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FEATURES OF CHILDREN'S HEALTH CONDITIONS IN LARGE FAMILIES: EXPERIENCE OF COHORT STUDY



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One of Russia's national development goals until 2030 is preserving the population, health and well-being of people. Overcoming the natural population decline in the country is impossible without increasing the number of large families. At the same time, researchers are interested in assessing

the conditions for children's health formation in large families, which is the purpose of the study. The authors used general scientific (literature analysis, study and generalization of information, comparison, synthesis, induction, deduction, classification) and empirical methods (measurements, questionnaires, observation, comparison). The information base is sample data of prospective cohort monitoring of 308 families in 2022, 65 of which are the control group of large families. Scientific novelty of the work consists in comparing the conditions of children's health in families with a different number of children. It is revealed that parents of three and more children more often than others have secondary education, they have lower medical activity, which leads to the omission of scheduled examinations and immunizations of their children. Marriages of parents with many children are somewhat stronger, but relations between spouses are more tense. Average per capita income and, accordingly, purchasing power is much lower than in families with one or two children. The largest part of the family budget is spent on food and compulsory payments. The living conditions of large families are more often unsatisfactory: cramped, poorly furnished and exposed to unfavorable environmental factors. As a consequence, large families more often experience material problems related to children's upbringing and care; in addition, they often experience the problem of lack of time. The impact of unfavorable conditions is confirmed by the analysis of children's health status. Children from large families show lower indicators of physical and neuropsychological development. Therefore, large families should be the main target groups in the course of preventive measures to improve children's health through socio-economic and medical support programs.

Risk factor, child health, neuropsychiatric development, large families, single-parent families, risk groups.

Introduction

The main wealth of any social system is human potential, an important component of which and a kind of economic resource is the health of its members. The state of public health, investment in health, demand for health capital determine the competitiveness of the labor force and the development of the economy as a whole (Gorchakova, 2020).

“Population conservation, people's health and well-being” is one of the main national development goals of Russia until 2030 (the goals are defined by Presidential Decree 474, dated July 14, 2020 to implement breakthrough development of the Russian Federation). One of the tools for its achievement is the National Project “Demography”.

In 2016, Russia entered the second stage of depopulation (Soboleva et al., 2021) with a subsequent increase in population loss. In addition, the last 10 years have been generous with new challenges to demographic development. Significant factors include the spread of coronavirus infection and a number of major political events both domestically

(pension reform, constitutional amendments) and internationally (the annexation of Crimea and four new regions, the start of the Special Military Operation (SMO)); digitalization and modernization of social institutions (reforming education, health care, the “family crisis”, changes in the sex and age composition of the population). As a result, the natural decline (the excess of the number of deaths over the number of births) of the Russian population, according to Rosstat, amounted to 702 thousand people in 2020, and in 2021 – more than 1 million people. According to the results of 2022, the indicator decreased by 42.5% (about 600 thousand people) compared to the pandemic year of 2021.

Childlessness is becoming more widespread in modern Russia, and one- and two-childhoods are converging (Churilova, Zakharov, 2019). In addition, the demographic situation is affected by tolerance to celibacy, legitimization of cohabitation, “aging” of marriage and fertility (Arkhangelsky, Kalachikova, 2021). The outbreak of the new coronavirus infection had a noticeable impact not only on mortality and life expectancy of the Russian population

Table 1. Number of households with children in the Russian Federation and the Vologda Oblast

Number of households	Russia	Vologda Oblast
Total	38432027	315625
Number of households with children under 18 years of age, incl.	15231213	130297
with 1 child, %	55.2	55.9
with 2 children, %	33.1	34.3
with 3 or more children, %	11.7	9.7

Source: own calculation according to the 2020 ARPC, section "Private households of two or more persons by type, household size and number of children under 18".

(life expectancy decreased over the two years of the pandemic by 3.3 years to the 2012 level¹), but also on reproductive intentions. An additional significant decrease in the number of people who want to have children in the future (including childless people) has been noted due to uncertainty about the future, economic instability and the spread of anxiety and depressive disorders (Makarentseva, 2020).

Scientists say that the pandemic will continue to contribute to further depopulation. This is confirmed by demographic forecasts. For example, the multivariant forecast of demographic development made by specialists of the Higher School of Economics shows that the population of the country in the long term in most scenarios will decrease (according to the most likely average variant – to 137.5 million people by 2100). Researchers also note that in the short term (until the early 2030s), all options demonstrate an increase in demographic burden (Yumaguzin, Vinnik, 2022). The practice of many countries shows a special priority of measures aimed at sustainable growth of population fertility, especially in the conditions of COVID-19 pandemic spread, which has formed long-term negative economic trends (Sarkisov, 2022).

In this regard, the problem of demographic development of the country, the issues of increasing the birth rate, increasing the number of children in families in Russia are becoming more urgent (Sivoplyasova, 2022), and require

an integrated multilevel approach to solution and are impossible without popularization of large families.

In 2020, according to the results of the All-Russian Population Census (ARPC), 40% of Russian families have children. More than half of them (55%) are families with one child, a third with two children, and only 11.7% are families with many children (*Table 1*). According to the 2010 ARPC, the share of the latter was 4.6% (just over a million families). In the Vologda Oblast the share of families with many children is even lower (only every tenth family).

According to the Russian Ministry of Labor, as of January 1, 2023, there were 2256626 large families in Russia, three quarters of them with three children and every sixth with four. A total of 7.4 million children are raised in large families (an average of 3.2 children per family)².

According to the Vologda Oblast Government, as of January 1, 2023 there were 20517 large families registered in the region, which is 936 more than a year earlier. There are 66561 children in them. In the Vologda Oblast the share of large families with three children is higher than the national average (82%) and less with four (every eighth) and more. Predominantly large families live in cities (Vologda and Cherepovets) or in Vologodsky Municipal District³.

Unfortunately, according to the results of the last ARPC, approximately every fifth family with three or more children in Russia is

¹ Unified interdepartmental information and statistical system. Federal State Statistics Service. Available at: <https://fedstat.ru>

² Appendix of the Ministry of Labor of Russia. Table on the number of large families. Available at: http://komitet2-6.km.duma.gov.ru/upload/site8/document_news/028/489/817/7.1.1._Prilozhenie_Mintrud_Rossii-tablitsa_o_kolichestve_mnogodetnykh_semey.pdf

³ Available at: <https://socium.gov35.ru/vedomstvennaya-informatsiya/novosti/5/87534>

Table 2. Share of families with children raised by a single parent

Indicator	Russia	Vologda Oblast
Single mothers, persons, incl.	2727132	29840
with one child, %	64.5	64.3
with two children, %	27.4	28.5
with three or more children, %	8.1	7.2
Single father, person, incl.	493681	5566
with one child, %	71.93	73.5
with two children, %	22.5	22.8
with three or more children, %	5.6	3.8

Source: own calculation according to the 2020 ARPC, section "Private households of two or more persons by type, household size and number of children under 18".

incomplete: children are brought up by a single mother in 18% of families, by a father – in 3% (Tab. 2). In the Vologda Oblast the situation is even more deplorable, every fourth large family has one parent (23% with single mother and 4% with single father).

In recent years, the share of large families among poor households with children has also been increasing (Zelinskaya et al., 2016b). Planning to have children is always a long-term orientation, at least for 18 years, at most until the child receives education and a profession. In this regard, if parents feel their economic well-being is threatened, they refuse to have a second and third child. Long-term support of families with children by the state will help to reverse the low birth rate; therefore, within the framework of the national project "Demography" the main instrument for ensuring sustainable population growth and stimulating the birth rate is the federal project "Financial support of families at the birth of children" announced by the government.

The situation of children in large families requires special attention from society and the state. This category of families stands out among others by all medical, social and economic indicators. Children of different age groups from large families lag behind in many quantitative and qualitative indicators of physical development, are characterized by a lower level of health and a higher incidence of disability, and are characterized by the maximum risk of poverty (Zelinskaya et al., 2016a; Zelinskaya et al., 2016b).

Thus, it can be assumed that the growth in the number of large families, which is so necessary for our country to solve the demographic problem, carries a threat of deterioration of the health potential of the child population, and thus of the health status in later life (Hempel et al., 2020). Investing in health in childhood not only promotes health in later life, but also dynamically improves a person's educational attainment and personal income, as well as other life prospects (Tao et al., 2021).

In view of the above, the issue of finding manageable risk factors for children's health, especially in large families, remains open and relevant.

An analytical review of the domestic literature devoted to the study of health status, organization of medical care and medical and social support for children from large families, conducted by colleagues from the Scientific Center for Children's Health of the Ministry of Health of Russia and the Russian Academy of Continuing Professional Education (Zelinskaya et al., 2016b), allowed us to conclude that there are few studies. The most studied are the psychological and pedagogical aspects of this problem. The issues of legislative and practical provision of the rights and interests of members of large families are also discussed (they are considered to be insufficiently effective).

Previously, we have calculated the relative risk of various prenatal risk factors for child health and development in utero and during the first seven years of life on the basis of cohort

monitoring data. The results allowed us to identify some prognostically significant factors (Shmatova et al., 2022; Shmatova et al., 2023a; Shmatova et al., 2023b). In this paper, we will emphasize the study of health risks for children in large families.

Within the framework of the study, we divided the conditions and factors of children's health formation into two blocks:

1) internal (or subjective) ones, depending to a greater extent directly on parents, namely the level of education, family status and satisfaction with relationships, medical activity and destructive practices of parents;

2) external (or environmental) ones, formed by the environment and depending not only on the subject: income, purchasing power, environmental and housing conditions; largely conditioned by the socio-economic policy of the state.

The aim of the study is to assess the conditions of child health formation in large families in comparison with small families.

Objectives of the study:

1) to analyze the internal conditions of child health formation in families with different number of children;

2) to analyze the external conditions of children's health formation in large and small families;

3) to compare the specificity and severity of some problems related to child care and upbringing in different families;

4) to assess the health status of children from large and small families.

The object of the study is families with children in the Vologda Oblast. The subject is factors and conditions of children's health formation.

Research methodology

The Federal Budgetary State Institution of Science "Vologda Research Center of the Russian Academy of Sciences" (FBSIS VolRC RAS) has been carrying out medical and social cohort monitoring "Study of conditions for the formation of a healthy generation" of families with children for 29 years. Six waves of the study have been conducted (cohorts of children born

in 1995, 1998, 2001, 2004, 2014 and 2020). Once the children, the participants of the monitoring reach adulthood, the cohort observation is stopped. The informants completing the questionnaires are medical professionals (obstetrician-gynecologist, neonatologist, pediatrician), the child's parent (predominantly mother), and the children themselves (when they reach the age of 10 years). Inter- and intra-cohort methods of analyzing the study data were used.

We combined cohort health and social monitoring data collected in 2022 on 308 families from two cohorts: birth year 2014 (99 children aged 8 years) and birth year 2020 (212 children aged 2 years; *Tab. 3*). Three families in the sample included twins, so the number of the observed children was 311.

Every third family we surveyed (32.2%) had one child, almost half (46.9%) had two children, and every fifth (20.9%) had many children. Most of the latter (80%) had three children, every sixth (16.9%) had four children, and two families had 5 or more children. At the time of the survey, 87.7% of families were complete. In 60% of incomplete families, a single mother was raising an only child on her own, in every fourth (23.7%) there were two children, and in every sixth (15.8%) there were three or more children. However, one third of mothers with many children were living together with a man without an officially registered marriage at the time of childbirth, but none of them had ever married before 2022.

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Table 3: Characteristics of the study sample of two cohorts in 2022, number of children monitored

The type of family in which the child lived at the time of the study	2020 cohort (child is 2 years old)	2014 cohort (child is 8 years old)	Total
The observed child is the only one in the family	70	30	100
There is 1 brother/sister (family with 2 children)	95	51	146
Large families	47	18	65
there are 2 siblings (family with 3 children)	37	15	52
there are 3 siblings (family with 4 children)	9	2	11
there are 4 and more siblings (family with 5 and more children)	1	1	2
Total children	212	99	311

Source: own research findings.

The health status of the cohort participants was analyzed on the basis of objective medical history data (by a pediatrician) and subjective assessments of mothers. Differences in the assessment of child health by mothers in families with different numbers of children were tested using the Mann – Whitney U test and showed statistical significance (at the level of $p = 0.026$).

Literature review of studies on the conditions of children's health formation in different families

A significant number of various risk factors have been identified as playing a pathogenic role in the etiology of child health disorders: socio-demographic (age, education, marital status), medical and biological (related to the period of pregnancy and childbirth, genetic), socio-economic (low material income, unfavorable housing conditions, single-parent families, disabled children, etc.), medical and organizational (decrease in the preventive orientation of medicine, shortcomings in the system of medical care for certain groups of the child population), medical and organizational (decrease in the preventive orientation of medicine, shortcomings in the system of medical care for certain groups of children).

The potential determinants of child health include mother's education, which measures the quality of her human capital (Becker, 1991). More educated mothers may have healthier children because they are better informed about basic hygiene, nutrition, effective health promotion, safe living, health care, and they

themselves lead healthier lives (Zaloudíková et al., 2012; Chen et al., 2020; Jarosz, Gugushvili, 2020). Maternal education also has a nurturing effect, and a significant part of health capital is accumulated through nurturing (Chen, Li, 2009).

Moreover, according to Edwards and colleagues, children's development is more influenced by mother's education and number of siblings (in large families it is more favorable), and less influenced by father's education. This is because the quantity and quality of time spent with children increases as well as mother's education grows (Edwards, Roff, 2010).

In addition, the level of education, according to many scholars, is negatively related to the risk of divorce (Raymo et al., 2015; Lundberg et al., 2016; Raley, Sweeney, 2020). Marriages of highly educated individuals are more stable (Härkönen, Dronkers, 2006; Park, Raymo, 2013; Matysiak et al., 2014; Garriga, Cortina, 2017). According to the family stress model, education reduces financial strain, improving the quality of family life (Conger et al., 2010). Lundberg and colleagues also hypothesized that long-term relationship stability is promoted by intensive investments in children (time and financial costs), which are more common among educated parents (Lundberg et al., 2016).

Lower levels of education increase a woman's risk of becoming a single mother (as a result of either divorce or out-of-wedlock fertility) (Williams, Finch, 2019; Raley, Sweeney, 2020).

In turn, a great deal of works clearly demonstrate that the more frequently children experience changes in family structure, the lower their levels of well-being (Hadfield et al., 2018;

Cavanagh, Fomby, 2019). This manifests as health (Bzostek, Beck, 2011; Smith et al., 2017) and behavioral problems (Fomby, Sennott, 2013; Mitchell et al., 2015; Fomby, Mollborn, 2017; Carol et al., 2020), emotional instability (Lee, McLanahan, 2015; Bzostek, Berger, 2017), and in socioeconomic achievement and relationship stability in adulthood (Amato, Patterson, 2017; Bloome, 2017). Young adults who lived with an unmarried mother during early childhood and adolescence are more likely to engage in alcohol use and depression by age 14 (Stritzel, Crosnoe, 2023). While boys' development is more sensitive to parental divorce and single motherhood than girls (Cavanagh, Fomby, 2019).

According to domestic scientists, the factor of single-parent families was the most significant of all socioeconomic risk factors for neuropsychiatric developmental disorders (NPD) among children aged 4-6 (RR = 1.687) (Momot et al., 2022). However, an international study conducted in Ethiopia, India, Peru, and Vietnam, contrary to hypotheses, found no association between changes in family structure and children's overall physical health (Oldroyd et al., 2022).

Research suggests that children living with both married biological parents have lower levels of behavioral problems compared to their peers in other family structures, including cohabiting biological families (Hveem et al., 2022). On the other hand, stable cohabiting families with two biological parents offer many of the same health, cognitive, and behavioral benefits as stable married biological parent families (Manning, 2015). Such patterns suggest that parental marriage provides a uniquely protective family environment and is protective of children's health and development.

A number of studies demonstrate that socioeconomic parental factors and living conditions in childhood matter for health in later (adult) life (Hayward, Gorman, 2004; Case et al., 2005; Currie, Schwandt, 2016).

Low parental income correlates with a higher risk (two to three times) of being diagnosed with somatic and psychological disorders and hospitalizations in adulthood (Spencer et al., 2013; Evensen et al., 2021). In a study (Apouey,

Geofard, 2013), it was found that the association between income and child's general health does not appear until the age of two, but remains strong until the age of 17.

The negative impact of unfavorable environmental factors in the place of family residence on the health of offspring is also noted. For example, intrauterine exposure to high levels of non-ionizing radiation has been associated with an increased risk of attention deficit hyperactivity disorder (ADHD), and especially ADHD with associated immune diseases (Li et al., 2020).

Results and discussion

Internal (subjective) conditions

According to our cohort study, the education level of mothers with many children is somewhat lower than that of respondent mothers in general (49.2% vs. 51.3% respectively have higher education, and 14.3 and 9.7% have secondary education, *Tab. 4*), but it is higher than that of fathers (49.2 and 39.3% have higher education, 14.3 and 25.0% have secondary education). It should be noted that, according to our monitoring data, the level of education of men in all types of families is lower than that of women.

The study found that parents' education level in complete families is higher than in incomplete ones: about 60% of mothers and 46% of fathers have a higher education diploma or are university students. The level of education of single mothers with many children is significantly lower than that of women in complete families with many children. Thus, only 16.7% of the former (52.6% of the latter) received higher education, and every second mother from a single-parent family has only a school education certificate (among married mothers with many children, only every tenth mother has such a certificate; see *Table 4*). This confirms the results of other studies on the correlation between a mother's low level of education and the risk of her divorce or initially single marital status.

Previously, we found that if a man did not have a higher education at the time of the birth of his son or daughter, the risk of physical

Table 4: Education level of parents in different families, %

Education level	Secondary	Number of children			Complete families	Number of children			Incomplete families	Number of children		
		1	2	≥3		1	2	≥3		1	2	≥3
Mother												
Higher	51.3	51	52.4	49.2	54,1	55.8	53.7	52.6	31.6	34.8	33.3	16.7
Unfinished higher	4.9	7.0	4.8	1.6	5,2	7.8	5.1	1.8	2.6	4.3	0	0
Secondary specialized	32.5	29	34.5	33.3	33,3	32.5	33.8	33.3	26.3	17.4	44.4	33.3
General secondary	9.7	11	6.9	14.3	6,3	2.6	6.6	10.5	34.2	39.1	11.1	50
Incomplete secondary	1.6	2	1.4	1.6	1.1	1.3	0.7	1.8	5.3	4.3	11.1	0
Father												
Higher	40.3	45.2	37.7	39.3	40.4	46.7	37.3	39.3	38.5	33.3	50.0	0
Unfinished higher	5.4	4.8	6.5	3.6	5.7	5.3	6.7	3.6	0	0	0	0
Secondary specialized	41.7	42.9	45.7	30.4	42.6	45.3	46.3	30.4	23.1	22.2	25.0	0
General secondary	10.8	4.8	8.7	25.0	10.6	2.7	9.0	25.0	15.4	22.2	0	0
Incomplete secondary	1.8	2.4	1.4	1.8	0.8	0	0.7	1.8	23.1	22.2	25.0	0

Source: own research results.

and neuropsychological developmental delay (PNPD) of his child in the first year of life increased by 50% (relative risk (RR)=1.52; confidence interval (CI) 95%:1.19-1.95) (Shmatova et al., 2023a). In turn, the mother's level of education showed no association with her children's PNDD at age of 1 year old.

In our cohort monitoring, 83% of parents with many children were officially married at the time of child's inclusion in the study (2014 and 2020), which is higher than among mothers with one or two children (72–82%). Another 9.2% lived together with the father of the child without registration in the civil registry office (in other families the share of "civil marriages" is higher – 14%).

At the time of this study (2022), their marital status remained unchanged (in families with fewer children, 3–6% divorced), which may indicate a greater strength of union in large families.

Nevertheless, every tenth large family participating in the cohort monitoring is incomplete (Tab. 5). Their share is slightly higher among families with 1–2 children (13%). According to the results of our earlier studies, incomplete families pose a threat to children's health and development. Thus, unmarried, divorced women are more likely to develop

anemia during pregnancy (RR = 1.20), fetal intra-uterine developmental delay (FIDD) (RR = 2.22), and newborn's congenital malformations (RR = 1.66). Their children are significantly more likely to be sick (RR = 1.13) (Shmatova et al., 2023a) and to be developmentally delayed already in the first year of life (RR = 1.46; 95% CI: 1.15-1.84). Subsequently, by 3–4 years of age, there is a two-thirds increase in the likelihood of disorders of the child's NPD (by the preschool age the risk of diseases of the cardiovascular system and ENT organs increases almost 4 times and twice respectively, by 6–7 years of age the risk of neurological pathologies (Shmatova et al., 2022).

Relations with a spouse (or a child's father in incomplete families) in a large family, according to the survey of mothers, are subjected to additional tension. Thus, mothers with many children characterize them as "good" less often (65%, in incomplete families even less often – every third; see Tab. 5) than, for example, mothers of two children (78%).

We have previously found that dissatisfaction with marital relations, even in the presence of an officially registered marriage, increases the likelihood of child developmental disorders at age 1 year by more than one third (RR = 1.36; 95% CI: 1.09–1.71) (Shmatova et al., 2023a).

Table 5: Family type, mother's marital status and her satisfaction with her relationship with the child's father in the year of the study, 2022, %

Answer option	Average	Number of children			Complete families	Number of children			Incomplete families	Number of children		
		1	2	≥3		1	2	≥3		1	2	≥3
Family type												
Complete	87.7	77.0	93.8	90.5	100	100	100	100	0	0	0	0
Incomplete	12.3	23.0	6.2	9.5	0	0	0	0	100.0	100.0	100.0	100.0
Child's mother marital status												
Married (officially registered marriage)	80.2	70.0	84.8	85.7	91.5	90.9	90.4	94.7	0	0	0	0
Living together with a partner without marriage registration	6.2	6.0	6.9	4.8	7.0	7.8	7.4	5.3	0	0	0	0
Single	7.1	14.0	2.8	6.3	0.7	0	1.5	0	52.6	60.9	22.2	66.7
Widow	1.6	3.0	1.4	0	0	0	0	0	13.2	13.0	22.2	0
Divorced	4.9	7.0	4.1	3.2	0.7	1.3	0.7	0	34.2	26.1	55.6	33.3
In your opinion, what is your relationship with your spouse (with the father of the child)?												
Good	71.4	66.0	77.9	65.1	78.1	81.8	80.1	68.4	23.7	13.0	44.4	33.3
Normal	18.5	17.0	16.6	25.4	18.1	14.3	16.9	26.3	21.1	26.1	11.1	16.7
Could be better	3.2	3.0	2.8	4.8	2.6	1.3	2.9	3.5	7.9	8.7	0	16.7
They don't suit me	1.0	2.0	0	1.6	0.4	1.3	0	0	5.3	4.3	0	16.7
Bad	1.3	1.0	0.7	3.2	0.4	0	0	1.8	7.9	4.3	11.1	16.7

Source: results of own study.

Parents' educational level correlates not only with the strength of family relationships, but also with health literacy and medical activity⁴. Mother's education and her cultural beliefs play a crucial role in accessing health care services from pregnancy (prenatal care), which affects both maternal and child health.

We have revealed that medical activity of parents with many children is somewhat lower. They are more likely to miss scheduled medical examinations and vaccinations (14.3%), especially in single-parent families (17 and 33%, respectively). The latter may be related not only to the lower level of education of parents, but also to the difficulties for a single mother to visit a medical facility with one child, leaving the others in someone else's care. Therefore, assistance in solving this problem should also be included in programs to support large families, social mediation for the purpose of health saving of their members.

Parents' behavior, their attitude to healthy lifestyle is also a certain risk factor for children's health. Our data show that parents of three or more children more often adhere to self-preserving behavior. According to the responses of mothers participating in the cohort monitoring, 29% of mothers with many children never drink alcohol (Tab. 6). Among mothers with one child, 27% of them do so, and among mothers with two children the figure is even less – 18%. A similar situation is observed with fathers with many children. Almost every fifth of them claims that they do not drink alcohol (19%). Among single fathers with one child, 16% chose this answer option, and among fathers with two children – 12.4%. Moreover, among single mothers with many children the share of those who completely refuse from destructive alcohol consumption practices is even higher (every third).

⁴ Life-course approach for maternal and child health: Much to do (2023). The Lancet Regional Health-Southeast Asia, 15, 100263. URL: <https://www.thelancet.com/action/showPdf?pii=S2772-3682%2823%2900123-3> (accessed 22.08.2023).

Table 6: Alcohol consumption by parents in different families, %

Response options to the question "How often do you drink alcohol?"*	Total families	Number of children			Complete families	Number of children			Incomplete families	Number of children		
		1	2	≥3		1	2	≥3		1	2	≥3
Mother												
Never	23.1	27.0	17.9	28.6	21.9	27.3	16.2	28.1	31.6	26.1	44.4	33.3
Once in a while, on special occasions (weddings, birthdays of relatives and friends, etc.)	51.0	50.0	53.1	47.6	51.9	49.4	54.4	49.1	44.7	52.2	33.3	33.3
On holidays (New Year, March 8, February 23, etc.)	18.5	11.0	22.8	20.6	19.3	11.7	23.5	19.3	13.2	8.7	11.1	33.3
Every week on weekends	1.6	1.0	2.1	1.6	1.9	1.3	2.2	1.8	0	0	0	0
Father												
Never	14.9	16.0	12.4	19.0	15.9	18.2	13.2	19.3	7.9	8.7	0	16.7
Once in a while, on special occasions (weddings, birthdays of relatives and friends, etc.)	45.1	44.0	47.6	41.3	50.0	53.2	50.0	45.6	10.5	13.0	11.1	0
On holidays (New Year, March 8, February 23, etc.)	22.1	18.0	26.2	19.0	23.7	18.2	27.9	21.1	10.5	17.4	0	0
Every week on weekends	3.6	2.0	4.8	3.2	4.1	2.6	5.1	3.5	0	0	0	0

* "Constantly" response option was not selected by any survey participant.
Source: results of own study.

External (environmental) conditions

The material security of the family first of all affects the health of the expectant mother and complicates her pregnancy. Previously, we found on the basis of cohort monitoring data that low purchasing power and unfavorable housing conditions are significant factors in the development of anemia and edema in the mother during pregnancy (Shmatova et al, 2022), as well as in the preschool years, increasing the risk of a child being placed on a dispensary (RR = 1.39, 95% CI: 1.11-1.74), mainly for gastrointestinal diseases (RR = 1.87, 95% CI: 1.13–3.09) and neurological pathologies (RR = 1.53, 95% CI: 1.12–2.11).

Analysis of data from our two monitoring cohorts in 2022 showed that average per capita income per family member was lower in large families than in families with one (by a quarter) and two children (by 10%; Tab. 7). In incomplete families, the income gap is even greater: in single mothers with many children, it is 22% lower than in full mothers with many children; 26% lower than in incomplete families raising two children, and 36.8% lower than in single mothers of a single child.

The main share of parents with many children (70%) believe that they can afford to buy necessary food and clothes, but are unable

to make large purchases (car, refrigerator, etc.). About 5% believe that their income is "quite enough not to deny themselves anything". Nevertheless, every fifth mother with many children who participated in the monitoring admitted that "money is enough only to buy food" (among mothers with one or two children it is twice less, 11–12%).

The overwhelming part of the monitoring participants' family budget is spent on food and various obligatory payments. In complete families with many children, the highest share of expenditures (a quarter) falls on utility payments, payment for kindergarten, additional education of children, etc. (Fig. 1). Single mothers bringing up three or more children more often do not work; their children attend preschool educational institutions and various paid classes less often. Accordingly, they have less expenses on this item, as well as loans, than in other families. However, they have to spend the most on food (60%) and assess the provision of their children with necessary foodstuffs as "good" (50%) or "satisfactory" (50%).

Every fifth large family (19%) lives in its own house, which is five times more often than

Table 7. Average monthly income and purchasing power in families

	Total families	Number of children			Complete families	Number of children			Incomplete families	Number of children		
		1	2	≥3		1	2	1		≥3	2	1
Please calculate the average monthly income per family member												
Average value, thousand rubles	17.6	20.2	16.8	15.2	17.7	20.7	16.8	15.6	16.8	18.6	15.9	11.8
Please estimate the possibilities of meeting the needs of your family based on its total income, %												
We have enough money to buy the necessary food and clothes, but we have to put off larger purchases	7.5	10.0	6.9	4.8	8.1	11.7	7.4	5.3	2.6	4.3	0.0	0.0
We have enough money to buy necessary food and clothes, but we have to postpone larger purchases for later	71.8	73.0	71.7	69.8	73.7	76.6	74.3	68.4	57.9	60.9	33.3	83.3
Money is enough only to buy food	13.0	12.0	11.0	19.0	11.1	7.8	9.6	19.3	26.3	26.1	33.3	16.7
Money is not enough even to buy food, so we have to go into debt	0.3	0.0	0.7	0.0	0.0	0.0	0.0	0.0	2.6	0.0	11.1	0.0

Source: results of own study.

single-child families (4%) and twice as often as two-child families (8.3%; *Tab. 8*). Single mothers bringing up three and more children do not have their own houses. At the same time, every sixth such family lives in a dormitory room, one sixth – in a rented apartment, every sixth – in a social rent apartment, the rest live in an apartment owned in full or joint ownership with other family members.

At the same time, 27% of large families have partially or completely inadequate housing (10% of families with one or two children; see *Tab. 8*).

Practically every fourth large family considers its living conditions unsatisfactory (36.5% of all large family participants of the cohort study and 66.7% of incomplete large families), refers to cramped conditions (23.8%), and more often incomplete families (every second family). The latter seems to be related to the fact that incomplete families more often live in dormitories and rented housing and do not have their own home.

More than 40% of children from large families of the monitoring participants live in a room with a sister and/or brother, only 12.7% have a separate room, which is two and four times less often than in families with two or one child, respectively.

We previously found that if the family's housing conditions were rated as "satisfactory", "poor", or "very poor", there was a two-thirds increased risk of child developmental delay in the first year of life (RR = 1.66; 95% CI: 1.37–2.03) (Shmatova et al., 2023a).

Environmental factors undoubtedly have a negative impact on child health in the future. For example, expectant mothers living in ecologically unfavorable areas are at greater risk of edema during the period of carrying the child. The presence of polluted air in the place where the family lives increases the risk of caesarean section during childbirth by 60%, which can also negatively affect the health of the future child. Consumption of "poor quality water" by a pregnant woman increases the risk of her unborn child developing cardiac disease by 1–2 years of age (RR = 1.63, 95% CI: 1.17–2.94). Electromagnetic radiation increases the risk of having a child with developmental abnormalities, congenital malformations and diseases by 2.7 times (Shmatova et al., 2022); by 6–7 years of age, such children are significantly more likely to be sick (RR = 1.25, 95% CI: 1.19–1.30), especially with ENT diseases (RR = 3.39, 95% CI: 1.50–7.69) and more prone to obesity (RR = 9.19, 95% CI: 1.75–48.35).

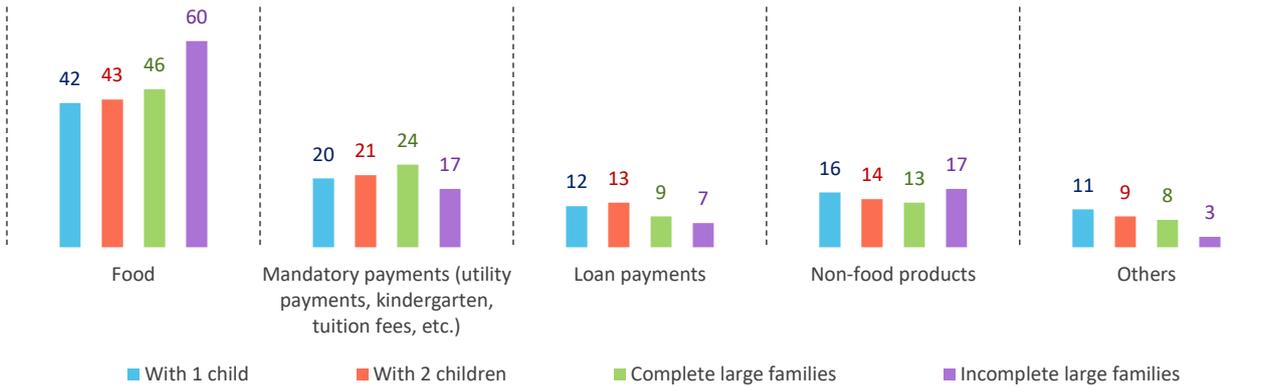


Fig. 1. Distribution of average monthly income in different families, %

Source: results of own research.

Table 8. Housing conditions of different types of families, %

	Average	Number of children			Complete families	Number of children			Incomplete families	Number of children		
		1	2	≥3		1	2	≥3		1	2	≥3
Type of housing*												
House	9.1	4.0	8.3	19.0	10.0	3.9	8.8	21.1	2.6	4,3	0	0
Apartment	88.2	92.0	90.3	77.8	88.6	94.8	89.7	77.3	87.0	82,6	100.0	83.4
Room in a dormitory	2.2	3.0	1.4	3.2	1.1	0	1.5	1.8	10.5	12,9	0	16.7
Form of ownership												
Belongs to you personally	43.5	35.0	51.0	39.7	42.6	31.2	50.0	40.4	50.0	47,8	66.7	33.3
Jointly owned with family members	48.7	50.0	46.2	52.3	51.5	57.1	47.1	54.4	29.0	26,0	33.3	33.4
Rent	3.5	8.0	0	4.8	2.3	5.2	0	3.6	13.2	17,4	0	16.7
Social rent / service	3.2	5.0	2.1	3.2	2.6	3.9	2.2	1.8	7.9	8,6	0	16.7
Self-assessment of the degree of home improvement												
Well-maintained	86.7	90.0	90.3	73.0	87.0	90.9	91.2	71.9	84.2	87,0	77.8	83.3
Partially improved	11.7	9.0	9.0	22.2	11.5	9.1	8.1	22.8	13.2	8,7	22.2	16.7
Unequipped	1.6	1.0	0.7	4.8	1.5	0	0.7	5.3	2.6	4,3	0	0
Self-assessment of the family's housing conditions												
Good	73.4	76.0	77.9	58.7	74.8	79.2	77.9	61.4	63.2	65,2	77.8	33.3
Satisfactory	24.7	22.0	21.4	36.5	23.3	19.5	21.3	33.3	34.2	30,4	22.2	66.7
Bad	1.0	1.0	0	3.2	0.7	0	0	3.5	2.6	4,3	0	0
Very bad	0.6	0.0	0.7	1.6	0.7	0	0.7	1.8	0	0	0	0
If conditions are unfavorable, how it is expressed, % of those who marked "bad", "very bad"												
Poor quality of drinking water	50.0	54.5	33.3	60.0	52.0	55.6	28.6	66.7	40.0	50,0	50.0	0
Polluted air	90.0	90.9	100.0	80.0	88.0	88.9	100.0	77.8	100.0	100,0	100.0	100.0
Contaminated soil (landfills, garbage)	33.3	36.4	22.2	40.0	40.0	44.4	28.6	44.4	0	0	0	0
Increased noise level	33.3	27.3	44.4	30.0	40.0	33.3	57.1	33.3	0	0	0	0
Lack of greenery, park	20.0	27.3	11.1	20.0	24.0	33.3	14.3	22.2	0	0	0	0
No places for children to play	30.0	27.3	11.1	50.0	32.0	33.3	0	55.6	20.0	0	50.0	0
Parking lot occupies the whole yard	40.0	33.3	40.0	50.0	37.5	33.3	33.3	50.0	50.0	0	50.0	0
Proximity to the highway	26.7	18.2	44.4	20.0	24.0	22.2	28.6	22.2	40.0	0	100.0	0
Other	6.7	0	11.1	10.0	8.0	0	14.3	11.1	0	0	0	0

* The table excludes the answer options "communal apartment" and "other" that were not selected by anyone. Source: results of own study.

One in six large families in 2022 rated environmental conditions in their place of residence as “poor, very poor”, which was 2.5 times more common than two-child families and one-third more common than single-child families (*Tab. 9*).

Among unfavorable environmental conditions in the place of residence, parents with many children most often name poor quality of drinking water (60%), contaminated soil (40%) and the yard filled with parked cars, lack of playgrounds (50%).

As for the issues of child rearing and care in different families, the survey revealed the following: parents with many children are more confident, more often than others they are convinced that they have no problems in this sphere (46%; *Tab. 10*); they are more aware of the issues of social assistance and support for families with children.

The constraints of large families in material resources and reduced purchasing power cause a number of corresponding difficulties: more often they complain about unsatisfactory housing conditions (11.7% of those experiencing problems; see *Tab. 10*); lack of money in general (every second), for full nutrition and medicines for children (every tenth), paid medical services (29.4%). There is also a deficit of medical specialists necessary for children within the framework of MHI (every fourth). Parents of three or more children are much more likely to experience a lack of time resources for practicing with their child (about 30% of those who admitted to having

difficulties). In incomplete families with many children, the level of unresolved problems in child care and upbringing is significantly higher than in complete families. According to the data presented in *Table 10*, it is not so much the presence of three or more children as the absence of the second parent in their livelihood and upbringing that plays the greatest role in the emergence of difficulties. It is single-parent families that are the most important risk group for the family's financial well-being, child health and development.

Children's health in large families

Let us try to assess the health status of children participating in the cohort monitoring of two waves (born in 2014 and 2020) according to two sources: mothers' assessment and medical history.

Only every second mother with many children (*Tab. 11*) characterizes the health of her children as “good”. In one- and two-child families their share is much higher – two thirds. In incomplete families with many children every sixth mother characterizes her children's health as “bad”.

The data from questionnaires of medical staff confirm the subjective assessments of mothers. Children from large families, according to the patient's medical records, are twice less likely to have the first health group (9.5%) than an only child (21%) or two children (23.4%) in the family. Thus, only every tenth child in a family with three or more children is healthy.

According to medical anamnesis data, monitoring participants from large families

Table 9. Self-assessment of environmental conditions in the place of family residence depending on the number of children, %

Environmental conditions	Total families	By the number of children			Complete families	Including			Incomplete families	Including		
		1	2	≥3		1	2	≥3		1	2	≥3
Good	33.4	37.0	29.7	36.5	34.1	36.4	31.6	36.8	28.9	39.1	0	33.3
Satisfactory	51.9	45.0	59.3	46.0	52.6	48.1	58.1	45.6	47.4	34.8	77.8	50.0
Bad	7.5	7.0	5.5	12.7	7.4	7.8	5.1	12.3	7.9	4.3	11.1	16.7
Very bad	2.3	4.0	0.7	3.2	1.9	3.9	0	3.5	5.3	4.3	11.1	0
Difficult to answer	4.9	7.0	4.8	1.6	4.1	3.9	5.1	1.8	10.5	17.4	0	0
Bad + very bad	9.7	11.0	6.2	15.9	9.3	11.7	5.1	15.8	13.2	8.7	22.2	16.7

Source: results of own study.

Table 10. List of problems related to child care and upbringing in families, % of those who faced problems

Перечень проблем	Total families				Complete families				Incomplete families			
	average	with 1 child	with 2 children	large families	average	with 1 child	with 2 children	large families	average	with 1 child	with 2 children	large families
There are problems, which include	55.8	57	55.9	54	54.1	54.5	54.4	52.6	68.4	65.2	77.8	66.7
Lack of money:	39.1	36.8	35.8	50.0	32.9	26.2	31.1	46.8	73.1	66.7	85.7	75.0
- to buy personal items for the child	4.7	8.8	1.3	5.9	2.8	4.8	0.0	6.7	15.4	19.9	14.3	0.0
- to give the child nutritious food	4.1	5.3	1.3	8.9	1.3	0.0	0.0	6.7	19.3	19.9	14.3	25.0
- to buy toys, games, books	5.2	7.0	3.8	5.9	1.3	2.4	1.3	0.0	26.9	19.9	28.5	49.9
- to visit paid specialists	24.4	17.5	27.2	29.4	22.0	14.3	24.3	26.6	38.5	26.7	57.1	49.9
- to buy medicines for the child	3.4	0.0	3.8	8.9	2.0	0.0	2.8	3.4	11.5	0.0	14.3	49.9
- to use paid services of additional education (8 years old)	36.2	52.6	24.5	41.1	30.1	41.7	20.0	42.2	67.5	76.7	51.4	0.0
Lack of time for lessons with the child	22.0	12.3	25.9	29.4	23.3	11.9	25.7	33.3	15.4	13.3	28.5	0.0
Lack of specialized doctors needed for the child	21.0	17.5	20.9	26.5	21.3	21.5	20.2	23.4	19.3	6.6	28.5	49.9
Parents» lack of knowledge	21.5	24.6	20.9	17.6	24.0	31.0	23.0	16.7	7.7	6.6	0.0	25.0
- about the peculiarities of the child's development	5.7	10.5	1.3	8.9	6.8	14.3	1.3	10.1	0.0	0.0	0.0	0.0
- about child rearing	5.2	5.3	5.0	5.9	6.1	7.2	5.3	6.7	0.0	0.0	0.0	0.0
- about social assistance and support programs	14.0	14.0	16.1	8.9	15.7	19.1	17.6	6.7	3.8	0.0	0.0	25.0
Lack of children's institutions of additional education in walking distance	16.8	19.3	17.4	11.7	15.7	16.7	16.2	13.3	23.1	26.7	28.5	0.0
Unsatisfactory housing conditions	3.4	3.5	0.0	11.7	3.5	4.8	0.0	10.1	3.8	0.0	0.0	25.0
Did not get a place in kindergarten (at the age of 2)	9.5	10.0	11.4	4.1	9.1	10.1	12.3	0.0	11.7	10.3	0.0	25.0
Lack of attention from medical personnel	4.1	3.5	6.1	0.0	4.8	4.8	6.8	0.0	0.0	0.0	0.0	0.0

Source: results of own study.

are sick more often (21.7% were sick more than five times a year) than participants from other families (about 11–12%). Every child communicates with team members in general education institutions (kindergarten, school), as well as in institutions of additional education, so the risks of contact with the virus and infection in large families increase many times. Especially if due to busyness or inattention to the health of children parents miss the issues of strengthening immunity, hygiene and disease prevention. It was noted above that the medical activity of parents with many children is lower than that of parents with few children.

When assessing the physical development of their children, parents of an only child more often define it as “advanced” (11% versus 4% of mothers of two children and 3% of mothers of three or more; see Tab. 11). Mothers with many children, on the contrary, more often note its lagging behind (12.3%) compared to those with fewer children (about 5%). Among mothers with many children, the share of those who believe that their children's NPD corresponds to or exceeds the norm is lower (81.5% vs. 88–93% of mothers with one or two children). Pediatricians assessing the health of children participating in the cohort monitoring confirm the mothers'

Table 11. Mothers' subjective assessment of their children's health and development in different families, %

Health and development	Average	Number of children			Complete families	Number of children			Incomplete families	Number of children		
		1	2	≥3		1	2	≥3		1	2	≥3
Assessment of the child's overall health												
Good	63.3	67.0	67.1	49.2	65.2	71.4	68.6	49.2	50.0	52.2	44.4	50.0
Satisfactory	33.8	29.0	32.2	44.6	32.6	26.0	30.7	45.8	42.1	39.1	55.6	33.3
Poor	0.6	0	0	3.1	0.4	0	0	1.7	2.6	0	0	16.7
Assessment of the child's physical development												
Ahead of age	6.1	11.0	4.1	3.1	6.6	13.0	4.4	3.4	2.6	4.3	0	0
Corresponds to age	85.9	81.0	90.4	83.1	85.7	79.2	89.8	84.7	86.8	87.0	100.0	66.7
Slightly behind the norm	5.8	5.0	4.8	9.2	6.2	6.5	5.1	8.5	2.6	0	0	16.7
Significantly behind the norm	0.6	0	0	3.1	0.4	0	0	1.7	2.6	0	0	16.7
Assessment of the child's neuropsychiatric development												
Ahead of age	4.5	5.0	5.5	1.5	4.4	5.2	5.1	1.7	5.3	4.3	11.1	0
Corresponds to age	84.2	83.0	87	80.0	83.9	80.5	86.9	81.4	86.8	91.3	88.9	66.7
Slightly behind the norm	5.1	6.0	5.5	3.1	5.9	7.8	5.8	3.4	0	0	0	0
Significantly behind the norm	0.6	0	0	3.1	0.4	0	0	1.7	2.6	0	0	16.7
Ahead of age + Corresponds to age	88.7	88.0	92.5	81.5	88.3	85.7	92.0	83.1	92.1	95.6	100.0	66.7
Behind the norm	5.7	6.0	5.5	6.2	6.3	7.8	5.8	5.1	2.6	0	0	16.7
Source: results of own study.												

assessments: only 85% of such children have a normal level of child development (93% of children from other families). This is especially true for single-parent families with three or more children, where every third child's NPD lags behind the norm (every eighth child in full families).

Conclusion

Russia will be able overcome the processes of depopulation only through the popularization of traditional strong large families. At the same time, it is extremely important to preserve the health of the child population, which is an important component of human potential, one of the most valuable economic resources, and a driving force of economic growth (Gorchakova, 2020).

The scientific novelty of the presented work lies in the comparison of the conditions of children's health formation in families with a different number of children. The conducted analysis allows us to conclude that the conditions are somewhat worse in families with many children. In families with three and

more children some socio-demographic factors of risk to child health are more pronounced. Among parents with many children there is a higher proportion of those without higher education and lower medical activity than among parents of one to two children. The average per capita income and purchasing power of large families are also lower. They more often live in unfavorable housing and environmental conditions. Protective factors of child health and development in a large family include a stronger parental stance on alcohol consumption and greater strength of the marital union. However, less satisfaction with marital relations (a risk factor for children's health) was revealed.

The analysis confirms the negative impact of risk factors on the health of children in large families. These children demonstrate worse indicators of physical and neuropsychological development compared to children from families with few children.

Negative conditions of health formation in large families are not unique for this type of family. They are predominantly provoked

by socio-economic problems and parents' lack of time resources, so large families objectively need more support. State programs to stimulate fertility and support (mostly poor) families with children certainly have a favorable impact, but they are insufficient with regard to large families. To receive most of the support measures, the mother must be single or the family must be poor, which does not inspire potential parents to have more children. All this suggests the need to improve the effectiveness of state support programs for families with three or more children.

It is important not only and not so much socio-economic assistance (as it can provoke social dependency and an increase in the number of antisocial families), but also the development of "helping" family mediation services, social nannies, the introduction of quotas for free attendance of children from large families to sections of additional education. The future of the country is human capital, which is closely linked to the development of health care, education, culture and sports. The state should make these sectors as accessible and free of charge as possible for families with three or more children. From the point of view of human capital, it is also important that the number of strong large families with highly educated parents interested in maintaining the health and development of their the future intellectual, labor and reproductive potential of the country, grows.

The practical significance of the conducted research lies in the allocation of large families

as a separate target group of therapeutic and preventive measures among the child population of infant and primary school age when planning future strategies for the prevention of disorders of physical and neuropsychiatric development of children, improving the quality of life of large families and preserving the gene pool of the nation.

The limitations of the study are mainly related to the specifics of cohort monitoring. (1) The sample consisted of those who voluntarily agreed to participate in the study, usually the better-off families. (2) The sample is shrinking each year. (3) There is an immeasurable confounding of all internal and external factors and conditions in shaping children's health that requires further study. (4) Changing the wording of questions, excluding previous ones and adding new ones to the questionnaires in some cases does not allow to trace trends and peculiarities of the impact of risk factors.

In the future, we plan to study the peculiarities of children's health formation in large families with the inclusion of data from earlier waves of monitoring (cohorts born in 1995, 2001, 2004) in order to expand the list of influencing risk factors, including throughout the entire period of a child's adulthood (up to 18 years of age). The need to analyze available statistical data should be separately noted. Another area of research will be the study of effective practices to stimulate the population's motivation to have three or more children and the state system of support for large families in Russia and in various countries of the world.

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