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ASSESSMENT OF NUTRITION KNOWLEDGE DURING LACTATION AMONG POSTPARTUM WOMEN

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ABSTRACT

Background: Breastfeeding is the most appropriate form of nutrition for newborns and infants. During lactation, milk production is an important function of a new mother's body. The lack of a healthy, balanced diet carries a high risk of macro- and micronutrient deficiencies in postpartum women.

Aim of the study: The aim of the study was to explore the nutrition knowledge of postpartum mothers during lactation, based on current guidelines.

Material and methods: The study involved 103 postpartum mothers who stayed in the maternity and neonatal ward in a secondary care hospital from April 2019 to January 2020. The diagnostic survey method was used as the research tool, which included an original questionnaire. Participation in the study was voluntary and anonymous. Results were analyzed using Microsoft Excel descriptive statistics. The analysis of Spearman's R correlation between the variables was performed in the Statistica 13.1 program. Statistical significance was taken at $p < 0.05$.

Results: The average score among respondents was 4.82/10 points. Most study participants (77%, n=79) considered breastfeeding women to have greater energy and nutritional requirements. More than half of the study participants (59%, n = 61) declared that some food products should be eliminated from the diet, namely strawberries, citrus fruit and chocolate.

Conclusions: Women's knowledge about nutrition during lactation is insufficient. There is a need to intensify education in this area by medical professionals including midwives.

KEYWORDS: breastfeeding, lactation, nutrition, human milk, knowledge

Background

Breastfeeding is the most appropriate form of nutrition for newborns and infants. According to the World Health Organization, exclusive breastfeeding is recommended for the first 6 months of life, and after introducing other types of food into the child's diet, breastfeeding should be continued at least until 24 months of age. A similar view has been adopted by the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN), which additionally emphasizes that breastfeeding should last as long as both the mother and the child need it [1–4].

The nutritional function is not the only role that breast milk plays. Due to the presence of many ac-

Table 1. The recommendations for women's nutrition during lactation [11–16]

Recommendations about nutrition during lactation	
An increase in energy demand	about 450–500 kcal per day
Fluid intake	about 3 liters per day
Recommended products rich in specific nutrients	
Carbohydrates	groats, pasta, rice, vegetables
Fat (polyunsaturated fatty acid)	corn oil, nuts, olive oil, sea fish*, sunflower oil
Proteins	dairy products, eggs, fish*, meat
Vitamins and minerals	cereal and dairy products, eggs, fish*, fruit, vegetables
Stimulants during lactation	
Caffeine	≤ 200 mg per day (2 cups of coffee or 4 cups of tea)
Nicotine and smoking	limit smoking to a minimum or completely refrain

* Due to the possible adversity of heavy metals, it is necessary to overlap fish from very polluted waters.

tive ingredients, such as lactoferrin, lactalbumin, cytokines and lysozyme, breast milk effectively supports the child's developing immune system, which helps to prevent infections. In 2011, McGuire et al. described the human milk microbiome in which they detected the presence of bacteria, including *Streptococcus*, *Staphylococcus*, *Serratia* and *Corynebacteria*. Yet another study demonstrated that colostrum, as well as subsequent breast milk, contain lactic acid bacteria *(Lactobacillus)* and some *Bifidobacteria* that model the immature immune system of the newborn. According to research, the composition of the breast milk microbiome may depend on the environment and the needs of the breastfeeding woman and the newborn. The factors that may affect it include, among others: the diet and nutritional habits of the mother during pregnancy and lactation [4–7].

During lactation, milk production is an important function of a new mother's body. The lack of a balanced diet carries a high risk of macro- and micronutrient deficiencies in a woman and is not conductive to maintaining a healthy body weight. The National Institute of Public Health – National Institute of Hygiene recommends that breastfeeding mothers follow the principles of nutrition based on the current food pyramid [8–10]. During lactation, energy demand increases by up to 670 kcal/day, of which approximately 500 kcal should be obtained from food. The rest should come from fat accumulated during pregnancy. Moreover, the means of obtaining additional energy depends to a large extent on a woman's body type. Slim mothers should have a greater caloric intake from food than women with more body fat [5,8,11,12] . It should also be noted that mothers who breastfeed more than one child at the same time should have a correspondingly greater caloric intake. For now, it is assumed that this should be an additional 500–600 kcal for each child. In addition to increased energy demand, adequate fluid intake is also crucial. A breastfeeding woman should drink at least 3 liters of fluid a day, which means that the fluid demand increases by about 800–1000 mL as compared to before pregnancy. The detailed recommendations are described in the table below (Table 1) [8,11].

Aim of the study

The aim of the study was to explore whether postpartum mothers have knowledge about nutrition during lactation, in relation to The Expert's Group recommendations of the Dietary Guidelines for lactating women, dated 2013 (in Polish: Stanowisko Grupy Ekspertów w sprawie zaleceń żywieniowych dla kobiet w okresie laktacji) as well as the guidelines of the National Institute of Public Health – National Institute of Hygiene, the European Office for Food Safety and the World Health Organization [11–14].

Material and methods

Study design and setting

The study was conducted among postpartum mothers who stayed in the maternity and neonatal ward in a secondary care hospital in Warsaw from April 2019 to January 2020. The study did not bear the features of a medical intervention and did not require the opinion of the Bioethics Committee. The researchers obtained the consent of the head of the hospital to conduct the study. The study was performed in compliance with the principles outlined in the Declaration of Helsinki. Participation of respondents was voluntary, and before completing the questionnaire, each woman was informed about the purpose of the study and the principle of data anonymity.

Participants

The study group was selected based on the following criteria:

– inclusion: women over 18 years of age who expressed their willingness to complete the questionnaire with writing and reading skills in Polish;

– exclusion: women under 18 years of age, no language skills in Polish

Variables

The study was conducted using the diagnostic survey method, which included a questionnaire devised by the study author. The questionnaire included questions about demographics and assessed knowledge about nutrition during breastfeeding, as well as sources of information in this regard. In the case of questions that evaluated participant knowledge, respondents were awarded points for giving correct answers (correct answer=1 point) for 10 of the questions.

Statistical methods

Results were analyzed using Microsoft Excel descriptive statistics. The analysis of Spearman's R correlation between the variables was performed in the Statistica 13.1 program. Statistical significance was taken at $p < 0.05$.

Results

Participants

We distributed 106 questionnaires among the postpartum mothers. All of them were returned to us. Due to incomplete data, three questionnaires were rejected from the analysis, leading to 103 participants in total.

Descriptive data

The postpartum mothers included in the study were 1–4 days post-delivery. Ages ranged from 18 to 49 years (average age - 29.95 years, median - 30 years). Most of the surveyed women were primiparous (61%, n=63), had higher education (73%, n=75), were married (70%, n=72), lived in a city with over 500,000 inhabitants (78%, n=81) and assessed their economic status as "good" (60%, n=62). The vast majority (96%, n=99) had plans to breastfeed their newborn baby. Detailed characteristics of the study group are presented in Table 2.

Table 2. Study group characteristics (n = 103)

Tested Feature		N	%
Delivery	first	63	61
	second	33	32
	third	6	6
	fourth	1	1
Level of education	lower secondary school	1	1
	vocational school	1	1
	secondary school	26	25
	tertiary education	75	73
Place of residence	village	7	7
	city up to 100,000 inhabitants	10	10
	city up to 250,000 inhabitants	3	3
	city up to 500,000 inhabitants	2	2
	city over 500,000 inhabitants	81	78
Marital status	married	72	70
	in an informal relationship	25	24
	single	5	5
	divorced	1	1
Economic status	very good	22	21
	good	62	60
	average	19	19
	poor	0	0
Breastfeeding of the previous child	yes	36	35
	no	4	4
	it is my first baby	63	61
Planning to breastfeed newborn baby	yes	99	96
	no	4	4
Influence of those closest to respondents on their nutrition during lactation	yes	32	31
	no	71	69

Knowledge about nutrition during lactation

The respondents were evaluated for their nutritional knowledge based on 10 specific questions on the topic. The average score was 4.82/10 points (Table 3).

Table 3. Level of knowledge about nutrition during lactation (n=103)

Level of knowledge about nutrition during lactation					
N	M	Me	Min.	Max.	SD
103	4.82	5.00	0.00	10.00	1.84

Almost half of the postpartum mothers (48.5%, n=50) claimed that "there is no such thing as a breastfeeding mother's diet" and 35.9% (n=37) of the respondents were convinced of its existence. The remaining respondents (15.4%, n=16) had no opinion on the subject.

Table 4. Opinions of postpartum mothers on nutrition during lactation (n=103)

Opinions on nutrition during lactation		N	%
Maternal nutrition during lactation and the composition of breast milk	Yes, it has a great influence on the composition of breast milk	47	45
	Yes, but it has little effect on the composition of breast milk *	38	37
	No, it has no effect on the composition of breast milk	10	10
	I do not know	8	8
The decision to follow an elimination diet when breastfeeding	Yes, you can always opt for an elimination diet	22	21
	Yes, but only if it is medically justified (e.g. allergy) *	58	56
	No, you should never switch to an elimination diet once you start breastfeeding	3	3
	I do not know	20	20
The influence of a woman's nutrition during lactation on the subsequent eating habits of the child	Yes *	48	47
	No	24	23
	I do not know	31	30

* Correct answer.

When assessing the energy and nutritional requirements of breastfeeding women, the vast majority of the study participants (77%, n=79) claimed there were special requirements when breastfeeding, whereas 23% (n=24) did not.

Slightly more than half of the surveyed women (59%, n=61) declared that some food products should be eliminated from the diet during lactation. Next, these respondents could choose products from a list prepared by the authors. The list of products was based on prevailing common myths concerning nutrition at breastfeeding [17]. Participants chose strawberries (64%, n=39), citrus fruit (52%, n=32) and chocolate (52%, n=32) most often as foods that should be avoided or eliminated during lactation. Almost half (44%, n=27) of respondents pointed cabbage, nuts and legumes as products that should be eliminated from the breastfeeding mother's diet. Cow's milk (28%, n=17), eggs (11%, n=7) and wheat (3%, n=5) were the least frequently selected items. Twenty six percent (n=16) of respondents offered a different answer than those proposed by the researchers, which included foods such as raw meat, fish, honey and blue cheese.

When assessing the amount of fluid intake by breastfeeding women, the majority of the study participants (69%, n=71) had knowledge of the recommended daily amount of fluid intake (approximately 3 liters of fluid per day). Guidelines for caffeinated coffee (maximum of 2 cups of coffee per day) and tea (maximum of 4 cups of lightly brewed tea per day) intake when breastfeeding were known to 47% (n=48) and 57% (n=59) of the study participants, respectively.

In the opinion of most of the women (91%, n=94), smoking is absolutely contraindicated during lactation. Only 4% (n=4) of the respondents claimed that smoking was not contraindicated, but that it inhibited lactation, and 5% (n=5) of the study participants had no knowledge in this regard.

Nearly half of the study participants (45%, n=47) were convinced that the mother's diet has a tremendous impact on the composition of breast milk. Only 37% (n=38) of women knew that nutrition had little influence on the composition of breast milk. In the opinion of 56% (n=58) of breastfeeding women, the elimination diet in a breastfeeding mother can be used only when it is medically justified. Moreover, 47% (n=48) of the study participants claimed that the nutrition of a breastfeeding mother had an impact on the later eating habits of the child (Table 4).

Factors influencing the level of knowledge of women

A weak statistically significant correlation between level of education and level of nutrition knowledge was found among postpartum women. The more educated the respondents, the better they knew about nutrition in the lactation period. The influence of those closest to the participants harmed their level of knowledge in this regard (Table 5).

Table 5. Correlations between the level of knowledge (0–10 points) and selected feature

Tested Feature	Spearman's Rho	p-value
Age	–0.003	0.971
Delivery	–0.105	0.288
Level of education	0.207	0.036
Breastfeeding the previous child	0.096	0.335
Planning of breastfeeding a newborn baby	0.046	0.641
Influence of those closest to respondents on their nutrition during lactation	–0.257	0.009

Women learned about nutrition during lactation from various sources. Most often they obtained information from the midwife. The surveyed women also preferred to use websites run by medical personnel (63%, n=65) and with advice for parents, the so-called "parenting websites" (52%, n=54) (Table 6).

There was a weak statistically significant correlation between the use of websites run by medical professionals and level of knowledge. Obtaining information from such websites contributes to increased awareness concerning nutrition in the lactation period (Table 6).

Table 6. Correlations between level of knowledge (0–10 points) and sources of information on nutrition during lactation (n=103)

Source of information	N	%	Spearman's Rho	p-value
Midwife	76	74	0.028	0.782
Websites run by medical personnel	65	63	0.309	0.001
Parenting advice websites	54	52	0.121	0.225
Books and magazines for a mother-to-be	48	47	0.118	0.234
Doctor	39	38	–0.109	0.273
Family / friend	36	35	0.037	0.714
Lactation consultant	27	26	0.156	0.116
Nurse	20	19	–0.103	0.299
Medical textbooks	19	18	–0.075	0.454
Dietician	5	5	0.115	0.246
Pharmacist	4	4	0.108	0.276
Other	3	3	0.031	0.759
Birth doula	1	1	0.024	0.812

Discussion

Key results

During lactation, women often limit their consumption of various products, even though they did not give them up before and during pregnancy. Such behavior is the result of misconceptions about the possibility of causing digestive system problems or allergies in the child [18]. This phenomenon is widespread not only in Poland. In a study by Jeong et al. an unjustified abandonment of selected food groups among young mothers was observed in South Korea. This is related to many myths regarding breastfeeding that are popular in Asia. In Korea, breastfeeding women are most often warned not to eat cold dishes or spicy food, including kimchi which contains large amounts of chilli [19].

Generalizability

According to current knowledge, a woman's diet does not cause the child to develop food allergies. Therefore, a diet that excludes potentially allergenic products (e.g. milk, nuts, strawberries, eggs) is unjustified in healthy women, with the exception of women who need to give up certain products due to their own allergy or disease. Moreover, an elimination diet without therapeutic indications may contribute to the occurrence of nutrient deficiencies in postpartum women [7,10,12,13].

In our study, 35.9% of women claimed that there exists a special diet for breastfeeding mothers. However, most postpartum mothers stated that certain foods should be avoided during lactation, mostly strawberries (64%), citrus fruit (52%) and chocolate (52%). Every fifth respondent stated that an elimination diet can always be adopted when breastfeeding. In a study by Bakalarz et al., 9% of women of childbearing age claimed that there exists a diet for breastfeeding women. In a study assessing the diet and nutritional status of breastfeeding mothers by Gajewska et al., women gave up products causing flatulence (65%) and fast food (64%). More than half of them excluded citrus fruit from their diet. They avoided chocolate (36%) or fine-stone fruit such as strawberries (33%) to a lesser extent. In a study by Jeong et al., respondents most often reported giving up caffeinated beverages (90.3%) and spicy dishes (85.5%). Less frequently, they indicated the elimination of nuts (13.1%) or selected fruit (10.3%) from the daily diet. According to Catherin et al., Indian women gave up eating eggs and fish while breastfeeding due to a belief that they had a negative effect on the baby's skin and hair [19–22].

In our study, some respondents declared that it is necessary to avoid raw meat, fish and blue cheese during breastfeeding. The consumption of these products are not contraindicated in this period but should meet specific conditions. Meat should be fresh, examined and come from a verified supplier. Fish must not come from very polluted waters and blue cheese should be pasteurized [23].

Balanced nutrition during breastfeeding is very important to maintain metabolic homeostasis. Due to the energy cost of breast milk production by a woman's body, her energy and nutrient requirements increase. Various groups of experts recommend increasing caloric intake postpartum. Following the WHO recommendation, the caloric content of the diet should increase by 10–20% depending on the physical activity undertaken by the woman. According to the recommendations of the US Centers for Disease Control and Prevention (CDC), breastfeeding women should consume about 450–500 kcal more than before pregnancy. The results of our study indicate that 23% of the respondents incorrectly stated that energy demand during lactation does not change in relation to non-breastfeeding women. Similar results were presented in a study by Niewiadomska et al., where 7.1% of women claimed that there is no increase in caloric demand during lactation [15,17,24,25] .

It is crucial to keep the body properly hydrated when breastfeeding. The opinion of the Expert Group recommendations of the Dietary Guidelines for lactating women (dated 2013) indicates that during lactation, daily fluid intake should amount to 3 liters. Our study demonstrated that as many as 69% of the respondents knew this recommendation. In the study by Niewiadomska et al., 63.5% of postpartum

mothers indicated that the daily fluid intake should be greater than 2 liters [11,24].

According to the guidelines of the European Office for Food Safety, the maximum daily amount of caffeine when breastfeeding is 200 mg, which is approximately 2 cups of coffee or 4 cups of tea. In our study, only 47% of postpartum mothers knew the acceptable daily intake level of coffee. The results of our study are different from those in a study by Bakalarz et al., where 80.4% of the respondents gave the correct answer for the acceptable amount of caffeine in the daily diet [13,15,20].

As emphasized by Nehring-Gugulska, smoking has a negative effect on lactation because nicotine reduces the concentration of prolactin, which results in lowered production of breast milk. Moreover, nicotine from the blood of a smoking mother can pass into breast milk, which adversely affects the development of the newborn, and later into infancy. Smoking cigarettes immediately prior to feeding the baby significantly increases the amount of nicotine in the breast milk and lowers the production of docosahexaenoic acid in the mammary gland that supports the proper development of the eyes and brain in infants up to 12 months of age. During lactation, women should completely refrain from smoking, and if this is impossible, limit smoking to a minimum. Most of the study participants considered smoking to be absolutely contraindicated when breastfeeding. In the study by Bakalarz et al., 65.4% of the respondents stated that a breastfeeding woman should not smoke [20,26,27].

According to nutritional recommendations, breastfeeding women should care for a varied and balanced diet during lactation. Despite this, their nutrition has little effect on the composition of breast milk. The only substances that influence it are minerals, vitamins B and C and select fatty acids. A total of 37% of postpartum mothers in our study knew about the little influence of nutrition on the composition of breast milk [16].

Limitations of the study

The collected data was from the maternity and neonatal ward in one hospital in Warsaw. It is possible that results could be different from another medical facility.

Conclusions

1. The majority of the study participants (59%), contrary to expert guidelines, claim that certain food products should be eliminated from the diet when breastfeeding.

2. Lack of knowledge about proper nutrition during lactation and the lack of essential nutrients in the diet may contribute to nutritional deficiencies, and consequently have a negative impact on the health of breastfeeding women.

3. Parenting advice websites, which may contain content that is inconsistent with current medical knowledge, are one of the main sources of information on nutrition for women during lactation. It is necessary for women to approach Internet advice with more caution and encourage them to verify the information from such sources. Medical professionals, especially midwives who care for women at every stage of the perinatal period, may play an educational role in this regard.

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