Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Changes in subjective quality of life in Poland during the COVID-19 pandemic

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Abstract

This research aimed to investigate whether the subjective quality of life in Poland changed during the COVID-19 pandemic and to identify which domains: material or non-material were changed more. Additionally, the aim was to indicate the groups of people with the highest changes in subjective quality of life. The study was carried out on a representative sample of adult inhabitants of Poland (N=1067) in December 2020 and 2021. The question regarding the quality of life consists of eight items that were focused on the following aspects of quality of life: work, level of living, income, family life, work-life balance, health, access to infrastructure (sports, cultural), and access to healthcare. These items encompass two dimensions of quality of life: material (level of living, income) and non-material (the other items). The total score was defined as the mean of all subdomain scores. There was performed the Mann-Whitney test (the data did not follow the normal distribution). To assess the effect size the Glass rank biserial correlation coefficient was calculated. The present study shows that in Poland during the COVID-19 pandemic there were no changes in subjective quality of life in material aspects and only very small (but statistically significant) changes in non-material aspects. The most visible changes in the non-material domain were observed in the group aged 30-44 which suggests that this group of people was most affected by the pandemic and the pandemic-related restrictions.

Keywords: quality of life; COVID-19 pandemic; Poland

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1. Introduction

Quality of life is a popular term that is used in very different contexts. Until today, no universal definition of this category has been developed. Difficulties in formulating it are deepened by the fact that quality of life is used in various research disciplines, such as economics, psychology, and medical sciences; each of them has its own traditions. Quality of life research includes the subjective and objective sides. There are two significant life quality research models [1]. The first model (the Scandinavian) focuses on the availability of resources and their possession, therefore emphasizing objective factors (e.g. [2]). The second model (the American) focuses rather on subjective perception and evaluation (e.g [3,4]). A kind of mixture of these two is the life quality approach by Erik Allardt [5]. This is a holistic approach to the quality of life.

The COVID-19 pandemic had a huge impact on different aspects of life all over the world. The most visible effects include health and the economy. In Poland, due to the large wave of the COVID-19 pandemic at the end of 2020, the government limited the economic, educational, and social activities entering the lockdown. There were used, among others, distance learning, suspension of cultural institutions (cinemas, theaters, etc.), and closure of the majority of stores in shopping malls [6]. At that time, no vaccine against SARS-CoV-2 (causative agent of the COVID-19 disease) was available. Vaccination against SARS-CoV-2 started on 28 December 2020. After one year, the situation changed in December 2021. Many of the temporary limitations had been lifted or had been relaxed. The "stay-at-home" action was over. There were still some limitations, e.g. the theatres, cinemas, etc. were open at 30% capacity, in shopping malls, one person was allowed for every 15 square meters but all the institutions were opened (only a few days before Christmas the government decided to close the schools). The share of the population that had been fully vaccinated was 55.52% (December 28, 2021) [7]. A different reality with many limitations at the end of 2020, social isolation, and fear of COVID-19 might have caused negative feelings and dissatisfaction with the whole life [8,9]. It can be expected that the possibility of vaccination against SARS-CoV-2 and the level of pandemic restrictions should have an impact on subjective quality of life.

This paper aimed to investigate the changes in subjective quality of life in Poland during the COVID-19 pandemic and to identify which domains: material or non-material changed more. Additionally, the aim was to indicate the groups of people with the highest changes in subjective quality of life.

2. Methods

The study was conducted based on a representative sample of the population living in Poland. In December 2020 and 2021, 1067 adult inhabitants were interviewed (CAWI technique, Computer-Assisted Web Interviewing). The group of respondents was not the same – there were interviewed two independent groups of respondents.

The question about subjective quality of life was measured on a 7-point Likert scale from "1=very dissatisfied" to "7=very satisfied". The question was formed by the author and focused on some aspects of quality of life important in the context of the COVID-19 pandemic. The question was: "Could you tell me how satisfied you are with the following aspects of your life?". This question consisted of eight items that were focused on the following aspects of quality of life: work, level of living, income, family life, work-life balance, health, access to infrastructure (sports, culture), and access to healthcare. These items encompassed two dimensions of quality of life: material (level of living, income) and non-material (the other items). Cronbach's alpha for the two distinguished domains were 0.816 and 0.815 (in 2020), 0.727 and 0.749 (in 2021), respectively. It demonstrated acceptable internal consistency of the domains in both analyzed years. The total score was defined as the mean of all subdomain scores.

In the analysis, there were used Cronbach's alpha (to measure an internal consistency of the set of items as a group), the Shapiro-Wilk test (to test the normality of material domain, non-material domain, and the total score), the Mann-Whitney test (the data did not follow the normal distribution, therefore the non-parametric test was used). To assess the effect size the Glass rank biserial correlation coefficient [10] was calculated. Values of this coefficient range from -1 (all values of the second sample are larger than all values of the first sample) to 1 (all values of the second sample are smaller than all values of the first sample) [11].

Additionally, the overall satisfaction from life was measured on a single-item Likert scale from "1=very dissatisfied" to "7=very satisfied". The question was: „Could you please tell me how satisfied you are with your life overall?". Getting an answer to this question allowed to compare the overall satisfaction to the total score and to

show the differences in results. The mountain plots (folded empirical cumulative distribution plots) [12] were used to summarize the comparison between obtained results.

All analyses were performed using R [13] with packages cowplot [14], ggpubr [15], mountainplot [16], and rcompanion [17].

3. Results

The basic characteristics of the respondents are shown in Table 1.

Table 1. Baseline characteristics of the samples in 2020 and 2021

	Description	2020	2021
		% or mean (SD)	% or mean (SD)
Age	18-29	20.1	16.1
	30-44	28.4	29.2
	45-59	24.4	23.2
	60 and above	27.1	31.5
Education level	not higher than lower secondary	2.3	2.5
	basic vocational	10.3	10.1
	secondary	47.2	46.7
	tertiary	40.1	40.7
Gender	male	47.6	47.8
	female	52.4	52.2
Labor market status	employed person	60.9	65.8
	unemployed person	5.7	2.3
	retiree	21.0	23.9
	pensioner	3.7	3.8
	student	4.5	1.9
	pupil	1.9	0.8
	other economically inactive people	2.2	1.4
Income quintile group (PLN)	1	560.72 (440.63)	833.83(575.08)
	2	1761.36 (243.59)	1980.29(194.94)
	3	2414.13 (177.49)	2587.28(155.30)
	4	3147.65 (232.64)	3257.01(267.43)
	5	4721.21 (1144.03)	5195.98(1801.42)

In 2020 and 2021, the majority of the sample was female (more than 51%). The largest share had people from the age category 30-44 (28.4% in 2020), and 60 and above (31.5% in 2021). In both years, the largest share had people with secondary education (about 47%), and being employed (more than 60% both in 2020 and 2021). In 2020, the sample was very diversified in terms of income: the mean income in the first quantile group was eight times lower than in the fifth group. In 2021, the differentiation of the income was lower: the mean income in the first quantile was six times lower than in the highest quantile.

The scores in the subdomains were different in both years (Fig. 1). A non-material domain was assessed higher than a material domain. It can be seen that the differences in scores between 2020 and 2021 are visible in the case of the non-material domain, and the total score. The detailed analysis based on the Mann-Whitney test and the Glass rank biserial correlation coefficient is presented in Table 2.
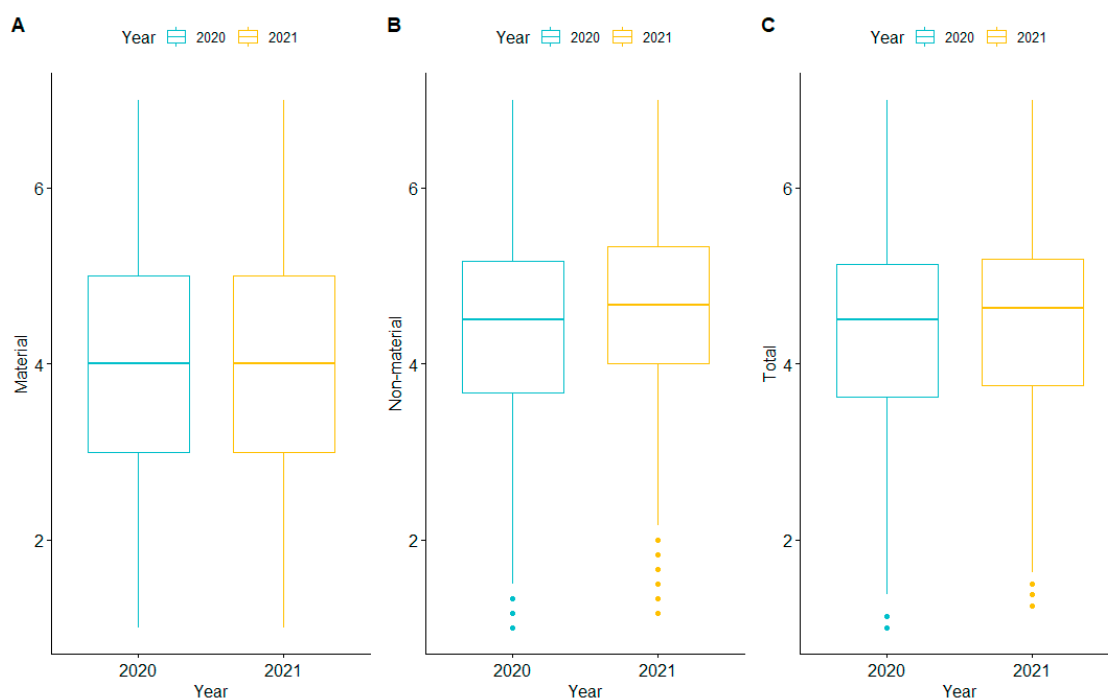
Fig. 1. Boxplots of quality of life scores in 2020 and 2021 (a) in the material domain; (b) in the non-material domain; (c) in total

Table 2. Changes in quality of life between 2020 and 2021

Quality of life subscales	2020	2021	Effect size	P-value
	Median (Q1 – Q3)	Median (Q1 – Q3)		
Material	4.00 (3.00-5.00)	4.00 (3.00-5.00)	0.002	0.933
Non-material	4.50 (3.67-5.17)	4.67 (4.00-5.33)	-0.087	0.000
Total	4.50 (3.63-5.13)	4.63 (3.75-5.25)	-0.062	0.013

The degree of change between 2020 and 2021 was significant for the non-material domain and total score. Material aspects of quality of life had been assessed as the same in both analyzed years. Negative values of the Glass coefficient mean that the assessment of the non-material aspects of quality of life in 2021 is better than in 2020. It should be emphasized that the strength of the correlation is very small (values were only slightly lower than zero). The total score significantly had improved from 4.50 to 4.63 but the effect size was also very small.

The detailed analysis allows to indicate the subgroups in which the quality of life significantly changed (Table 3). The values of effect size were small or marginal, in many groups the results were not significant. The statistically significant changes with small effect size were visible rather in non-material domain. The quality of life in this domain improved significantly (with small effect size) in 30-44 and 45-59 age groups, and among the employed. The 30-44 group was characterized by the highest effect size (-0.163). The marginal effect size (statistically significant) was in case of males and females, and among people with secondary education.

Table 3. Changes in quality of life between 2020 and 2021 in subgroups*

	Quality of life subscales	2020 Median (Q1 – Q3)	2021 Median (Q1 – Q3)	Effect size	P-value
Male	Material	4.00 (3.50-5.00)	4.00 (3.00-5.00)	0.026	0.466
	Non-material	4.50 (3.83-5.17)	4.67 (4.00-5.33)	-0.086	0.015
	Total	4.50 (3.63-5.13)	4.63 (3.75-5.13)	-0.052	0.139
Female	Material	4.00 (3.00-5.00)	4.50 (3.00-5.00)	-0.020	0.579
	Non-material	4.50 (3.67-5.17)	4.67 (4.00-5.33)	-0.088	0.013
	Total	4.38 (3.63-5.13)	4.50 (3.88-5.25)	-0.071	0.045
18-29	Material	4.00 (3.50-5.00)	4.00 (3.00-5.00)	0.031	0.594
	Non-material	4.50 (3.75-5.17)	4.67 (3.79-5.33)	-0.050	0.401
	Total	4.50 (3.63-5.13)	4.63 (3.75-5.13)	-0.024	0.684
30-44	Material	4.50 (3.50-5.00)	4.50 (3.50-5.00)	-0.002	0.963
	Non-material	4.50 (3.83-5.17)	4.92 (4.17-5.50)	-0.163	0.000
	Total	4.50 (3.82-5.13)	4.75 (4.10-5.38)	-0.121	0.009
45-59	Material	4.00 (3.00-5.00)	4.50 (3.50-5.00)	-0.048	0.343
	Non-material	4.50 (3.67-5.33)	4.83 (4.00-5.33)	-0.131	0.011
	Total	4.38 (3.50-5.13)	4.63 (3.88-5.25)	-0.110	0.033
60 and above	Material	4.00 (3.00-5.00)	4.00 (3.00-5.00)	0.027	0.555
	Non-material	4.50 (3.67-5.17)	4.50 (3.67-5.17)	-0.008	0.856
	Total	4.38 (3.63-5.00)	4.38 (3.60-5.00)	0.001	0.976
not higher than lower secondary	Material	4.00 (3.00-5.00)	3.50 (2.25-4.00)	0.314	0.052
	Non-material	4.00 (3.17-5.00)	4.00 (3.42-5.00)	-0.024	0.891
	Total	4.13 (3.50-4.75)	3.88 (3.13-4.69)	0.084	0.608
basic vocational	Material	4.00 (3.00-4.50)	4.00 (3.00-5.00)	-0.089	0.251
	Non-material	4.33 (3.38-5.00)	4.67 (3.67-5.33)	-0.142	0.069
	Total	4.13 (3.38-4.75)	4.50 (3.60-5.00)	-0.146	0.062
secondary	Material	4.00 (3.00-5.00)	4.50 (3.00-5.00)	-0.036	0.326
	Non-material	4.50 (3.67-5.17)	4.67 (4.00-5.33)	-0.092	0.011
	Total	4.38 (3.50-5.13)	4.50 (3.75-5.13)	-0.077	0.035
tertiary	Material	4.50 (3.50-5.00)	4.50 (3.50-5.00)	0.053	0.174
	Non-material	4.67 (3.83-5.33)	4.83 (4.00-5.33)	-0.068	0.084
	Total	4.63 (3.88-5.13)	4.63 (4.00-5.25)	-0.031	0.434
employed person	Material	4.50 (3.50-5.00)	4.50 (3.50-5.00)	-0.003	0.925
	Non-material	4.67 (4.00-5.33)	4.83 (4.17-5.50)	-0.105	0.001
	Total	4.63 (3.88-5.25)	4.69 (4.13-5.25)	-0.075	0.017
unemployed person	Material	3.00 (2.00-4.00)	3.00 (2.00-4.00)	0.030	0.833
	Non-material	3.67 (3.00-4.50)	3.83 (3.33-3.95)	-0.112	0.418
	Total	3.50 (2.75-4.25)	3.63 (3.00-4.25)	-0.075	0.591
retiree	Material	4.00 (3.00-5.00)	4.00 (3.00-5.00)	0.053	0.314
	Non-material	4.50 (3.67-5.17)	4.50 (3.50-5.17)	0.023	0.661
	Total	4.38 (3.63-5.03)	4.38 (3.50-5.00)	0.033	0.529
pensioner	Material	3.50 (2.88-5.00)	3.50 (2.50-4.50)	0.059	0.652
	Non-material	3.59 (2.83-4.54)	4.00 (2.67-4.67)	-0.038	0.773
	Total	3.44 (2.85-4.66)	3.88 (2.75-4.63)	0.009	0.951

* due to small size, some groups (pupil, student, other economically inactive) were skipped in the analysis

The question about selected aspects of quality of life was compared to overall satisfaction with respondents' life. The values of the Spearman coefficient are shown in Table 4. The correlation is significant and large in all cases. The highest correlation is visible between overall satisfaction and the total score.

Table 4. Correlation between overall satisfaction and quality of life domains

Quality of life domains	Correlation with overall satisfaction	
	2020	2021
Material	0.667***	0.643***
Non-material	0.646***	0.625***
Total	0.704***	0.683***

The results of the assessment of overall satisfaction are presented in Fig. 2. The scores in 2020 and 2021 are the same. The results of the Mann-Whitney test and the value of the Glass coefficient (Table 5) are confirmation of the results presented in the boxplots. There is no significant difference between 2020 and 2021.
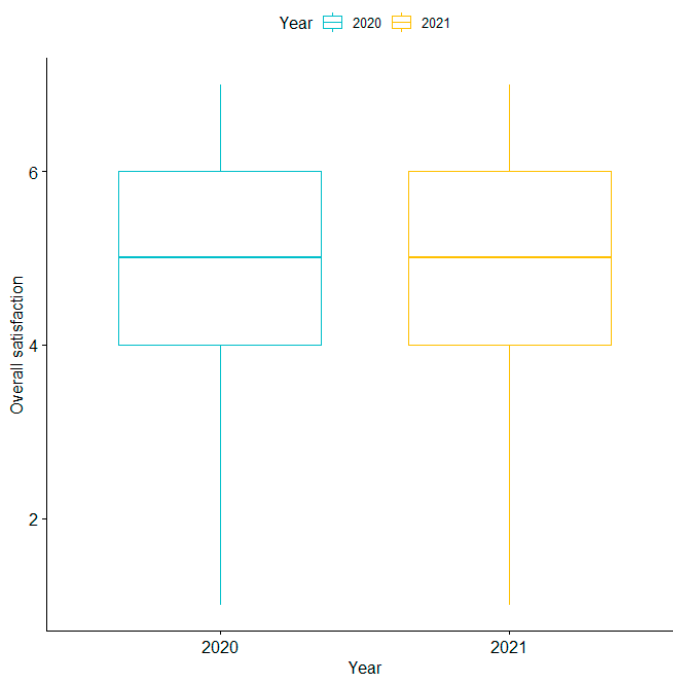

Fig. 2. Boxplots of overall satisfaction in 2020 and 2021

Table 2. Changes in overall satisfaction between 2020 and 2021

	2020	2021	Effect size	P-value
	Median (Q1 – Q3)	Median (Q1 – Q3)		
Overall satisfaction	5.00 (4.00-6.00)	5.00 (4.00-6.00)	-0.0255	0.292

The results of the assessment of overall satisfaction are very interesting. On the one hand, the scores in both analyzed years are the same (the situation is similar to the material domain). On the other hand, the values of the overall satisfaction are definitely higher than scores in the material domain and also in the non-material domain.

According to the expectations, the results suggest that the overall satisfaction is a different category than the total score. The total score includes only the selected aspects of life.

Comparing the folded empirical cumulative distribution plots (Fig. 3), it can be stated that the total score of quality of life and overall satisfaction were very similar in 2020 and 2021. The shapes of the mountains plot in 2020 and 2021 are very similar. There are visible small differences that may suggest higher scores in 2021. However, the differences are very small, therefore, the previously calculated effect sizes were generally marginal.
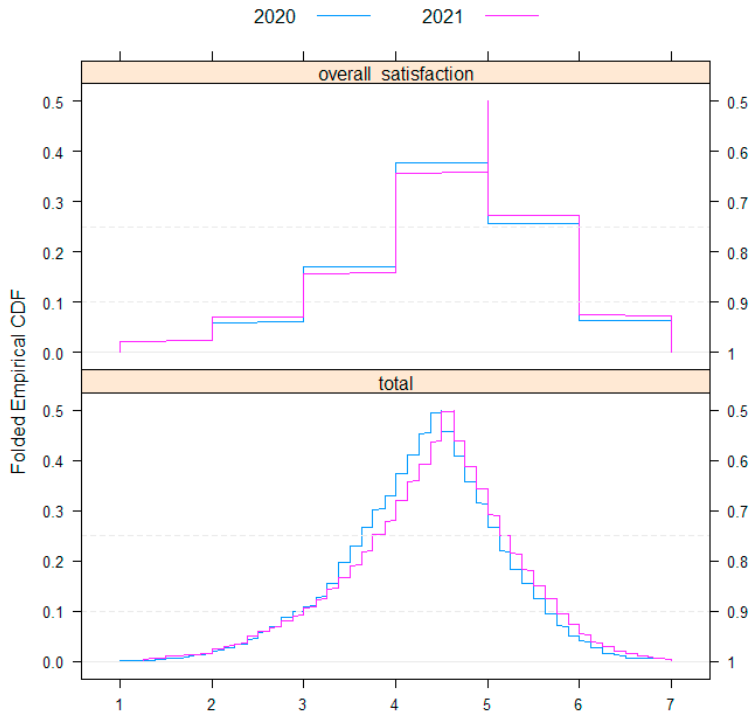

Fig. 3. Mountain plots of quality of life score in total and overall satisfaction in 2020 and 2021

4. Discussion

The present study shows that in Poland during the COVID-19 pandemic there were no changes in subjective quality of life in material aspects and only very small (but statistically significant) changes in non-material aspects. Therefore, the pandemic situation and the government restrictions on economic activities did not have an impact on the subjectively felt economic situation of the respondents. It can be seen that between December 2020 and 2021 individual income of the respondents in all quantile groups had increased (Table 1). An increase in income is also visible after adjusting for inflation (an increase in real income) which suggests that the subjective assessment of the material domain should indicate some changes. This is not, however, as might be expected. It could be stated that the objective indicators of the economic situation and subjective feelings of the respondents are not in line.

During the COVID-19 pandemic, there were conducted a lot of research on subjective quality of life. However, these studies had a different nature. Many studies were devoted to the issue of quality of life of people with a specific disease, e.g. children with autism spectrum disorder [18]. It should be emphasized that the studies were conducted using different kinds of questionnaires. Therefore, the obtained results vary and the comparison of the results is very hard. Some authors use standardized questionnaires, e.g. The World Health Organization Quality of

Life (WHOQOL) [19], Health-Related Quality of Life (HRQOL) [20,21], while other authors use their own questionnaires to assess the subjective quality of life [22].

Our findings concerning the changes in subjective quality of life are in line with the previous research. Bidzam-Bluma et al. [23] showed that in Poland and Germany the older people (60 and above) rated their quality of life, life satisfaction, and well-being higher than younger people. Al Dhaheri et al. [24] reported that in the Middle East and North Africa the pandemic had a higher impact among females, participants aged 26-35 years, and those lower educated. The different research results were obtained, among the others, by Kharshiing et al. [25]. They found that demographic variables such as gender, age, education, and income had not influenced the qualitative aspects of people's lives. Tran et. al. [20] studied the impact of COVID-19 on household income, health status, and health-related quality of life. They showed that about two-thirds of the households reported household income loss due to the impact of COVID-19. Respondents being female and living with a family of 3-5 people had a lower quality of life. Age did not have a significant impact on quality of life.

The presented comparisons should be considered with caution because of the different questionnaires used by authors and different kinds of methods. Besides, the conducted analyzes showed the changes in quality of life during the COVID-19 pandemic compared to the period before the pandemic. The presented analysis shows the changes in quality of life during the COVID-19 pandemic.

There are limitations to the present research. Question items examining self-reported changes are not exhaustive. The choice of items was subjective and the problem was considered from the point of view of the ongoing pandemic only through the prism of the selected issues. Besides, the research was conducted with different groups of respondents. In assumptions, the research was to be conducted once. It would be interesting to show the changes in subjective quality of life in the same group of people but by conducting the study for the first time (in 2020) we optimistically did not assume that the pandemic would last so long. After a year, it was impossible to reach the same group of respondents. Conducting research in the same group would allow using a different type of testing (tests for dependent groups instead of tests for independent groups).

5. Conclusion

The COVID-19 pandemic had a huge impact on many aspects of people's life. "Stay-at-home" action and lockdowns changed the style of life and had an impact on the economic situation. It should be expected that the changes in the epidemic situation and the heavy economic restrictions have a huge impact on the quality of life both in objective and subjective aspects. Meanwhile, the results of this study are surprising. The subjective quality of life has not changed as much as it might be expected. In 2021 compared to 2020 only the non-material aspects were assessed as slightly higher. The most visible changes in the non-material domain were observed in group 30-44 which suggests that this group of people was most affected by the pandemic and the pandemic-related restrictions. This is a group having children of school age and distance learning changed their daily life at most. Besides, people aged between 30 and 44 are the large audience group of theatres and cinemas; therefore, the closing of cultural institutions was very felt by this group. Summarizing, the changes in non-material aspects of quality of life were felt the most by the group of professionally active people, with children of school age, and participating in cultural life.

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