

Pregnant Nutrition and Influence to Infant Health Condition

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Summary

A goal of the following research is to study nutrition status in pregnant women and to link it to new-born and mother's health status. During the research nutrition questionnaire has been made. The questions were about nutrition status and also about risk factors that had influence maternal and infant health status. The research group was consisting of 100 pregnant women. The number of participators was calculated by a sample size proportion. According to the research outcomes following opinions had set: Body mass index (BMI) was high level in 64% of mothers. 25% of newborns have low birth weight (below 2800 grams) and 23% high birth weight (high 3900 grams). A different kind of anemia was shown in the 38% of mothers and 41% of new-born. 50% of pregnant women had a lack of milk, 51% a milk food, 50% a beef, 52% a chicken, 30% a fruit, 9% vegetables and green deficit in daily nutrition status. 26% of pregnant women had a deficit of calories, 34% had the deficit of protein, and 36% had the deficit of carbohydrate. 7-7% of pregnant women are using alcohol and cigarettes.

Abbreviations: WHO – World Health Organization, SPSS – Statistical Package for the Social Sciences; OR – Odds Ratio, RR – Relative Risk, 95% CI – 95% Confidence Interval, *BMI- Body Mass Index*.

Key words: *Nutrition status, Risk-factors, Hemoglobin, Body Mass Index.*

Introduction

Proper nutrition is fundamental to human health. The food, which we accept, boosts the body's tissues and cells as development, as well as their regular updating. The food is a source of energy that our organism spends not only exercise, but also during the rest time.

Healthy food is a plant or animal products, which provides the necessary nutritive substances and energy in order to maintain growth and health (The US Department of Agriculture, 2014).

According to US food and drug agency- healthy foods are: 1. If it is less fat; 2. If it contains the minimum number of salt and cholesterol; 3. Provides the following one of them with at least 10 percent of the vitamin A, vitamin C, calcium and proteins (Healthy eating plate, 2015).

Maternal and child health are two main components of Millennium Development Goals (WHO report, 2010).

In the development countries pregnancy and delivery complications is one of the main reasons of mortality and morbidity of women. According to the WHO maternal and infant mortality rate is very high in the world. In 2008 358,000 maternal mortality cases were described which is less than cases described in 1990 – 546,000.

According to the WHO every year 8.8 million children die before the age of 5. Including 3.8 million cases from this is shown during neo-natal period (from birth to 28 days), 1.8 million is during postnatal period (till 1 year), and 3.2 million during 1-5 years (WHO report, 2005).

Since 2010 ministry of labour health and social affairs of Georgia launched maternal and infant health program. This program includes the provision of a safe pregnancy process, complicated delivery management, decrease of perinatal mortality, high quality consultations of pregnant

women, early detection of genetic diseases and birth defects. The program includes: antenatal care, early detection of genetic abnormalities, high- risk pregnant and maternal treatment, screening of newborns and children hypothyroidism and phenylketonuria. The proper management of pregnancy and fetal development is necessary for the proper and adequate nutrition.

During all three trimester of pregnancy nutrients should be correctly selected and planed. It is necessary to take into account the following factors:

- ◇ Adequate fetal growth and development of the basic physiological needs nutrients and energy;
- ◇ Pregnant women physiological fluid and energy to satisfy the demand of basic food in all three trimesters of their health and work to maintain.
- ◇ During all three trimester of pregnancy active, positive and comfortable environments ensuring self-esteem.

It is important to build an Embryo and then the fetus with 'building protein', which is the lack of a variety of nutrients; as well as excess it can be undesirable consequences. Full fetal development adversely affects the following factors:

1. The energy and protein deficiency;
2. Ω3 Ω6 deficiency or imbalance between them;
3. A vitamin deficiency and abundance;
4. Deficit of folic acid, zinc, and iodine (Mikeladze M., and others, 2015).

Energy and protein deficiency in pregnant women and the fetus food diet' leads to growth retardation and infant malnutrition. Protein deficiency in pregnant women should have a strong place that affect fetal development, because the slightest failure of the fruit still gets the required amount of energy and protein, protein reserves from the mother's depot.

Polyunsaturated fatty acids depends myelin membrane development, which plays the main role of the nervous system and the functioning of the calculated formulation. A classic example of the lack of nutrients caused by a deficiency of folic acid and zinc is fetal neural tube defects (hereinafter anencephaly spinal cord and brain hernia), congenital heart disease.

An embryonic development of the neural tube to close during the early period (28 days after conception), so it's important that women take folic acid until the pregnancy. A vitamin deficiency or the excess may cause fetal malformations. Because of this in US in recent years reduced the daily dose of vitamin A 0.8 mg / day. Great importance is given to pregnant women with calcium and iron-rich diet. Calcium deficiency of the mother from the depot bodies (bones, teeth) becomes endogenic calcium mobilization, which is the foundation of pregnant women osteoporosis and tooth decay. Normal fetal growth and development is necessary for the mother's diet rich in animal protein, vitamins and microelements.

An adequate intake of essential nutrients pregnant women physiological needs. Pregnancy in the first trimester of the mother's diet should be varied, rich in vitamins and trace elements. It should be noted that exactly the first trimester pregnant women include changes in the tastes of foods and food intolerance are more common, which require particular attention from the doctor (National nutrition strategy, 2015).

Methodology

The survey included several components. The method of research was quantitative. In the process there were pre-developed food questionnaires for pregnant women. The questionnaire covered the food and risk -factors, which had a significant impact on maternal and child health.

For the exclusion of compounders also include other important questions about the additional risk factors, such as tobacco and alcohol consumption.

Pregnant women about the data collection were carried out retrospectively specifically composed of pregnant women's means.

Additional retrospectively studied the nutritional status of women in the nursing mother's nursing questionnaire, also childbirth complications, any mothers and babies health condition and results of laboratory studies, implying that the mother and the newborn hemoglobin levels.

The nutrients had been processed using a special program that calculates the nutritional products and micronutrient macronutrient number.

The results obtained have been processed by the computer

program SPSS. Cross - sectional epidemiological analysis was conducted in two groups.

The research group was consisting of 100 pregnant women. The number of participators was calculated by a sample size proportion.

The selection criteria were not randomized. Pregnant women were selected in consultation with a wide base. At the same time has been used and the sample is easily accessible on the web application, which will allow pregnant women to fill out a questionnaire online.

For pregnant women the necessary nutrients and energy are some of the modern approach to the table (Mikeladze M., and others, 2015).

Results

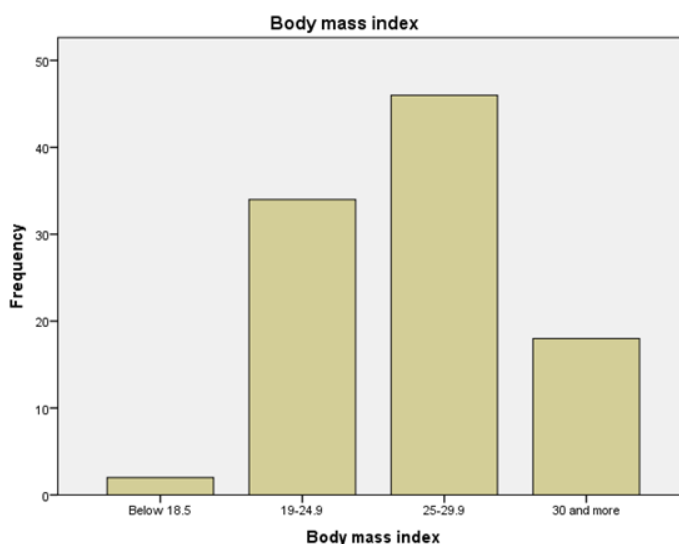
17% of pregnant women had moderate anemia, 21% had mild anemia and 62% has standard ratio of hemoglobin in blood.

19% of infant had moderate anemia, 22% had mild anemia and 59% has standard ratio of hemoglobin in blood.

10% of infants had 2000 g birth weight, 15% weight was between 2100-2800 grams, 52% weight was between 2900 -3800 grams and 23% was more than 3900 grams.

A body mass index of the pregnant women was following: 2% had weight deficit, 34% had normal balance, 46% were overweight and 18% was obese.

Diagram 1



16% of pregnant women were drinking milk 3 times a month, 34% did this once a week, 23% 2-4 times a week, 27% approximately every day.

Table 1

Macro or micronutrients	Basic needs for women from 18-29	Additional requirement for pregnant women
Energy, k/Cal	2200	350
Protein, grams	66	30
	33	20
Percent (%) from k/Cal	12	
Fetus, grams	73	12
Fetus, (%) from k/Cal	30	
Unsaturated fat (%) from k/Cal	10	
Polyunsaturated fat (%) from k/Cal	6-10	
Omega-6 (%) from k/Cal	5-8	
Omega-3 (%) from k/Cal	1-2	
Phospholipids, grams	5-7	
Carbohydrates, grams	318	30
Sugar (%) from k/Cal	<10	
Dietary fiber, grams	20	
Vitamin C, mg	90	10
Vitamin B1, mg	1, 5	0, 2
Vitamin B2, mg	1, 8	0, 2
Vitamin B6, mg	2, 0	0, 3
Niacin, mg	20	2
Vitamin B12, mcg	3, 0	0, 5
Folate, mcg	400	200
Pantothenic acid	5, 0	1, 0
Biotin, mcg	50	
Vitamin A mcg	900	100
Beta-carotene, mg	5, 0	
Vitamin E	15	2
Vitamin D, mcg	10	2, 5
Vitamin K, mcg	120	
Calcium, mcg	1000	300
Phosphor, mg	800	200
Magnum, mg	400	50
Potassium, mg	2500	
Sodium, mg	1300	
Chlorine, mg	2300	
Ferum, mg	18	15
Zinc, mg	12	3
Iodine, mg	150	70
Copper, mg	1, 0	0, 1
Manganese, mg	2, 0	0, 2
Chromium, mcg	50	
Selenium, mcg	55	10
Molybdenum, mcg	70	
Fluorine, mg	4, 0	

Table 2. Pregnant Hemoglobin

		Fre-quency	Per-cent	Valid Percent	Cumula-tive Per-cent
Valid	100 g/l	17	17.0	17.0	17.0
	101-119 g/l	21	21.0	21.0	38.0
	120 g/l and more	62	62.0	62.0	100.0
	Total	100	100.0	100.0	

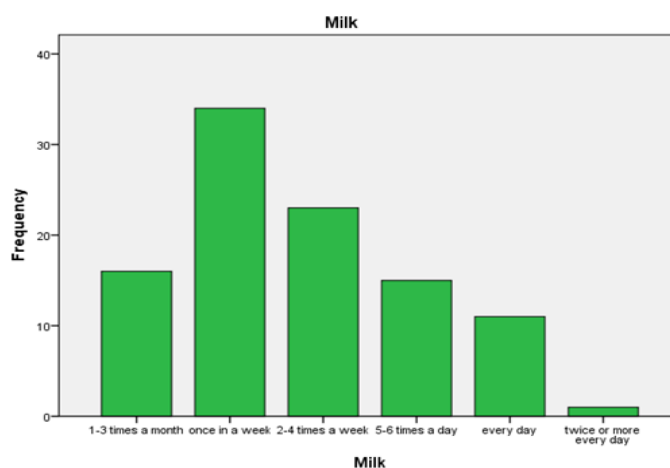
Table 3. Infant Hemoglobin

		Fre-quency	Per-cent	Valid Percent	Cumula-tive Per-cent
Valid	100 g/l	19	19.0	19.0	19.0
	101-119 g/l	22	22.0	22.0	41.0
	120 g/l and more	59	59.0	59.0	100.0
	Total	100	100.0	100.0	

Table 4. Infant weight

		Fre-quency	Per-cent	Valid Percent	Cumula-tive Percent
Valid	2000 grams	10	10.0	10.0	10.0
	2100-2800 grams	15	15.0	15.0	25.0
	2900-3800 grams	52	52.0	52.0	77.0
	3900 grams and more	23	23.0	23.0	100.0
	Total	100	100.0	100.0	

Diagram 2



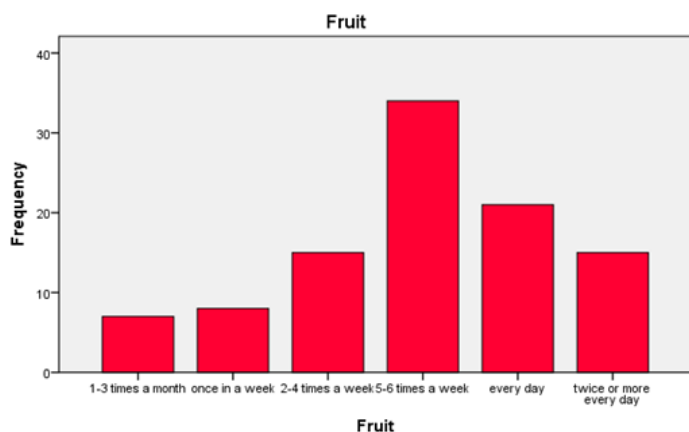
16% of pregnant women were drinking milk 3 times a month, 34% did this once a week, 23% 2-4 times a week, 27% approximately every day.

6% of pregnant women were eating milk products 3 times a month, 16% did this once a week, 29% 2-4 times a week and 49% approximately every day.

10% of pregnant women were eating beef 3 times a month, 40% did this once a week, 30% 2-4 times a week and 10% approximately every day.

7% of pregnant women were eating fruit 3 times a month, 23% did this once a week, 34% 2-4 times a week and 36% approximately every day.

Diagram 3



9% of pregnant women were eating vegetables and green 3 times a month, 30% did this once a week and 61% approximately every day.

14% of pregnant women never drank soft drink, 31% did it 3 times a month, 36% did this once a week and 19% 2-4 times a week.

72% of cases were natural childbirth cases and 28% was caesarean section.

In 85% of infant cases were shown breastfeeding, in 12% mixed feeding and in 3% were shown non-natural feeding. 7-7% of pregnant women were using alcohol and cigarettes.

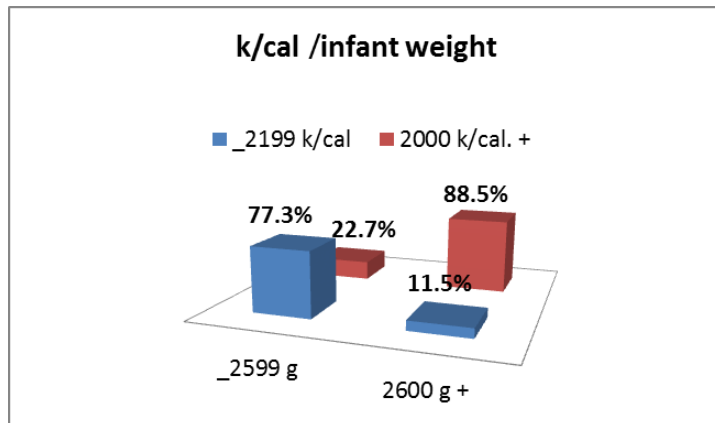
During this research 7 cases were shown with Asplasia, 3 cases with infant heart diseases, 1 with spina bifida and 1 with infection.

Pregnant women in the daily diet of calorie low number (2200 k /cal) the incidence of 65.4% of a low birth weight (2600 g), while the daily food ration for a caloric normal number (2600 k /cal, and more) 93.2% of cases were registered in infants of normal weight (2600 and up). It should be noted that the incidence of low birth weight of 77.3% of pregnant women in the diet was low in calories ($X^2= 38.5$;

$P < 0.01$).

Of pregnant women received a low-calorie the odds ratio (OR) is 26.1 times higher to infants born with low weight (OR = 26.1; 95% CI = 7.7 - 87.9), the relative risk (RR) indicator - 9.7 times (RR = 9.7; 95% CI = 4.0 - 23.6).

Diagram 4

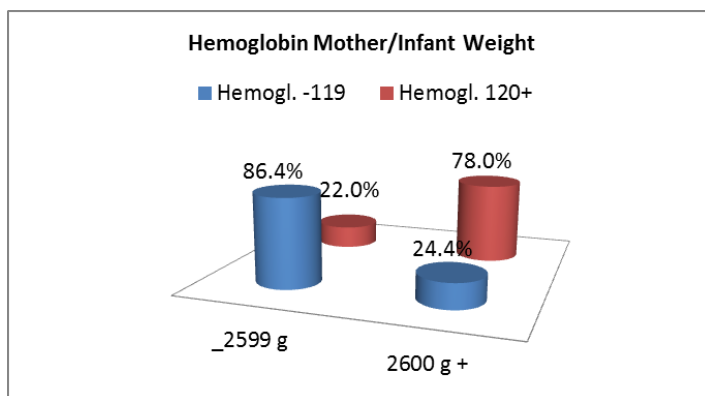


Pregnant women in the daily diet of protein low number (65 g) 47.1% cases were to place a low birth weight (2600 g), while the daily food ration of proteins in normal number (66 g or more), 90.9% was incidence of the registered infants with normal weight (2600 and up).

It should be noted that the incidence of low birth weight of 72.7% of pregnant women in the diet was low in protein ($X^2= 18.9$; $P < 0.01$). Of pregnant women received low amounts of protein in your daily diet by making the odds ratio (OR) by 8.9-fold higher for infants born with low weight (OR = 8.9; 95% CI = 3.0 - 26.1), the relative risk (RR) indicator - 5.2 times (RR = 5.2; 95% CI = 2.2-12.0).

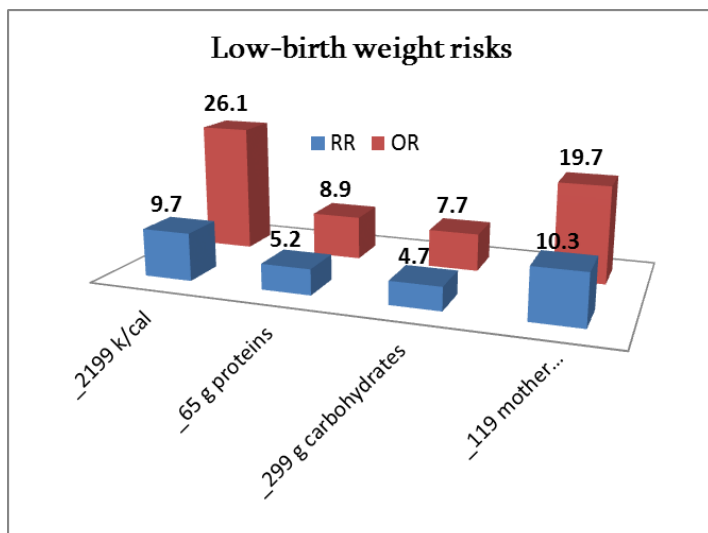
Pregnant women in the daily diet, a low amount of carbohydrate (300 g) containing the incidence of 44.4% of a low birth weight (2600 g), while the daily diet of carbohydrate normal number (300 g or more), the incidence of 90.6% - was registered as a normal birth weight (2600 and up).

Diagram 5



Thus the trend of infants with low birth-weight risk is following:

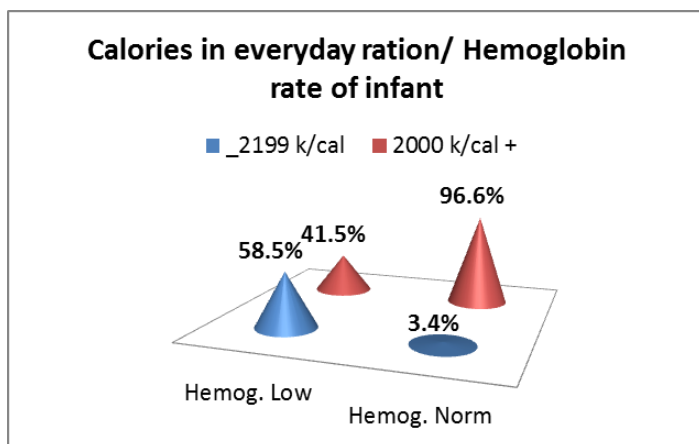
Diagram 6



High- weight infants (4000 g or more) 94.7 % in case of pregnant women received daily food ration of high protein. While normal-weight infants (3900 g or less) 81 % in case of normal proteins points ($X^2 = 8.6$; $P < 0.01$).

The high amounts of protein in your daily diet of pregnant women the odds ratio (OR) for infants born with high weight 12.4 times higher (OR = 12.4; 95% CI = 1.6 - 92.7), the relative risk (RR) indicator - 9.3 times higher (RR = 9.3; 95% CI = 1.3 - 66.5).

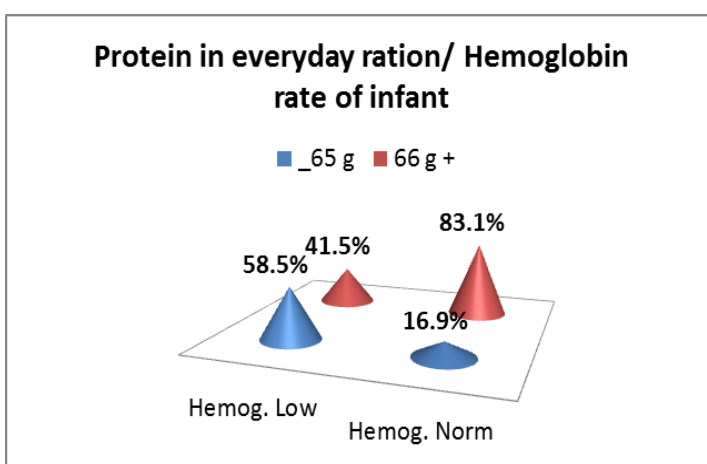
Diagram 7



Low amounts of protein in the diet of pregnant women 70.6 % cases were described infant with low hemoglobin (120 or less). Whereas, normal amounts of protein in the diet of pregnant women 74.2 % cases were described normal newborn hemoglobin (120 and more) ($X^2 = 18.6$; $P < 0.01$).

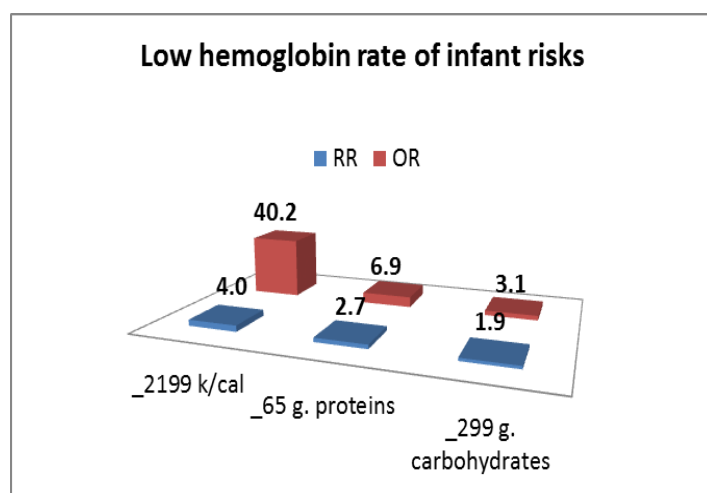
Low amounts of carbohydrates in the diet of pregnant women is shown 58.3 % of case of an infant with low hemoglobin (120 or less). Whereas, normal amounts of carbohydrates in the diet of pregnant women shows 74.6 % case of normal newborn hemoglobin (120 and more) ($X^2 = 7.0$; $P < 0.01$).

Diagram 8



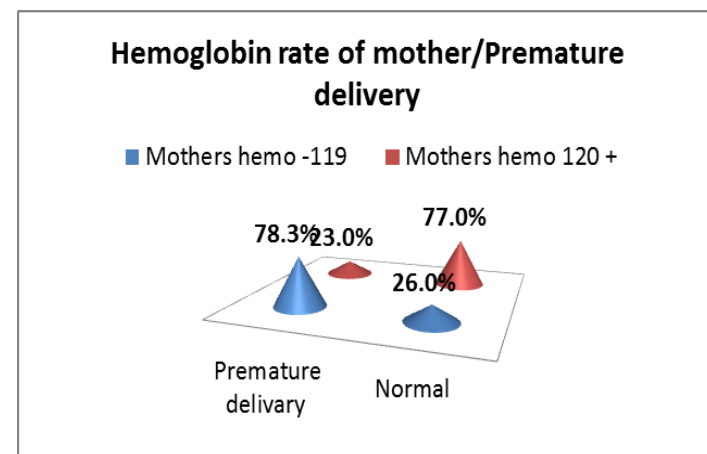
The number of infants born with low blood hemoglobin risk trend was following:

Diagram 9



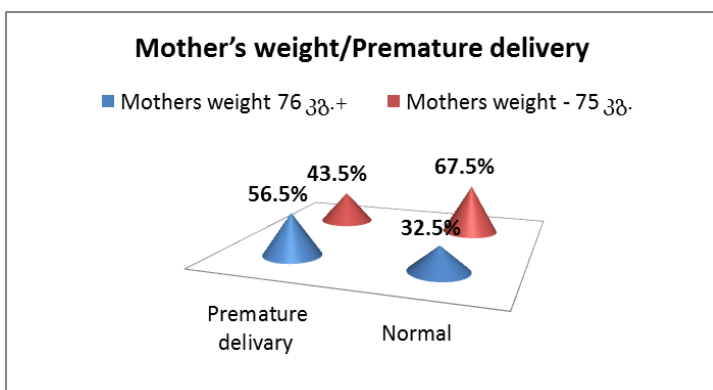
In 78.3 % of premature births, pregnant women were faced low blood hemoglobin level (120 or less). Whereas, in 77% cases of timely delivery, pregnant women had normal hemoglobin level (120 and more) ($X^2=20.6$; $P < 0.01$).

Diagram 10



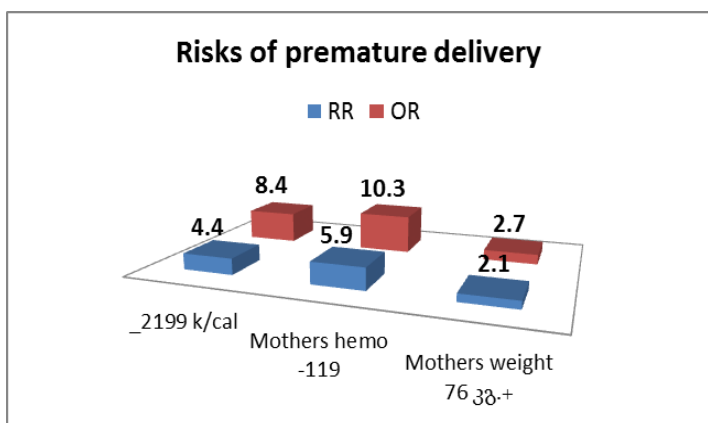
In 56.5% of premature births of pregnant women were faced a high weight (76 and over). While in 67.5% were timely deliveries in case of normal weight (75 or less) ($X^2 = 4.3$; $P < 0.05$).

Diagram 11



In 60.9% of premature births pregnant women were faced a low number of calories in the diet. While in case of 84.4% timely deliveries, normal number of calories in the diet was shown ($X^2 = 18.9$; $P < 0.01$). Of pregnant women with low calories in the diet odds ratio parameter (OR) for premature birth was 8.4-times higher (OR = 3.0; 95% CI = 3.0 - 23.8), and the relative risk (RR) indicator - 4.4 times higher (RR = 4.4; 95% CI = 2.2 - 9.0).

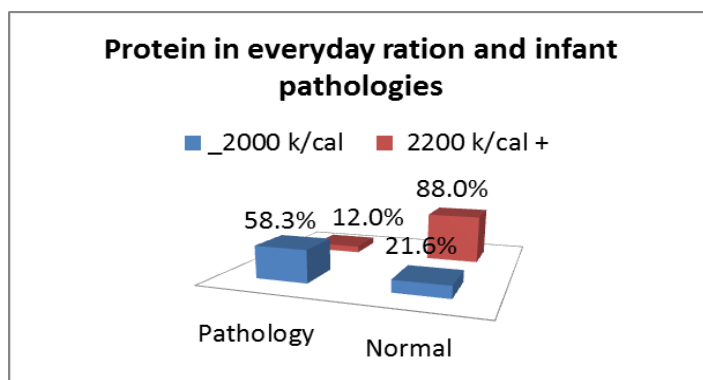
Thus the risk trend of premature delivery was as following:
Diagram 12



In case of 22.9 % low number of calories in daily diet newborn health problems was described, while the diet of pregnant women with a sufficient amount of calories was making 93.2 % of the children born with no signs of problem.

In case of 23.5% low protein by pregnant women is correlated newborn health problems, while making 93.9% of pregnant women in the diet with sufficient amount of protein does not cause the newborn health problems. At the same time, 66.7% of newborn pathology observed in the case of pregnant women in low amount of protein in the diet ($X^2 = 6.5$; $P < 0.05$).

Diagram 13

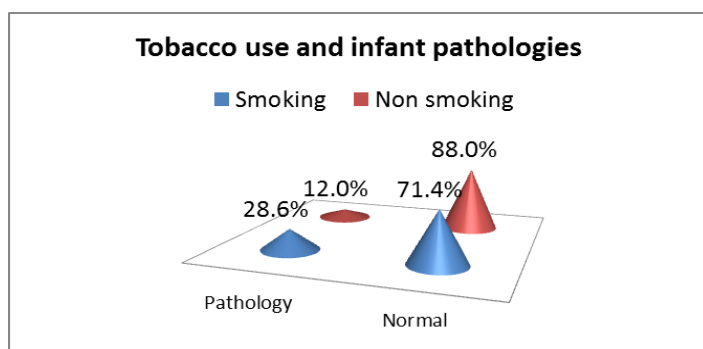


Low amounts of protein in the diet of pregnant women, the odds ratio index (OR) for infant health problem risk was 4.8 - times higher (OR = 5.1; 95% CI = 1.3 - 17.2), the relative risk (RR) indicator - 3.9 times higher (RR = 3.9; 95% CI = 1.3 - 11.9).

Of pregnant women who did not smoke signifying 94.3% of healthy newborn and pregnant women who smoked 28.6 % in case of newborn health problems. This results was not trustful $P > 0.05$, it takes , but there was shown a certain trend.

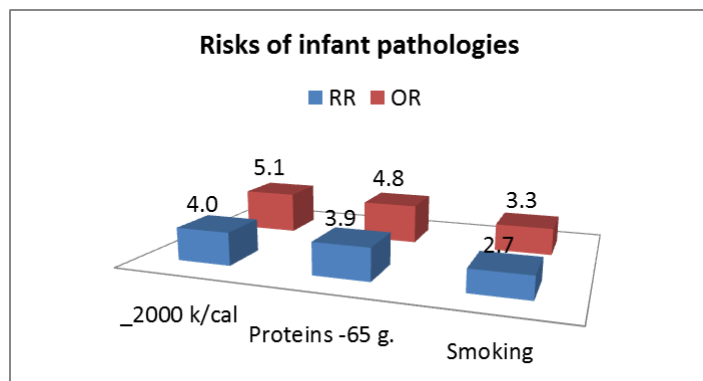
Pregnant women who smoke odds ratio (OR) for infants with health problem risk was 3.3 times higher (OR = 3.3; 95% CI = 0.6 - 19.4), the relative risk (RR) indicator - 2.7 times higher (RR = 2.7; 95% CI = 0.7 - 9.8).

Diagram 14



Thus infants with low birth-weight risk trend was following:

Diagram 15



Conclusions:

According to research results were formulated following conclusions:

1. According to the body mass index 64% of the mothers were overweight or obese. 25 % of infants was shown low (2800 g), and 23% higher (and more than 3900 g) weight. Various degrees of anemia were observed in 38 % of pregnant women and 41% of newborns.
2. In the diet of pregnant women there was shown following deficit, 50 % of milk, 51% - milk products, 50% - beef, 52% - chicken meat, 30% - fruit and 9% - a shortage of vegetables and herbs. 26 % of pregnant women had the deficit of calories, 34% had the deficit of protein and 36% had the deficit of carbohydrate. 7-7 % of pregnant women consume alcohol and cigarettes.
3. The infant birth weight was observed in cases when pregnant women received daily food at a low amount of calories (65.4%), proteins (47.1%), carbohydrates (44.4%), as well in the mother's hemoglobin low rate of 86.4% ($p < 0.01$). The risk of low birth weight infants increased when pregnant women receives low-calorie meals daily 9.7-times, 5.2-times in case of protein-, 4.7 times in case of carbohydrate and in low rate of maternal hemoglobin cases - 10.3 times.
4. The infant birth with high weight was observed in cases where pregnant women received the high amount of calories (92.3 %), proteins (94.7 %) and carbohydrates (89.7 %) ($P < 0.01$). High birth weight infants risk increased by pregnant women daily caloric intake of food 4.0 times, 9.3 times protein and carbohydrate- 4.7 times.
5. Low hemoglobin of newborn was observed in cases of pregnant women received a low amount of protein (70.6 %) and carbohydrates (58.3%) ($p < 0.01$). Newborn low hemoglobin risk increases by low amount of protein intake 2.7 times, while the carbohydrate - 1.9 times.
6. Premature birth have been observed, when faced with a number of pregnant women by the low amount of calories (60.9%), low hemoglobin in the blood of pregnant women also-indicates (78.3%) and the high weight of pregnant women (56.5) at the time ($p < 0.01$). Premature births in pregnant women increases the risk of low-calorie daily diet 4.0 times, pregnant women with low blood hemoglobin rate- 5.9 times and pregnant women with high weight - 5.9 times.
7. In the case of newborn health problems, there is a low amount of calories in the diet of pregnant women's calories (22.9%) and protein (23.5%) receiving, as well as - maternal smoking (28.6%). Infant health problem risk increases low-calorie in daily ration of pregnant, making 4.0 times, proteins - 3.9 times and 2.7 times that of the pregnant woman's tobacco users.

Recommendations:

According to the research worked out the following recommendations:

1. For the number of pregnant women with low hemoglobin, premature delivery and low birth weight and high infant prevention and health promotion it is recommended that pregnant women food rations contain 2200-2800 k / calories, 66-100 g. Protein, 300-400 g. Carbohydrate.
2. For pregnancy hemoglobin low number, premature delivery and low birth and high weight prevention and neonatal health promotion following pregnant diet is recommended: to increase milk (500 g), dairy products (50 g), beef (100 g), chicken meat (70 g), fish (70 g) Fruit (300 g), vegetables and greens points (500 g).

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