I. V. Baskakova [a], *A. S. Podymova* [b], *I. D. Turgel* [a], *M. S. Balandina* [a]
[a] Ural Federal University (Ekaterinburg, Russian Federation; e-mail: ibaskakova@rambler.ru)
[b] Sverdlovsk Regional Center for Prevention and Control of AIDS (Ekaterinburg, Russian Federation)

THE IMPACT OF HIV INFECTION ON THE POPULATION'S QUALITY OF LIFE IN REGIONS[1]

Assessment of quality of life of patients with HIV infection is of great importance due to the unfavourable epidemic situation with this disease both in the Russian Federation in general and in the Sverdlovsk region. This chronic disease, accompanied by long-term therapy and medical supervision, has adverse effects on lives of people carrying HIV/AIDS. Additionally, it negatively impacts the functioning of all spheres of the society. In the autumn of 2018, we studied the population's quality of life in the Sverdlovsk region using the methodology of the World Health Organization (the WHOQOL-26 questionnaire). This questionnaire considers quality of life as an integral characteristic of physical, psychological, emotional, and social functioning of a healthy or sick person based on subjective perception. We added specific questions in the questionnaire to assess how the quality of life of a person with a positive HIV status changes depending on whether the respondent receives antiretroviral therapy. The sample included patients visiting branches of the Sverdlovsk Regional Center for Prevention and Control of AIDS. The quality of life of the survey participants was assessed in four dimensions: physical health, psychological well-being, social connections and the environment. The majority of HIV patients assess their quality of life and health by means of averages. However, according to the "physical health" and "social well-being" measurements, the quality of life of people living with HIV/AIDS is lower than in the control group of healthy respondents. The study's results demonstrate the importance of developing and implementing a program of professional and socio-economic rehabilitation for people who carry HIV/AIDS to maintain social functioning and optimal quality of life.

Keywords: quality of life, quality of life in medicine, health-related quality of life, quality of life index, HIV-AIDS infection, people living with HIV/AIDS level of well-being, physical health, psychological well-being, social well-being, measurement of quality of life, quality of life of patients with HIV infection

Introduction

One of the problems, which are currently extremely pressing for Russia, is the quality of life. Without exaggeration, the direction and rate of further transformations in the country, as well as its economic, social and political stability, largely depend on the ability of the government to suggest a solution, increasing the level of well-being and the quality of life of the population as quickly as possible.

Successful implementation of twelve national projects, aimed at "securing the breakthrough research, technological, social and economic development of Russia, increasing the quality of life, creating conditions for personal fulfilment and bringing out the potential of every person"[2] may become a response to the present-day challenges. The development of such projects indicates the fact that the problem of increasing the quality of life (in medicine, in particular) has taken centre stage in the state policy. Simultaneously, the search for the new ways of economic development has led to the understanding that "only the quality of life can express the goals of the global community to the maximum extent, as the humanity stands on the verge of the transfer to the new civilisation or 'the civilisation of quality'" [1]. This statement explains the active use of the term "quality of life in medicine" in the scientific literature over the last. Primarily, the term reflects the degree of a person's adaptation to the illness as well as the possibility of performing the regular functions, corresponding to their social and economic status [2].

In its turn, in the modern medicine the term "health-related quality of life" has come into widespread acceptance; it is related to the assessment of parameters defining how the disease and its treatment impact the psychological and emotional state of the patient and their social status [3]. In other words, monitoring of the quality of life of a person is treated as an instrument, characterised by

[1] © Baskakova I. V., Podymov A. S., Turgel I. D., Balandina M. S. Text. 2020.

[2] Natsionalnye proekty. Klyuchevye tseli i ozhidaemye rezultaty [National projects. Key goals and expected results]. Retrieved from: http://government.ru/projects/selection/741/35675/ (Date of access: 23.05.2019).

the high degree of descriptiveness, which can help assess not only the health of the patient, but also the effectiveness of the treatment delivery.

Several aspects conditioned the choice of the HIV infection as a research subject; the most important is the enormous social significance of the disease: HIV infection of young working age people (18–44 years) becomes of one of the most significant causes in the overall mortality structure of the Russian population. More people (8.6 %) aged 18–44 years die of HIV-related diseases than of malignant tumours (7.5 %), respiratory diseases (4.0 %), diseases of the nervous system (2.0 %), coronary heart diseases (5.2 %) and tuberculosis (2.7 %)[3]. The share of HIV-related cases as a cause of death from infectious and parasitic diseases in the structure of mortality of the Russian population increased from 3.9 % in 2015 to 52.6 % in 2016 [4]. This chronic disease is accompanied by a significant reduction in the quality of life of a patient, and its treatment and recovery require substantial expenditures [5].

We decided to study the impact of HIV infection on the quality of life due to the current unfavourable situation in Russia, as well as the insufficient coverage of this complex synthetic category, despite the publication activity of specialists and experts in the field. A high level of differentiation of the socio-economic development of the constituent entities of the Russian Federation indicates the feasibility of studying the quality of life problem at the regional level.

The study aims to assess the quality of life of the population of the Sverdlovsk region, including people living with HIV/AIDS. We applied the methodology of the World Health Organization (in which the quality of life is an integral characteristic of the physical, psychological, emotional and social functioning of a healthy or a sick person based on their subjective perception. Additionally, we considered how the treatment of HIV-infected patients with antiretroviral therapy (ART), accompanied by medical costs, affects the change in their quality of life.

The main hypotheses of the study are: (1) the presence of HIV infection reduces the quality of life, (2) the quality of life of a person decreases during disease progression, (3) the use of antiretroviral therapy helps slow down the progression of the disease, thereby prolonging the period characterised by higher quality of life.

Due to the lack of a conventional definition of the quality of life, first, we will define approaches to its definition to clarify and specify the research subject.

Definition and measurement of the quality of life

The concept of "quality of life" still does not have a single universally accepted definition, despite the close attention of numerous researchers. This fact is noted in the works of several authors, primarily foreign ones, such as J. Ormel et al. [6], L. Yuan [7], A. Smith [8], D. Wunsch [9].

Given the variety of existing definitions, we want to note two conceptual approaches to the examined category under study: objective, based on quantifiable indicators, and subjective, characterising a person's satisfaction with the level of physical, psychological and social well-being.

In international literature, the most general definition of the quality of life is predominantly subjective, implying that it is a feeling of well-being of a person that stems from their satisfaction or dissatisfaction with life, or happiness or unhappiness [10]. T. M. Gill and A. R. Feinstein [11] proposed a similar definition, stating that the quality of life is an individual assessment of a person's position in society in the context of their culture and individual set of values.

Russian researchers consider the quality of life as an integral characteristic of the physical, psychological, emotional and social functioning of a healthy or sick person, based on their subjective perception [12]. This approach is similar to the definition, according to which the quality of life is the degree of person's internal and social comfort [13]. In this context, the definition of the quality of life covers not only the physical and professional functions of a person, but also their psychological state, social interaction and somatic perception [14].

Simultaneously, the modern definitions of quality of life often use the categories of "prosperity", "well-being", "degree of satisfaction". Unambiguously, these terms reflect the multidimensionality of the concept that requires researchers to structure this complex concept, highlighting individual components to simplify its study and monitoring.

Thus, F. Snoek [15] suggests three main directions for measuring the quality of life:

1. Physical dimension: a general state of health.

[3] Natsionalnye proekty. Klyuchevye tseli i ozhidaemye rezultaty. S. 10–12. [National projects. Key goals and expected results. Pp. 10–12]. Retrieved from: http://government.ru/projects/selection/741/35675/ (Date of access: 23.05.2019).

2. Mental dimension: self-control, love, satisfaction, morality, self-esteem, perceived control over life, social comparisons, beliefs, and aspirations.

3. Social dimension that is divided into two types. The first one is private social life, which implies an individual's satisfaction from the availability of social support, income, education, and work. The second type is public social life, which is the satisfaction from community, social security, quality of housing, pollution, transportation, crime, equality and justice.

In the work of J. Ruževičius, the quality of life is measured in the following directions:

1) physical condition (health, workload, durability, nutrition);

2) material condition (prosperity, living conditions, quality of the economy;

3) average income, purchasing ability, working and rest conditions, etc.);

4) psychological state (emotions, tenets, values, job satisfaction, stress;

5) moral and psychological climate in the family, organisation, society);

6) education and self-development (training, quality of education, skills and knowledge application);

7) social relations (relationships with people, family, support); opportunities for self-expression and leisure (recreation, hobbies, creativity, entertainment);

8) safety and environment (personal physical security: bodily security, security in rights, social and economic security) [16].

A. J. McSweeny et al. discuss four main directions for measuring the quality of life: emotional state of an individual, social functioning, the quality of daily activity, and leisure activities [17].

We would like to note that all measurements of quality of life are related: studies have repeatedly confirmed that a change in one of them is accompanied by the change in the others. For example, K. Lloyd et al. have convincingly demonstrated that social interactions lead to improved self-esteem and increased personal and social competencies [18].

Considering all the variety of approaches to defining and assessing the quality of life, we conclude that the state of health and medical service availability are mandatory and fundamental elements of all approaches. The World Health Organization (WHO) in 1948 defined health as a state of complete physical, mental and social well-being. R. Kaplan introduced the term "health-related quality of life" in the early 1990s, distinguishing the parameters describing health status and health care from the general concept of the quality of life [19]. The quality of life associated with the patient's health is a person's assessment of the subjective factors that determine their current health, health care and actions that contribute to its strengthening, the ability to achieve and maintain the level of functioning that allows a person to follow their life goals and reflects the level of well-being [20].

Thus, scientists started using the term "health-related quality of life" that means the assessment of parameters associated and unassociated with the disease and differentially determines the effect of the disease and its treatment on the psychological, emotional state of the patient and their social status [21]. It allowed considering the quality of life as the basic or additional goal of treatment, as well as refining an appropriate technique, which we will address in more detail later.

The assessment of the quality of life only based on objective variables, reflecting the external living conditions of citizens, greatly facilitates the execution of the research task. However, according to some experts, the refusal to take into account personal assessments of the quality of life significantly distorts the measurement results. W. K. H. Fakhoury and S. Priebe [22] conducted a comparative study of the results of measuring the quality of life using only objective and only subjective indicators and identified significant differences, explained by the fact that measuring subjective and objective indicators allows assessing different aspects of the quality of life.

Thus, most researchers are of the opinion that both objective and subjective criteria should be used in measuring the quality of life [23].

In international practice, the quality of life index, developed by the Economist Intelligence Unit[4], is an example of measuring the quality of life taking into account only objective indicators.

In Russia, the set of objective indicators is used for measuring the quality of life at the regional level. The indicators note the actual state of various aspects of life conditions and the situation in the social and economic sphere. The analysis of 72 indicators allowed creating the integral index, the rating of the Russian regions in terms of the quality of life, which is available at the website of

[4] Reyting kachestva zhizni v stranakh mira. Informatsiya ob issledovanii [The quality of life index in countries worldwide]. Retrieved from: https://gtmarket.ru/ratings/quality-of-life-index/info (Date of access: 15.05.2019).

"RIA RATING" company[5]. The calculation of the rating depends on the analysis of the indicators, characterising the principal aspects of the quality of life in the region. They include the income level of the population, the employment of the population and the labour market, housing conditions of the population, security of residence, demographic situation, environmental and climatic conditions, public health and educational level, etc.

Other examples of assessing the quality of life of the population, considering only objective criteria in certain regions of Russia, include the methodological approaches of the Institute of Macroeconomic Research of the Russian Foreign Trade Academy, the Independent Institute for Social Policy, the Institute for Complex Strategic Studies, etc. The developed approaches rely on a single integral indicator constructed from the set of individual indicators. However, due to the differences in the initial sets of indicators, the use of different methods results in the inconsistency of the obtained estimates.

The study of the quality of life of patients with HIV infection based on their subjective assessments is presented, for example, in the paper of A. Talukdar et al. [24], where they use a combination of methods WHOQOL-BREF and Beck Depression Inventory (BDI). Analysis of the relationship between HIV infection and the psychological state of patients in India allowed the authors to conclude that the presence of depression and neurotisation of the personality of HIV-infected patients decreases the quality of life.

N. G. Filonenko [25] presents the results of the survey of people living with HIV/AIDS (PLWHA), revealing the problems people unavoidably face when they are diagnosed with HIV. Among them, the author notes the problems with finding employment, self-discrimination, negative attitude of society to infected people, difficult access to medical services (dentistry, obstetrics & gynaecology, admission to hospital), the impossibility of protecting the privacy of the diagnosis, etc.

Thus, to measure the quality of life, it is possible to consider both objective and subjective indicators. Assessment of objective criteria of the quality of life allows compiling the rating of the Russian regions, tracking the dynamics of changes in the external living conditions of citizens, and developing measurable goals for the regional policy. However, to analyse the effect of the disease on the quality of life of patients, it is advisable to measure subjective criteria of the quality of life, namely, perceptions and assessments of the objective conditions by individuals, as they allow evaluating the satisfaction of the population with the achieved indicators of the quality of life.

Data and methods of assessing the quality of life of the population with positive and negative HIV status in the Sverdlovsk region

Based on the assessment of objective criteria of the quality of life, the Sverdlovsk region ranked 13th in the rating of the constituent entities of the Russian Federation in terms of the quality of life level in 2018[6]. The score of the region amounted to 56.672 out of 100, while the average value of the rating score was 46.37. In comparison with 2017, the Sverdlovsk region dropped in the rating by two positions, going from the 11th to the 13th place. The publicly accessible data do not allow analysing the reasons for the improvement or degradation of the situation, as well as the personal assessment of the quality of life by the citizens.

To measure the subjective assessment of the quality of life by citizens of the Sverdlovsk region, we use the methodology of the World Health Organization, namely, the WHOQOL–26 questionnaire[7], widely used in the social and economic empirical studies in different countries of the world.

The WHO uses the following criteria for assessing the quality of life:

1) Physical state (strength, energy, tiredness, pain, discomfort, sleep, rest);

2) Psychological state (positive emotions, thinking, studying, self-esteem, appearance, negative feelings);

3) Social life (personal relations, social value of the subject);

4) Environment (well-being, safety, ecology, prosperity, accessibility and quality of medical aid and information, access to education, daily life, ecology).

---

[5] Kachestvo zhizni v rossiyskikh regionakh — reyting 2017 [Quality of life in the Russian regions — rating 2018]. Retrieved from: http://www.riarating.ru/infografika/20180214/630082471.html (Date of access: 11.05.2019)

[6] Kachestvo zhizni v rossiyskikh regionakh — reyting 2017 [Quality of life in the Russian regions — rating 2018]. Retrieved from: http://www.riarating.ru/infografika/20190219/630117422.html (Date of access: 23.04.2019).

[7] Programme on mental health WHOQOL User Manual. Retrieved from: https://www.who.int/mental_health/evidence/who_qol_user_manual_98.pdf (Date of access: 03.08.2018).

Table 1

Comparison of social and demographic characteristics of the samplings of the respondents with different HIV status

Characteristics	HIV-negative respondents, %	PLWHA, %
Gender		
Men	37	38
Women	63	62
Age		
18–25 y.o.	7	7
26–35 y.o.	39	40
36–45 y.o.	42	43
46–55 y.o.	10	9
56 y.o. and older	2	1
Education		
Complete secondary education (11 years)	12	13
Incomplete secondary education (9 years)	15	17
Intermediate vocational education	38	43
Incomplete higher education	12	9
Higher education	21	17
2 or more university degrees	2	1
Marital status		
Single	33	28
Registered marriage	44	34
Civil marriage	11	25
Divorced	12	13
Parental status		
No children	36	32
With Children	64	68

In our study, the WHOQOL-26 questionnaire was used to interview respondents with different HIV status. It included the questions that allow assessing how the quality of life of a person with a positive HIV status changes depending on whether the respondent receives antiretroviral therapy aimed at weakening the virus and stopping the further development of the disease.

ART delivery is associated with a significant increase in medical costs. According to the data of the Sverdlovsk Regional Center for Prevention and Control of AIDS, the cost of the standard of treatment of people living with HIV, including ART, for one adult patient in 2017 amounted to 137,059.48 roubles. Excluding ART, the cost of treating one adult patient was 42379.99 roubles, but the therapy prolongs the life of chronically ill citizens. This study aims to propose a toolkit for assessing the effects of medical costs of therapy and their potential impact on the quality of life of a patient.

In the period from October to December in 2018, we conducted the survey of HIV-infected people aged 18 and older who were considered outpatients. The sample included 109 patients attending various branches of the Sverdlovsk Regional Center for Prevention and Control of AIDS (SRCPCA); some patients were interviewed through a questionnaire posted on the website of the SRCPCA. In other words, interviewers collected 99 % of all questionnaires; another 1 % of the questionnaires were received online. In order to analyse the impact of HIV infection on the quality of life, we also interviewed a control group of HIV-negative people: a total of 237 respondents aged 18 and older.

Comparison of social and demographic characteristics of the samplings of the respondents with different HIV status is presented in Table 1.

We have used the statistics package "Stata/IC 14.2" to process the data.

Results of the assessment of the quality of life of the population with different HIV status in the Sverdlovsk region

The quality of life index in four main directions is presented in Table 2. For every measurement, the quality of life index (QLI) can take the values from 0 to 100.

The citizens of the region are least satisfied with their state of health (the average value of the quality of life index in the sampling was 67.47 for physical health), and most satisfied with social connections (QLI amounted to 71.36 for social connections).

We have conducted the variance analysis (ANOVA) to compare the average QLI in the groups of respondents with different states of health; its results are presented in Table 3.

The way in which the respondent assesses their state of health significantly influences the quality of life: the respondents who consider their health to be "excellent" have a significantly higher quality of life (e.g. 72 points for the physical health dimension) compared to the respondents with "poor" health (39 points).

The most strongly correlated indicators are physical health and satisfaction with the environment (the correlation coefficient is 0.6169) and satisfaction with the environment and psychological well-being (the correlation coefficient is 0.6569).

Table 2

Results of the assessment of the quality of life of the population for the entire sample in four dimensions

Dimension	Number of respondents	Mean value	Standard deviation	Minimum value	Maximum value
Physical health	346	67,47	14,33	26,67	100
Psychological well-being	346	68,84	13,46	30	100
Social connections	346	71,36	16,05	26,67	100
Environment	346	69,70	15,33	28,67	100

Table 3

The respondents' assessment of their state of health and quality of life in four dimensions

State of health	Physical health		Psychological well-being		Social connections		Environment	
	Mean value	Standard deviation	Mean value	Standard deviation	Mean value	Standard deviation	Mean value	Standard deviation
Excellent	72,00	5,66	62,50	10,61	73,33	9,43	65,71	16,16
Good	47,29	9,72	48,24	8,15	48,43	13,76	47,06	14,88
Average	44,18	10,72	46,14	13,80	52,73	18,16	46,36	12,84
Poor	39,00	13,14	45,00	11,95	41,67	19,44	33,57	15,10

Table 4

Pair correlation coefficients between the main dimensions of the quality of life index

	Physical health	Psychological well-being	Social connections	Environment
Physical health	1			
Psychological well-being	0,5720	1		
Social connections	0,5293	0,5620	1	
Environment	0,6169	0,6569	0,5617	1

Thus, it is evident that the quality of life can and should be managed. In this regard, it is advisable to develop a strategic programme aimed at improving the quality of life at the regional level. It should include, firstly, a description of goals for all major metrics of the quality of life, and secondly, a portfolio of initiatives and activities aimed at achieving these goals, as well as associated budgetary and economic implications.

Translation

Table 5

Quality of life for the control group of HIV-negative respondents in four dimensions

Dimension	Number of respondents	Mean value	Standard deviation	Minimum Value	Maximum Value
Physical health	237	68,15	10,3	43,33	96,67
Psychological well-being	237	68,67	9,99	35,05	91,00
Social connections	237	72,72	12,54	34,33	100
Environment	237	69,77	11,02	28,67	97,14

Table 6

Quality of life for PLWHA in four dimensions

Dimension	Number of respondents	Mean value	Standard deviation	Minimum Value	Maximum Value
Physical health	109	65,25	16,71	26,67	100
Psychological well-being	109	68,57	15,35	30	100
Social connections	109	67,81	15,94	26,67	93,33
Environment	109	69,64	15,54	31,42	100

Table 7

Comparative assessment of the quality of life index in the main four dimensions for PLWHA and the control group of HIV-negative respondents according to the questionnaire "WHOQOL-26"

Group	Quality of life dimensions ($M \pm \sigma$)			
	Physical health	Psychological well–being	Social connections	Environment
PLWHA	65,25 ± 16,71	68,57 ± 15,35	67,81 ± 15,94	69,64 ± 14,72
Control group	68,15 ± 10,3	68,67 ± 9,99	72,72 ± 12,54	69,77 ± 11,02
	$P_{1-2} < 0{,}001$	$P_{1-2} > 0{,}05$	$P_{1-2} < 0{,}001$	$P_{1-2} > 0{,}05$

Further, we consider two groups of respondents with different HIV status. Tables 5 and 6 present the results of the measurement of the quality of life index of people with positive and negative HIV status. The quality of life index for each measurement can take values from 0 to 100. The average QLI value for HIV-negative people amounted to 68.15 for physical health, 68.67 for psychological well-being, 72.72 for the social sphere, 66.67 for the environment.

The average QLI value for PLWHA amounted 65.25 for physical health, 68.57 for the psychological sphere, 67.81 for the social sphere, and 69.77 for the environment.

Table 7 shows a comparison of the quality of life of PLWHA and apparently healthy people in terms of all parameters.

PLWHA have a lower quality of life index in terms of "physical health" and "social connections" compared to the control group. This fact can be explained by the influence of the disease on physical health, as well as the patient's dissatisfaction with the system of social connections, loss of positive interpersonal relationships due to the negative attitude of the public towards HIV/AIDS patients. Thus, 61 % of the respondents noted that they are upset by people who reproach them for their positive HIV status (Figure 1)

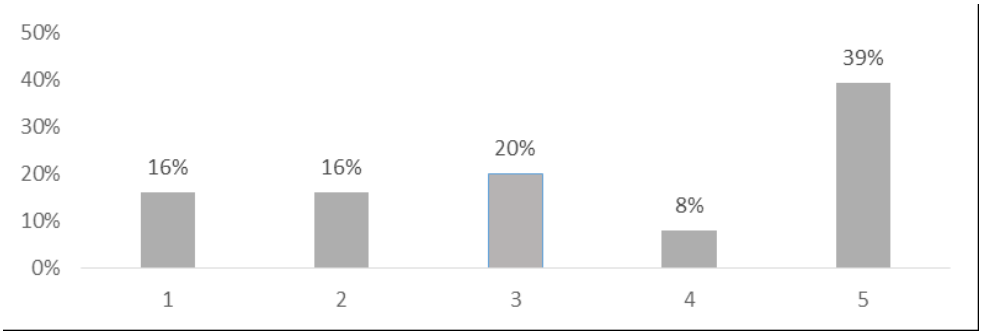

Fig. 1. *Distribution of responses from the HIV- positive respondents to the question "How much do people who accuse you of your HIV status upset you?", where 1 is "very much", 5 is "do not upset at all"*

Translation

Table 8

Distribution of the HIV-positive respondents by the clinical characteristics

Characteristics	Number of respondents	Respondents percentage, %
Assessment of HIV status of the respondents (based on survey results)		
Asymptomatic HIV infection	60	55
Symptoms of HIV	43	39
AIDS	6	6
Distribution of the respondents by first positive HIV test, date		
2015–2018	41	38
2010–2014	24	22
2005–2009	25	23
2000–2004	17	15
Before 2000	2	2
Distribution of the respondents by the date of infection		
2015–2018	38	35
2010–2014	25	23
2005–2009	33	31
2000–2004	1	1
Before 2000	12	10
Distribution of the respondents by the source of HIV infection		
Homosexual intercourse	4	3
Heterosexual intercourse	65	60
Injecting drug abuse	29	27
Blood transfusion	1	1
Other	10	9

Both groups of respondents have approximately the same QLI in terms of "psychological well-being" and "environment". In the WHO questionnaire, respondents independently assess the quality of life index on a five-point scale, as each respondent subconsciously compares themselves with their social environment. The insignificant difference between the groups may be explained by the effect of social comparison, when individuals within the community do not see significant differences between their quality of life and the quality of life of other individuals. The second explanation is the psychological adaptation of individuals to any changes in life, which results in them humbly accepting their position in life.

Table 8 presents the distribution of the HIV-positive respondents by the clinical characteristics of the disease. The research data allow concluding that the most common ways to get or transmit HIV

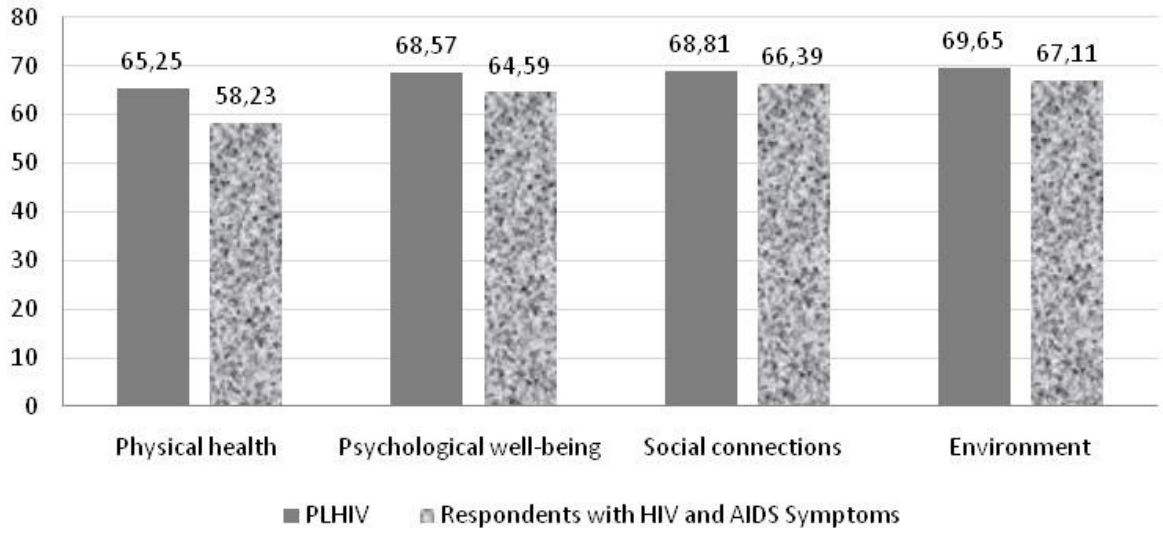

Fig. 2. *The quality of life index for PLWHA and the respondents with the symptoms of HIV and AIDS*

Translation

are sexual intercourse (64 % of the respondents were infected during sexual intercourse) and injecting drug use with non-sterile instruments (27 % of the infected respondents).

The authors asked the HIV-positive respondents to assess the disease state. Based on the answers, all PLWHA were divided into three groups: the first group includes the people with asymptomatic disease course, the second group consists of the respondents with the symptoms of HIV infection, the third group is the respondents with AIDS. Figure 2 demonstrates the quality of life index for PLWHA and the respondents with the symptoms of HIV and AIDS. During the disease progression, the decrease in the QLI of the respondents was detected.

Graphs in Figure 3 demonstrate that the quality of life of the people receiving antiretroviral therapy (ART) is higher than that of the people, who do not receive it. Receiving ART increases the quality of life by 3 % in the "physical health" category, 16 % in the "psychological well-being" category, and 14 % in the "environment" category.

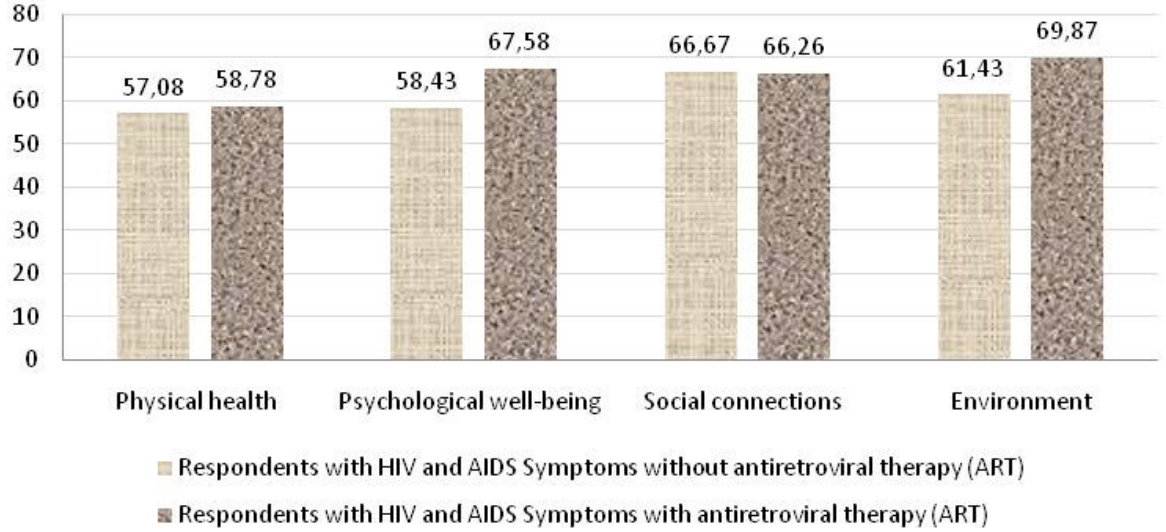

Fig. 3. *Comparative assessment of the quality of life index by four dimension among the respondents with late HIV and AIDS in general, and the respondents taking ART*

Results of the conducted study demonstrate that injecting drug users are unsatisfied with the quality of their lives and their health state (Table 9).

Table 9

Distribution of the answers of HIV-positive respondents to the question "How do you assess the quality of your life?", where 1 is "very bad", 5 is "excellent"

Respondent status	Injecting drug users	People, not using injecting drugs
Asymptomatic HIV infection	3,76	4,15
Symptoms of HIV	3,26	3,5
AIDS	3,21	4,66

Conclusion

The study allowed identifying the interrelation between the quality of life index in the "physical health" dimension and the satisfaction of individuals with the environment, namely, the quality of medical and social services, financial situation, safety level, accessibility of leisure and recreation opportunities. Satisfaction with the environment also influences the psychological well-being of individuals, including the feeling of the significance of life, emotional well-being.

We discovered that the majority of people with HIV-infection assign average values to the quality of their life and health. However, in the categories of "physical health" and "social well-being" the quality of life of PLWHA is lower than that of the control group of healthy respondents.

In the course of disease progression from asymptomatic form to HIV infection with symptoms and AIDS, we have detected the decrease in the quality of life index of the respondents by 10.7 % in the "physical health" dimension, 5.8 % in the "psychological well-being" dimension, and 3.6 % and 3.5 % in the dimensions of "environment" and "social well-being", respectively.

Translation

Providing patients with ART not only increases their quality of life in terms of "physical health", but increases the patients' satisfaction with the "environment" and "psychological well-being". In further studies, it is planned to develop a model for forecasting the spread of HIV infection in the region considering two approaches to HIV epidemic control differing in the scope of ART provision to the patients. It will be necessary to compare the change in the costs of therapy provided to PLWHA and the QLI resulting from the expanded access to ART.

Among PLWHA, injecting drug users have the lowest level of satisfaction with the quality of their lives and their health state.

Results of the study demonstrate the importance of developing and implementing the programme for professional and socio-economic rehabilitation of PLWHA for supporting the social functioning and the optimal quality of life. Such programme serves not only as one of the indicators of the medical aid quality, but as the indicator of the social effectiveness of the system of cross-sectoral medical and social support.

The study has revealed the necessity to increase the efficiency of the quality of life management.

References

1. Boytsov, B. V. & Kryanev, Yu. V. (1999). Sistemnaya tselostnost kachestva zhizni [Systemic integrity of the quality of life]. *Standarty I kachestvo [Standards and quality], 5,* 20–27. (In Russ.)

2. Evsina, O. V. (2013). Kachestvo zhizni v meditsine — vazhnyy pokazatel sostoyaniya zdorovya patsienta (obzor literatury) [The quality of life in medicine is an important indicator of the patient's health status (literature review)]. *Lichnost v menyayushchemsya mire: zdorovye, adaptatsiya, razvitiye [Personality in a changing world: health, adaptation, development], 1.* Retrieved from: http://humjournal.rzgmu.ru/art&id=24 (Date of access: 20.04.2019). (In Russ.)

3. Ulyukin, I. M. & Lobzin, Yu. V. (2003). Kachestvo zhizni bolnykh VICh-infektsiyey [Quality of life of patients with HIV infection]. *Obzory po klinicheskoy farmakologii i lekarstvennoy terapii [Reviews on clinical pharmacology and drug therapy], 2(2),* 58–65. (In Russ.)

4. Nechaeva, O. B. & Podymova, A. S. (2018). Vliyanie VICh-infektsii na demograficheskuyu situatsiyu v Rossii [Impact of HIV infection on demographic situation in Russia]. *Meditsinskiy alyans [Medical Alliance], 1,* 6–16. (In Russ.)

5. Podymova, A. S., Baskakova, I. V. & Balandina, M. S. (2018). Otsenka sotsialno-ekonomicheskikh poter ot prezhdevremennoy smertnosti naseleniya ot VICh-infektsii [Evaluation of Social and Economic Losses from Premature Mortality caused by HIV Infection]. *Ekonomika regiona [Economy of Region], 14(4),* 1341–1355. DOI: 10.17059/2018–4–22. (In Russ.)

6. Ormel, J., Lindenberg, S., Steverink, N. & Vonkorff, M. (1997). Quality of life and social production functions: A framework for understanding health effects. *Social Science Medicine, 45(7),* 1051–1063. DOI: 10.1016/s0277–9536(97)00032–4.

7. Yuan, L., Yuen, B. & Low, C. (1999). Quality of Life in Cities — Definition, Approaches and Research. In: *L. Yuan, B. Yuen, C. Low (Eds.), Urban quality of life. Critical issues and options* (pp.1–13). Singapore: School of Building and Real Estate, National University of Singapore.

8. Smith, A. E. (2000). Quality of life: a review. *Education and Ageing, 15,* 419–435.

9. Wunsch, D. & Risser, R. (2002). *Lebensqualität: Definitionen — Konzepte (Life quality — definition and concepts).* Referat am BDP-Kongress für Verkehrspsychologie. Regensburg, 56.

10. Ferrans, C. E. & Powers, M. J. (1985). Quality of life index: development and psychometric properties. *Advances in Nursing Science, 8,* 15–24.

11. Gill, T. M. & Feinstein, A. R. (1994). A critical appraisal of the quality of quality-of-life measurements. *The Journal of the American Medical Association, 272(8),* 619–626. DOI: 10.1001/jama.1994.03520080061045.

12. Novik, A. A. & Ionova, T. I. (2007). *Rukovodstvo po issledovaniyu kachestva zhizni v meditsine. 2 izdanie [Guide to the study of the quality of life in medicine. 2nd edition].* Moscow: ZAO «Olma Media Grupp», 320. (In Russ.)

13. Belevskiy, A. S. & Senkevich, N. Yu. (2000). Kachestvo zhizni — *predmet nauchnykh issledovaniy v pulmonologii [Quality of life* — a subject of scientific research in pulmonology]. *Terapevticheskiy Arkhiv [Therapeutic Archive], 72(3),* 36–41. (In Russ.)

14. Schipper, H., Clinch, J. J. & Olweny, C. L. M. (1996). Quality of life studies: Definitions and conceptual issues. In: *Spilker B. (Ed.), Quality of Life and Pharmacoeconomics in Clinical Trial, 2nd ed.* (pp. 11–23). New York: Lippincott-Raven.

15. Snoek, F. J. (2000). Quality of life: A closer look at measuring patients' well-being. *Diabetes Spectrum, 13(1),* 24–28.

16. Ruževičius, J. (2012). *Management de la qualité. Notion globaleetrecherche en la matière.* Vilnius: Maison d'éditions Akademinė leidyba, 432.

17. McSweeny, A. J., Grant, I., Heaton, R. K., Adams, K. M. & Timms, R. M. (1982). Life quality of patients with chronic obstructive pulmonary disease. *Archives of internal medicine, 142(3),* 473–478. DOI: 10.1001/archinte.1982.00340160057014

18. Lloyd, K. M. & Auld, C. J. (2002). The role of leisure in determining quality of life: Issues of content and measurement. *Social Indicators Research, 57(1),* 43–71. DOI: 10.1023/A:1013879518210.

19. Kaplan, R M. (1998). Profile versus utility based measures of outcome for clinical trials. In: *M. J. Staquet, R. D. Hays, P. M. Fayers (Eds.), Quality of Life Assessment in Clinical Trials: Methods and Practice* (pp. 69–90). New York: Oxford University Press.

20. Novik A. A. & Ionova T. I. (2002). *Rukovodstvo po issledovaniyu kachestva zhizni v meditsine [Guide to the study of the quality of life in medicine].* Moscow: OLMA-PRESS, 314. (In Russ.)

21. Novik, A. A., Ionova, T. I. & Kaynd, P. (1999). *Kontseptsiya issledovaniya kachestva zhizni v meditsine [The concept of the study of quality of life in medicine].* Saint Petersburg: Elbi, 140. (In Russ.)

22. Fakhoury W. K. H. & Priebe, S. (2002). Subjective quality of life: Its association with other constructs. *International Review of Psychiatry, 14(3),* 219–224. DOI: 10.1080/09540260220144957.

Translation

23. Rogerson, R. (1999). Quality of life, place and the global city. In: *L. Yuan, B. Yuen, C. Low (Eds.), Urban quality of life. Critical issues and options* (pp. 13–31). Singapore: School of Building and Real Estate, National University of Singapore.

24. Talukdar, A., Ghosal, M. K., Sanyal, D., Talukdar, P. S., Guha, P., Guha, S. K. & Basu, S. (2012). Determinants of Quality of Life in HIV-Infected Patients Receiving Highly Active Antiretroviral Treatment at a Medical College ART Center in Kolkata, India. *Journal of the International Association of Providers of AIDS Care (JIAPAC), 12(4),* 284–290. DOI: 10.1177/1545109712445924.

25. Filonenko, N. G. (2009). *Nauchnoe obosnovanie osnovnylh napravleniy povyshenya kachestva zhizni VICH-infitsirovannykh. Avtoreferat dissertatsii kandidata meditsinskikh nauk [Scientific substantiation of the main directions of improving the quality of life of HIV-infected people. Abstract of the dissertation of the PhD in Medicine].* Moscow: National Research Institute of Public Health RAMS, 26. (In Russ.)

Authors

Irina Vladimirovna Baskakova — PhD in Economics Sciences, Assistant Professor, Graduate School of Economics and Management, Ural Federal University; Scopus Author ID: 57195675115; ORCID: 0000–0001–7097–0860, Researcher ID: 0–4304–2016 (19, Mira St., Ekaterinburg, 620000, Russian Federation; e-mail: ibaskakova@rambler.ru).

Anzhelika Sergeevna Podymova — PhD in Medicine, Chief Physician, Sverdlovsk Regional Center for Prevention and Control of AIDS; ORCID: 0000–003–2523–3794 (46, Yasnaya St., Ekaterinburg, 620102, Russian Federation; e-mail: apodymova@list.ru).

Irina Dmitrievna Turgel — Doctor of Economics, Professor, Graduate School of Economics and Management, Ural Federal University; Scopus Author ID: 505743576; ORCID: 0000–0001–8647–7739 (19, Mira St., Ekaterinburg, 620000, Russian Federation; e-mail: i.d.turgel@urfu.ru).

Marina Sergeevna Balandina — Senior Lecturer, Graduate School of Economics and Management, Ural Federal University; Scopus Author ID: 57206893495; ORCID: 0000–0003–1789–7320 (19, Mira St., Ekaterinburg, 620000, Russian Federation; e-mail: balandina.marina@gmail.com).