



Association of
Hospitals of the KR



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CENTER

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Social-medical causes of mortality of children under 2 years old, who died at home and during the first 24 hours after hospitalization

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ABBREVIATIONS

MOH KR	Ministry of Health of the Kyrgyz Republic
RMIC	Republican Medical and Information center
KSMITRP	Kyrgyz State Medical Institute for Training and Retraining of personnel
ADB	Asian Development Bank
WB	World Bank
UNICEF	UN Children Fund
USAID	United States Agency for International Development
WHO	World Health Organization
MPC	Medical and Prophylactic organization
MMI	Mandatory medical insurance
TH	Territorial hospital
CGDP	Center of general doctor practice
CFM	Center for Family Medicine
PHC	Primary Health Care
RC	Republican Center
GFD	Group of family doctors
ICDM	Integrated children diseases management
ATBV	Kalmett Geren anti tuberculosis vaccine
AP	Additional packet of the mandatory medical insurance fund
FAP	Feldsher and obstetric station
MP	Medical personnel
SV	Supervisor
EBF	Exclusively breast feeding
CDM	Congenital development malformation
CHD	Congenital heart disease
GDS	General dangerous symptoms
ORM	Oral rehydration medication
MDG	Millennium Development Goals
ZAGS	Civil status act recording
IM	Infant mortality
MICS	Multi –indicate cluster survey

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SUMMARY

In conducting of the survey the experience of other countries was taken into account, in particular the Romanian survey “Socio-medical causes of death of children under 5 years who died at home and during the first 24 hours after hospitalization”. Final report. UNICEF. Bucharest 2005.

The covered by the survey areas were selected with regard to the mortality rate of children under 2 years at home and during the first 24 hours after hospitalization in hospitals with the highest indices (main group) and in hospitals with a relatively favorable situation with a mortality rate (control group) and also with regard to a geographical location of areas.

The survey covered all children who died at home and during the first 24 hours after hospitalization from January 2007 till December 2008 in the surveyed areas. According to the age characteristic all died children were split into two categories: under 1 year old and from 1 till 2 years old. The survey covered 105 who died under the age of 2 years old at home and during the first 24 hours after hospitalization.

The comparative analysis of the data demonstrated that the majority of children at the age under 1 year old out of the control group died at home whereas in the main group the highest mortality rate of children under 1 years old was reported during the first 24 hours after hospitalization.

Approximately the same number of children in both groups who at the age from 1 till 2 years old die at home. Death of children at the age from 1 till 2 years old who died during the first 24 hours after hospitalization. Were reported only in the main group.

Characteristics of communities in which died children lived

Characteristics of communities in which died children lived were formulated on the basis of interviewing of mothers about their settlements infrastructure, communication means as well as accessibility of medical assistance services.

In a comparative analysis of the data it was identified that:

- For the majority of mothers in both groups it could take less than 30 minutes to walk till the nearest GFD/FAP и hospitals and for 1/3 of mothers – about an hour at the same time for 1/6 part of mothers of the main group it took from 1 – 3 hours to get to a hospital;
- 80% of roads to GFD/FAP in the main group are earth rounds whereas in the control group 52.4% of them are asphalt ones. Asphalt roads till hospitals in the control group constitute 95.2%, which reduces the time of mothers and children reaching a hospital, whereas 62.4% of roads in the main group are earth roads;
- Mothers from the control group had a possibility to use ambulance car services in 5 times more than mothers in the main group;
- 77.6% of mothers in the main group had mobile phones and in a control group 47.6% of mothers had stationary phones which are more reliable;
- Majority of families in both groups had access to ambulance car services, and families out of the control group enjoyed the benefits of access to a drugstores network.

Characteristics of families, in which children died

The characteristics of families in which children died include information about the number of family members, its social and economic status, and drinking water accessibility.

The survey demonstrated the following in the section:

- 45.2% of death cases at home of children at the age under 1 years old was recorded in families with the number of members up to 3 members, hence the first or the second child die more frequently, which is probably connected with insufficient knowledge about mother's nursing a child;
- Death of children at the age under 1 years old during the first 24 hours after hospitalization years old and children from 1 till 2 years old who died at home in the majority of cases was recorded in the families consisting of 4-6 members which is probably explained with existence of other small children and lack of mother's time and attention;
- Compared groups have approximately the same social and economic status of households;
- Approximately half of families in the main group use water out of water ditches, which increases the risk of enteric infections' development.

Characteristics of parents

The sections contain information about parents: their age, occupation, education, their diseases and bad habits.

In general average mothers' age in the main and control groups was 25-29 years old:

- majority of mothers in compared groups during the survey were unemployed. 1/4 part of fathers of the main group were engaged in small entrepreneurial activity (sale of rice, vegetables and berries) and 1/3 part of fathers of the control group were engaged in farming. At the same time approximately the same number of fathers (1/3) did not have job;
- majority of mothers of the main group and fathers of the control group had a complete secondary education, whereas the majority of parents in the control group had higher education;
- approximately half of mothers of both groups were at the age under 20 years old when their first pregnancy began. About 5% of mothers of the main group were at the age of 30-34 years old at the moment of their first pregnancy, which is a risk factor for both a child and a mother;
- mothers of the main group had more renal diseases. Approximately the same number of mothers of both groups suffered from anemia and mothers in the control group had more hepatitis and psychoneurological diseases;
- majority of fathers of both groups had a bad habit of smoking. At the same time in the control group they drank alcohol in 1.5 times more than in the main group.

Antenatal visits of MPC

Pre-natal visits and timely following of MP' recommendations favorably influence the, health of new born infants and children.

Analysis of the data demonstrated, that:

- 91.5% of mothers during pregnancy were registered by a family doctor/feldsher. The main part of mothers of the control group was registered prior to 12 weeks of pregnancy. Approximately, a third part of mothers of both groups – during the period from 12 till 20 weeks. At the same time, 13.6% of pregnant women of the main group were registered during the period later than 21 weeks of pregnancy;
- 20% of children of the control group were premature born, which could become a risk factor and influence a disease progress;
- only 12.7% of mothers during up to 12 weeks of pregnancy of the main group and 26.7% of them of the control group took the folic acid which could reduce the cases of CDM among children;
- practically more than 60% of children mortality in both compared groups was recorded among children of the 1-3 pregnancy.

Risk factors from the child side

Risk factors from the side of a child include early child's age, his/her low weight, as well as complications in delivery. This is confirmed with the following:

- 60% of children under a year in the control group and 47.6% of children in the main group died at the age from 3 up to 9 months. At the same time 15% of children in the control group died during the period of new born. Death of children at the age from one year till a year and a half prevailed in the main group, which is probably connected with registration of children, who died at the age under 1 year old but were registered as died at the age from 1 till 2 years old;
- Newborn 2 times more frequently die at home than at a hospital. Probably it is connected with underestimation of the level of gravity of newborn status before discharging from the maternity home, as well as bad continuity and communication between maternity homes and CFM and also inside of GFD and FAPs;
- Boys' death prevails in mortality of children in both compared groups;
- More died children in the main group had low weight;
- In the control group a quarter of children when discharged from a maternity home had CDM and other diseases and complications in delivery from the side of a child in the form of asphyxia.

Child supervision at CFM/GFD/FAP

Analysis of the medical documentation at an outpatient level and interview of mothers of the dead children demonstrated:

- number of mothers' visits to GFD/FAP for the last 6 months was 4 times in the main group and 6 times in the control group;
- majority of visits were visits of a nurse, who mainly invited children to come to have a vaccination and make anthropometric measurements;
- 38.1% of dead children in the main group and 20% of dead children in the control group were assessed by a medical personnel based on recommendations of the ICDM program for existence of dangerous disease symptoms and at the same time approximately a fourth part of the dead children in both groups was correctly classified;
- practically all children in the control group received the first doze of an anti bacteria medication prior to sending to a hospital and only a third part of children received it in the main group;

- medical personnel underestimated the gravity of the condition of 10% of the dead children of the main group and because of that a child was not sent to a hospital for treatment on time;
- questioning of mothers about the reason of a failure to call for an ambulance car demonstrated, that 76.9% of mothers in the main group and 85.7% of mothers in the control group referred to a lack of an ambulance car service and first aid service in villages;
- 71.6% children of the main group and 57.1 % of children of the control group were sleeping in a beshik (cradle). About 15.6% of cases of death of children at home in the main group happened when they were in a beshik;
- majority of mothers approached late to a MPO because of a child disease, which demonstrates low level of mothers' awareness about dangerous diseases symptoms. Children arrived to a hospital in a very grace condition in the late diseases stages with complications in progress.

Circumstance of children's death

Mothers were asked to describe the circumstances under which their children died at home or during the first 24 hours after hospitalization which demonstrates that:

- sudden death of children in 90% of cases happened because of a mechanical asphyxia. In 10% of cases a sudden death symptom was recorded. ;
- interview of mothers demonstrated that in 33.3% of cases of death of children at the age under 1 year old in the main group and in 18.2% of cases in the control group happened suddenly when sleeping;
- in 30% of cases of death of children under 1 year old medical personnel made a diagnosis of a medical asphyxia or sudden death in medical documentation, without specifying the cause of death. But during a detailed mother's questioning mothers stated that their child had general disease symptoms, which probably led to a death. The diagnosis of a sudden death or mechanical asphyxia causes more and more doubts in the fact that there is a detailed analysis of death circumstances on site and lead to an idea that at the MPO level there is no good quality analysis of a child death at home. The majority children' s death at the age under 1 year old at home with a diagnosis of a sudden death and mechanical asphyxia happened during child sleeping in beshik;
- About a half of children in the control and 1/3 of children in the main group died from a rapid disease progress (during 24 hours);
- CDM, heritable diseases and accidents were more frequent among the died children at the age from 1 till 2 years old in the control group;
- Medical personnel underestimated the gravity of a child condition with 10% of died children of the main group, and due to that a child was not sent to a hospital for treatment on time;
- 11.5% of mothers in the main group when a child got sick approached not a medical personnel but healers (moldo, sorcerers).

Medical services rendered at a hospital level

Assessment of medical services at a hospital level was made via review of medical documentation on dead children. For child health preservation rendering of first aid, timely and qualified medical assistance at all the levels of public health is very important.

Analysis of the medical documentation at the hospital level demonstrated that:

- 10.6% of died children in the main group were examined by the MP of the receiving department later than 6 hours after the receipt;
- 1/3 of children of the main group with acute enteric infections and grave dehydration and 40% of children with acute respiratory infections and pneumonia initially stayed at an infection and children departments for more 6 hours and did not receive proper emergency therapy and supervision and were transferred to a reanimation and intensive therapy departments in extremely grave conditions;
- As an average died in a reanimation department children stayed there for about 8 hours being children of the main group and 10 hours being children of the control group;
- more than 40% of children of the main group dies from acute diarrhea accompanied by dehydration and more than 50% of children of the control group died from acute respiratory infections and pneumonia;
- obtained data make it possible to make a conclusion that children die from acute infections, tragic consequences of which could have been avoided, though 1/3 of died children of the control group had accompanying complications (CHD).

Laboratory testing of children died during the first 24 hours after hospitalization

- approximately the same number of died children in both groups had a general blood test, whereas biochemical tests were prescribed only for 75.6% of children of the main group, and for no ill child in the control group;
- in total only 22.2% of died children of the main group and 14.3% of died children of the control group had determined blood group and rhesus factor;
- majority of died children did not have laboratory tests data interpretation in the medical documentation.

Treatment of children who died during the first 24 hours after hospitalization

The comparative analysis of case histories of died children in both groups demonstrated the same tactics of diseases management which was not in compliance with clinical protocols. Probably that was due to a lack of clinical protocols at a hospital level for many nosologies as well as availability of outdated clinical protocols. Due to that descriptions of treatment were made without split of the died children into the main and control groups.

Practically all children arrived to a hospital in a very grave condition during the late stages of diseases with complications in progress, such as: neurotoxicosis, expressed in hyperthermic and convulsion syndromes, DIC-syndrome and dehydration in a grave stage.

Analysis of the medical documentation of the children, who died during the first 24 hours after hospitalization demonstrated:

- in 60% of cases there is no calculation of the injected infusion liquid and proper monitoring of the injected liquid, as well as in 40% of cases, children with pneumonia were prescribed only one antibiotic in spite of their grave condition;
- aminophylline for children of both groups was frequently prescribed without proper reasons, without accurate assessment of the gravity of the condition. In 90% of cases it was injected intravenously in a stream way, without monitoring

when it is recommended for injection to children of an early age intravenously in a droplet way;

- in 100% of cases unjustifiable prescription of a diuretic (phurosemid) and frequently in a big doze was stated, which could reinforce the existing dysfunction of homodynamic and electrolyte disorders. At the same time cardiac glycoside – digoxin is broadly baselessly prescribed, which can influence the cardiac muscle in a toxic way with the existing imbalances of acid-base equilibrium;
- rehydration infusion therapy being the main treatment intervention for preservation of a child's life in fight against diarrhea was made without a proper calculation of the injected liquid and without any monitoring in all the cases;
- in case of diarrhea the necessary Ringer solution is dropped in small amounts only at the beginning of rehydration was unjustifiably replaced with 5% and 10% glucose solutions and colloidal solutions: rheopolyglucin, polyglucin and saline acesaline. Infusion therapy with colloidal solutions with the explicit dehydration of children can promote development of vascular hypervolemia with developing cardiac and vascular deficiency;
- in 37% of cases children were prescribed up to 5-6 medications at the same time and in 20% - more than 7-8 medications;
- only 56% children in the terminal stage were transferred to ALW;
- such medications as: diaretics, cardiac glycoside, colloidal solutions, vitamins, calcium and magnum medications and so on were unjustifiably prescribed.

Postmortem examination of died children

Practically all postmortem diagnosis coincided with clinical diagnosis. Probably it is due to insufficient knowledge of pathologists about pediatrics on site and also it can be explained with a lack of laboratories for good quality histopathology and microbiology testing of biopsy material of died children.

Analysis of the histories of cases of died children demonstrated that:

- postmortem examination of died children was made only in 23,.8% in the control and in 4.2% in the main group;
- in medical documentation of died children postmortem epicrisis are recorded not in a complete way, they do not have enough information about the circumstances and causes of death;
- in 30% of cases in the main group, in the map of a child development (form 112/y) there is no postmortem epicrisis, which leads to a conclusion on a low quality analysis of data about the death of children on site.

I. INTRODUCTION

The Kyrgyz Republic is situated in the northern-eastern part of Central Asia. Kyrgyzstan is a mountain country with the bigger part of its territory covered with mountains. The population of the Kyrgyz Republic as of the beginning of 2009 amounted 5 million 304 thousand people with the permanent population amounting 5 million and 276 thousand. Population of Kyrgyzstan is young in a demographic sense: at the beginning of 2008 children and teenagers constituted 33% of the total population, 59.0% - people of able to work age and 8.2% - persons above able to work age. More than a third part of the population (34.7%) lived in cities and about 2/3 (65.3%) – in villages. For the last years the most stable development of demographic processes was recorded in 2003-2006, which was characterized with increasing tempos of the population growth with a decreasing of a migration population outflow and an annual tempo of the population growth amounted 0.9-1.1%. In 2007 the lowest growth of the population was recorded which is connected to a growth of a migration outflow of the population of the republic. In 2008 the number of the country population increased by 51.8 thousand people or by 1%¹.

According to the data of the Ministry of Public Health of the KR there are 1627525 children at the age under 14 years old, including 101344 of children under 1 year old and 490001 under 5 years old in the republic.

First aid to the population is rendered by 79 centers of family medicine, 12 centers of general doctors' practice (CGDP), 678 groups of family doctors (GFD), 21 independently legal GFD and 960 feldsher and obstetric stations (FAP).

The government of the Kyrgyz Republic and Ministry of Public Health declare their adherence to the main principles of the National Program on the public health reform in the Kyrgyz Republic "Manas taalimi" for 2006-2010. Accomplishment of the MDG4 and MDG5: "Decrease of mothers and children mortality rate indices due to an increase of an evidence based medical services outreach" till 15 per 1000 live-born by 2015 was specified as an objective №1 in the section "Rendering of individual medical and public health services within the frameworks of priority programs".

During the first year of age more than three thousand children or 29-30 of children per 1000 born children die from various diseases, poisoning and traumas every year in the country. Till 2004 the national criteria of live-born and accordingly infant mortality had differences if compared with the recommended by the World Health organization (WHO), which considerably decreased the country index. In 2004 Kyrgyzstan transferred to international live-born and infant mortality criteria. After that ZAGS bodies started registration of new born infants with a low weight (from 500 till 1000 grams). According to an official data after introduction of new live-born criteria IM increased from 25.7% in 2004 till 29.7 in 2005 and stopped at a level of 27.1% per 1000 live-born during the period from 2005 till 2008 (diagram1).

¹ RMIC 2008

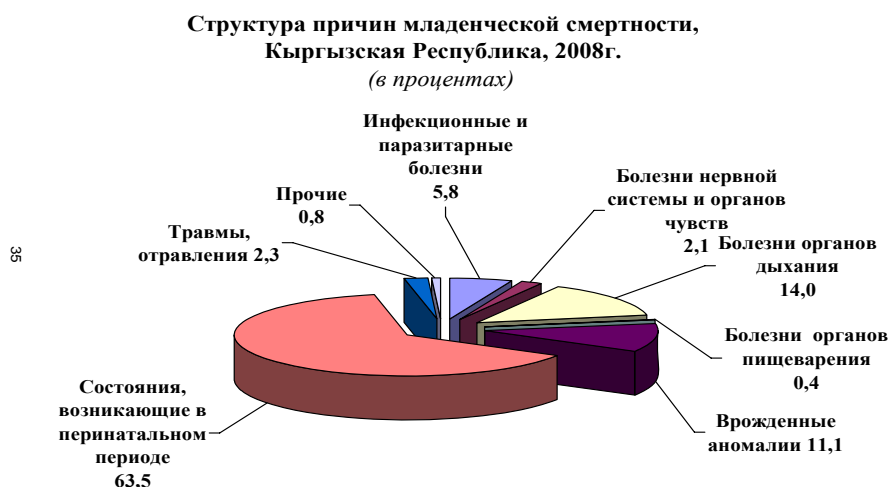
Diagram 1
Dynamics of infant and children mortality, Kyrgyz Republic



Diseases which emerge during the prenatal period occupy the main place in the structure of infant mortality (2007 – 60.0%; 2008 – 63.5%), respiratory diseases (2007 – 16.7%; 2008- 14.0%), congenital anomalies congenital anomalies (2007 – 11.3%; 2008 – 11.1%) and infection and parasitic diseases (2007 – 6.8%; 2008r – 5.8%), including third of intestinal infections. Children mortality rate amounted 31.5 per 1000 live-born (2007 – 35.3 -10.8%).

Diagram 2

Structure of infant mortality causes, Kyrgyz Republic, 2008
(in %)



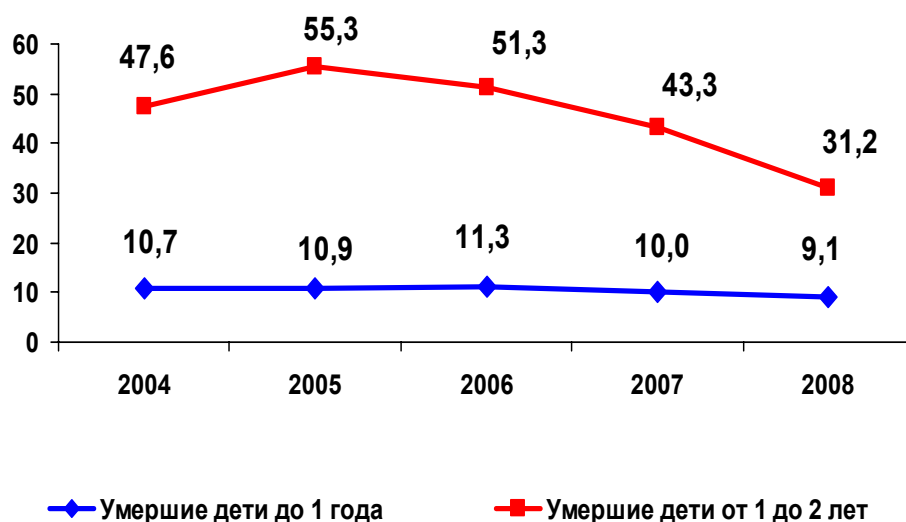
Conditions emerging in perenatal period (63.5) Traumas, poisoning (2.3) Other (0.8) Infection and parasitic diseases (5.8) Nurve system and sense bodies diseases (2.1) Respiratory diseases (14.0) Alimentary organs diseases (0.4) Congenital anomalies (11.1)

Big share of died new born infants with congenital anomalies, which has a certain tendency to growth (2000- 8.9 % and 2008 – 11.1%)² cause certain concerns. According to the MICS data (2006) the infant mortality rate in rural areas is in 1.4 times higher than in urban areas.

In spite of a comparative decrease of mortality the share of children mortality at home remains at the same high level (Diagram 3).

Home children mortality, Kyrgyz Republic, 2004-2008 (%)

**Смертность детей на дому,
Кыргызская Республика, 2004-2008гг. (%)**



till 2 years old

Children died at the age under 1 year old

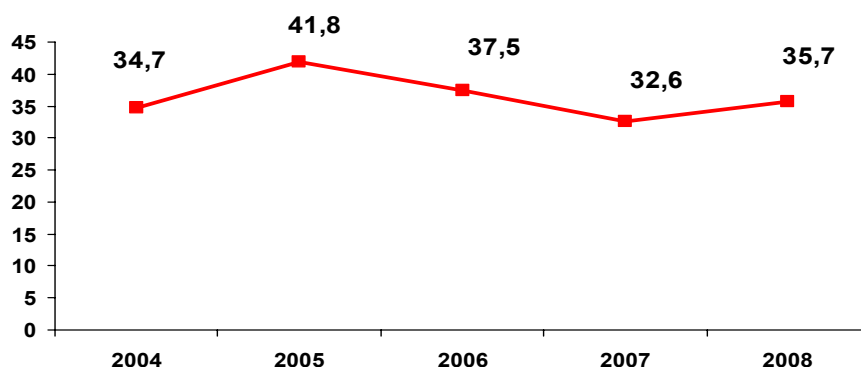
Children died at the age from 1

More than 30% of children at the age under 1 year old die during 24 hours after hospitalization to a hospital.

² RMIC, 2007 г.

Lethality of children under 1 year old who died during 24 hours, 2004-2008 (%)

**Досуточная летальность детей до 1 года,
Кыргызская Республика, 2004-2008гг. (%)**



Probably this is connected with a lack of parents' knowledge about dangerous diseases symptoms and late addressing for medical assistance,³ as well as with a nonqualified medical assistance rendering both at a hospital and GFD/FAP.

All the above mentioned determines the vitality of the survey conducting.

II. GOALS AND OBJECTIVES

Survey goal:

Study of social, medical and biological factors risk factors which led to death of children at the age under 2 years old at home and during 24 hours after hospitalization with a subsequent development of recommendations on children mortality decrease at home and at a hospital.

Survey objectives:

1. identification of social and medical and biological of risk mortality factors of children under 2 years old;
2. assessment of the volume and quality of medical service rendered to died children during a disease, which led to their death;
3. development recommendations on mortality decrease of children at the age under 2 years old at home and during 24 hours after hospitalization.

III. METHODOLOGY

Main survey stages:

1. Adjustment of all survey instruments - the working group adjusted the instruments (April-May 2009).
2. Preliminary piloting of all instruments – piloting was carried out from 17.06.2009 till 19.06.2009 in close to the city area not included into the main list of the covered by the survey areas.

³ The memorandum on the results of the country public health organizations activity for 2007 and objectives for 2008

3. Discussion with representatives of MoH of the KR of the results of a preliminary piloting, approval of the survey goals and objectives, areas selection criteria, survey timeframes and responsible officials (July 2009).
4. Conducting of the survey in the selected country areas (July-August).
5. Entry of the received outputs into the data base for processing (September).
6. Making of a preliminary report and discussion (October-November).
7. Preparation of a final report, findings presentation and conducting of a round table (November-December).

Areas selection criteria:

3 areas were selected for the survey conducting based on the following criteria:

1. Children mortality rate at the age under 2 years old at home and during 24 hours after hospitalization (2 areas (rayons) with the highest indices (main group) and 1 area with a relatively favorable situation with children mortality (control group) at the age under 2 years old) were selected;
2. Geographic location (areas were selected from the northern and southern regions of the republic).

The survey included all children who died at home and during the first 24 hours after hospitalization from January 2007 till December 2008 in the surveyed areas. According to the age category all died children were split in 2 groups: under 1 year old and from till 2 years old (see the table 1).

Table 1

Categories of children who died under 2 years old and were included into the survey

Group	Age group	Place of death
Main	Under 1 year old	At home
		At a hospital during the first 24 hours after hospitalization
	From 1 year old till 2 years old	At home
		At a hospital during the first 24 hours after hospitalization
Control	Under 1 year old	At home
		At a hospital during the first 24 hours after hospitalization
	From 1 year old till 2 years old	At home
		At a hospital during the first 24 hours after hospitalization

All covered by the survey died children were split into 4 categories depending on the age and place of death. Hence:

The first category - children under 1 year old, who died at home;

The second category - children under 1 year old, who died during the first 24 hours after hospitalization;

The third category – children from 1 till 2 years old, who died at home;

The fourth category - children from 1 till 2 years old, who died during the first 24 hours after hospitalization.

The provided by mothers information about the children who died at the age under 2 years old is confidential and due to that the names of the surveyed areas are not specified.

Data sources:

1. Questioning of mothers whose children died during the survey period– from 2007 till 2008. Questioning of mothers was carried out at home, in the event mothers were absent grandfathers, grandmothers, father of a died child or another family member, who nursed the child and knew the circumstances of the child's death were interviewed.
2. Medical documents of the died children were provided by the administrations of CFM and TH.

Survey mechanisms:

The survey was conducted based on the similar survey conducted in Romania "Socio-medical causes of death children under 5 years who died at home and during the first 24 hours after hospitalization". Final report. UNICEF. Bucharest 2005.

3 instruments were applied in the survey including the first and the second ones, which were developed by the working group and the questionnaire of the Romanian survey made the basis of the third instrument, which afterwards was adjusted to the regional peculiarities and the public health system of our country.

3 instruments were filled in for all children, who died at the age under 2 years old at a hospital.

I *instrument* (annex 1). With assistance of the first instrument assessment of rendering of the quality of medical service at the hospital level was made with the use of clinical protocols (Clinical protocol for a hospital level of public health. Part 2. Bishkek 2005)

The following documents of a child, who died during the first 24 hours after hospitalization, were subject to the analysis:

- a) delivery case history;
- b) new-born development case history
- c) child disease case history.

II *instrument* (annex 2). Assessment of the quality of rendered medical assistance at the outpatient level was made with the help of the second instrument using the clinical protocols at the primary public health level (ICDM program). The following documents of a child, who died at home, were subject to the analysis:

- a) outpatient supervision map of a pregnant women;
- b) outpatient child development map.

III *instrument* (annex 3). With assistance of the third instrument information about a settlement, child's mother and family, as well as the data on a died child via parents questioning and viewing of the status (social, economic and other) of the family and family members was collected.

Data collection

The data was collected by 2 teams of researchers consisting of 4 researchers. All researchers were trainers of the ICDM program, members of the working group

engaged in development of clinical protocols and guidelines who had practical experience of work both at outpatient and a hospital levels.

In each team the first researcher worked with the hospital level documentation of the children died at the age under 2 years old during the first 24 hours after hospitalization (delivery case history, new-born development case history, child disease case history).

The second researcher made assessment of died children medical documentation maintenance at the outpatient level (outpatient pregnant woman supervision map; outpatient child development map).

The third and fourth researchers collected data on a settlement, child's mother and family, as well as the information about a died child via parents' questioning and view of the condition (social, economic and other.) of the family and its members.

Visiting the areas teams of researchers received a list of children, who died at home and during the first 24 hours after hospitalization and their addresses. Researchers' teams interviewed mothers of dead children and collected information out of medical documentation of dead children, stored with the childhood coordinator responsible for CFM and TH. Researchers studied medical records, such as: maintenance and quality of supervision, correctness of prescribed medications, timeliness and completeness of doctor's and nurse's visits and vaccinations, as well as records on the death, evidence of mothers about the death of their child, laboratory tests and results of postmortem examination.

Prior to information collecting researchers got familiarized with the survey instruments and issues of development of interview conducting skills and issues of conversation with mothers of died children. There also were considered the ways of mothers' assuring in the fact that the provided by them information will remain confidential, as well as the data taken out of medical files of died children. Data collection team members could in detail explain to mothers the goal of an interview, confirming the fact that the interview goals was identification of the causes, which led to a death of child and assessments of needs of services rendering, as well as prevention of future deaths but not in condemning of criticism of someone's behavior. Prior to interviewing of mothers researchers explained the goal of their visit and received mothers' consent.

Data collection period was from August 3 till August 30, 2009.

Data processing and presentation

The data was processed in a computer with the use of software for medical statistics and analysis of the SPSS.

IV. SURVEY RESULTS

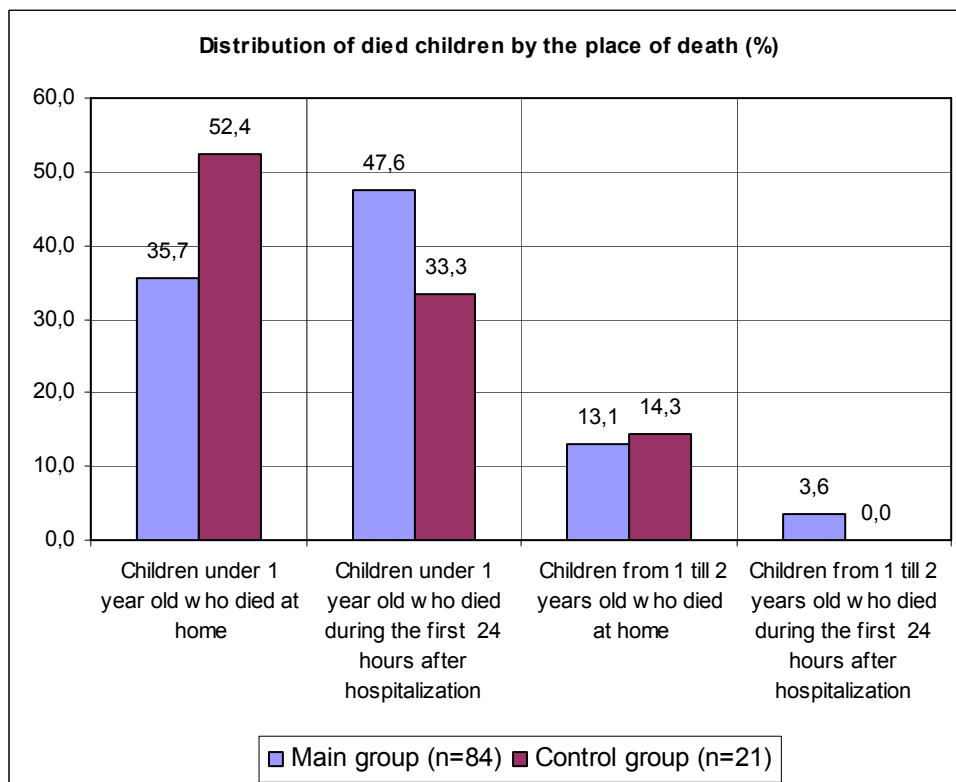
Section 4.1.General information

The survey covered cases of death of 108 children at the age under 2 years old, died at home and during the first 24 hours after hospitalization. During the process of work 3 children who died during the first 24 hours after hospitalization were excluded from the research because those children died at a hospital staying there for more than 24 hours. In spite of the fact that in the MPC reports they were included into the mortality of children who died during the first 24 hours after hospitalization.

The comparative analysis of the data demonstrated that the majority of children at the age under 1 year old of the control group died at home whereas in the main group the highest mortality is among children under 1 year old was reported during the first 24 hours after hospitalization.

Approximately the same number of children of both groups at the age from 1 till 2 years old dies at home. Mortality rate of children at the age from 1 till 2 years old, who died during the first 24 hours after hospitalization, was reported only in the main group.

Diagram. 5



As it was demonstrated in table 2 in the sample survey 7.5% of death of children at the age under 2 years old at home and during the first 24 hours after hospitalization happened in rayon centers and 92.5% were in rural areas.

Table 2

Administrative status of settlements in which the families of died children lived

Type of settlement	%
Rayon center	7.5
Village	92.5
Total	100.0

Section 4.2. Characteristics of communities in which died children lived

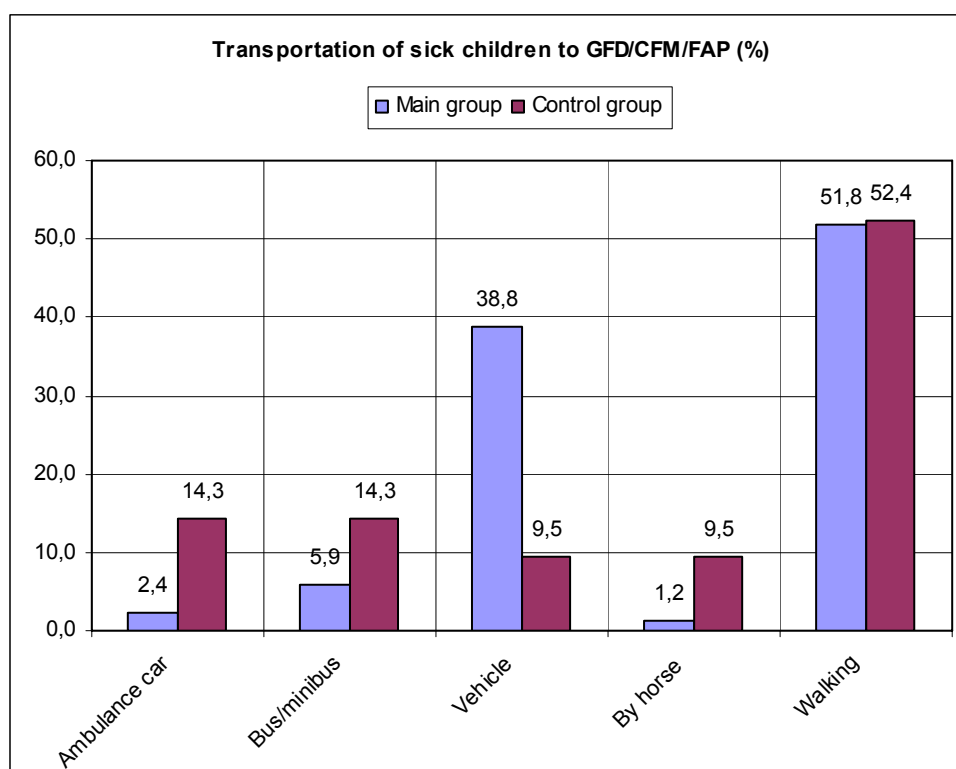
Characteristics of communities in which died children lived were collected via interviewing of mothers about the settlement infrastructure, communication means, as well a possibility of access to medical assistance services.

4.2.1. Settlement infrastructure

More than a half of mothers of both groups could reach the nearest CFM/GFD/FAP walking and about 50% of mothers reach a hospital by car.

Mothers of the control group had the biggest access to ambulance car (diagram. 6).

Diagram. 6



The comparative analysis of the condition of roads till CFM/GFD/FAP demonstrated that 80% of roads in the main group are earth roads, whereas in the control group 52.4% are asphalt roads. In addition in the control group 95.2% of mothers could reach hospitals using asphalt roads, which reduces the time of their arrival (table 3).

Table 3

Types of roads to CFM/GFD/FAP and hospitals (%)

Type of roads	Main group		Control group		Total	
	GFD/FAP	Hospital	GFD/FAP	Hospital	GFD/FAP	Hospital
Main asphalt roads	17.6	35.3	52.4	95.2	24.5	47.2
Country earth roads	80.0	62.4	47.6	4.8	73.6	50.9
Mountain paths	2.4	2.4	-	-	1.9	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

23.8% of interviewed mothers of the control group reported about existence of seasonal restrictions of access to the nearest MPO (mountain blocs, avalanches), at the same time it was mentioned only by 3.6% of mothers of the main group (Table 4).

Table 4

Snow blocs and avalanches parts (%)

	Main group	Control group	Total
Yes	3.6	23.8	7.6
No	96.4	76.2	92.4
Total	100.0	100.0	100.0

For the majority of mothers of the control group the road till the nearest GFD/FAP and hospital takes less than 30 minutes.

As it is demonstrate in Table 5 about a half of the interviewed mothers of the main group also can get to the nearest hospital for less than 30 minutes and 1/3 of mothers spend for that up to an hour and 15.3% of mothers spend from 1 till 3 hours.

Table 5

Time spent on getting to CFM/GFD/FAP and hospital (%)

	Main group		Control group		Total	
	GFD/FAP	Hospital	GFD/FAP	Hospital	GFD/FAP	Hospital
Less than 30 minutes	78.8	49.4	90.5	61.9	81.1	51.9
From 30 minutes up to 1 hour	20.0	35.3	9.5	33.3	17.9	34.9
From 1 up to 3 hours	1.2	15.3	-	4.8	9	13.2
Total	100	100	100	100	100	100

77.6% of mothers of the main group had mobile phones and in the control group a half constituted mothers (47.6%) who had home telephones, which are more reliable in contrast to a mobile communication where the outreach zone is determined by availability of base stations, peculiarities of a locality terrain and a standard of mobile communication (Table 6).

Table 6

Availability of telephone communication (%)

	Main group	Control group	Total
Stationary	7.1	47.6	15.1
Mobile	77.6	42.9	70.8
Public telephones	4.7	4.8	4.7
Do not know/respond	10.6	4.8	9.4
Total	100	100	100

4.2.2. Accessibility of ambulance car (O3) services

52.9% of respondents of the main group and 42.9% of the control group respondents had access to medical services of CFM/GFD in the village of their residence, 35.3% and 19% accordingly had access to a FAP (Table 7).

Territorial hospital accessibility was stated only by 9.4% of respondents in the main group and 33.3 % of respondents in the control group. 71.4% of respondents had

drug units in the village of their residence in the control. and 41.1% of respondents in the main group.

Table 7

Types of medical organizations in a settlement (%)

Types of medical organizations	Main group	Control group	Total
TH	9.4	33.3	14.2
Maternity home	-	4.8	0.9
CFM/GFD	52.9	42.9	50.9
FAP	35.3	19.0	32.1
Drugstore	41.1	71.4	47.2
Other	2.4	-	1.9
Total	100.0	100.0	100.0

Hence:

- majority of mothers of both groups could reach the nearest GFD/FAP and a hospital walking for not less than 30 minutes and 1/3 of mothers – up to an hour, at the same time for 1/6 part of mothers of the main group it took them from 1 till 3 hours to get to a hospital;

- mothers of the control group could use the ambulance car services in 5 times more than mothers of the main group;

- 77.6% of mothers of the main group had mobile phones and in the control group 47.6% of mothers had stationary phones, which are more reliable;

- majority of families of both groups had access to medical assistance services and families of the control group enjoyed the benefit of access to a drugstores network.

Section 4.3. Characteristics of families, in which died children lived

The section describes information about the family size, its social and economic status, drinking water accessibility.

4.3.1. Family size

About a half of covered with the survey families consist of 4-6 members (Table 8).

Table 8

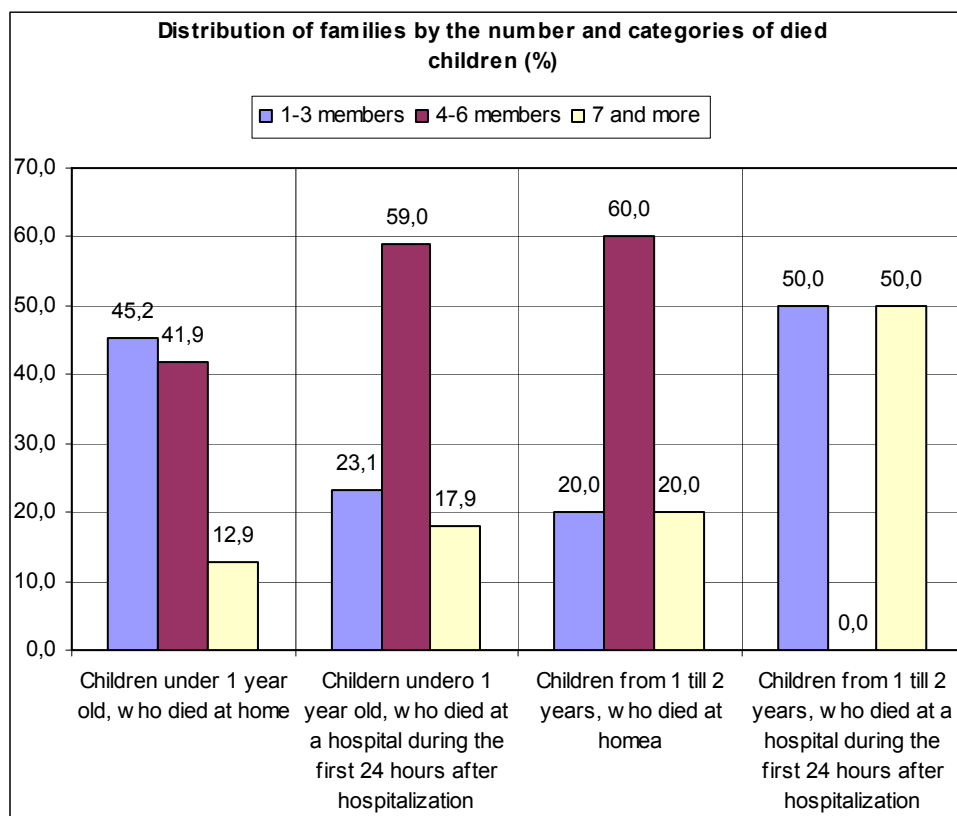
Family size, not including the died child (%)

Number of members	Main group	Control group	Total
2-3 members	16.5	19.0	17.0
4-6 members	49.4	57.1	50.9
7 and more members	34.1	23.8	32.1
Total	100	100	100

45.2% cases of death of children at the age under 1 year old at home recorded that there were up to 3 members in their families. Hence the first or the second child dies, whose death might be connected with insufficient mother's knowledge and nursing of the child.

Mortality of at the age under 1 year old during the first 24 hours after hospitalization and children from 1 till 2 years old at home in the majority of cases was recorded in the families consisting of 4-6 members which can be connected with existence of other small children and lack of mother's time and attention (diagram.7).

Diagram.7



4.3.2. Social and economic status of a family

For assessment of social and economic status of a family information was collected about home objects, land parcel, communication means and vehicles.

Continuous use objects and some services accessible for families of both groups, are presented in Table 9.

Practically all households had a TV set and 80% of families of both the main and control groups had land parcels. More than a half of families of the control group had a possibility to listen to the radio and only 28.5% of families of the main group. Both groups had cattle and agricultural machinery in the equal amount. About 90% of mothers of the main group had mobile phones and only 61.9% of mothers had them in the control group.

Table 9

Social and economic status of households (%)

Товары	Main group	Control group	Total
1.Vehicle	35.3	23.8	33.0
2.Bicycle	26.2	14.3	23.8
3.Moto cycle	11.9	-	9.5
4.TV set	98.8	100.0	99.1
5.Radio	28.6	52.4	33.3
6.Music center	14.3	19.1	15.2

7. Refrigerator	28.6	33.3	29.5
8. Stationary telephone	7.1	23.8	10.5
9. Mobile phone	89.3	61.9	83.8
10. Own house/apartment	68.2	85.7	71.7
11. Land parcel	80.0	80.9	80.2
12. Agricultural machinery	4.7	4.8	4.7
13. Cattle	74.1	76.2	74.5

All households' objects were summed up to develop families' social and economic indicator. Social and economic indicator was developed based on defining of equal points (1 point) in case of owning of each of the following household objects: a refrigerator, radio, TV set, computer, stationary telephone communication, mobile phone, agricultural machinery. Received by each family points vary within the interval from 0-10 points. Those points were necessary for classification of families according to 4 levels: very low level when a family owned 0-1 objects, low when a family owned 2-4 objects, average when a family owned 5-7 objects and high when a family owned 8-10 objects.

In general based on the calculations it is evident that 1.2% of mothers of the main group and 9.5% of mothers of the control group have very low social and economic status (they have none of the mentioned household objects or as a maximum one object), 28.2% and 23.8% accordingly have low social and economic status (having 2-4 household objects), 38.8% and 33.3% accordingly have average social and economic status (more than 5-7 household objects). 31.8% of families of the main and 33.3% of families of the control group have very high social and economic status (more than 8-10 household objects).

As it is demonstrated in diagram. 8 the compared groups have approximately the same social and economic status of households.

Diagram. 8

Distribution of families by social and economic status (main group) in %



Very low Low Average High

Distribution of families by social and economic status (control group) in %

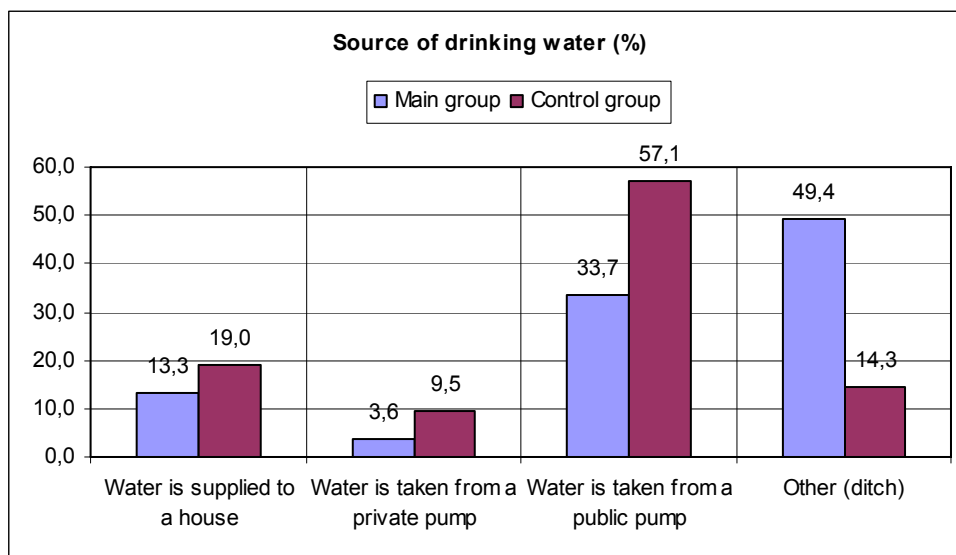


Very low Low Average High

4.3.3. Living conditions of the covered by the survey families

Approximately half of families of the main group use portable water and during summer time they use water from ditches. Majority of families of the control group use water pumped for public purposes (diagram. 9).

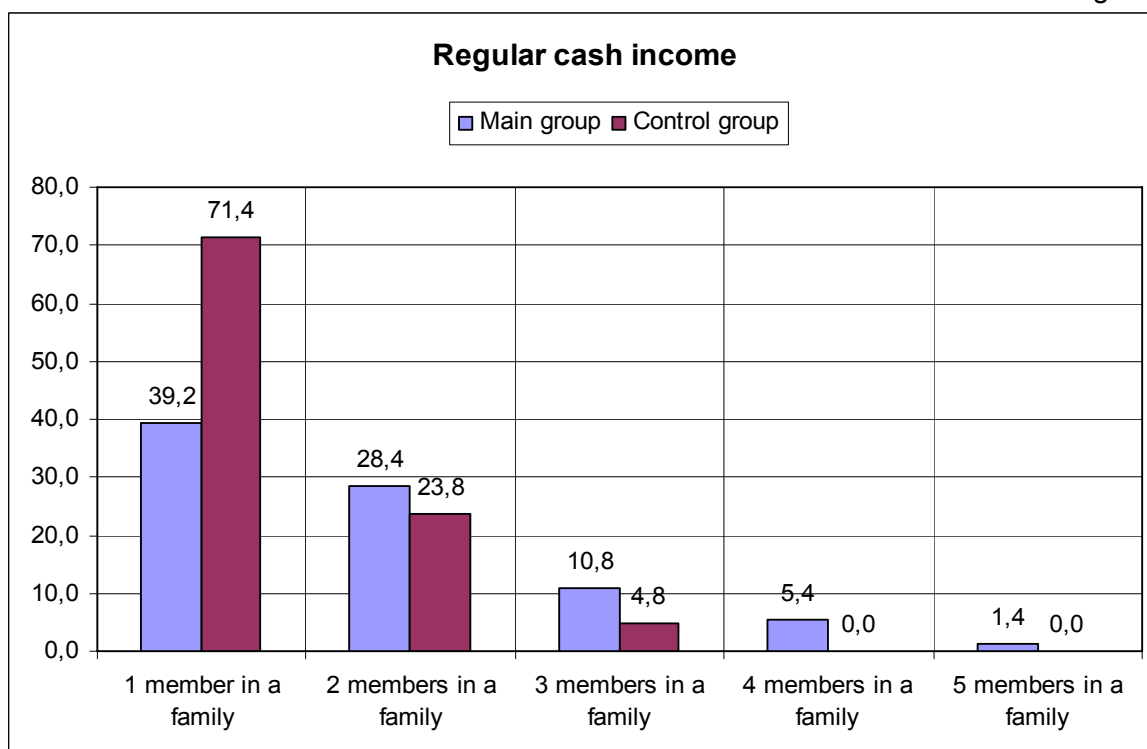
Diagram. 9



4.3.4. Family income

Diagram 10 presents sources of regular income by the place of residence. It is remarkable that only 1 family member had a regular income in 40% of cases in the main group and more than 70% in the control group. 28.4% and 23.8% had regular salary in the family consisting of 2 members accordingly.

Diagram. 10



The received amount of income was the same both in the main and control groups (Table 10).

Table 10

Amount of regular family income

	Main Group	Control group	Total
Number of family members who receive regular cash amounts during 6 months	1.57	1.33	1.52
Received amount	2436.34	2588.90	2471.16

Hence:

- 45.2% of death cases at home of children at the age under 1 year old reported that there up to 3 members in their families and hence, the first or the second child dies more frequently. Probably it is connected with insufficient mother’s knowledge and nursing;
- mortality of children at the age under 1 year old during the first 24 hours after hospitalization and children from 1 till 2 years old of who died at home in the majority of cases was reported in the families consisting of 4-6 members, probably it is explained with existence of other small children and lack of mother’s time;
- compared groups have approximately the same social and economic status of households;
- approximately half of families of the main group used water from water ditches.

Section 4.4. Characteristics of parents

The section contains information about parents: age, occupation and education.

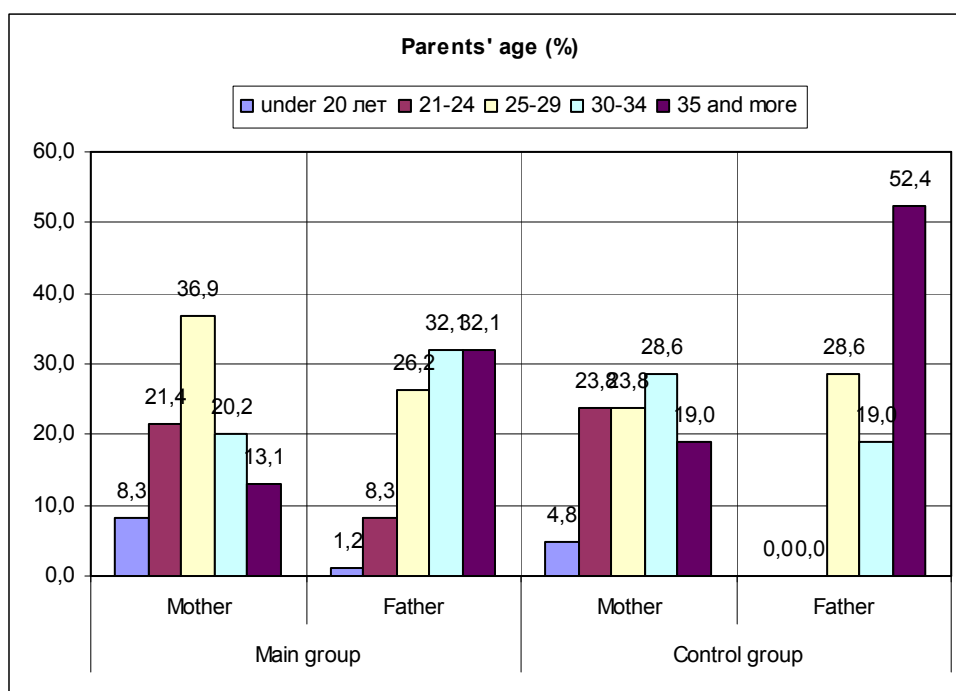
4.4.1. Mothers’ age

Age of mothers is a potential risk factor of infant mortality. Mothers who give birth to children at the age under 18 and after 40 years old give the highest infant maternity rates.

For instance: according to diagram 11 8.3% and 4.8% in the main and control groups were mother at the age under 20 years old and 20.2% and 28.6% of mothers were at the age of 30-34 years old.

In general an average age of mothers of both groups was 25-29 years old where the minimum age was 16 years old and the maximum – 47 years old.

32.1% of fathers were at the age older than 30 years old in the main group and 52.4% of fathers were older than 35 years old in the control group.



4.4.2. Parents' occupation

Majority of mothers in the compared groups were unemployed during the survey. 1/4 part of fathers in the main group were small entrepreneurs (selling of rice, vegetables and fruit), whereas 1/3 part of fathers in the control group were engaged in farming. At the same time approximately the same number of fathers (1/3) did not have job.

Table 11

Mother's and father's occupation (%)

Place of work	Main group		Control group		Total	
	Mother	Father	Mother	Father	Mother	Father
Public servant	12.2	7.2	14.3	5.0	12.6	6.8
Private entrepreneur (with a patent)	2.4	4.8	-	10.0	2.0	5.9
Self-employed without a patent (trader, craftsman and other)	3.7	26.5	9.5	5.0	4.9	22.3
Farmer (agricultural worker)	6.1	16.9	4.8	30.0	5.7	19.3
Temporary unemployed/housewife	70.7	36.1	71.4	40.0	70.9	3,9
Pensioner	1.2	7.3	-	5.0	1.0	6.8
Law enforcement officer	-	1.2	-	-	-	1.0
Other	3.7		-	5.0	2.9	1.0
Total	100	100	100	100	100	100

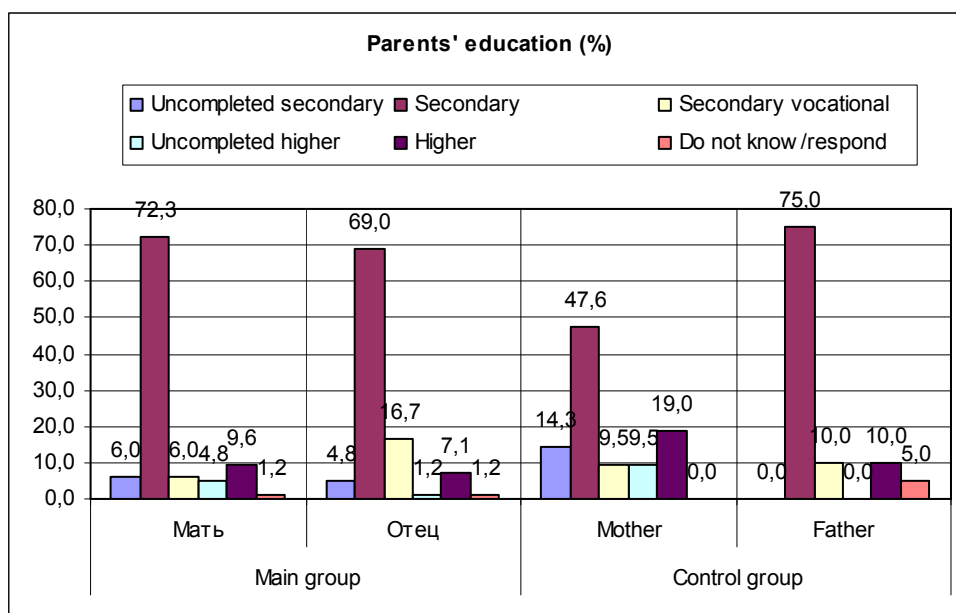
4.4.3. Education of parents

Level of parents' education is one of the main indices influencing the health and survival of a child. Low level of parents' education is one of the risk factors, which promotes infants' death and death of children in the early age.

As it is demonstrated in diagram 12 the majority of mothers of both groups had a completed secondary (school) education – 72.3% in the main group and 47.6% in the control group. Uncompleted secondary education was in more than 2 times more frequent among mothers in the control group against mothers in the main group (14.3% and 6.0% accordingly). Mothers with a higher education amounted 9.6% in the main and 19% - in the control group.

About 70% of fathers in both groups had a completed secondary education at the same time 16.7% of fathers in the main group and 10% in the control group had secondary vocational education. Only 4.8% of fathers in the main group had incomplete secondary education.

Diagram 12



Hence:

- in general an average age of mothers in of both groups was 25-29 years old;
- majority of mothers in the compared groups were unemployed during the survey. 1/4 part of fathers in the main group were engaged in entrepreneurial activity (sale of rice, vegetables and berries) and 1/3 part of fathers of the control group were engaged in farming. At the same time approximately the same number of fathers (1/3) did not have job;
- majority of mothers of the main group and fathers of the control group had a completed school education, whereas higher education had more parents of the control group.

Section 4.5. Risk factors from the side of parents

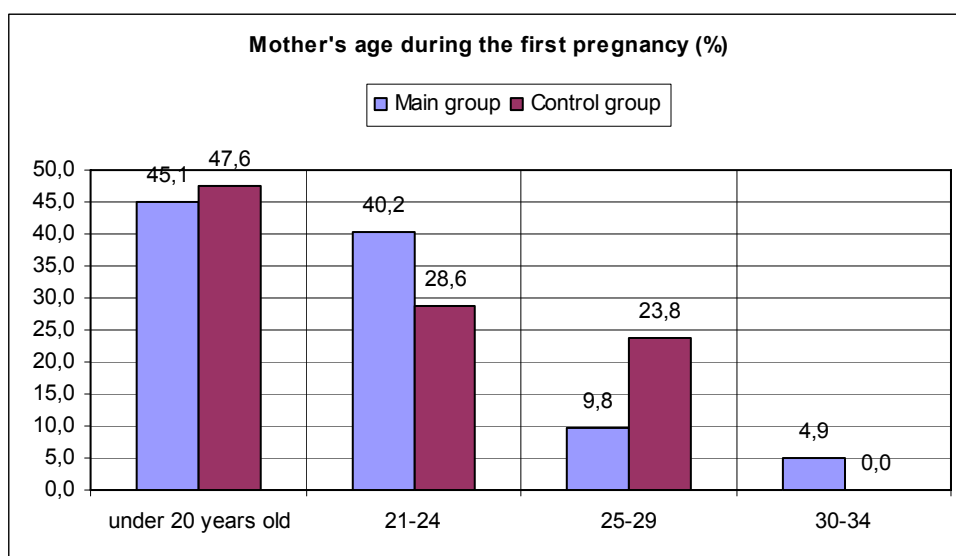
4.5.1. Age and the first pregnancy

In the entire sampling an average age of mothers a the time of the first pregnancy was 20.5 years old, when the earliest pregnancy age was 16 years old and the latest - 33 years old (diagram. 13).

Approximately half of mothers of both groups were under 20 years old and about 5% of mothers of the main group were 30-34 years old when they became pregnant for the first time, which is a risk factor both for the child and the mother. More than 40% of

mothers of the main group the first pregnancy happened at the age of 21-24 years old and at the same time 1/3 of mothers of the control group had the first pregnancy at the age from 21 till 29 years old.

Diagram. 13



About 50% of mothers of both groups, included in the survey, were healthy. 14.1% of mothers of the main group and 9.5% of mothers of the control group had renal diseases and also in the control group mothers more frequently had anemia (14.3%), there also were hepatitis and psychoneurological diseases (Table 12). But those facts became known from mothers and that is why we cannot fully rely on the data. About 50% of mothers in both groups, included into the survey, were healthy.

Table 12

Condition of mother's health (%)

Состояние здоровья		Main group	Control group	Total
1	Healthy	51.8	38	49
2	HTN	4.7	4.7	4.7
3	hepatitis	2.4	4.7	1.9
4	endocrine diseases	0	4.7	0.9
5	Renal diseases	14.1	9.5	13.2
6	Anemia	12.9	14.3	13.2
7	Respiratory diseases	2.4	0	21.9
8	psychoneurological diseases	4.8	9.5	5.7
9	gynecological diseases	4.8	0	3.8
10	ear, nose, throat diseases	0	4.7	0.9
11	skin diseases	0	4.7	0.9
12	brucellosis	1.2	0	0.9

4.5.2. Bad habits of fathers

Majority of fathers of both group had a bad habit of smoking. At the same time in the control group alcohol was drunk in 1.5 times more frequently that in the main group (Table 13).

Table 13

Bad habits (smoking and school drinking) fathers (%)

Bad habits	Main group	Control group
Smoking	54.1	66.7
Alcohol drinking	37.6	66.7

Hence:

- approximately half of mothers of both groups was under 20 years old and about 5% of mothers of the main group were at the age of 30-34 years old when they had the first pregnancy, which is a risk factor for both a child and a mother;

- renal diseases are more frequent among mothers of the main group. Approximately the same number of mothers of both groups suffered from anemia. Besides, mothers of the control group had more cases of hepatitis and psychoneurological diseases. But those factors became known from mothers, that is why we cannot fully rely on the information

- majority of fathers of both groups had a habit of smoking. At the same time in the control group alcohol was consumed in 1.5 times more frequently than in the main group.

Section 4.6. Antenatal visits of MPO

The benefits of antenatal visits of medical personnel aimed at infant mortality prevention are well known. Antenatal visits and timely implementation of MP recommendations favorably influence the health of both new born infants and mothers.

91.5% of mothers were registered during their pregnancy by a family doctor/feldsher and about a half of women of both surveyed groups were registered prior to a 12-week pregnancy period. At the same time 13.6% of pregnant women in the main group were registered during 21-27 weeks pregnancy period.

Table 14

Registration at a GFD/FAP (%)

	Pregnancy period	Main group	Control group	Total
1	Prior to 12 weeks	48.5	61.1	51.2
2	12-20 weeks	34.8	27.8	33.3
3	21-27 weeks	13.6	5.6	11.9
4	28-36 weeks	3.0	5.6	3.6
Total		100.0	100.0	100.0

In both groups the majority of mothers visited GFD/FAP 5 и more times during their pregnancy. At the same time it is necessary to take into account the fact that some mothers recollected the number of antenatal visits with difficulty.

Table 15

Antenatal mothers' visits to GFD/FAP (%)

	Number of visits	Main group	Control group	Total
1	1-2 times	15.9	11.1	14.8
2	2-5 times	33.3	61.1	39.5
3	More than 5	49.2	27.8	44.4

	times			
4	Not once	1.6	-	1.2
	Total	100.0	100.0	100.0

4.6.1. Pregnancies outcome

1/4 part of mothers of the control group reported miscarriages whereas still-born had only mothers of the main group (Table 16).

Table 16

Pregnancies outcome (%)

		Main group	Control group	Total
1	miscarriages	14.5	25.0	16.3
2	Still-born	5.7	-	4.5
3	abortions	66.7	57.1	64.5

The majority of mothers of both groups had self-dependent deliveries and also partus maturus.

Table 17

Deliveries (%)

Delivery	Main group	Control group	Total
Self-dependent	96.4	90.0	95.2
Cesarean section	3.6	10.0	4.8
Total	100.0	100.0	100.0

20% of children of the control group were born prematurely, which could be a risk factor and influence the clinical course (Table 18).

Table 18

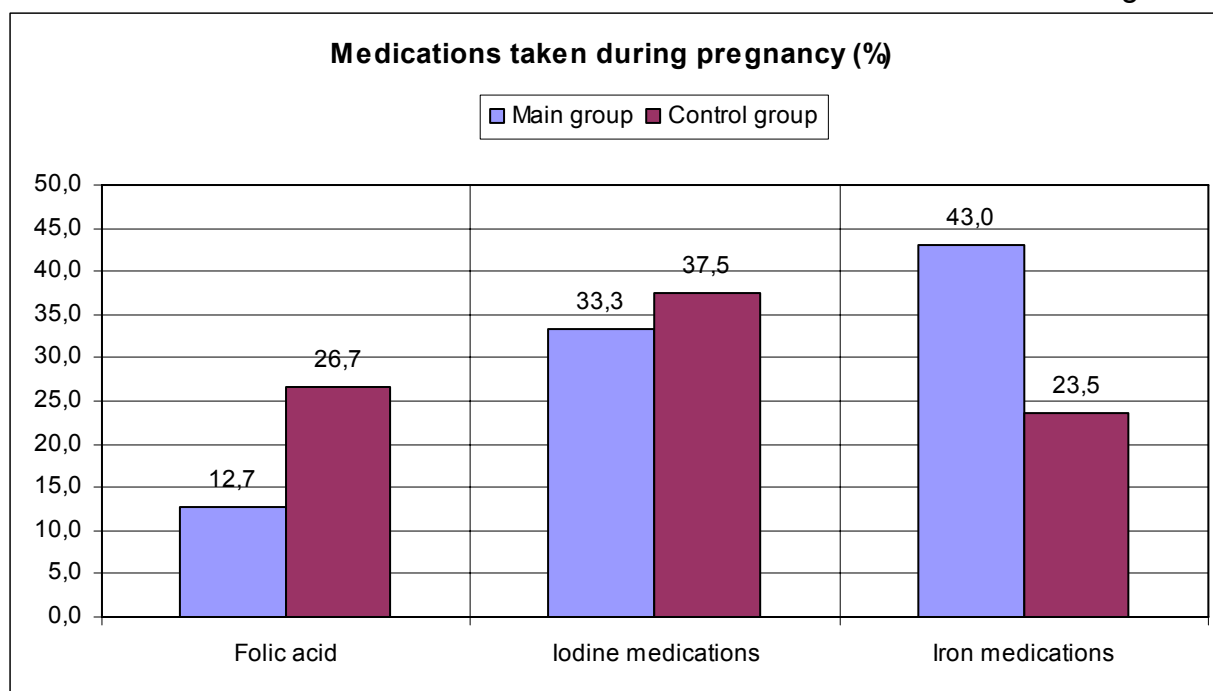
Deliveries outcome (%)

Delivery	Main group	Control group	Total
partus maturus	85.9	80.0	84.8
premature	12.9	20.0	14.3
overmature	1.2	-	1.0
Total	100.0	100.0	100.0

According to the clinical protocol pregnant women must take folic acid and iodine medications during the first term of pregnancy.

As it is demonstrated in diagram 14 only 12.7% of mothers took folic acid during pregnancy under 12 weeks in the main and 26.7% - in the control group and approximately 1/3 of mothers of both groups took iodine medications during pregnancy (33.3-37.5%).

Iron medications took 43% of mothers of the main group and 23.5% of mothers of the control group during pregnancy.



Practically more than 60% of death of children in both compared groups were with children from the I-III pregnancy whereas 24.4% of children were from the I pregnancy in the main group and 35% were from the II pregnancy in the control group. In the majority of cases children died after the 1 and the 2 deliveries, which might be connected with insufficient mothers' knowledge about nursing a sick child and lack of knowledge about dangerous symptoms of diseases.

Table 19

Number of died children depending on the number of deliveries (%)

Delivery by number	Main group	Control group	Total
I	24.4	15.0	22.7
II	2.1	35.0	23.6
III	16.7	20.0	17.3
IV	18.9	15.0	18.2
V	12.2	5.0	10.9
VI	3.3	-	2.7
VII	2.2	10.0	3.6
IX	1.1	-	0.9
Total	100.0	100.0	100.0

Hence:

- 91.5% of mothers were registered by a family doctor/feldsher during their pregnancy. More mothers of the control group got registered under 12 weeks of pregnancy and 1/3 of mothers of the main group – during the period from 12 till 20 weeks. At the same time 13.6% of pregnant women of the main group got registered later than 21 weeks of their pregnancy;
- 20% of children of the control group were prematurely born, which can be a risk factor and influence their clinic course;
- only 12.7% of mothers of the main group took folic acid during the period of pregnancy under 12 weeks and 26.7% of the control group took folic acid and

approximately 1/3 of mothers of both groups (33.3-37.5%) took iodine medications during pregnancy. More mothers of the main group took iron medications;
 - practically more than 60% of deaths in both compared groups happened with children from 1-3 pregnancy.

Section 4.7. Risk factors from the side of a child

Risk factors from a child's side include child's early age, low eight and complications in delivery.

4.7.1. Age of children at the moment of death

60% of children under 1 year old in the control group and 47.6% of children in the main group died at the age from 3 till 9 months. At the same time of 15% children of the control group died during newborn period. In the main group death of children (17.9%) at the age from 12 – 18 months prevailed over the same deaths in the control group, which might be due to registration of children who died under the age under 1 year old as died at the age from 1 till 2 years old (Table 20).

Table 20

Distribution of died children by the age in months (%)

Age (months)	Main group	Control group	Total
Under 1	7.2	15	8.7
1-3	19	0	15.4
3-6	20.2	30	22.1
6-9	27.4	30	27.9
9-12	5.9	10	6.7
12-18	17.9	5	15.4
18-25	2.4	10	3.8
Total	100.0	100.0	100.0

The majority of children under 1 year old died at home and during the first 24 hours after hospitalization at the age from 3 till 9 months. It might be explained with physiological peculiarities of a child's organism and a number of factors of the environment. As it is demonstrated in the Table 21 new-born infants die 2 times more frequently at home (out of 9 new born infants 6 died at home) than at a hospital which might be due to underestimation of the gravity of a new-born infant condition prior to discharge from a maternity home and poor continuity between maternity homes and CFM and also inside GFD and FAPs.

For instance:

Child E. 20 days. After discharge from a maternity home mother and her child went to another village to he mother. She went back in 20 days with a sick child and the same time the child died at home.

Child K. 8 days. After discharge from a maternity home the child was supervised by a district MP. The child dies on the eighth day at home.

Child C. 27 days. The child was not examined by a district doctor not a single time. He died at home.

Mortality in the third category of died children is two times higher at the age from 12 till 18 months, that at the age from 18 till 24 months. High mortality of children in the age confirms once again an assumption that children who died at the age under 1 year old were registered as children who died at the age from 1 till 2 years old.

For instance:

Child 3, born on 23.01.2006, according to the medical documentation he died on 31.01.2007 whereas the interview with mother and father demonstrated that a child actually died at home on 10.11.2006.

Child O, born on 27.12.2005, according to the medical documentation died at home on 16.01.2007 whereas the interview with mother showed the child died in September 2006 when a child was 9 months.

Table 21

Distribution of died children by categories of death (%)

Age in months	Children who died at home at the age under 1 year old	Children under 1 years old, who died during the first 24 hours after hospitalization	Children at the age from 1 till 2 years old who died at home	Children at the age from 1 till 2 years old who died during the first 24 hours after hospitalization	Total
Under 1	13.6	5.9	-	-	7.9
1-3	18.1	23.5	-	-	17.7
3-6	20.4	29.4	-	-	21.3
6-9	38.6	31.3	-	-	29.2
9-12	9.2	9.7	-	-	7.9
12-18	-	-	66.7	100.0	11.5
18-24	-	-	33.3	-	4.5
Total	100.0	100.0	100.0	100.0	100.0

4.7.2. Children gender

As it is evident from Table 22 children mortality in of both compared groups prevails among boys – 56.4% and 43.6% accordingly.

Table 22

Distribution of children by gender (%)

Gender	Main group	Control group	Total
Boys	55.6	60	56.4
Girls	44.4	40	43.6
Total	100.0	100.0	100.0

Distribution of died children by gender depending on categories demonstrated that in the I category cases of girls' death predominate whereas in the II category cases of boys' predominate. In the III category of died children cases of girls' death almost 2 times more in number than boys' death cases (Table 23).

Table 23

Distribution of children by gender depending on the category (%)

Gender	Children who died at home at the age under 1 year old	Children under 1 years old, who died during the first 24 hours after hospitalization	Children at the age from 1 till 2 years old who died at home	Children at the age from 1 till 2 years old who died during the first 24 hours after hospitalization	Total
Boys	35.9	53.1	9.4	1.6	100.0
Girls	42.9	36.7	18.4	2.0	100.0
Total	38.9	46.0	13.3	1.8	100.0

4.7.3. Weight when born

It is known that children who have low weight are more exposed to unfavorable environment impact. For instance: the comparative analysis demonstrated that 22.5% of dead children in the main group and 12.5% of children in the control group had low weight (Table 24).

Table 24

Weight when born (%)

Weight when born	Main group	Control group	Total
Was born with the weight less than 2500 gr	22.5	12.5	16.7
Was born with the weight more than 2500 gr	77.5	87.5	83.3
Total	100.0%	100.0	100.0

As it is demonstrated in Table 25. approximately the same number of died children of the I and II categories had low weight less than 2500 gr. In the III category death at home was recorded of children with the weight when born more than 2500 gr, whereas in the IV category of died children the number of died children was the same irrespective of the weight.

Distribution of died children by categories of death and weight when born (%)

Weight when born	Children who died at home at the age under 1 year old	Children under 1 years old, who died during the first 24 hours after hospitalization	Children at the age from 1 till 2 years old who died at home	Children at the age from 1 till 2 years old who died during the first 24 hours after hospitalization
Was born with the weight less than 2500 gr	17.7	19.6	0	50
Was born with the weight more than 2500 gr	82.3	80.4	100	50
Total	100.0	100.0	100.0	100.0

4.7.4. Condition of health of new born infants

In the main group the majority of died children (92.7%) were discharged from a maternity home with a diagnosis: healthy. At the same time in the control group 26.3% of children had CDM and other diseases.

Table 26

Health condition of new-born in discharge from a maternity home (%)

Condition of health		Main group	Control group	General
1	Healthy	92.7	73.7	89,.1
2	Have congenital development anomalies	4.9	10.5	5.9
3	Have other diseases	2.4	15.8	5.0
	Total	100.0	100.0	100.0

Delivery complications with the child in the form of asphyxia were more frequent (30%) in the control group (Table 27).

Table 27

Delivery complications. Asphyxia (%)

Asphyxia	Main group	Control group	Total
Yes	22.1	30.0	23.6
No	77.9	70.0	76.4
Total	100.0	100.0	100.0

Hence:

- 60% of children under 1 year old in the control group and 47.6% of children in the main group died at the age from 3 till 9 months. At the same time 15% of children of the control group died during new-born period. In the main group death of children at the age of 12 – 18 months prevailed, which might be connected with registration of children, who died at the age under 1 year old as died at the age from 1 till 2 years old;
- new-born die 2 times more at home than at a hospital it might be connected with underestimation of the gravity of new-born prior to a discharge from a maternity home and bad continuity between a maternity home and CFM, and also inside GFD and FAPs;
- mortality of children in both compared groups prevails among boys;
- low weight in the majority of cases had dies children in the main group;
- in the control group a quarter of children when discharged from a maternity home had CDM and other diseases and other child delivery complications in the form of asphyxia.

Section 4.8. Child supervision at CFM/GFD/FAP

As it is demonstrated in Table 28 in reviewing of a child development map it was found out that for the last 6 months mothers visited GFD/FAP 4 times in the main and 6 times the control groups. 90% of mothers of both groups identified vaccination and anthropometric measurements as the reason for visiting GFD/FAP. Though the majority of died children were at the age under 1 year old, the number of visits было only 4-5 times and a family doctor made the least number of examinations. In the majority of

cases examinations were made by a nurse who mainly invited children for vaccination and anthropometric measurements. Practically 67% of died children cases had a nurse's and less frequently doctor's record in the child development map about the fact that a home visit was not less than a week before a child's death.

Table 28

Average number of visits of mother with child to GFD/FAP

Average	Main group	Control group	Total
Visits during the last 6 months	4.4	6.7	4.8
Visits during 12 months	5.2	5.7	5.3

Only during 38.1% visits of the main group and 20% of the control group medical personnel assessed dangerous symptoms of diseases and correctly classified approximately 1/4 part of died children in both groups. Practically all children of the control group received the first doze of antibacterial medications prior to sending to a hospital and only a third part of children received it in the main group (Table 29).

Table 29

Assessment of recommendations of ICDM MP program

		Main group	Control group	Total
1	Assessment of general dangerous symptoms	38.1%	20.0%	34.6%
2	Whether they were classified correctly	21.1%	25.0%	21.7%
3	Antibiotics were prescribed prior to sending to a hospital	33.3%	100.0%	42.9%

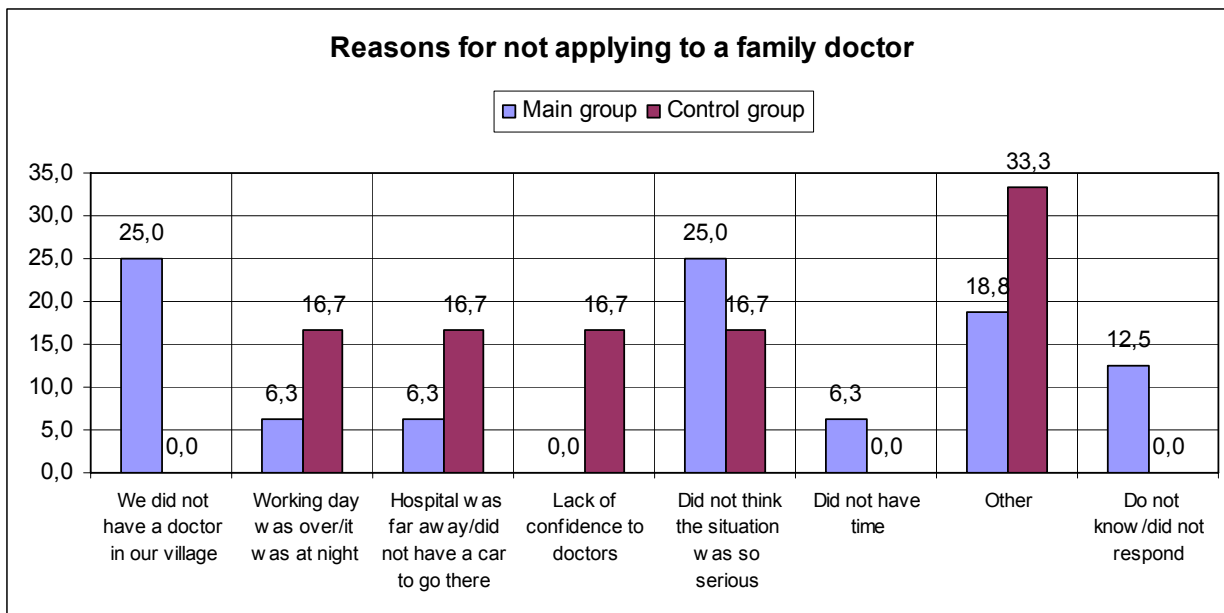
Comparative analysis of the child development map demonstrates that the majority of family doctors do not carry out regular prophylactic and medical attendance of children of the early age, with an exception for the initial prophylactic and medical attendance of a new-born after discharge from a maternity home. Interviews of mothers demonstrated that regular prophylactic and medical attendance made by a nurse in mainly connected with the vaccination schedule and visits to sick children were made only in 30% of cases and only 10% of active visits were made by doctors.

In two cases children were not timely examined by medical personnel of the primary level due to a lack of continuity between CFM a maternity home. As a result one child died at the age of 8 days at home and another child of the main group died at the age of 6 days during the first 24 hours after hospitalization.

In respond to the question "Why did not you call the ambulance in case of worsening of a child's condition?" the responds were different (diagram 15).

One quarter of mothers of the main group did not apply MP because there was no family doctor in their village and the same number of mothers did not think that the condition of their child was so grave and 1/3 of mothers of the control group did not pay special attention to the child condition thinking that the diseases will end by itself.

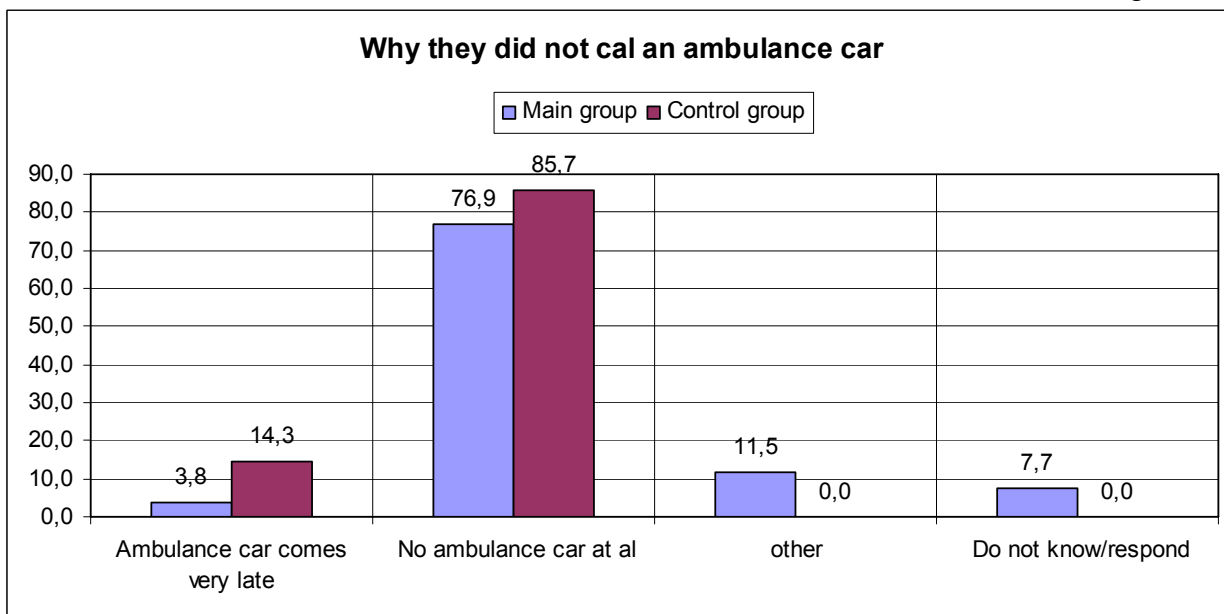
Diagram. 15



No doctor in their village The working day was over/it was night The hospital is far away/no car to go there Do not trust doctors Did not think the situation was so serious No time Do not answer./respond

Interview of mothers about a failure to call an ambulance car demonstrated that 76.9% main и 85,7% of mothers of the control group referred to a lack of an ambulance car service in the village of their residence (diagram.16).

Diagram.16



As it is demonstrated in Table 30 71.6% of children of the main group and 57.1 % of the control group slept in beshik. In the main group about 15.6% of cases of death of children at home occurred when a child was in beshik (out of 32 of children, who died at the age under 1 year old at home, 5 children died in beshik).

Table 30

Where and with whom a child slept (%)

	Main group	Control group	Total
One in the room	3.7	-	2.9
In beshik	71.6	57.1	68.6
Together with a mother/parents	23.5	42.9	27.5
Together with other people	1.2	-	1.0
Total	100.0	100.0	100.0

4.8.1. Initial examination of children because of disease causing the death of a child

73.9% of died children of the main group and 25% - of the control group were examined by a family doctor after a child got sick. Feldshers/nurses examined children of the control group 3 times more frequently and only inconsiderable part of children of both groups was examined by the MP of the ambulance car (Table.31).

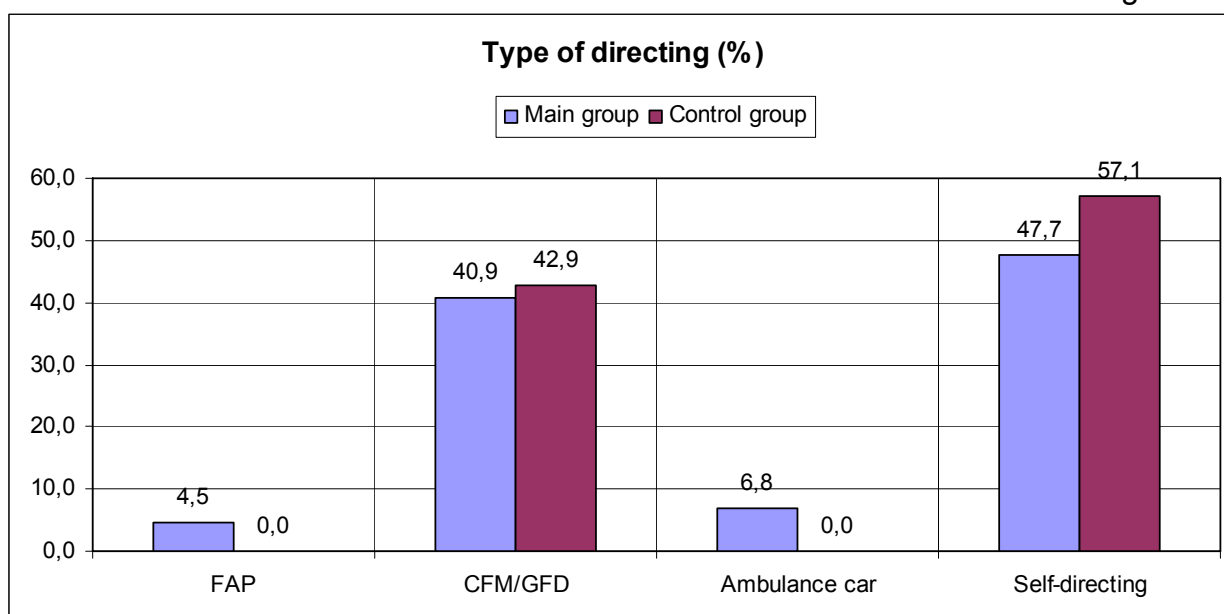
Table 31

Who made examination (%)

	Main group	Control group	Total
Ambulance doctor	4.3	12.5	6.5
Family doctor	73.9	25.0	61.3
Feldsher/nurse	21.7	62.5	32.3
Total	100.0	100.0	100,0

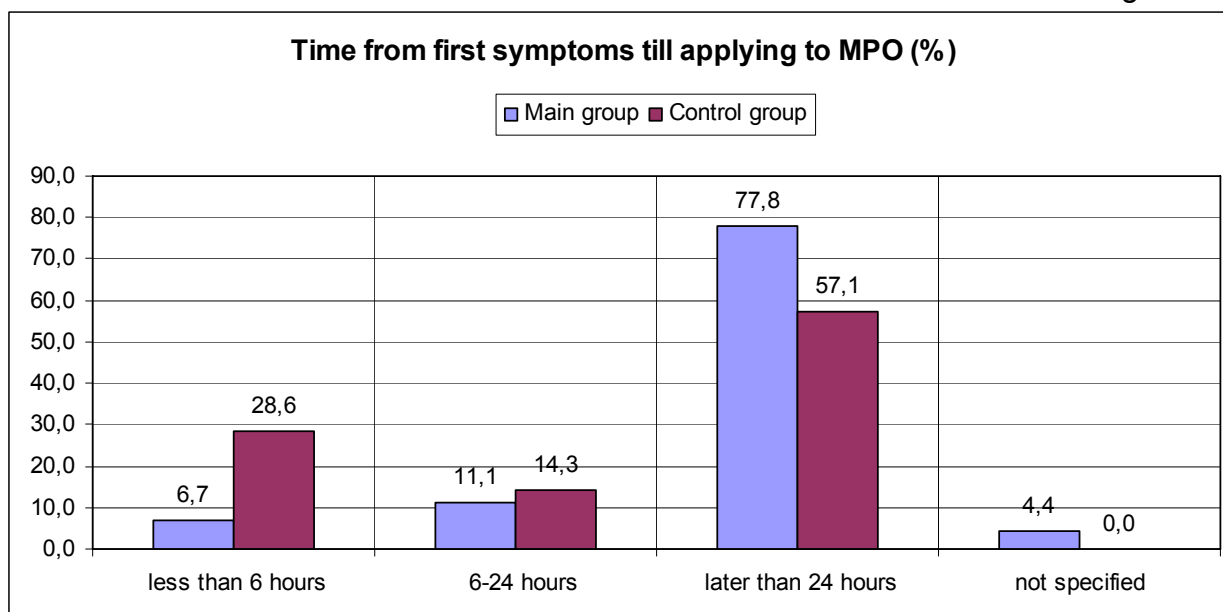
Approximately the same number of children of both groups was delivered to a hospital independently without a preliminary examination by a family doctor, who demonstrates insufficient work of primary level medical personnel and also lack of communication between mothers and MPO (diagram 17).

Diagram. 17



As it is demonstrated in diagram.18 the majority of mothers of died children approached late to MPO, which demonstrates low mothers' awareness about dangerous symptoms of diseases. Children arrived to a hospital in a very grave condition in late stages of diseases with complications.

Diagram. 18



Hence:

- number of visits of mothers to GFD/FAP for the last 6 months amounted 4 times in the main group and 6 times in the control group;
- Home visits were more made by nurses who mainly invited children for vaccination and anthropometric measurements;
- 38.1% of died children of the main group and 20% - of the control group were assessed by medical personnel for the existence of dangerous diseases symptoms, at the same time approximately 1/4 part of the died children of both groups were correctly classified;
- practically all children of the control group received the first doze of an antibacterial medication prior to sending to a hospital and only a third part of children of the main group received it;
- Medical personnel underestimated the gravity of condition of 10% of the died children of the main group and as a result a child was not sent to a hospital treatment on times;
- interview of mothers about the reasons of non calling an ambulance car demonstrated that 76.9% of mothers of the main group and 85.7% of mothers of the control group referred to an absence of an ambulance car in the village of their residence;
- 71.6% of children of the main group and 57.1 % of children of the control group slept in a beshik. In the main group about 15.6% of cases of death of children at home occurred when they were in a beshik;
- in the majority of cases they record late applying to an MPO, which demonstrates low mothers' awareness about dangerous symptoms of diseases. Children arrived to a hospital in a grave condition in the late stages of diseases with complications.

Section 4.9. Circumstances of death of children

Mothers were asked to describe the circumstances under which their children died.

As it is evident from Table 32 the majority of children died as a consequence of a too quick clinical course whereas in the control group mortality of children was recorded as from CDM.

Table 32

How a child died (%)

No	Causes of death	Main group	Control group	Total
1	Sudden death without symptoms of diseases when wake	-	4.8	1.0
2	Sudden death without symptoms of diseases when asleep	3.8	4.8	4.0
3	Exacerbation of chronic diseases	1.3	-	1.0
4	Serious congenital anomalies and heritable diseases	7.5	23.8	10.9
5	Accidents	7.5	9.5	7.9
6	Sudden death as a consequence of an accident	-	4.8	1.0
7	As a result of too quick clinical course	45.0	38.1	43.6
8	Other	35.0	14.3	30.7
	Total	100.0	100.0	100.0

4.9.1. Sudden death without signs and symptoms of diseases

Sudden death of without signs and symptoms of diseases requires a thorough study of the causes. According to the interview of mothers of the main group 33.3% of cases and 18.2% of cases of the control group death of children at the age under 1 year old occurred suddenly when sleeping (Table 33).

According to the majority of mothers their children felt well before sleep and there were no any symptoms of a disease.

For instance:

Child K. 8 days. At 5 am mother breastfeed her child in beshik and at 8 o'clock in the morning the mother found her child dead. The same day the child was buried without informing anyone.

Analysis of the causes of death of children connected with a sudden death demonstrated that in 90% of cases children died from mechanical asphyxia and in 10% of cases a postmortem diagnosis of a syndrome of sudden death was made:.

It is necessary to mention that in the course of a detailed interview of mothers, whose children died at home as a result of sudden death without symptoms of diseases it was found out that children had some general symptoms of a disease, but they simply did not pay attention to them.

In 30% of cases of death children under 1 year old, in medical documentation without specifying the causes of death they made a diagnosis: mechanical asphyxia or sudden death.

For instance:

Child , the age was 1 months and 12 days. The day before death, the child was fidget, cried a lot, sucked badly. No one took his temperature. Parents took him to healer to exorcise him. He slept a night in a beshik. In the morning they took him dead out of beshik. In his medical documentation they recorded a diagnosis: mechanical asphyxia.

Child T, the age was 2 months and 10 days. The child had high temperature and diarrhea. Pheldsher prescribed outpatient treatment – phyrazolidon. There was no further supervision of the child. MP underestimated the gravity of the condition and as a result the child was not sent to a hospital for treatment and died at home. They recorded a diagnosis of a sudden death in his medical documentation.

The comparative analysis of children mortality at home at the age under 1 year old, demonstrated that sudden death without signs of diseases in the main group was recorded in 15.6% of cases when a child was sleeping in beshik.

For instance:

Child O, the age was 1 month and. 10 days. He died when he was sleeping in beshik. The medical documentation recorded the diagnosis: mechanical asphyxia.

Child A, the age was 1 year old. There was vomiting before sleep, mother cleaned the child's mouth and put him into beshik to sleep. She found the dead child in the morning in beshik.

Table 33

Mortality of children at home at the age under 1 year old (%)

		Main group	Control group	Total
1	Sudden death without symptoms of diseases when asleep	33.3	18.2	29.3
2	Exacerbation of chronic diseases	3.3	-	2.4
3	Serious congenital anomalies and heritable diseases	20	18.2	19.5
4	Accidents	10	9.1	9.8
5	As a result of too quick clinical course	33.3	54.5	39
	Total	73.2	26.8	100

4.9.2. Death as a result of too quick clinical course

It is known that acute respiratory and intestinal diseases of children of the early age frequently lead to complications in the form of cerebral edema and especially with children who have other diseases, such as development malfunctions and back group diseases (anemia, low weight and others).

According to the Table 47 33.3% of children under 1 year old in the main group and 54.5% of children of the control group died as a result of quick clinical course.

CDM, heritable diseases (66.7%) and accidents (33.3%) were recorded dead children with children who died at the age from 1 till 2 years old in the control group (Table 48).

Majority of children (63.6%) of the main group died as a result of a quick clinical course.

MP, approximately in 10% of cases of death of children in the main group, underestimated grave condition of a child and as a result a child was not sent to a hospital for treatment on time.

3.7% of children did not receive treatment at a hospital due to a lack of mother's possibility to get hospitalized together with a child and also due to the fact that children already had treatment at hospital.

For instance:

Child G, the age was 1 year and 2 months. In the evening the temperature raised, at night parents gave paracetamol to the child, the temperature went down inconsiderably. In the morning the child had cyof roadsu, which stopped on its own. In the morning they appealed to a nurse because she lived nearby. She made an intramuscular injection of ampicillin and said that she will repeat the injection in the evening. In the afternoon the child temperature again went u, which did not go down after taking paracetamol. They applied to a family doctor to GFD. The doctor without examining the child and taking his temperature directed the child to a territorial hospital for treatment, which situated in the rayon center (1 hour drive). On the way to the hospital the child again had cyof roadsu several times and than died.

30% of mothers of the main group in case of children diseases apply not to the medical personnel but to healers (moldo), who made phlebotomy, made cuts on gums and between shoulders, cut a chicken and put it on the body, in case of enteric infection they warmed up the dough in an open, exorcised and put on a stomach of a child And only when the condition of a child worsened considerably they applied to MP.

10% of death of children at the age under 1 year old in the main group occurred as a result of a serious disease clinical course. Those children often received treatment at a hospital. Some parents agreed that the treatment was useless for the child and they took him home and the death of such children was registered as "died at home".

For instance:

Child A, the age was 6 months and 11 days. When he was 1.5 month they made him a diagnosis of biliary atresia. He was treated several times at a hospital. From mother's words the last hospitalization was from 25.03 till 10.04.08 and the child was discharged in a very grave condition. The doctor told that the child condition will improve at home but the father knew about an unfavorable disease outcome. The child died at home on 11.04.08. In the issued epicrisis they recorded that the child was discharged in a satisfactory condition.

4.9.3. Death as a result of accidents

About 10% of cases of death of children under 1 year old occurred as a result of an accident and almost 2 times more frequent among children at the age from 1 till 2 years old.

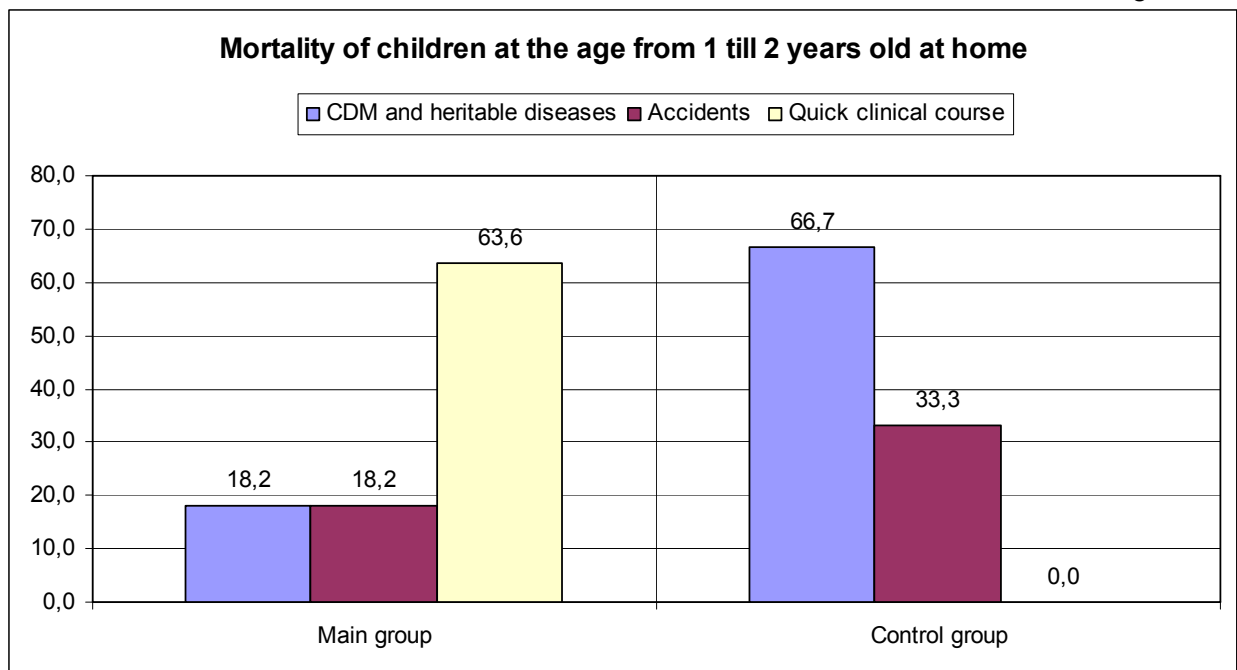
Analysis of the causes of death as a result of an accident demonstrates that not only parents not always looked after a child but also that in the majority of cases they did not know about the interests of a child of an early age. The majority of parents did not pay attention to the fact that children under 1 year old start exploring the environment and thus they shall pay much more attention to a child not to put the child's life under threat.

For instance:

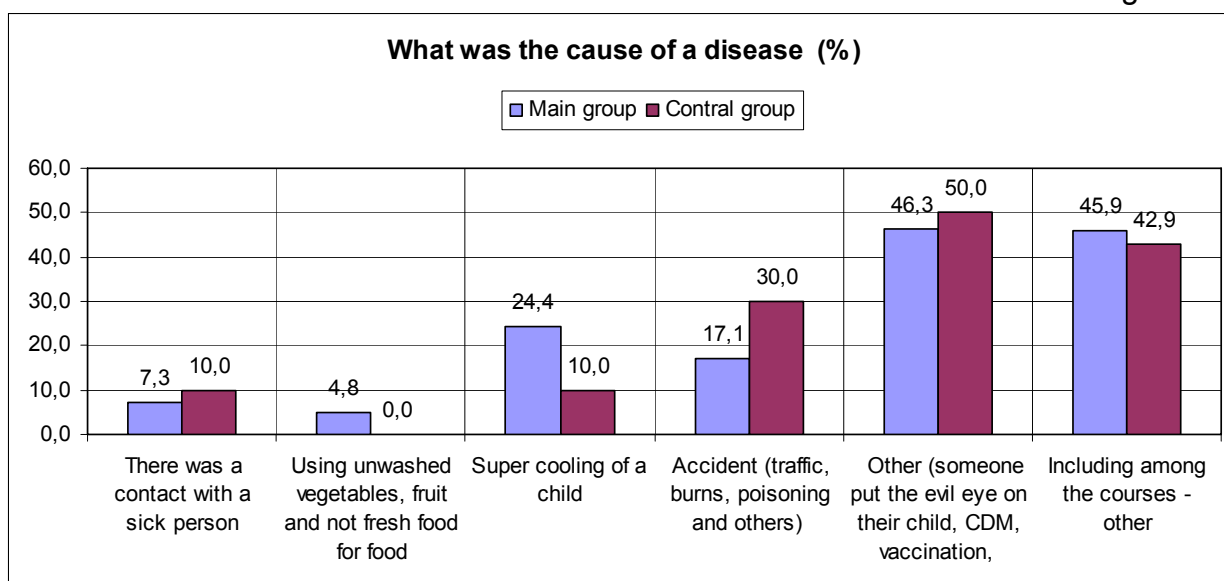
Child C, the age was 8 months. Mother put pillows around a child left him alone in the room and went to a shed to milk a cow. The child tried to reach a toy, turned over with his face down and panted.

Child Z, the age was 10 months. The child was dropped by his sister. The parents did not pay attention and did not apply to MP. The child died at home as a result of a grave cerebral trauma.

Diagram. 19



During interview of mothers about a half of them in the main group and control group pointed to the fact that they do not know the causes of death of their children. It can be assumed that this is due to concealment of causes of death by medical personnel and also the fact that parents themselves are afraid of responsibility for their children. 15% of mothers of the main group thought that someone put the evil eye on their child, but at the same time 1/3 part of mothers of the control group reported that the cause of death of children was CDM. Accidents were more mentioned speaking about died children of the control group. 1/4 part of mothers of the main group thought that the child super cooling was the cause of the death (diagram.20).



The comparative analysis of the first symptoms of diseases demonstrates that the majority of children of both groups recorded raising of temperature, at the same time vomiting and diarrhea were more among died children of the main group.

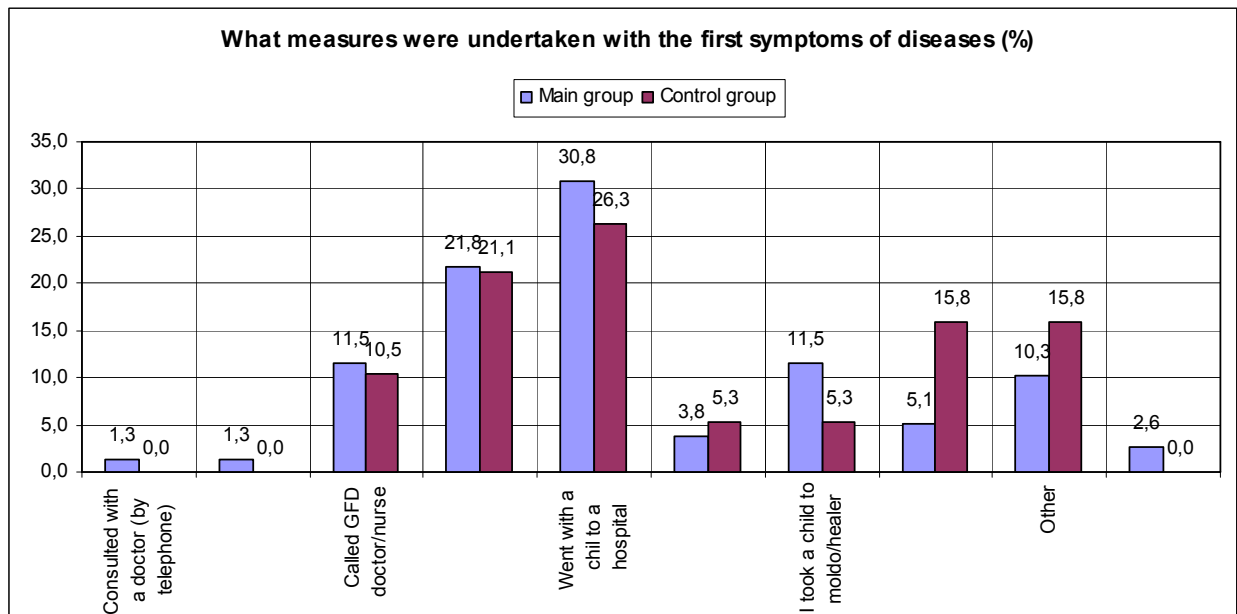
Table 34

Symptoms of diseases (%)

Symptoms of diseases	Main group	Control group	Total
1 Temperature	58.4	36.8	54.2
2 Vomiting	35.1	10.5	30.2
3 diarrhea	29.9	26.3	29.2
4 Cough	11.7	10.5	11.5
5 Psychataxia	1.3	-	1.0

1/3 part of mothers of both groups with a sick child were immediately sent to a hospital and approximately the same number of mothers applied to medical personnel of GFD/FAP. More than 15.8% of mothers of the control group did not take any measures because they thought that their children had diseases which cannot be treated. 11.5% of mothers went to healers and sorcerers.

Diagram. 21



Hence:

- sudden death of children in 90% of cases occurred due to a mechanical asphyxia. In 10% of cases a syndrome of sudden death was recorded;
- interview of mothers demonstrated that in 33.3% of cases the death of children at the age under 1 year old of the main group and in 18.2% of children of the control group occurred suddenly when they were asleep;
- in 30% of cases of death of children under 1 year old in medical they diagnosed mechanical asphyxia or sudden death in the documentation without specifying the causes of death. It is necessary to mention that during the detailed interview of mothers, whose children died at home as a result of sudden death without signs of diseases, it was found out that the children had some general symptoms of diseases, at which they simply did not pay attention;
- diagnosis of sudden death or mechanical asphyxia causes more and more doubts that on site they consider in detail the causes and circumstances of death and lead to an idea that in MPO they do not have good quality analysis of death of children who died at home;
- majority of deaths of children at the age of children under 1 year old at home with a diagnosis of sudden death or mechanical asphyxia occurred when a child was sleeping in beshik;
- about a half of children of the control group and 1/3 of children of the main group died due to a quick clinical course (during 24 hours);
- CDM, heritable diseases and accidents more frequently occurred among children, who died at the age from 1 till 2 years old in the control group;
- in 10% of cases of death of children of the main group medical personnel underestimated the gravity of a child condition, as a result of which the child was not sent to a hospital for treatment on time;
- 11.5% of mothers of the main group in case of diseases of children applied not to medical personnel but to healers (sorcerers, moldo).

Section 4.10. Medical services rendered at a hospital level.

Assessment of medical services at a hospital level was made via reviewing medical documentation of dead children. Rendering of urgent, timely and qualified

medical assistance at all the levels of public health is very important for preservation child's health.

4.10.1. Initial examination of a child by MP of the receiving department

For the majority of children of both groups initial examination was made during the first 3 hours but in the main group 10.6% of dead children were examined later than 6 hours (Table 35).

Table 35

Time of initial examination of a child by MP of the receiving bloc

Time in hours	Main group	Control group	Total
1. less than 3 hours	76.6	85.7	77.8
2. from 3till 6 hours	-	-	-
3. later than 6 hours	10.6	-	9.3
4. Not specified	12.8	14.3	12.9
Total	100.0	100.0	100

42.9% of dead children of the control group after entering the children department during 3 hours were transferred to the RITD, whereas 23.4% of children of the main group were transferred later than 6 hours, which demonstrates underestimation of the gravity of children' condition, which aggravated an unfavorable disease outcome.

Table 36

Time of child's staying in the children department till the moment of transfer to the RITD (%)

Time in hours	Main group	Control group	Total
1. less than 3 hours	6.4	42.9	11.1
2. from 3till 6 hours	2.1	-	1.9
3. later than 6 hours	23.4	14.2	22.2
4. Received by RITD	68.1	42.9	64.8
Total	100	100	100

According to Table. 37, as average, children of the main group who died at the reanimation department stayed there for about 8 hours and children of the control group - 10 hours. This testifies to the fact that the medical personnel had enough time for a comprehensive examination and adequate treatment.

Table 37

Average number of hours of children staying in a reanimation department

Time in hours	Main group	Control group	Total
Average time of staying in a hospital	7.8	10.0	8.1

Late transfer to a reanimation department

About 30% of children with AEI and grave dehydration initially stayed at an infection department for more than 6 hours and did not receive a due emergency therapy and transferred to an RITD in an extremely grave condition.

40% of children with ARI and pneumonia arrived to a children department in a grave or average grave condition and did not receive a necessary volume of therapy and supervision and later due to worsening of the condition were transferred to a RITD.

4.10.2. Diagnosis of died children during the first 24 hours after hospitalization

The comparative analysis of the clinical diagnosis of died children during the first 24 hours after hospitalization demonstrates that more than 40% of children of the main group died from acute diarrhea with dehydration, and more than 50% of children of the control group died from ARI and pneumonia (Table 38). The received data allow making a conclusion that children die from acute infections (about 80%), from which they could have been saved though 1/3 of dead children of the control group had an accompanying background (CHD).

Table 38

Diagnosis of died children during the first 24 hours after hospitalization (%)

Diagnosis	Main group	Control group	Total
1. Pneumonia	23.4	28.5	24.1
2. Pneumonia+ diarrhea	4.3	14.3	5.5
3. ARVI	17	14.3	16.6
4. ARVI+ diarrhea	2.1	-	1.9
5. Acute diarrhea with moderate dehydration	4.3	-	3.7
6. Acute diarrhea with grave dehydration	36.2	-	31.5
7. lingering diarrhea with grave dehydration	-	14.3	1.9
8. Dysentery	2.1	-	1.9
9. Dysentery with grave dehydration	2.1	-	1.9
10. Post delivery trauma	4.3	-	3.7
11. Brain injury	2.1	14.3	3.7
12. Anemia in grave stage	2.1	-	1.9
13. Hemorrhagic disease of new born infants. Umbilical hemorrhage	-	14.3	1.9
Total	100.0	100.0	100.0

Hence:

- 10.6% of died children of the main group was examined by MP of the receiving department after 6 hours after being received;
- 1/3 of children of the main group with AEI with grave dehydration and 40% of children with ARI and pneumonia initially arrived to an infection and children departments, stayed there for more than 6 hours without receiving due emergency therapy and supervision and were transferred to a RITD in extremely grave conditions;
- as average, died in a reanimation department children of the main group stayed there for about 8 hours and children of the control group - 10 hours. This testifies to the fact that medical personnel had enough time for a comprehensive

- examination and adequate treatment;
- more than 40% of children of the main group died from acute diarrhea with dehydration and more than 50% of children of the control group died from ARI and pneumonia;
- The received data allow making a conclusion that children die from acute infections, from which they could have been saved though 1/3 of dead children of the control group had an accompanying background.

4.10.3. Laboratory testing of children died during the first 24 hours after hospitalization

According to diagram 22 approximately for the same number of died children of both groups they took bulk blood tests, through only 75.6% of children of the main group and no sick child of the control group had biochemical tests.

Bulk urine analysis was taken from the majority of children of the main group. Bacteriological tests were taken based on data and only from 42.9% children of the main group. The fact that they determine a blood group only for a small number of children causes concern because it must be done for all. Analysis of the medical documentation of the majority of died children demonstrated a lack of interpretation of the received tests depending on a plan of treatment actions.

For instance:

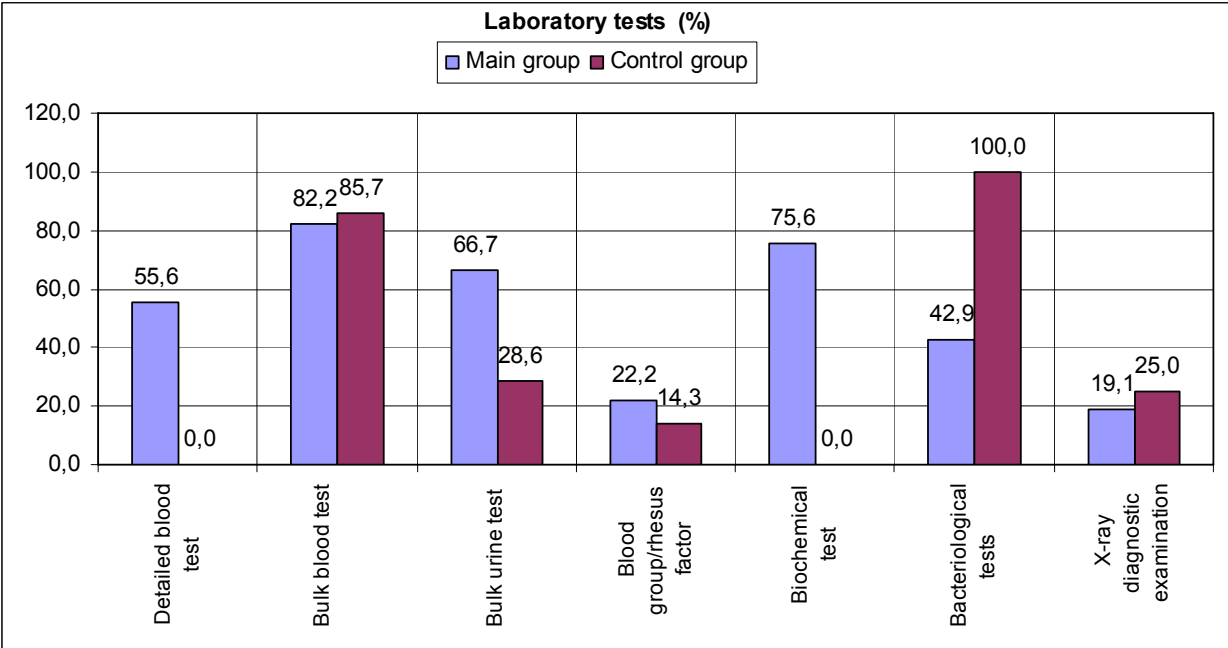
Child A, the age was 1 month and 24 days. Diagnosis: ARI. Neurotoxicosis. DIC syndrom. Anemia in a grave stage. In a detailed blood test: erythrocytes 1×10^{12} ; haemoglobin 18gr/l; platelets 85000.

In this case the necessary hemotransfusion was not prescribed and made. In the main group this was the case with 4 died children.

The child at the age was 6 days, diagnosis Hemorrhagic disease of new born infants. Umbilical hemorrhage.

Blood group was not determined and no necessary volume of emergency assistance was provided.

Diagram. 22



Hence:

- Approximately the same number of died children of both groups were taken bulk blood analysis whereas only 75.6% of children of the main group and no sick child of the control group had biochemical tests.

- In total only 22.2% of died children of the main group and 14.3% of died children of the control group had blood group/rhesus factor determined. In the medical documentation of the majority of died children there is no interpretation of laboratory data.

4.10.4. Treatment of children, who died during the first 24 hours after hospitalization

The comparative analysis of the histories of diseases of died children of both groups demonstrated the same tactics of diseases management, which do not follow the clinical protocols. It might be connected with a lack of clinical protocols at a hospital level for many nosologies, as well as outdated clinical protocols. Due to that treatment descriptions were made without separation of the died children into main and control groups.

Practically all children arrived to a hospital in a very grave condition in late stages of diseases with complications, such as: neurotoxicosis, which was expressed in hypethrmic and convulsion syndromes, DIC syndrome and dehydration in a grave stage.

ARI

In 60% of cases in histories of diseases of died children there is no calculation of the injected infusion liquid and adequate monitoring of the injected liquid.

In 2 cases of diseases with a clinical diagnosis of ARI children had anemia in a grave stage and needed in having hemotransfusion with the replacement purpose according to life necessities but instead of the therapy in both cases the children were unjustifiably dropped rheopoyglucin solution which could aggravate the existing hemorrhagic syndrome of children. In those cases the validity of a diagnosis of ARI causes doubts because the gravity of children condition was caused by the existing anemia in a grave stage (hemoglobin 47 g/l and 18g/l of children under 3 months).

Aminophylline of children of both groups was used frequently unjustifiably, without strict calculation based on the gravity of the condition. In 90% of cases it was injected in a stream way intravenously without monitoring whereas it is recommended to inject it intravenously in a droplet way to children of an early age.

Children with grave ARI needed oxygen therapy, which was not prescribed due to unknown reasons.

Pneumonia

Analysis of the histories of diseases demonstrated that 30% of in a hospital died from pneumonia.

In spite of an extremely grave condition of children, in 40% of cases only one antibiotic was prescribed (ampicillin and cephasoline) without adding the second antibiotic – gentamicin. In was proved that in such cases monotherapy with one antibiotic doe not give the assumed result. .

All children needed oxygen therapy (dewy O₂ through a mask, nebulizer, and oxygen tent) as the main component of basic therapy in emergency conditions of children. This type of treatment in the majority of cases is not prescribed and not monitored according to the histories of diseases.

In 100% of cases unjustifiable prescription of a diuretic (phurosemid) and frequently in a big doze was stated, which could reinforce the existing dysfunction of hemodynamics and electrolyte disorders. At the same time cardiac glycoside – digoxin is broadly baselessly prescribed, which can influence the cardiac muscle in a toxic way with the existing imbalances of acid-base equilibrium.

Application of an inotropic medication– dopamine based on necessities was recorded only for 5.6% of children with a diagnosis of ARI and pneumonia but without an adequate calculation and monitoring. This can be explained with the fact that it is necessary to have perfusors (infusomats) for dopamine application, because it is injected via titration and its effect depends on the calculated dose and the time of impact of the medication on the organism of a sick child.

AEI

Treatment of all children with diarrhea and grave dehydration did not correspond to the clinical protocol. Rehydration infusion therapy being the main treatment intervention for preservation of a child's life in fight against diarrhea was made without a proper calculation of the injected liquid and without any monitoring in all the cases; The volume of the injected liquid is not distributed by hours and they do not specify the beginning and end of liquid injecting and does not reflect the dynamics of the condition

The Ringer solution is dropped in small amounts only at the beginning of rehydration was unjustifiably replaced with 5% and 10% glucose solutions and colloidal solutions: rheopolyglucin, polyglucin and saline acesaline. Infusion therapy with colloidal solutions with the explicit dehydration of children can promote development of vascular hypervolemia with developing cardiac and vascular deficiency;

Probe rehydration which can be made at the same time with infusion rehydration is not practiced.

In the reviewed by us 1/3 of histories of diseases cephasoline was unjustifiably prescribed instead of the necessary antibiotic - ampicillin.

For 10% of died children at the age under 2 old years whose blood group and rhesus factor were determined during the first 24 hours after hospitalization according to life necessities needed transfusion of the same group erythromass with the replacement purpose. Those actions were not prescribed and done.

Plolypragmazia

At a hospital the majority of sick children unjustifiably received several medications at the same time: groups of vitamins B, C, calcium chloride, digoxin, furosemide, magnum sulphate, nicotinic acid, no-shpa and aminophylline. In 37% of cases the children were prescribed up to 5-6 medications at the same time and in 20% - more than 7-8 medications.

Child A. with pneumonia at the age of months (the weight – 4kg) was at the same time prescribed 16 medications.

Oxygen therapy

Practically all children in an emergency condition need oxygen therapy as the main component effectively eliminating the existing hypoxia and hypoxemia together with the infusion therapy.

Lack of oxygen therapy in RITD makes the conducted by doctors intensive therapy as insufficiently effective.

IVL

Only 56% of children in the terminal stage were transferred to an IVL whereas early connecting to IVL (in the event there is adequate equipment in RITD and trained experts) as the basic therapy and in emergency conditions of children, could considerably prevent deaths. As records in histories of diseases demonstrate the available IVL devices (Fabius, PO-6) do not correspond modern requirements.

Dopamine

Inotropic medication dopamine has an effect depending on the dose and is a basic medication for many emergency conditions of children. Availability of perfusors in RITD is necessary for the use of dopamine.

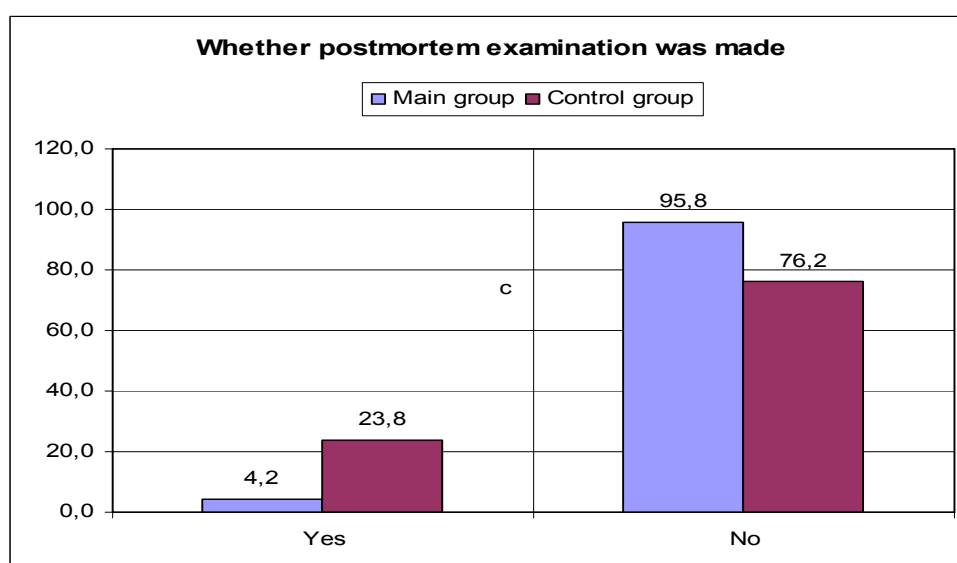
Hence:

- Analysis of the medical documentation of the died during the first 24 hours after hospitalization children demonstrated that in 60% of cases there is no calculation of the injected liquid and a proper monitoring of the injected liquid;
- In 40% of cases, children with pneumonia were prescribed only 1 antibiotic in spite of their grave condition;
- Aminophylline to children of both groups was frequently unjustifiably prescribed without an exact assessment of the gravity of condition. In B 90% it was injected in a stream way intravenously without monitoring whereas it is recommended to inject it intravenously in a droplet way to children of an early age
- In 100% of cases unjustifiable prescription of a diuretic (phurosemid) and frequently in a big doze was stated, which could reinforce the existing dysfunction of hemodynamics and electrolyte disorders. At the same time cardiac glycoside – digoxin is broadly baselessly prescribed, which can influence the cardiac muscle in a toxic way with the existing imbalances of acid-base equilibrium.
- Rehydration infusion therapy being the main treatment intervention for preservation of a child's life in fight against diarrhea was made without a proper calculation of the injected liquid and without any monitoring in all the cases;
- The Ringer solution is dropped in small amounts only at the beginning of rehydration was unjustifiably replaced with 5% and 10% glucose solutions and colloidal solutions: rheopolyglucin, polyglucin and saline acesaline. Infusion therapy with colloidal solutions with the explicit dehydration of children can promote development of vascular hypervolemia with developing cardiac and vascular deficiency
- In 37% of cases children were prescribed up to 5-6 medications at the same time and in 20% - more than 7-8 medications;
- Only 56% of children in the terminal stage were transferred to an IVL
- unjustifiably prescribed such medications as: diuretics, cardiac glycosidoses, colloidal solutions, vitamins, calcium, magnum and otter medications.

4.10.5. Postmortem examination of died children

Postmortem examination of died children was made in 23.8% in the control and in 4.2% in the main group (diagram. 23). Low percentage of postmortem examinations is due to a resolute refusal of many parents to make a postmortem examination and probably a lack of doctors' interest. Practically all postmortem diagnosis of died children of both compared groups coincided with clinical diagnosis. Probably it is due to insufficient knowledge of pathologists and doctors. In medical documentation of died children postmortem epicrisis are recorded not in a complete way, they do not have enough information about the circumstances and causes of death. In 30% of cases in the main group, in the map of a child development (form 112/y) there is no postmortem epicrisis, which leads to a conclusion on a low quality analysis of data about the death of children on site.

Diagram. 23



Hence:

- Postmortem examination of died children was made only in 23.8% in the control and in 4.2% in the main group. Practically all postmortem diagnosis of died children of both compared groups coincided with clinical diagnosis. Probably it is due to a lack of children pathologists on site and also lack of laboratories for good quality histopathology and microbiology examination of bio parts of died children;

- In medical documentation of died children postmortem epicrisis are recorded not in a complete way, they do not have enough information about the circumstances and causes of death;

- In 30% of cases in the main group, in the map of a child development (form 112/y) there is no postmortem epicrisis, which leads to a conclusion on a low quality analysis of data about the death of children on site.

CONCLUSIONS AND RECOMMENDATIONS

At the community level	
Low mothers' awareness about dangerous symptoms of diseases when it is necessary to apply immediately to MP	<ul style="list-style-type: none"> • Improve the work at the community level aimed at identification of dangerous symptoms of diseases and nursing a child • Raising public awareness on site about the laws adopted by the Jogorku Kenesh., resolutions and orders of the MoH KR on public health • Carry out explanatory work: parents' school, school of young mothers and others. • Carry out explanatory work with the population on a healthy way of life
Lack of mothers' knowledge about the rights of both patients and also medical personnel responsibility related to medical assistance rendering	
Low responsibility of mothers for the health of future children (late women's approaching MP during pregnancy)	
Existence of fathers' bad habits (smoking, alcohol drinking), lack of permanent job in villages	
Lack of MP communication with the population – low confidence to medical personnel, applying to healers and sorcerers	
Mothers paying insufficient attention to new-born children and as a result deaths from accidents and also deaths when sleeping in beshik.	
At the level of primary medical assistance	
Low percentage of pregnant women who were prescribed folic acid and iodine medications during the first term of pregnancy	<ul style="list-style-type: none"> • Conduct regular monitoring of medical assistance to children of an early age with a focus on an internal monitoring • Continuation of MP trainings on evidence medicine basis, including training of nurses • Continuation of MP trainings on identification of dangerous symptoms of diseases, which require immediate hospitalization • Improve the work aimed at good quality medical
Inadequate supervision by family doctors at an outpatient level of new-born infants and children at the age under 2 years old	
Low quality of medical documentation on the died children (lack of postmortem epicrisis, dates cause and time of death)	
Underestimation of the gravity of a child condition at an outpatient level (insufficient assessment of general dangerous symptoms of diseases)	

<p>They do not give the first dose of an antibacterial medication to seriously sick children before sending to a hospital (according to the ICDM program)</p>	<p>documentation maintenance</p> <ul style="list-style-type: none"> • Timely prescription of antibacterial therapy to children with pneumonia • Timely prescription of ORM to children with diarrhea (low osmola)
<p>They identify children death causes insufficiently thoroughly, especially the cases of children death at home with a diagnosis: sudden death or Mechanical asphyxia.</p>	
<p>At the level of rendering hospital assistance, including emergency assistance</p>	
<p>Lack of clinical protocols on rendering assistance at home, including emergency assistance</p>	<ul style="list-style-type: none"> • Development of clinical protocols on all nosologies, including emergency assistance to children • Improve the system of redirecting of seriously sick children both inside of a hospital and to another level of medical assistance
<p>Rendering not timely emergency assistance to seriously sick children inside of a hospital from the moment of hospital entry</p>	
<p>Underestimation of the gravity of condition of seriously sick children at a hospital level (seriously such children initially entered somatic departments)</p>	
<p>Low quality assistance at a hospital, including emergency assistance (poly pragmazia, lack of monitoring of injected liquid, late transfer to ILV)</p>	
<p>Incomplete examination of seriously sick children in a reanimation department</p>	
<p>Insufficient communication of MP with parents of died children</p>	
<p>Discharge of seriously sick children from a hospital</p>	
<p>At the level of policy, leadership and management in the public health sector: <i>at an oblast and rayon levels</i></p>	
<p>Insufficient continuity between CFM, TH and maternity homes</p>	<ul style="list-style-type: none"> • Good quality analysis of cases of children of an early age with the purpose of raising awareness of medical personnel about the causes and ways of children death
<p>Low quality analysis of cases of children death on site (reviews of</p>	

children death/Analysis of a child death are not everywhere, causes of death of children are not specified)	<p>prevention</p> <ul style="list-style-type: none"> • Improvement of the system of registration of dead children • Improve continuity between CFM, TH and maternity homes
Not reliable registration of died children (especially of children under 1 year old, which is registered as the death of children older than 1 year old)	
Low % postmortem examination of dead children	
Low level of knowledge of pediatric pathologists (100% lack of differences between postmortem and clinical diagnosis)	
At the level of policy, leadership and management in the public health sector: <i>at the national level</i>	
Lack of clinical protocols on many nosologies at a hospital level	<ul style="list-style-type: none"> • Development of clinical protocols on all nosologies including emergency assistance to children • Improve access of the population to a drugstores network and ambulance car services • Supply of necessary devices to children hospitals and emergency assistance departments
Inaccessibility of medication (lack of drugstores in the nearest vilalges)	
Inaccessibility of ambulance car services	
Lack of necessary devices in pediatric departments including reanimation ones	
At the level of the Government	
Difficult access to pure drinking water	<ul style="list-style-type: none"> • Ensure pure water supply
Low percentage of roads with an asphalt cover, the majority of roads are lo quality earth roads	<ul style="list-style-type: none"> • Improvement of the condition of roads

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