

## Risk factors and newborns' body weight

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### ABSTRACT

Main target of the work was the revealing and assess of main factors of risk negatively impacting the antenatal development (i.e. weight of fetus) and gaestacide age. To achieve our target and perform our assignment we applied the following methods and materials. We made up a protocol of the entire research, according to which the methodology of the given scientific research was defined. To minimize the system errors we applied the cohortive randomized controlled (parallel control) disguised design of research, to define it more specifically we applied 'case-controlled' method of survey on the basis of the retrospective data. To avoid occasional errors we increased the number of those being researched. According to the materials received by us among the factors of risk impacting the gaestacidal age and body weights of the newborn infants the most significant ones are as follows: social-economic factor (malnutrition) RR=5.4 ( $p<0.01$ ), age of pregnant ( $<17$  or  $>35$ ) RR=5.3 ( $p<0.01$ ), gaestosis of the pregnant RR=5.1 ( $p<0.01$ ), infectious gynecological pathology RR=4.7 ( $p<0.05$ ), the pregnant anemia RR=4.5 ( $p<0.05$ ), group and Rhesus conflict RR=4.2 ( $p<0.01$ ). Thus, in Georgia nowadays one can reveal a variety of factors of risk during the period of pregnancy (social-economic factors – malnutrition, age of the pregnant, infectious gynecological pathology, gaestosis, the pregnant anemia, group and Rhesus conflict). More frequently those factors impact the pregnant in combined forms and present the most hazardous factors for the premature delivering and antenatal hypotrophy development of fetus in the period of its being in the belly. All the mentioned above information is of great significance for the Georgian Public Health Service of Mother's and Children's Protection being in the process of its reformation. Taking into account all these data is sure to serve positively the cause of the optimization of the pre and perinatal service.

**KEYWORDS:** *newborn, body weight, risk factors, antenatal care*

One of the basic reserves of decreasing the rate of mortality among the population is pre and perinatal period. And the major part in the lethality structure of the above-mentioned contingent makes those born prematurely and having insufficient body weight.

Taking into account the basic links of the demonstrative medicine with requirements of Consort's item 22 there have not been carried out randomized medical research of the factors representing the risk for the gaestacide age and insufficient body weight at the moment of birth [1,2,4,7].

On the basis of the leading informational medical publications (such as Cochrane, Ovid, Medline, Kluwer, Springer, Bleckwell, Embasse as well as the available printed publications) the development of antenatal dystrophy of the pregnant women plays a significant role as a major factor of risk, according to the great number of random-controlled researches, and unrandomized researches as well, having been held all over the world [5,6].

There adduces an obvious tendency that there exists a close connection between the factors of risk in the antenatal period on one hand and prematurity and insufficient body mass of a newborn baby on the other hand [1,2,3,6].

At the beginning of the 21<sup>st</sup> century, taking into consideration the present reality, Georgia is placed among the states being on the developing-transitional stage. Henceforth there have appeared a great number of negative social-economical problems (e.g. emotional stresses during the pregnancy, malnutrition, physical labor, etc.) characteristic of the so-called transitional period. All these factors impact the development of pregnancy and the body mass of a fetus at the highest extent negatively.

The main target of our work is to reveal the impact of the factors of risk on the gestacide age and hindrances for the antenatal development (i.e. fetus's mass) and to make the potential assess of the factors.

### MATERIALS AND METHODS

The research was being held on the grounds of the Scientific Research Institute of Pre- and Perinatal Medicine and Obstetrics and Gynecology of Ministry of Health Protection of Georgia by ac. K.Chachaa and its maternity hospital in the period of 2003-2004.

To achieve the above-mentioned targets and properly fulfill the tasks of our research we applied the following methods and materials. First we made a protocol, according to which we defined the methodology of our research. To minimize the chance of error we applied the cohortive randomized controlling (parallel control) disguised design of research, to define it more specifically we applied 'Occasion-Control' method of research on the basis of the retrospective data. To avoid the occasional errors we increased the number of those being surveyed.

The basic source of information consisted of the following units: information on the pregnancy and that of delivery and circumstances around it. The gaining of this information happened at the Maternity Hospital of the Scientific Research Institute of Perinatal Medicine and Obstetrics and Gynecology named after academician K. Chachava of Ministry of Public Health of Georgia on the basis of case histories (Form #097) and questioning mothers.

Assessment of anatomic and physiological features of newborn infants were performed by us to define the physical data of the newborn infants, that is: weight, length, circumference of breast, circumference of head. To assess the degree of physical maturity we applied the Ballard – 1979 scheme. The assess of neurological features contained the following criteria: 1. The newborn infant's pose; 2. "Square Window"; 3. Responding reaction of hands; 4. Popliteal angle; 5. "Scar" symptom; 6. Achieving ear by heel.

To define the correspondence of anthropometrical physical and neurological maturity we applied the schemes from the packet of NCHS – 1999: 1. Scheme of gaestacide assess; 2. Length distributing scheme according to the gaestacide age; 3. Scheme of correspondence of

length of premature infants and their weight; 4. Scheme of correspondence of weight and gestational age of newborn infants.

The data of each infant and mother were put in diagnostic-epidemiological questionnaire individually. On the basis of the recorded data there was defined the number of exposed and unexposed children in the basic group (that of those born prematurely and with insufficient body weight). Then among those born in due time, practically healthy newborn infants, there was randomly added control group. On the final stage we performed the comparison of the objects of research from the control and basic group and defined the factors of risk of the frequency of exposition to be thoroughly studied.

The basic principles of the epidemiological research design are exhibited on the given scheme (Fig.1).

In general, the distribution of the data on the separate factors of risk in the basic and the control groups, their research from is presented in the shape of Tab.1.

By comparing the ratio (a/b) in absolute numbers of the exposed (a) and unexposed (b) prematurely born infants

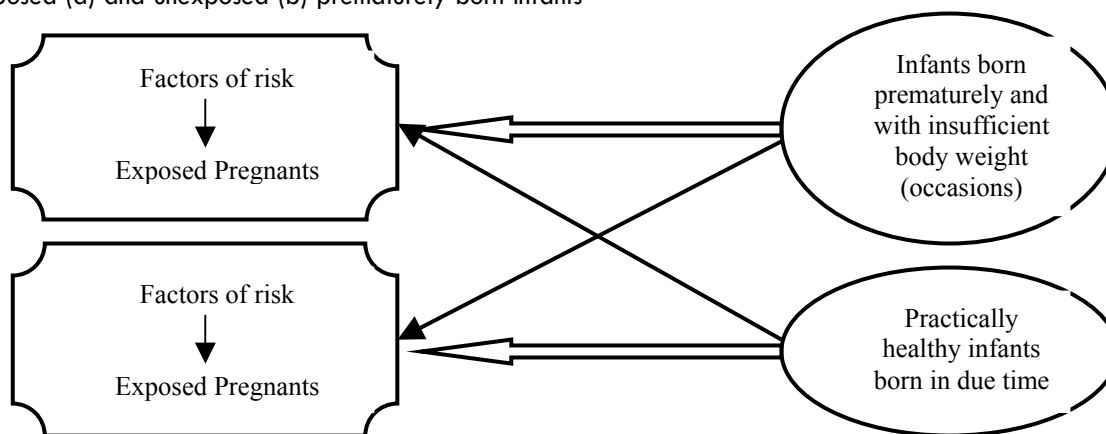
with the presented data (c/d) of the control group, we defined the connection in development between the factors of risk and the incidents in development.

Consequently, as it follows from the mentioned above, alongside with the considering the statistic routine data, we studied thoroughly the following statistic indexes: 1. relative Risk – RR. 2. Attributable Risk – AR. Endeavoring to avoid any confounding factors of the results of the performed experiments we carried out the stratification analysis of the received data.

Basically the group being researched consisted of the randomly selected 64 prematurely born infants while the control one contained 60 born in due time practically healthy newborn infants.

The distribution of the newborn infants in the basic and control groups according to the scheme is exhibited in Tab.2.

As for the exposure of the factors of risk in the basic and control groups, you can see the corresponding data in Tab.3.



**Fig.1** Main principles of epidemiological research design.

Group	Exposure of Factors of Risk (cases in absolute numbers)		
	Exposed	Unexposed	Total
Basic	a	b	a + b
Control	c	d	c + d

**Tab.1** Distribution of data on the separate factors of risk in basic and control groups.

Groups	Female		Male	
	Absolute Number	Percentage from total number in corresponding groups of patients	Absolute Number	Percentage from total number in corresponding groups of patients
Basic	31	48.43%	33	51.56%
Control	29	48.33%	31	51.66%

**Tab.2** Distribution of newborn infants in basic and control groups according to scheme.

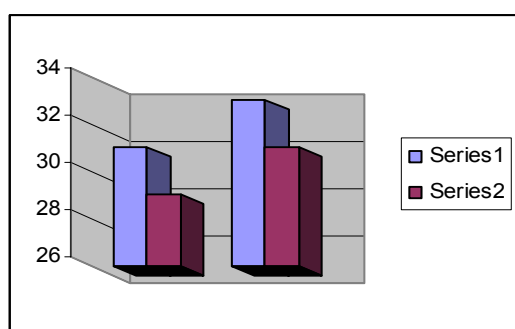
Name of factor	Basic Group		Control Group	
	Absolute Number	Percentage from total number in corresponding groups of patients	Absolute Number	Percentage from total number in corresponding groups of patients
Multifetus pregnancy	7	10.93	2	3.33
Pathology of placenta	14	21.87	3	5
Application of medicaments during pregnancy	12	18.75	4	6.66
Second childlessness	6	9.38	0	0
Gaestosis	13	20.31	3	6
Anemia	18	28.12	5	8.33
Somatic pathology of mother	13	20.31	6	10
C hepatitis	3	4.68	0	0
Operations performed during pregnancy	5	7.81	0	0
Group and Rhesus conflict	15	23.43	4	6.60
Infectious gynecological pathology	18	28.12	6	10
Age of pregnant <17	11	17.18	3	5
Age of pregnant >35	18	28.12	2	3.33
Social-economic factors (malnutrition)	26	40.62	6	10
<i>Total</i>	179	100	28	100

**Tab.3** Distribution of factors of risk in basic and control groups according to scheme.

#### SUMMARIZING AND ANALYZING THE RECEIVED DATA

The potential assess of the major social-economical and biological factors of risk for the minor gaestacide age and for the proper development of infants with the deficiency of body weight was performed by means of integration of the receiving data.

Distribution of the patients in the basic and control groups according to the sex was sufficiently identical ( $p < 0.01$ ) (Fig.2).

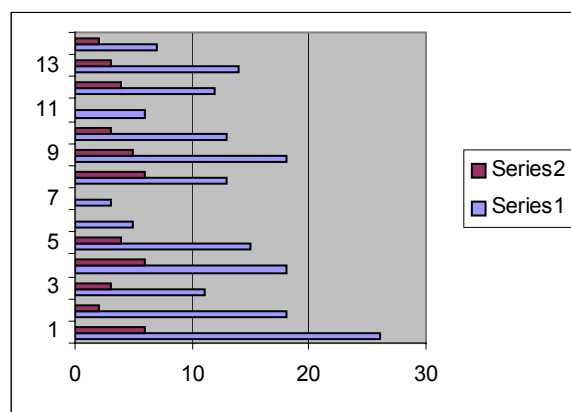


Series 1 – Female newborn infants  
Series 2 – Male newborn infants

**Fig.2** Distribution of patients in basic and control groups according to their sex.

In the process of our research special attention was paid to the exposure of the specific factors of risk among the pregnant.

The close study of the antenatal anamnesis of the newborn infants from the basic and control groups revealed the fact that in the basic group the occurrence of factors of risk of the polymorphic kind during the pregnancy was of higher frequency in comparison with the control group (Fig.3).



**Fig.3** Occurrence of specific factors of risk during period of pregnancy in basic and control groups.

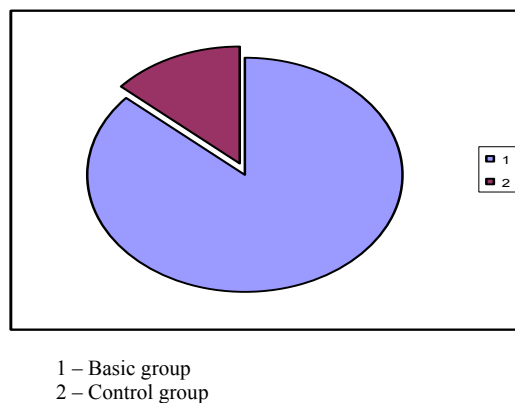
**Series 1 – Basic group.**

1. Social-economic factors (malnutrition);
2. age of a pregnant woman is > 35;
3. Age of a pregnant woman is < 17;
4. Infectious gynecological pathology;
5. Conflict between groups and Rhesus;
6. Operations performed during pregnancy period;
7. C-hepatitis;
8. Mother's somatic pathology;
9. Anemia;
10. Gaestosis;
11. Second childlessness;
12. Application of medicaments during period of pregnancy;
13. Pathology of placenta.
14. Multifetus pregnancy.

**Series 2 – Control group.**

1. Social-economic factors (malnutrition);
2. Age of pregnant > 35;
3. Age of pregnant is < 17;
4. Infectious gynecological pathology;
5. Conflict between group and Rhesus;
6. Operations performed during pregnancy;
7. C-hepatitis;
8. Mother's somatic pathology;
9. Anemia;
10. Application of medicaments during period of pregnancy;
11. Second childlessness;
12. Gaestosis;
13. Pathology of placenta;
14. Multifetus pregnancy.

The existence of factors of risk of high frequency ( $p < 0.01$ ) was revealed among the patients of the basic groups, especially the cases of two or more factors of risk combined together (Fig.4).



**Fig.4** Revealing factors of risk (total number) in basic and control groups.

According to the results received the most significant factors impacting the gaestacidal age and weight of newborn infants are as follows: social-economic factors – malnutrition of the pregnant RR=5.4 ( $p < 0.01$ ), age of the pregnant (<17 or 35) RR=5.3 ( $p < 0.01$ ), the gaestosis of the pregnant RR=5.1 ( $p < 0.01$ ), infectious gynecological pathology RR=4.7 ( $p < 0.05$ ), anemia of the pregnant RR=4.5 ( $p < 0.05$ ), conflict between group and Rhesus RR=4.2 ( $p < 0.01$ ).

Consequently as it follows from the said above one can reveal in present Georgia the whole variety of the factors of risk (i.e. social-economic factors, malnutrition, age of the pregnant, infectious gynecological pathology, gaestosis, the pregnant anemia, conflict between a group and Rhesus), which combined with one another impact the pregnant and present the factors of risk causing premature delivering and antenatal hypotrophy of the fetus.

In the process of reformation of the Georgian Mother and Child Protection Service the above presented data is of special significance and will assist in the cause of optimization of pre and antenatal service.

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## Факторы риска рождения ребенка с низкой массой тела

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### РЕЗЮМЕ

В последние годы проблема задержки внутриутробного развития плода становится все более актуальной. Проанализированы истории развития новорожденных с задержкой внутриутробного развития. Учитывался вариант задержки развития и ее степень, гестационный возраст детей, их состояние при рождении, а также различные факторы риска формирования данной патологии со стороны матери. Составляли протокол для определения методологии исследования. Установлены причины, которые могут нарушить нормальное течение внутриутробного развития плода. Наиболее частыми факторами риска рождения детей с задержкой внутриутробного развития в Грузии оказались социально-экономические факторы (малнутрация) - RR=5.4 ( $p<0.01$ ), возраст беременной ( $<17$  или  $>35$ ) RR=5.3 ( $p<0.01$ ), инфекционная гинекологическая патология, гестоз RR=5.1 ( $p<0.01$ ), анемия RR=4.5 ( $p<0.05$ ), резус-конфликт (RR=4.2 ( $p<0.01$ )). Учет этих факторов необходим для оптимизации пре- и перинатального обслуживания.

**Ключевые слова:** *новорожденный, масса тела, факторы риска, антенатальная защита*