

RUSSIAN GRANDPARENTING: DEMOGRAPHIC AND STATISTICAL MODELLING EXPERIENCE

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ABSTRACT

The demographic situation in Russia has been quite complicated for many years. Its important negative manifestations are low birth rates and low life expectancy at birth. In this situation, studies on the role of older people (primarily grandparents) in the birth, upbringing, and development of grandchildren become especially important. The purpose of our exploratory research is to model the objective and subjective characteristics of Russian grandparents who realize the functions of parental labour in relation to their grandchildren. Statistical modelling of differences between the target group and the alternative group was carried out primarily on the basis of the parametric and nonparametric independent samples tests: t-test, Mann-Whitney U test, median test. Specific features related to age, level of education, social activity and subjective assessments of health of the grandmothers involved in daily childcare were revealed. The model of a typical grandmother actively involved in parental labour was presented. This will be the basis for developing a full-scale survey and determining the best research design.

INTRODUCTION

The demographic situation in Russia has been quite complicated for many years. Low fertility – Russia is 186th in the world in terms of the total fertility rate (Country Comparison: Total Fertility Rate data 2020), low life expectancy at birth – 158th in the world (Country Comparison: Life Expectancy at Birth data 2020) force the country's leadership to make serious efforts to change the prevailing trends. In 2019, the Russian government adopted a new state program - the so-called national project “Demography” (National project “Demography” 2018). This project pays special attention to measures aimed at increasing the birth rates and the life expectancy (including active life) of the population.

These two problems are studied separately in Russia. At the same time, modern demographers, sociologists, psychologists and economists from around the world are studying the role of older people (primarily grandparents) in the birth, upbringing, and

development of grandchildren (Sichimba et al. 2017; Nedelcu 2017; Coall et al. 2018). In particular, the family-work conflict stands out as one of the most important problems of the working population in developed economies in recent years (Aisenbrey and Fasang 2017). Attracting grandparents to the upbringing of grandchildren is one of the potential mitigation tools. Scientists note the various positive effects of this intergenerational interaction for the elderly people: increased life expectancy (Chapman et al. 2018); strengthening of positive motivation and improved mental and psychological well-being (Coall and Hertwig 2010); improved physical health (Kim et al. 2017), reduced risk of death (Hilbrand et al. 2017); increased level of happiness (Danielsbasca and Tanskanen 2016), etc. There are also studies that identify positive aspects of intergenerational interaction for children: the impact on their learning outcomes (Del Boca et al. 2018), mitigation of situations of family crises, in particular, parental divorces (Attar-Schwartz and Buchanan 2018), etc.

The inclusion of grandparents in the process of raising grandchildren is influenced by various objective and subjective factors. Objective factors are, for example, the socio-demographic characteristics of the elderly: age, gender, health status, marital status, education, work experience, geographical distance from the place of residence of grandchildren, etc. Apparently, the role of subjective factors is also significant: personal activity, hierarchy of life values, satisfaction with relationships with children, self-assessment of health status, etc.

We consider the participation of grandparents in raising their grandchildren as a type of labour activity. They carry out part of the parental functions by taking care of their grandchildren. The approach to parenthood as a labour activity is quite common in the scientific literature (Erickson 2005; Oakley 1974; Daniels 1987; Pedersen et al. 2011; Bagirova et al. 2014; Veress and Bagirova 2018).

The purpose of our study is to model the objective and subjective characteristics of grandparents who realize the functions of parental labour in relation to their grandchildren. In our opinion, it is advisable to conduct an analysis separately for grandmothers and grandfathers, since the intensity and reasons for involvement in the process of parental labour may differ

in these gender groups. In this paper, we focus on the study of grandmothers.

DATA AND METHODS

1. A full-scale sample survey is necessary to identify the specifics and factors of parental labour of grandparents. To develop it, we conducted a pilot / exploratory study based on the data available in the Russian official statistics. We used data from the Federal statistical survey “Comprehensive monitoring of living condition” (Comprehensive monitoring of living conditions 2018). This survey is carried out by the Federal State Statistics Service in all regions of Russia once every two years. It covers 60 thousand households. Its results are considered representative of the whole country, urban and rural settlements, and of individual socio-demographic groups of the population. For our research we used the data of the 2018 survey. Some of its questions allowed us to model the parental labour of grandparents in the first approximation. In Russia, there are no surveys that use the category of “parental labor” in the Russian official statistics.

2. We used variable: “Does your daily routine include taking care of children, your own or other people’s (without payment)?” as the most valid indicator of the population’s involvement in the process of parental labour. Answer options to this question included: yes, no, difficult to answer, no answer.

3. Since there are no data in Russian official statistics that allow us to unambiguously identify the socio-demographic groups of elderly people as people who have grandchildren, we modeled this group based on the most valid indicator - the respondent's age. We focused on the official statistical indicator of the average age of a first-time mother: 28.7 years old in 2018 (Mean age of mothers at childbearing (years) 2019) and 25.5 years old in 1989 – the previous generation of mothers (Mean age of mothers at childbearing (years) 2002). Thus, we selected women aged 55 and older for our research. On average, a Russian woman becomes a grandmother at this age.

4. In the process of forming the target group of respondents, we considered the fact that the intensity, nature, factors and reasons for involvement in the process of parental labour may differ in two groups of grandmothers – those who live with their grandchildren (in the same household) and those who live separately. Therefore, we considered it appropriate to study these groups differentially. In this study, we focused on the grandmothers who live separately from their grandchildren.

The general scheme for the formation of the target group of respondents is presented in Figure 1. We selected women aged 55 and older, living separately from their children and taking care of children daily (in this case, they are most likely to be grandchildren). Grandmothers who were not involved in the process of daily childcare were an alternative group which the first group was compared to.

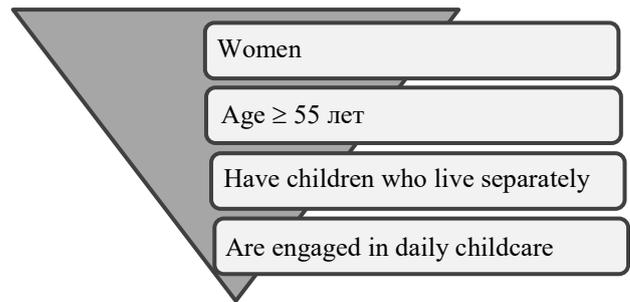


Figure 1: Formation of a Target Group of Respondents for the Study

5. The following variables were selected to model the differences between the target and the alternative groups and to create a socio-demographic portrait of grandmothers actively involved in the process of parental labour:

Var 1: age (years);

Var 2: educational level (number of years spent on education);

Var 3: marital status;

Var 4: place of residence (urban or rural area);

Var 5-8: health variables - objective indicators and subjective assessments:

- Var 5: frequency of applying for outpatient care in a medical organization;

- Var 6: frequency of ambulance calls;

- Var 7: self-assessment of health (from 1 – «very bad» to 5 – «very good»);

- Var 8: self-assessment of the opportunity to lead an active life;

Var 9: social activity variable (visits to the theater, cinema, sports and religious events, cafes and restaurants, trips around the country and abroad over the last year). During the modelling process, this group of indicators served as the basis for creating an aggregate variable which reflects the total number of the respondents' activities over the last year.

The choice of these variables was justified by research hypotheses, which consist of the influence of a combination of objective and subjective characteristics on the respondents’ involvement in childcare. Subjective characteristics included personal activity in various fields (presumably, the higher the activity, the higher the desire and ability to realize the functions of parental labour in relation to grandchildren) and self-assessment of health status (a similar relationship was assumed: the higher the self-assessment of health, the higher the involvement in processes of caring for grandchildren).

6. Statistical modelling of differences between the target group and the alternative group was carried out primarily on the basis of the following parametric and nonparametric independent samples tests:

- t-test;

- Mann-Whitney U test;

- median test.

We found it necessary to use these tests simultaneously for two reasons. Firstly, they allow us to evaluate differences between various types of data with

different distribution types. Secondly, the scientific literature does not present an unequivocal opinion on the possibilities and usefulness of a particular test. The authors prove the greater effectiveness of using various tests based on their own experiments and simulation studies.

T-test is often used to determine if the means of two sets of data are significantly different from each other provided that the test samples are characterized by normal distribution. In our study, we used this test in conjunction with Levene's test for equality of variances for two possible cases – when equal variances are assumed and not assumed. In studies, the use of these tests is most often considered exclusively for continuous data. However, Zar, based on the experiments of several authors, concludes that interval-scale or ratio-scale measurement are not intrinsically required for the application of the parametric testing procedures. These methods may be considered for ordinal-scale data if the assumptions of such methods are met (Zar 2014).

Additionally, we used the Mann-Whitney U test to model differences. This is a nonparametric analogue of the t-test. We used it because assumption of normality was often not met. U test is the most powerful nonparametric alternative to the t-test for independent samples. Several studies have shown that in certain cases Mann-Whitney U test may offer even greater power to reject the null hypothesis than the t-test (see, for example, Hollander, Wolfe and Chicken 2013). Alternatively, Zimmerman shows on the basis of a series of experiments that replacement of the t-test by a nonparametric alternative under violation of homogeneity of variance does not necessarily maximize correct decisions (Zimmerman 1987). Gibbons and Chakraborti, based on the results of a simulation study, conclude that very little power will be lost if the Mann-Whitney U test is used instead of tests that require the assumption of normal distributions (Gibbons and Chakraborti 1991).

Mann-Whitney U test was originally designed to work with continuous data (Mann and Whitney 1947). Later it was corrected to enable using it on data containing ties (see, for example Hollander, Wolfe and Chicken 2013). This is important because some variables in our study are numerical, however, they contain ties. Other variables are ordinal-scaled data (which means that they have ties).

For greater reliability of the results of our modelling, we used the median test, which compares the medians of two samples. Mood shows that the median test is about 64% as powerful as the two-sample t-test (Mood 1954). Zar notes that this test is about 67% as powerful as the Mann-Whitney test (Zar 2014). Fligner and Policello proved that if the two sampled populations have equal variances and shapes, then the Mann-Whitney U test is a test for difference between medians (Fligner and Policello 1981).

Thus, we compiled a socio-demographic portrait (model) of the studied group based on the positive results of at least two independent samples tests.

We also used other methods to analyze the relationship of individual variables – crosstabs analysis with Phi coefficient calculation (if both variables are dichotomous) and Cramer's V (for two categorical variables). However, according to the analysis results, the variables that were analyzed using these methods did not add any significant characteristics to the final model.

RESULTS

3476 people were selected as the target group. These were grandmothers involved in the daily process of parental labour. 19771 people were selected for the alternative group, which the target group was compared to. These were grandmothers who were not involved in the daily process of parental labour.

The tests for the significance of differences (tables 1-5) shows that the target group differs from the alternative group in the following parameters:

- Var 1: age (target group respondents are younger);
- Var 2: educational level (respondents of the target group have a higher level of education);
- Var 7: self-assessment of health status (target group respondents assess their health higher);
- Var 9: social activity in various areas of life (respondents of the target group go to the cinema, theater, cafes / restaurants, to sports events more often).

Table 1: Group Statistics (t-test)

Variable	Is childcare a part of daily activities?	Mean	Std. Deviation
Var 1	Yes	63.78	6.195
	No	68.06	8.943
Var 2	Yes	12.32	2.399
	No	11.64	2.813
Var 7	Yes	2.92	0.507
	No	2.77	0.602
Var 9	Yes	1.61	1.585
	No	1.14	1.401

Table 2: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	Sig. (2-tailed)
Var 1	1*	808.1	0.000	-27.147	0.000
	2*			-34.910	0.000
Var 2	1*	109.6	0.000	13.390	0.000
	2*			14.962	0.000
Var 7	1*	555.4	0.000	13.961	0.000
	2*			15.745	0.000
Var 9	1*	202.4	0.000	17.851	0.000
	2*			16.374	0.000

* 1 – Equal variances assumed

2 - Equal variances not assumed

Table 3: Ranks (Mann-Whitney Test)

Variable	Does your daily routine include taking care of children, your own or other people's	Mean Rank	Sum of Ranks
Var 1	Yes	8954.28	31125090.50
	No	12093.37	239098037.50
Var 2	Yes	12823.15	44457846.50
	No	11361.13	223723373.50
Var 7	Yes	12822.19	44557127.50
	No	11405.63	225363867.50
Var 9	Yes	13417.73	46640028.00
	No	11308.64	223583100.00

Table 4: Mann-Whitney Test Statistics

	Var 1	Var 2	Var 7	Var 9
Mann-Whitney U	2.51E+07	2.98E+07	3.01E+07	2.81E+07
Wilcoxon W	3.11E+07	2.24E+08	2.25E+08	2.24E+08
Z	-25.451	-11.993	-13.959	-17.966
Asymp. Sig. (2-tailed)	0.000	0.000	0.000	0.000

Table 5: Median Test Statistics

	Var 1	Var 2	Var 7	Var 9	
Median	66.00	12.00	3.00	1.00	
Chi-Square	545.0	54.0	14.7	266.9	
df	1	1	1	1	
Asymp. Sig.	0.000	0.000	0.000	0.000	
Yates' Continuity Correction	Chi-Square	544.2	53.7	14.4	266.2
	df	1	1	1	1
	Asymp. Sig.	0.000	0.000	0.000	0.000

The differences between the two compared groups in the following parameters were insignificant:

- Var 3: marital status (the share of respondents engaged in daily childcare did not differ among women who were married – officially or not, never married, widowed or divorced)

- Var 4: place of residence (involvement in daily childcare did not differ between grandmothers living in urban and rural areas);

- Var 5 and Var 6: objective parameters of health status (the frequency of ambulance calls and the frequency of seeking outpatient care in a medical organization did not differ between the two compared groups of grandmothers; interestingly, the aforementioned subjective assessments of health turned out to be a significant factor differentiating the two groups).

Thus, the test results allowed us to create the following model of a typical grandmother actively involved in the process of parental labour (Figure 2).

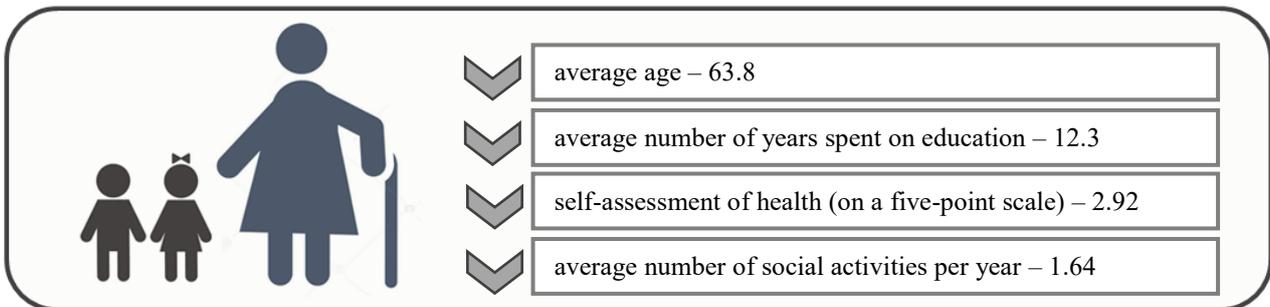


Figure 2: Model of a Typical Grandmother Actively Involved in the Process of Parental Labour

DISCUSSIONS

Understanding the characteristics of grandmothers who are involved in the upbringing of their grandchildren raises questions about the reasons for the non-participation of others. In our opinion, the motivation for parental labour of grandparents in relation to their grandchildren can be enhanced by special state demographic measures aimed at stimulating this type of labour. We largely mean material incentives, i.e. payments for the time that grandparents spend with their children, thereby replacing parents. In our opinion, the

establishment of such payments could be based on documents from institutions of preschool, school and additional education, which would indicate who brings the child to this institution and who picks him/her up after classes, what is the duration and frequency of these classes. In addition, some of the documents can be provided by the healthcare system, which has the ability to record information about the caregiver of a sick child. An increase in the time spent by grandparents with grandchildren should lead to an increase in the amount of corresponding payments for their labor.

An increase in the number of grandparents engaged in parental labour would help solve a number of important Russian socio-economic problems:

1) insufficient provision of kindergartens. For example, the average availability of preschool education in Russia for children aged 1.5 to 3 is 85.8% (Availability of preschool education for children aged 1.5 to 3 data. 2019), however, this indicator does not exceed 70% in 9 Russian regions. The increase in the number of grandparents involved in parental labour is primarily relevant for regions with low levels of kindergarten availability. Perhaps these regions could become a pilot platform for the development of incentive systems for the inclusion of grandparents in the implementation of the parental labor functions;

2) low standard of living of seniors. In 2019, the average amount of an appointed old-age pension was 15096 rubles (219.6 euros) (Average amount of an appointed old-age pension data 2019). State-paid parental labour could raise the living standards of pensioners. In addition, the very fact of payments (even small ones) for caring for grandchildren would indicate the recognition of the importance and significance of this activity by the state, which could become an independent incentive for participation in this type of labor;

3) low fertility. In 2018, the total fertility rate in Russia was 1.58, which is 25% lower than the level of simple reproduction (Total Fertility Rate data 2019). The help of grandparents in raising grandchildren could encourage the family to have the next child and to reduce the breaks between the births of children. Both would contribute to the increase in the fertility rate in Russia.

CONCLUSIONS

The study led to the following conclusions. Firstly, the results, which were obtained on the basis of non-specialized (and therefore, possibly not fully valid) data, nevertheless, revealed specific features of the group of grandparents involved in daily childcare and formed the model of a typical grandmother actively involved in parental labour. This will become the basis for the development of a full-scale survey, which will allow us to investigate the features more fully and to model the behavior of this population group. Conducting this survey is extremely relevant, given the importance of increasing the size of this population group to solve the problems of reproduction of the Russian population.

A significant part of this survey will be devoted to the study of socio-psychological variables related to the motivation and other subjective factors of participation of grandparents in the parental labour. The use of such variables will allow us to create a more complete model of a typical grandmother actively involved in the process of parental labour.

In addition, we consider it appropriate to conduct further analysis on the basis of another methodological approach, the results of which will complement and potentially expand the previously obtained results. The

approach involves assessing the level of “active grandparenting” in different groups of grandmothers identified by various socio-psychological, demographic and economic variables. This will enable us to create a detailed model of a typical grandmother actively involved in the process of parental labour. Such approach will allow us to identify specific “growth potentials”- those groups of grandmothers for whom special incentive measures can be developed to increase their involvement in parental labour.

Secondly, the resulting model of a typical grandmother engaged in parental labour allows us to create a certain “portrait” of the opposite category - those who are not involved in this labour. This is a kind of target group for which special state measures can be developed aimed at enhancing the parental labour of grandparents.

Thirdly, we have shown that there are several problems in Russia that can be solved by expanding the circle of grandparents involved in parental labour. This seems possible through the introduction of state incentives for the labour related to the grandchildren care.

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