

# Influence of mother's age on infant child's nutrition

Influencia de la edad de la madre en la nutrición del lactante

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## Abstract

In order to study the influence of the mother's age on the nutrition of children of the first year of life-based on 7 St. Petersburg children's polyclinics, it was conducted a random sample survey of 1742 mothers who had 1-year-old children. The study found that in obstetric hospitals 20-24 years old and 40 and older years old mothers planned to breastfeed a child for the longest time, but 18 to 35 years old mothers continued breastfeeding for the longest time. With maternal age increasing the proportion of refusals of breastfeeding grows due to the lack of milk and with the need to study or work, but the proportion of refusals related to the unwillingness of the mother to continue breastfeeding decreases. Assessment of the impact of age on the timing of the introduction of complementary foods in the child's diet showed that the older the mother is, the later she introduces the first and second complementary foods. Mothers under 20 and over 40 were more likely than mothers of other age groups to introduce meat and fish puree later than it is recommended. Almost all mothers under 20 gave children cottage cheese paste and egg yolk at the optimal time, unlike women of other age groups, who introduced these products later. With the increase of the mother's age, the proportion of children who received fermented milk products in the recommended period increases and the proportion who received them later decreases. Thus, the age of the mother has a significant impact on the nutrition of children in their first year.

**Keywords:** Breastfeeding, the age of the mother, the duration of breastfeeding, the reasons for refusing to breastfeed, the timing of the introduction of the complimentary food.

## Resumen

Para estudiar la influencia de la edad de la madre en la nutrición de los niños del primer año de vida sobre la base de 7 policlínicas infantiles de San Petersburgo, se realizó una encuesta aleatoria de 1742 madres que tenían niños de 1 año. El estudio encontró que, en los hospitales obstétricos, las madres de 20 a 24 años y mayores de 40 años planeaban amamantar al niño durante un tiempo más prolongado, pero, de hecho, las madres de 18 a 35 años continuaron amamantando durante más tiempo. Con el aumento de la edad materna, la proporción de rechazos a la lactancia materna aumenta debido a la falta de leche y a la necesidad de estudiar o trabajar, pero la proporción de rechazos relacionados con la falta de voluntad de la madre para continuar amamantando disminuye. La evaluación del impacto de la edad en el momento de la introducción de alimentos complementarios en la dieta del niño mostró que cuanto mayor es la madre, más tarde introduce el primer y el segundo alimento complementario. Las madres menores de 20 y mayores de 40 eran más propensas que las madres de otros grupos de edad a introducir puré de carne y pescado más tarde de lo recomendado. Casi todas las madres menores de 20 años dieron a los niños pasta de requesón y yema de huevo en el momento óptimo, a diferencia de las mujeres de otros grupos de edad, que introdujeron estos productos más tarde. Con el aumento de la edad de la madre, la proporción de niños que recibieron productos lácteos fermentados en el período recomendado aumenta y la proporción que los recibió más tarde disminuye. Por lo tanto, la edad de la madre tiene un impacto significativo en la nutrición de los niños en su primer año.

**Palabras clave:** Lactancia materna, edad de la madre, duración de la lactancia materna, las razones para negarse a amamantar, el momento de la introducción de alimentos complementarios.

## Introduction

Proper nutrition of children can be considered as a guarantee of the future health of the nation<sup>1-3</sup>. Breast milk is an ideal food for newborns and infants<sup>4,5</sup>. It serves as a source of all easily digestible nutrients and biologically active compounds necessary for a child<sup>6,7</sup>. To provide support to mothers in the area of breastfeeding, which should be carried out by maternal and child health services, World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) specialists developed "Ten principles of successful breastfeeding", which are used in more than 150 countries<sup>8-10</sup>.

Even though the duration of breastfeeding is crucial for the child's harmonious physical neuropsychiatric development, according to WHO, many mothers stop breastfeeding a few weeks after childbirth<sup>11-13,28</sup>. The reasons for women's refusal to breastfeed children are different and can be associated with both the child and the mother. In addition, all the reasons for refusal of breastfeeding should be divided into objective and subjective. The objective reasons for refusals may be the lack of milk, mother's disease (lactation mastitis, taking some drugs and severe chronic diseases of the heart, lungs, kidneys or liver in the acute stage, some infections, etc.), child's disease (hereditary metabolic disorders, deep prematurity, birth injuries, severe forms of lactase deficiency, etc.). Subjective reasons on the part of the mother include personal or socially determined reasons, such as the need to go to work or study, the fear of a woman to spoil the figure and shape of the breast, the mother's reluctance to continue breastfeeding, etc. On the child's part, subjective reasons for refusal can be associated with the use of a dummy and/or pacifiers, violation of feeding techniques, bottle feeding, etc.

For normal psychomotor and physical development of the child in the second half of his life, additional energy and nutrients are required, which the child can receive only when introducing additional food into the diet<sup>14,15</sup>. After the age of six months, once the quantity and the composition of maternal milk are no longer sufficient to meet the nutritional needs of the infant, it is important and necessary to begin complementary feeding. The timing of the introduction of complementary foods has a significant impact on the child's body<sup>16</sup>. They are set individually for each child, taking into account the peculiarities of the development of the digestive system, the excretory organs, the level of metabolism, as well as the degree of development and functioning of the central nervous system, that is, his readiness to perceive new food<sup>17</sup>. According to experts in the field of baby food, the introduction of the first products can be started as early as 4 months and as the first complementary food, as a rule, should be fruit or vegetable puree. Then, a second complementary food is introduced, which is cereal porridge. As a third complementary food, according to modern ideas about the nutrition of infants, it is advisable to use meat puree<sup>18,19</sup>.

Due to the fact that in recent years, the age of childbirth in our country is moving to an older age group, the study of the influence of the age of the mother on the duration of breastfeeding, the reasons for refusing it and the timing of the intro-

duction of complementary foods in the first year of life is an urgent topic for research.

## Purpose of Research

To study the influence of the mother's age on the nutrition of children in their first year of life

## Materials and Methods

The study was conducted based on 7 children's polyclinics in St. Petersburg in 2018-2019. All children's polyclinics (departments) were clinical bases of St. Petersburg State Pediatric Medical University of the Ministry of Healthcare of the Russian Federation.

According to the specially developed form "Questionnaire of the mother of a one-year-old child", 1742 mothers who had one-year-old children were surveyed by random sampling. Evaluation of the distribution of respondents by age revealed that the majority of women were 25-29 years old; the proportion of them was 36.3%. There were 1.7% respondents under 20, 20-24 - 24.4%, 30-34 - 25.7%, 35-39 - 10.7%, 40 and older - 1.2%. The average age of the mother was  $28.6 \pm 0.11$ .

In the questionnaire, in addition to the age of the mother, the actual and planned terms of breastfeeding, the duration of feeding the child with breast milk and the introduction of complementary foods in the first year of life were studied. The mother independently filled out the questionnaire after local pediatricians' or specialist doctors' appointments during the medical examination provided for the child who is 1 year old by Order of the Ministry of Healthcare<sup>20</sup>.

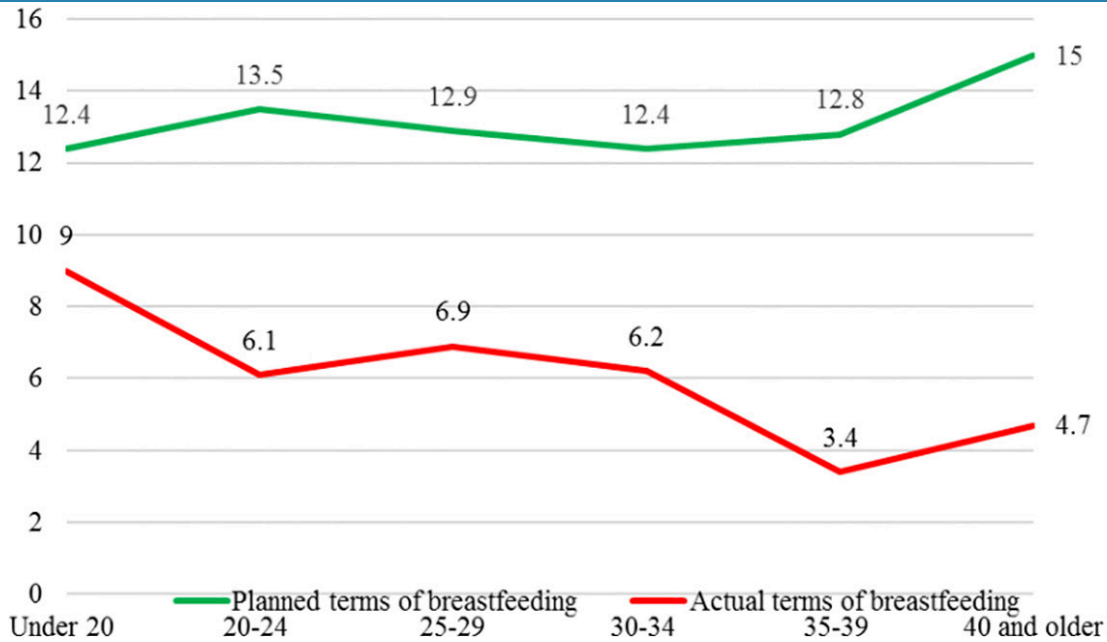
Mathematical data processing was carried out using spreadsheets "MS Office Excel 2010".

## Research results and their discussion

On average, mothers participating in the survey planned to breastfeed their babies up to  $12.5 \pm 0.08$  months in maternity care facilities. To study the effect of mother's age on the planned at an obstetric clinic period of breast feeding showed that on average, mothers under 20 were going to feed to  $12.4 \pm 0.11$  months, 20-24 – to  $13.5 \pm 0.08$  months, 25-29 – to  $12.9 \pm 0.08$  months, 30-34 – to  $12.4 \pm 0.08$  months, 35-39 – to  $12.8 \pm 0.09$  months, 40 – to  $15.0 \pm 0.10$  months. In fact, the average feeding time was only  $5.9 \pm 0.08$  months.

The evaluation of actual terms showed that on average mothers under 20 fed up to  $9.0 \pm 0.11$  months, 20-24 - up to  $6.1 \pm 0.08$  months, 25-29 – up to  $6.9 \pm 0.08$  months, 30-34 - up to  $6.2 \pm 0.08$  months, 35-39 -  $3.4 \pm 0.09$  months, 40 and older -  $4.7 \pm 0.10$  months (Fig. 1). A comparative assessment of planned and actual terms of refusal from breastfeeding depending on the age of the mother is presented in figure 1.

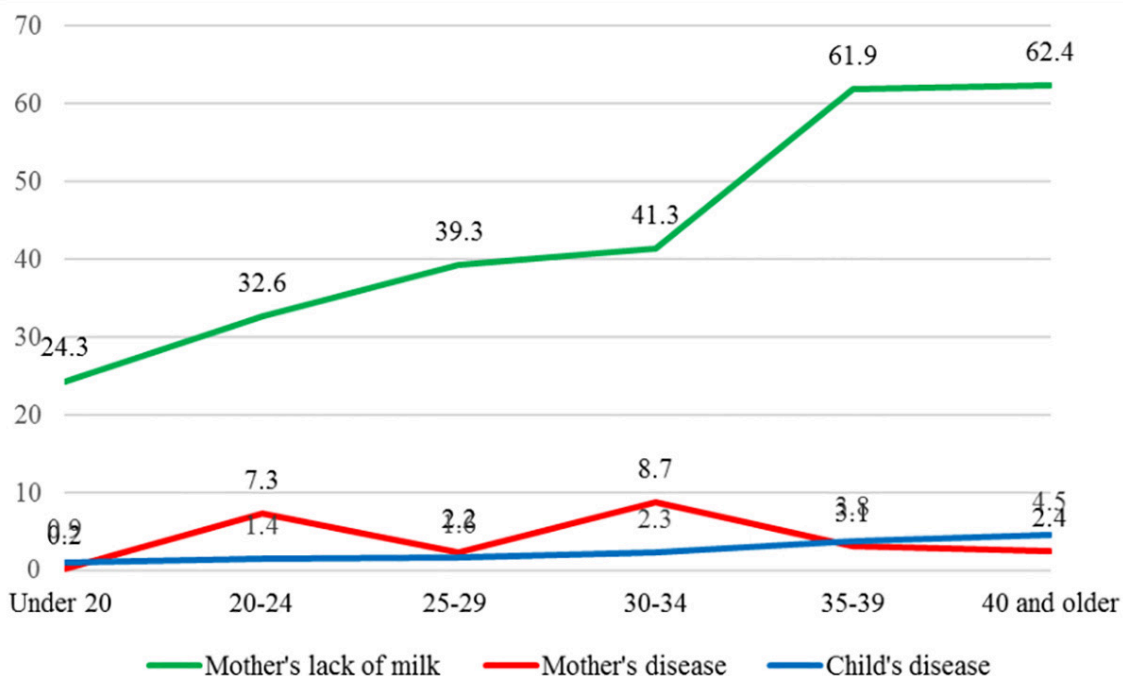
Figure 1. Planned and actual terms of breastfeeding duration depending on the age of the mother (in months).



The study of the influence of the mother's age on the proportion of breastfeeding withdrawal for an objective reason showed that the older the mother is, the higher is the total proportion of breastfeeding withdrawal for an objective reason. It was found that the lack of milk was the most often objective reason for which women suspend breastfeed. Mothers under 20 had a minimum withdrawal rate of 24.3%, while those of 40 and

older had a maximum withdrawal rate of 62.4%. Meanwhile, 20-24-year-old women (7.3%) and 30-34-year-old ones (8.7%) most often stopped breastfeeding because of their illness, and 35-39-year-old and 40-year-old and older mothers (3.8% and 4.5%, respectively) because of the illness of the child. The proportion of breastfeeding withdrawal for an objective reason in different age groups of mothers is shown in figure 2.

Figure 2. The proportion of breastfeeding withdrawal for an objective reason in different age groups of mothers (expressed in %)

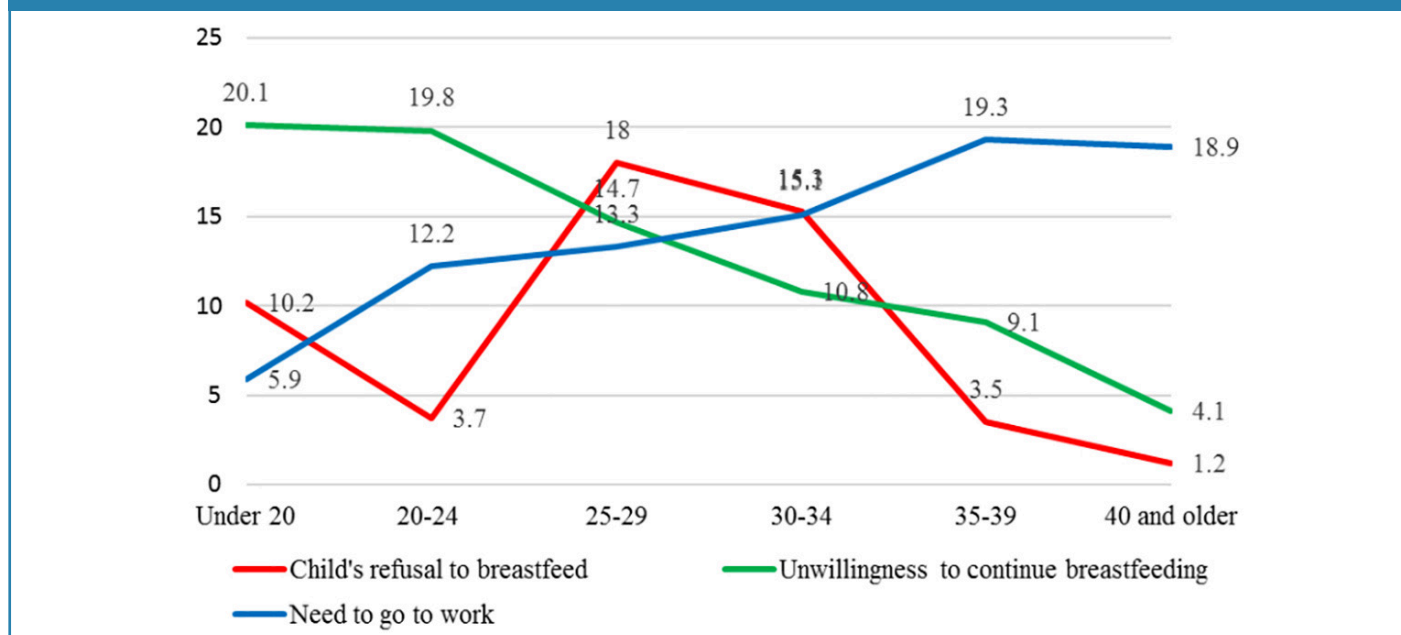


Evaluation of the influence of the mother's age on the proportion of objective breastfeeding withdrawal from all causes revealed the presence of a direct strong correlation between the studied indicators ( $t > 2$ ). The same pattern was observed in the study of breastfeeding withdrawal associated with the lack of milk, and due to the disease of the child.

Among the subjective reasons for breastfeeding withdrawal, the main reasons were the mother's unwillingness to continue breastfeeding, the child's refusal to breastfeed and the need

to go studying or working<sup>21,22</sup>. The proportion of breastfeeding withdrawal due to the reluctance of the mother to continue breastfeeding was highest in mothers under 20 (20.1%) and decreased with age. On the contrary, the proportion of breastfeeding withdrawal due to the need to go studying or working, was the lowest in mothers under 20 (5.9%) and increased with age. The highest proportion of the child's refusal to breastfeed was 25-29 years old (18.0%) and 30-34-year-old (15.3%) mothers. The influence of age on subjective reasons for breastfeeding withdrawal is presented in figure 3.

Figure 3. The proportion of breastfeeding withdrawal for subjective reasons in different age groups of mothers (expressed in %)



There was a direct strong correlation between the age of the mother and the proportion of refusals due to the need to go studying or working ( $t > 2$ ). A strong inverse correlation ( $t < 2$ ) was established between the age of the mother and the proportion of breastfeeding withdrawal due to her unwillingness to continue feeding the child with breast milk.

In the course of this study, the influence of the mother's age on the timeliness of the introduction of complementary foods in the diet of the child in the first year of life was studied. According to the recommendations of pediatricians and nutritionists, the first complementary food is advisable to start with fruit puree no earlier than 4 months old. Then vegetable and grain products are introduced into the diet<sup>23,24</sup>. It was found that most mothers gave the child fruit and vegetable puree in time (Table 1).

Table 1. Distribution of children on the timeliness of introduction of the first complementary food in a diet depending on the mother's age (in % to total)

Age	Fruit puree				Vegetable puree			
	Earlier	In time	Later	Total	Earlier	In time	Later	Total
Under 20	2,1	97,8	0,1	100,0	-	96,9	3,1	100,0
20-24	-	89,2	10,8	100,0	-	86,9	13,1	100,0
25-29	-	87,5	12,5	100,0	-	89,6	10,4	100,0
30-34	1,7	79,7	18,6	100,0	-	83,1	16,9	100,0
35-39	5,7	75,1	19,2	100,0	6,1	75,7	36,9	100,0
40 and older	-	25,2	74,8	100,0	-	41,3	58,7	100,0

Evaluation of the effect of age on the timeliness of the introduction of the first complementary food revealed the presence of a strong reverse correlation between age and the share of children who received timely fruit and vegetable purees ( $r_{xy} = -0.86$  и  $r_{xy} = -0.87$ ) and a strong direct one – between age and the share of children who received a puree later ( $r_{xy} = 0.83$  и  $r_{xy} = 0.93$ ). Accordingly, with the increase in the age of the mother, the proportion of children who received in time the first complementary food decreases, and the proportion of those who received fruit and vegetable puree later increases.

Grain product is the second complementary food, which is introduced about a month after the first. It was revealed that the proportion of mothers who introduced cereal porridge into the diet of children early was the highest in the age group under 20 years old. As in the case of the first complementary food, there was a direct strong correlation between the age of the mother and the proportion of children who received porridge later ( $r_{xy} = 0.88$ ). Accordingly, with age increasing, the proportion of respondents who introduced the second complementary food later increases. Distribution of children on the timeliness of the introduction of the second complementary food in a diet depending on the age of the mother is presented in Table 2.

**Table 2. Distribution of children on the timeliness of introduction of the second and third complementary foods in a diet depending on the mother's age (in % to total)**

Age	Porridge				Meat puree			
	Earlier	In time	Later	Total	Earlier	In time	Later	Total
Under 20	98,5	1,2	0,3	100,0	-	0,9	99,1	100,0
20-24	-	79,0	21,0	100,0	28,6	34,3	37,1	100,0
25-29	-	78,1	21,9	100,0	-	40,6	59,4	100,0
30-34	3,1	66,7	30,2	100,0	3,4	32,7	63,9	100,0
35-39	11,1	58,3	30,6	100,0	10,3	31,1	58,6	100,0
40 and older	-	22,4	77,6	100,0	-	2,1	97,9	100,0

Experts in the field of baby food recommend using meat puree as a third complementary food, which should be introduced from 7 months of life, but not earlier than 5.5. At about the same time with meat puree, it is advisable to start giving the child cottage cheese paste (cottage cheese) and egg yolk<sup>25,26</sup>. As can be seen from Table 2, mothers of all ages introduced meat puree later than the optimal time. Moreover, the proportion of mothers below 20 years old and after 40 years old, introducing the third complementary foods later, was the highest.

Evaluation of the influence of age on the timing of the introduction of cottage cheese paste revealed that, except for mothers below 20 years old, women of all other ages introduced cottage cheese later than the term. Young mothers in 96.3% of cases gave children cottage cheese paste in time. And the largest proportion of respondents who introduced cottage cheese later was among 40 years old and older mothers (97.1%). When studying the introduction of egg yolk in the diet of the child, a similar pattern was established. Also, there was a direct strong correlation between age and the proportion of mothers who introduced yolk earlier than the optimal period ( $r_{xy}=0.94$ ). Thus, with age increasing, the proportion of respondents, who introduced yolk earlier, increases. The distribution of children according to the timeliness of the introduction of cottage cheese paste (cottage cheese) and egg yolk into the diet, depending on the age of the mother, is presented in Table 3.

**Table 3. Distribution of children on the timeliness of introduction of cottage cheese paste (cottage cheese) and egg yolk in a diet depending on the mother's age (in % to total)**

Age	Cottage cheese paste				Egg yolk			
	Earlier	In time	Later	Total	Earlier	In time	Later	Total
Under 20	-	96,3	3,7	100,0	0,3	94,9	4,8	100,0
20-24	4,2	29,6	66,2	100,0	3,8	39,2	57,0	100,0
25-29	5,2	20,9	73,6	100,0	6,8	33,9	59,3	100,0
30-34	11,5	32,6	65,9	100,0	7,3	36,4	56,3	100,0
35-39	13,8	17,2	69,0	100,0	21,2	24,2	54,6	100,0
40 and older	0,7	2,2	97,1	100,0	33,3	-	66,7	100,0

Fermented milk products and fish puree are not recommended before the age of eight months<sup>27</sup>. Evaluation of the effect of age on the timeliness of the introduction of fermented milk products revealed the presence of strong direct correlation between age and proportion of the children who received them in time ( $r_{xy}=0,86$ ) and a strong inverse one between age and proportion of the children who received milk products later ( $r_{xy}=-0,92$ ). Accordingly, with the increase in the mother's

age, the proportion of children who received fermented milk products in time increases and the proportion who received them later decreases. The study of the introduction of fish puree in the diet of an infant child showed that in most cases, mothers introduced fish puree later than term. However, the proportion of mothers who gave their children fish puree later than recommended was highest among women younger than 20 and older than 40 (98.9% and 97.5%, respectively), as can be seen from Table 4.

**Table 4. Distribution of children on the timeliness of introduction of fish puree and fermented milk products in a diet depending on the mother's age (in % to total)**

Age	Kefir				Fish puree			
	Earlier	In time	Later	Total	Earlier	In time	Later	Total
Under 20	-	1,3	98,7	100,0	-	1,1	98,9	100,0
20-24	1,1	3,3	95,6	100,0	5,9	5,9	88,2	100,0
25-29	11,7	11,7	76,6	100,0	9,2	16,7	74,1	100,0
30-34	18,9	13,4	67,7	100,0	13,2	7,9	78,9	100,0
35-39	24,1	14,1	61,8	100,0	17,4	21,7	60,9	100,0
40 and older	-	46,7	53,3	100,0	-	2,5	97,5	100,0

### Conclusions

1. In obstetric hospitals, 20-24-year-old and 40-year-old and older mothers planned to feed a child with breast milk the longer period of time, however 18 to 35-year-old mothers continued breastfeeding the longest time.
2. With the mother's age increasing the proportion of breastfeeding withdrawal due to the lack of milk increases in connection with the need to go studying or working, but the proportion of breastfeeding withdrawal related to the unwillingness of the mother to continue breastfeeding decreases.
3. The older the mother is, the later she introduces the first and second complementary foods in the diet of her child.
4. Mothers under 20 and over 40 were more likely than mothers of other age groups to introduce meat and fish puree later.
5. Almost all mothers under 20 gave children cottage cheese paste and egg yolk in time, unlike women of other age groups, who introduced these products later.
6. With the mother's age increases, the proportion of children who received fermented milk products in time increases and the proportion who received them later decreases.

Thus, the age of the mother has a significant impact on the nutrition of children in their first year.

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