfeeding on child's health in the future. In a study from 2009, several aspects concerning mothers' knowledge on lactation were evaluated.³⁰ None of the respondents selected the answer which stated that breastfed children suffered from otitis more frequently than those fed with formula. All the respondents also agree that breastfed children less frequently suffer from rhinitis and cough than children fed with formula. A study conducted in one of the hospitals in Toruń showed that 93% of the studied women believed that breastfed children are less often ill, but 47% of the respondents claimed that breastfeeding did not have any effect on health in adulthood.³⁴

In this study, 29.8% of the respondents declared that they were taking supplements. According to the newest reports, due to the fact that during pregnancy and lactation there is an increased demand for certain nutrients, supplementation should be considered.³⁵ There are several nutrients which are very important for the course of pregnancy and lactation, deficiencies of which are frequently found in these women. These include primarily folic acid, vitamin D, iron, DHA, and iodine. Their supplementation is recommended by the Polish Gynaecological Society due to the fact that their positive effect has been unequivocally proven.³⁶ It should be remembered that any supplementation should always be selected individually and should depend on the woman's health and diet.³⁷

The topic of proper diet during lactation should be already addressed during the pregnancy. In one of the studies, the respondents were asked about their opinion whether health education during pregnancy should address the diet during the period of breastfeeding.³⁸ As much as 92.5% of women agreed with such statement, 6.5% saw no need for such education and 1 person had no opinion. It can be clearly concluded from the above study that women would like health education to cover also nutrition during lactation.

Conclusions

On the basis of the presented study, we can conclude that the level of nutritional knowledge in the studied group of women in the first period of breastfeeding is high. However, it should be noted that it is higher among women with secondary or higher education or those attending university. Data analysis, on the other hand, did not show that age, number of children or place of resi-

dence had an impact on the presented level of nutritional knowledge. The respondents indicated mass media (television, press, the Internet) as the source of their knowledge. It can be said that the issue of nutrition during lactation is popular and readily addressed by both pregnant and nursing women.

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