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POVERTY AND PROBLEMS OF NUTRITION IN THE RUSSIAN REGIONS

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Abstract

The processes of formation and development of human capital are determined by a combination of social, economic and demographic factors. A significant place in the structure of these factors is poverty as a socio-economic phenomenon. Poverty has a negative impact on the quality of human capital, poverty indicators are closely correlated with the disease incidence of the population, with a fairly low level and quality of education. Privation and poverty limit access to quality consumption, and most importantly, to the consumption of quality food with high nutritional value. The purpose of the study is to identify and assess the impact of factors related to poverty on the specific features of nutrition of Russian households exemplified by the territories of the Siberian Federal District. On the basis of an absolute approach to the definition and measurement of poverty, correlation and regression analysis being used, the assessment of the influence of economic and demographic factors on household nutrition in the Siberian regions is offered. The main problems in the diet of people with low income were identified. The research results represent a contribution to the regional economy in terms of the development of social policy instruments for the purpose of equalizing the population in terms of nutritional characteristics. The practical significance of the study lies in the possibility of applying the results of work in the activities of government in the development of social policies and strategies for food security.

Keywords: Absolute poverty, correlation and regression analysis, nutritional characteristics, poverty factors, region.

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1. Introduction

Poverty is one of the most significant factors that have a negative impact on the formation and development of human capital. The quality of human capital is largely determined by socio-economic living conditions, income levels, the spending patterns of the population, the availability of medical care and, most importantly, high-quality consumption, namely a balanced, nutritious diet. The high concentration of deprivations in poor, low-income households does not allow citizens to meet their nutritional needs in accordance with generally accepted consumption standards (Townsend, 2010). Food consumption by poor Russian families is significantly lower than the national norms on energy and nutritional value (Morozova, Glushakova, & Fadeikina, 2016). All this makes it possible to speak of poverty as an obstacle in the process of the formation and development of human capital. An important direction in the study of human capital is the assessment of the impact of socio-economic factors (including poverty) on the main characteristics of food consumption.

2. Problem Statement

The Siberian Federal District (SFD) includes twelve regions. In the considered subjects of the federation, the gross regional product per capita, per capita incomes, the state of people's health, and the level of education are significantly differentiated. The indicators that characterize the quality of human capital in the Siberian Federal District are inferior to those of the Russian average. Incomes of the population of the Siberian territories are 21-23% lower than the average in Russia. The absolute poverty rate is 54% higher. Life expectancy is lower than the average for the Russian Federation by 2.1 years for the entire population, 1.56 years lower for women and for 2.41 years for men. In the Siberian Federal District, indicators of the overall primary morbidity and morbidity of the digestive organs, improper metabolism are higher than the average in Russia. Primary morbidity in the Siberian regions is higher by 9%, the morbidity of the digestive organs is higher by 28%. All this negatively affects the formation and development of human capital.

From 2013 to 2017, the number and proportion of Russians with incomes below the subsistence minimum (absolutely poor) increased from 15.5 million to 19.8 million people (the proportion of the poor - 13.4% of the total population of the Russian Federation). The urgency of the problem of quality nutrition of households is due to the relatively low standard of living of a significant part of Russians (Karabchuk, Pashinova, & Soboleva, 2013; Kislitsyna, 2015; Kuklin, Pecherkina, Tyrsin, & Surina, 2017). Low incomes of the population, the decline in real incomes in recent years create prerequisites for the exacerbation of the problem of poverty and, as a consequence, a decrease in the nutritional value of food consumed. Poverty is closely correlated with low indicators of quality of life, with a high morbidity rate of the population, with limited access of the population to a full, balanced diet (Mukhacheva & Morozova, 2018). Nutrition of households with incomes below the subsistence minimum (the poor in the terminology of state statistics) is significantly lower than rational norms of food consumption in the territory of the Russian Federation.

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3. Research Questions

3.1. How does the level of poverty (the proportion of people with incomes below the regional subsistence minimum) affect the structure of nutrition in the analysed regions?

3.2. What are the main nutritional problems in high-poverty regions?

3.3. What economic and demographic factors related to poverty have the most significant influence on the main nutritional characteristics of the population?

4. Purpose of the Study

The purpose of the study is to identify and assess the impact of economic and demographic factors related to poverty on the specific features of the nutrition of Russian households exemplified by the territories of the Siberian Federal District. At the same time, it is important to study the effect of the scale of poverty on the nutritional structure of Siberian households. The obtained results will allow to adjust the directions of social policy in order to equalize the population in terms of nutrition characteristics, to ensure the development of food safety strategies.

5. Research Methods

5.1. The paper used an absolute approach to the definition and measurement of poverty. In accordance with the absolute approach, the number of poor people includes people and households with average per capita incomes below the subsistence minimum. Despite Russia's proximity to developed rather than developing countries in terms of basic socio-economic development indicators, in our country poverty is interpreted in the same way as in noticeably lagging behind it developing countries, i.e. through the category of absolute poverty (Anikin & Tikhonova, 2014; Slobodenyuk & Anikin, 2018). This approach allows us to explore the differentiation of the Siberian regions on the scale of absolute poverty. From the standpoint of this approach, the main problems in the field of nutrition of the population due to low incomes were considered.

5.2. The correlation and regression analysis used in the work made it possible to assess the influence of factors related to poverty on the main nutritional characteristics of Siberian households.

5.3. The main source of information was the data of the Federal State Statistics Service on average in the Russian Federation and in the regions of the Siberian Federal District. A comparative analysis of statistical data was carried out between the Siberian territories.

6. Findings

In 2017, as in previous years, the Siberian regions differed significantly in the number and proportion of people with incomes below the subsistence minimum (the scale of absolute poverty). The relatively low proportion of the poor is recorded in the Omsk, Novosibirsk, Kemerovo regions, Krasnoyarsk and Altai territories. The poverty rate in these subjects was 14.5% - 17.5%. The highest levels of absolute poverty among Siberian territories are observed in the republics of Tyva (42%) and Altai (25%). The remaining five regions occupy an intermediate position in terms of poverty - from 18%

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to 21%. Depending on the socio-demographic composition of households, the majority of the poor population live in cities, in families of 4 or more people, with children under 16 years of age. This structure is determined by the fact that the corresponding type of household is the most common. Although the risk of falling into the number of poor is higher in single-person families, in single-parent families raising minor children, as well as in multi-child families.

For the consideration of problems in the field of nutrition of the population of the Siberian regions, data from the Federal State Statistics Service of the Russian Federation (FSSS) were used, characterizing food consumption on average per consumer for the main food groups. Only two groups of products were excluded from the analysis - these are sugar, confectionery and vegetable oil and other fats. In absolute terms, the consumption of sugar, confectionery, fats differs weakly by regions with high and low levels of poverty.

Let us consider the differences in consumption by major food groups between the "poorest" Siberian territories and fairly prosperous subjects in terms of the scale of absolute poverty.

Table 01. Food consumption in the Siberian regions with high and fairly low poverty level in 2016, on average per consumer per year, kg

Region	Bread, bakery products	Potatoes	Vegetables, melons and gourds	Fruits, berries	Meat, meat products	Fish, fish products	Eggs, pieces	Milk, dairy products
Tyva Republic	149	45	49	43	57	8.6	191	149
Altai Republic	123	55	72	51	62	11	226	238
Omsk region	90	72	103	70	66	24	214	270
Novosibirsk region	90	67	97	64	63	25	218	252
Krasnoyarsk Territory	97	60	100	80	74	22	232	269
Altai Territory	105	82	94	64	65	23	242	246
Kemerovo region	92	60	88	69	66	20	243	261
On average in SFD	99	65	90	67	66	21	219	249
Rational consumption rate	96	90	140	100	73	22	260	325
The consumption level of 2016 in relation to the rational norm	103	72	64	67	90	95	84	77

Note: Data source: Federal State Statistical Service (FSSS)

Bread, bread products (their share in the structure of food is 20-29%), milk, dairy products (29-39%), and chicken eggs prevail in the structure of consumption of the regions with the highest poverty rates (republics of Tyva and Altai). In areas with favorable climatic conditions, potatoes are added to the above-mentioned list, some vegetables grown quite often in personal subsidiary farms. Residents of the Tyva and Altai republics, compared with their Siberian neighbours, very rarely consume fresh fruits,

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berries, melons, fish, fish products, and meat (excluding meat and vegetable products, by-products, lard). That is, carbohydrate products with low nutritional value (wheat bread, flour, cereals, pasta), inexpensive dairy products, milk, and chicken eggs predominate in the diet of the population in regions with a high level of poverty.

Territories with a fairly low level of poverty (Omsk, Novosibirsk, Kemerovo regions, Krasnoyarsk Territory, Altai Territory) are much less likely to consume bread, cereals, flour, and pasta. The share of bread products in their food structure is reduced to 13-14%. In these regions, against the background of a higher proportion of milk, dairy products, vegetables, melons, fresh fruits, meat and fish, the share of consumed bread, bread products, potatoes and eggs decreases. But in absolute terms, dairy products, eggs are the most popular products in the regions with both high and fairly low levels of poverty. An exception to this number is only the Tyva Republic, where bread products are most often consumed (the share in the nutrition structure is 29%, the highest among Siberian territories).

Analysis of differences in household consumption patterns made it possible to identify problems in the area of nutrition of the population, typical for Siberian regions with a high level of poverty. Relatively low energy value of the diet. In the “poorest” subjects, this indicator is 2190 - 2450 kcal per day. In regions with a fairly low poverty scale - 2,600-2,780 kcal. Low proportion of animal products in the daily ration of the “poorest” territories. And as a result, these products provide caloric intake only by 20-26%. In regions with lower poverty rates, this value is 33-35%. Consumption of animal protein averages 28-37 grams per day. The same indicator in areas with lower poverty levels is 44-50 grams per day.

On average, in the SFD, the actual food consumption in almost all food groups is lower and significantly lower than the rational norms established by the Ministry of Health of the Russian Federation. The most significant lag is observed in fresh vegetables, melons, fruits, berries, potatoes and dairy products.

An assessment of the statistically significant effect of poverty factors on the basic characteristics of nutrition implies the use of correlation and regression analysis. Among the statistical indicators reflecting the factors influencing the nutritional characteristics of the population, the selection was carried out in accordance with the following criteria:

- the qualitative nature of the indicator, its ability to reflect the influence of demographic and economic factors on nutritional parameters;
- availability of indicators for the entire study period or the ability to calculate the corresponding indicator based on FSSS data.

Based on these criteria, the following indicators were selected: 1) the value of per capita income (PCI) in the Siberian regions; 2) the share of the population with incomes below the subsistence minimum; 3) unemployment rate according to ILO methodology; 4) the share of expenditure on food in the overall structure of household expenditure; 5) the proportion of households that have minor children in their composition, since the presence of children significantly increases the risk of the family being among the poor (Karabchuk et al., 2013); 6) the share of rural residents in the total population of the region, since the extent of absolute poverty in rural areas is higher compared to urban settlements; 7) the proportion of people from 60 years and above in the total population of the respective regions, because the risk of falling into the number of poor among pensioners is higher compared to the able-bodied

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population. Of the seven indicators, five were selected based on a correlation analysis. Between these indicators and the scale of absolute poverty the closest connection is fixed.

To assess the relationship between the main nutritional characteristics of Siberian households and nutritional factors due to poverty, the Pearson correlation coefficient was calculated, allowing to determine the presence (absence) of a relationship between the two quantitative indicators, as well as assess its closeness and statistical significance.

Table 02. Correlations linking the factors of poverty with the nutritional characteristics of the population of Siberian regions

Economic and demographic factors associated with poverty	**Nutrition characteristics of the population**					
	Y_0 Bread, bakery products	**Y_1 Fish, fish products**	**Y_2 Vegetables, melons and gourds**	**Y_3 Fruits, berries**	**Y_4 Animal protein**	**Y_5 Caloric intake**
Absolute poverty scale, % - **X_1**	0.730	- 0.832	- 0.828	- 0.637	- 0,617	- 0.533
Unemployment rate, % - **X_2**	0.808	- 0.761	- 0.911	- 0.737	- 0.459	- 0.397
Percentage of households with children under 16, % - **X_3**	0.835	- 0.796	- 0.897	- 0.741	- 0.568	- 0.506
Rural population in the region, % - **X_4**	0.796	loose correlation	loose correlation	- 0. 622	loose correlation	loose correlation
value of per capita income, rubles – **X_5**	- 0.678	0.801	0.759	0.640	0.743	0.578

Note: Pearsons (sig.) at a significance level of $p < 0.05$; $N = 26$. The calculations are made by the authors based on the FSSS data.

The only group of food products whose consumption increases under the influence of poverty factors is bread, bakery products. Therefore, this dependent variable was excluded from further analysis. Almost all independent variables (with the exception of the value of per capita income) have a negative impact on the characteristics of food. Between the selected factors associated with poverty (independent variables: X1, X2, X3, X4, X5) and nutritional parameters (Y1, Y2, Y3, Y4, Y5) the correlation was determined by using a multiple linear regression model. The criteria for the selection of the above power parameters were the quality indicators of the models obtained.

For each regression model, a coefficient of determination was calculated, which shows how well the model describes the correlation between explanatory and explicable indicators. Of the nine models obtained, five were selected that had the optimal coefficients of determination: 0.913 (poverty factors and consumption of fish, fish products); 0.931 (factors of poverty and consumption of vegetables, melons); 0.791 (factors of poverty and consumption of fresh fruits, berries); 0.884 (poverty factors and animal protein in the daily ration of a person); 0.737 (factors of poverty and caloric intake of the daily ration of the individual). Characteristics of the regression equations are presented in table 3.

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Table 03. Regression dependence of nutritional characteristics on poverty factors by regions of the Siberian Federal District

Poverty factors	**Y_1 Fish, fish products**	**Y_2 Vegetables, melons and gourds**	**Y_3 Fruits, berries**	**Y_4 animal protein content**	**Y_5 caloric value**
Coefficient of determination	**0.913**	**0.931**	**0.797**	**0.884**	**0.737**
Constant	6.181	120.609	3.251	22.886	3.948
Absolute poverty scale, %	- 0.107	- 0.204	weak influence	- 0.198	- 0.088
Unemployment rate according to ILO methodology, %	- 0.102	- 0.017	- 0.138	- 0.044	- 0.045
Households with minor children, %	- 0.101	- 0.065	weak influence	- 0.163	weak influence
The share of the rural population in the total population of the region, %	weak influence	+ 0.112	- 0.104	weak influence	+ 0.124
Per capita income	+ 0.001	+ 0.008	weak influence	+ 0.002	+ 0.022

Note: Source: calculations made by the authors

The most significant factors of poverty that have a negative impact on nutritional characteristics are the unemployment rate according to the ILO methodology, the scale of absolute poverty. The identified link suggests that the increasing of the unemployment rate and the proportion of people with incomes below the subsistence minimum decreases the caloric intake, the consumption of foods containing animal protein, the consumption of fish, fish products, fresh fruits, berries, vegetables, melons.

The next factor of influence associated with poverty is the presence of children under the age of 16 in the household. State statistics data record a low standard of living for households with minor children. The low level, quality of life of families with children works to increase the share of food spending and to reduce the cost of medical, educational services and recreation (Lezhnina, 2014). With an increase in the number of minor children in households, consumption of products containing animal protein, consumption of fish, fish products, fresh vegetables, and melons and gourds is significantly reduced.

Living in a rural area has an ambiguous impact on the food parameters studied. Regions with a relatively high proportion of rural residents more often consume fresh vegetables, melons, the villagers have a higher caloric diet. But consumption of fruit, berries decreases. At the same time, there is a weak regression link between living in the village and the consumption of products with animal protein, and the consumption of fish.

The factor that has a positive impact on the characteristics of food is the value of per capita income. The high level of per capita income in the Siberian regions is recorded in the Krasnoyarsk Territory (in 2016, 28.0 thousand rubles), in the Novosibirsk and Omsk regions (25.4 and 25.2 thousand rubles, respectively). In these regions, poverty is lower and unemployment is relatively low. The low proportion of the poor in the Kemerovo Region, Altai Territory with an average income level for the SFD (about 21.4 thousand rubles) is due to the low subsistence minimum (SM). In 2016, households with incomes higher than the SM in comparison with low-income families consumed almost 2 times more fruits and berries; 1.7 times more - vegetables, melons; 1.6 times more - dairy, meat products, fish; 1.4

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times more - sugar, confectionery; 1.2 times more consumed vegetable oils and other fats. Household income determines the ability to meet many rational needs, including requirements for high-quality and varied nutrition. The structure of consumption, food and energy value of food depends largely on the financial ability of the family to buy certain foods.

As a result of using an absolute approach to measuring poverty, the correlation and regression analysis, the assessment of the influence of poverty factors on the main nutritional characteristics of the population is given. The study found that the growth of absolute poverty, unemployment, an increase in the number of children in the family worsens the quality of food. Under the influence of poverty factors, consumption of products containing animal protein is reduced, the share of fish, fish products, vegetables, melons and gourds decreases in the structure of food, the proportion of bread and bread products increases. Families living in rural areas are much less likely to consume fresh fruits and berries. The food structure of the Siberian regions with the highest poverty rates is dominated by carbohydrate products with low nutritional value, cheap dairy products and chicken eggs. With an increase in per capita incomes, households more often consume fresh fruits, berries, vegetables, melons, more expensive dairy products (cheese, cottage cheese, butter, cream), meat products, and fish. The structure of food for families with incomes lower and higher than the subsistence minimum differs most significantly.

7. Conclusion

Human capital, as a combination of abilities, health, knowledge, skills of the population, ultimately directed to meet a variety of individual and social needs, is an important factor in the development of the economy and, in turn, is determined by many conditions and circumstances, the most important of which is quality of nutrition. A full, balanced diet works to improve health, to increase the duration and quality of life, work efficiency. But rational nutrition requires appropriate opportunities, first of all, material ones. The study convincingly proved that an increase in absolute poverty, unemployment, and the number of minor children in households is working to reduce the food and, in some cases, the energy value of food consumed. The rational norms of food consumption, approved by order of the Ministry of Health of the Russian Federation, are most poorly implemented for vegetables, melons, fresh fruits, berries, dairy products and potatoes. Even the rising cost of food for Siberian households does not allow them to balance their diet in accordance with rational norms. Economic and demographic factors of poverty have a negative impact on the consumption of high-quality food and, ultimately, on the state of human capital of the population of the regions. The research results can be recommended for use in the process of strategic planning of the development of the regions of the Russian Federation, in particular, social policy.

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