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M.P. Cherkun, I.P. Katerenchuk  
Poltava State Medical University, Poltava

## COMPARATIVE ASSESSMENT OF QUALITY OF LIFE PARAMETERS IN RURAL AND URBAN RESIDENTS WITH COMORBID HYPERTENSION

e-mail: mpchercun@gmail.com

The study highlights the results of a comparative analysis of the quality of life of 152 patients with hypertension and its combined course with type 2 diabetes and coronary heart disease living in urban and rural areas. Quality of life parameters were determined using the SF-36 questionnaire. It was found that the patient's quality of life worsens with increased comorbidity. A clinically significant difference in the quality of life parameters depending on territorial affiliation was established. Thus, the level of quality of life in patients from rural areas is mainly reduced due to the mental component, manifested by a decrease in an emotional state and a decrease in vital activity, while in urban residents – due to the physical part of health, which led to the impossibility of performing everyday tasks.

**Key words:** hypertension, SF-36 questionnaire, comorbidity, mental component of health, physical component of health.

М.П. Черкун, І.П. Катеренчук

## ПОРІВНЯЛЬНА ОЦІНКА ПОКАЗНИКІВ ЯКОСТІ ЖИТТЯ СІЛЬСЬКИХ І МІСЬКИХ ЖИТЕЛІВ З КОМОРБІДНИМ ПЕРЕБІГОМ ГІПЕРТОНІЧНОЇ ХВОРОБИ

У даній статті висвітлені результати порівняльного аналізу якості життя 152 пацієнтів з гіпертонічною хворобою та її поєднаним перебігом з цукровим діабетом 2 типу та ішемічною хворобою серця, що проживають у місті та в сільській місцевості. Параметри якості життя визначали за допомогою опитувальника SF-36. Виявлено, що якість життя хворих погіршується зі збільшенням коморбідності. Встановлено, клінічно значиму різницю показників якості життя в залежності від територіальної приналежності. Так, рівень якості життя у пацієнтів з сільської місцевості переважно знижується за рахунок психічного компоненту, що проявлялися зниженням емоційного стану, зниженням життєвої активності, тоді як у міських жителів – за рахунок фізичного компоненту здоров'я, що призводило до неможливості виконання повсякденних справ.

**Ключові слова:** гіпертонічна хвороба, опитувальник SF-36, коморбідність, психічний компонент здоров'я, фізичний компонент здоров'я.

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According to the WHO, hypertension (HT) is the most important cause of mortality among chronic non-infectious diseases worldwide. The number of patients with arterial hypertension in the world is expected to increase by 15–20 % by 2025 and reach about 1 billion 560 thousand people [12]. According

to research, more than 30 % of the adult population of Ukraine (over 12 million) have high blood pressure (BP), which leads to such complications as myocardial infarction and heart and kidney failure, which in turn cause disability of people of working age and high economic costs for their treatment [2]. According to the latest research on the presence of hypertension depending on the territorial affiliation, HT prevalence in the rural population was 36.3 %. In contrast, in the urban population, it is 29.6 % [3]. In the vast majority of cases, the course of HT is complicated by comorbid pathology, most often coronary heart disease (CHD) and diabetes mellitus (DM), which further affects the quality of life (QoL) of patients. This is especially important, considering that among the working population, the number of patients with type II DM has increased by almost 5 %, and the mortality from coronary heart disease globally is about 16 % [4, 9]. Studying the QoL of patients in international practice is one of the generally accepted methods of assessing their health [6, 9,10]. Recently, the quality of life is considered a combination of physical, psychological, emotional and social functioning, which is evaluated by each patient subjectively. The study of QoL in medicine is a unique new approach that fundamentally changed the traditional view of the problem of illness and the patient. The ultimate goal is to increase life expectancy and improve its quality [1, 5].

**The purpose** of the study was to analyze the quality of life of rural and urban residents with hypertension and its comorbid course.

**Materials and methods.** The study includes 152 patients divided into 3 groups treated at the Poltava Regional Clinical Medical Cardiovascular Center of the Poltava Regional Council from 2018 to 2022 with isolated HT and its comorbid course. The first group included 45 patients with an isolated course of hypertension, 26 (57.8 %) of whom were urban residents and 19 (42.2 %) –rural residents. The second group consisted of 68 patients with HT combined with coronary heart disease, of whom 34 were urban residents (50.0 %) and 34 were rural residents (50.0 %). The third group consisted of 39 patients whose course of HT was complicated by coronary heart disease and type 2 diabetes. Of them, 24 patients (61.5 %) were urban residents, and 15 (48.5 %) were rural residents. The age of patients in the studied groups varied from 22 to 85 years (average age  $57.87 \pm 0.94$  years), and patients were compared by gender (Table 1).

Table 1

**Characteristics of patient groups depending on age, gender, and territorial affiliation**

	Patient groups					
	1 (n=45)		2 (n=68)		3 (n=39)	
	Urban residents	Rural residents	Urban residents	Rural residents	Urban residents	Rural residents
Average age of patients, years	52.1 $\pm$ 2.5	49.3 $\pm$ 3.0	58.4 $\pm$ 1.4	57.0 $\pm$ 1.7	66.9 $\pm$ 1.7	65.2 $\pm$ 2.0
Male patients, (abs., %)	18 (69.2 %)	7 (36.8 %)	11 (32.4 %)	16 (47.1 %)	11 (45.8 %)	7 (46.7 %)
Female patients, (abs., %)	8 (30.8 %)	12 (61.2 %)	23 (67.6 %)	18 (52.9 %)	13 (54.2 %)	8 (53.3 %)

The mean duration of the disease of Group 1 urban resident patients was  $119.3 \pm 25.6$  months; rural residents were  $129.8 \pm 25.2$  months. In the second group, urban residents had hypertension for an average of  $152.4 \pm 15.6$  months, and rural residents –  $155.1 \pm 23.8$  months. In Group 3, the duration of the disease on HT was slightly higher and amounted to  $165.5 \pm 20.1$  and  $164.1 \pm 40.3$  months in urban and rural residents, respectively (Fig. 1).

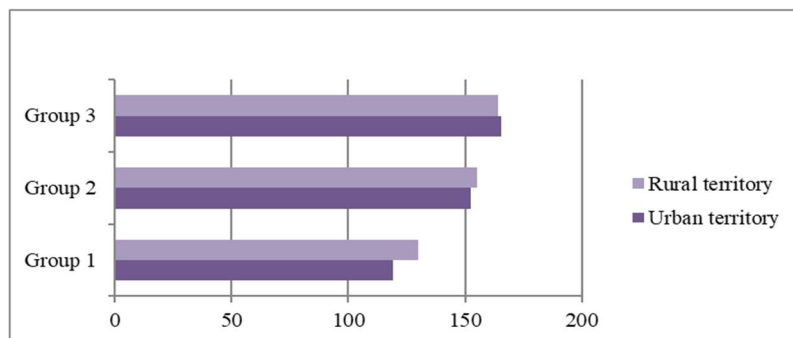


Fig. 1. The average duration of hypertension in the compared groups (months).

Quality of life was assessed by self-report followed by the official version of the Brief Health Status Assessment Questionnaire MOS SF-36 (2011). This questionnaire includes 36 questions, which are divided into 8 scales, namely: physical functioning (PF), role functioning due to physical condition (RP), pain intensity (BP), general health (GH), vital activity (VT), social activity (SF), emotional state (RE), and mental health (MH). Each scale was evaluated from 0 to 100 points, with the higher the score, the higher the level of health in general. The quality of life was considered to be of a low level with an indicator of 0–20 points, a reduced index of the quality of life – 21–40 points, an average indicator – 41–60 points, an increased index – 61–80 points, and a high index – 81–100 points [11, 13]. When comparing the above indices in the compared groups, a clinically

significant difference was considered a difference of 10 points or more, according to the questionnaire's instructions for data processing.

Statistical processing of the obtained data was performed with the help of Statistika 10 and MedStat programs. Quantitative indices are given as mean values (M) and their standard deviation (SD), and qualitative indices – as frequencies and percentages. To determine the index difference, parametric and non-parametric methods were used: Student's t-test or Mann-Whitney U-test. At  $p < 0.05$ , the differences were considered statistically significant.

**Results of the study and their discussion.** Urban residents of the first group had higher indicators of the physical health component than rural residents. Thus, the physical functioning (PF) level was  $84.1 \pm 1.3$  points, and general health (GH) was  $84.1 \pm 1.1$  points. At the same time, the level of pain intensity (BP) and role activity (RP) were moderately lower  $-76.3 \pm 1.5$  and  $78.2 \pm 1.5$  points, respectively. The level of physical functioning (PF) in rural residents was  $78.2 \pm 1.7$  points, role activity (RP) –  $70.1 \pm 1.7$  points, pain intensity (BP) –  $72.2 \pm 1.8$  points, total health (GH) –  $87.4 \pm 0.9$  points. In contrast to the physical component of health, higher indices of the mental component of health were primarily observed in rural residents. Thus, the level of vital activity (VT) was  $80.4 \pm 2.0$  points, general emotional state (RE) –  $78.2 \pm 1.3$  points, and mental health (MH) –  $74.4 \pm 1.8$  points. The indicator of vital activity (VT) in urban residents was determined on average at the level of  $72.6 \pm 1.5$  points, emotional state (RE) – at  $73.2 \pm 1.2$  points, and mental health (MH) at  $67.2 \pm 1.2$  points. Regarding social activity (SF), urban patients had a higher average of  $87.4 \pm 1.2$  versus  $82.8 \pm 1.3$  for rural residents (Table 2). Thus, clinically significant differences in indices of mental and physical components of health in the group with an isolated course of hypertensive disease were not observed between rural and urban residents.

Table 2

Evaluation of the quality of life of patients of the compared groups (M $\pm$ m)

SF-36 scale	Group 1		Group 2		Group 3	
	Urban residents	Rural residents	Urban residents	Rural residents	Urban residents	Rural residents
<i>Physical component of health</i>						
PF	84.1 $\pm$ 1.3	78.2 $\pm$ 1.7	62.4 $\pm$ 1.4	66.2 $\pm$ 1.1	56.5 $\pm$ 1.1	44.8 $\pm$ 1.8
RP	76.3 $\pm$ 1.5	70.1 $\pm$ 1.7	52.4 $\pm$ 1.2	64.1 $\pm$ 1.0	40.1 $\pm$ 1.3	34.4 $\pm$ 1.1
BP	78.2 $\pm$ 1.5	72.2 $\pm$ 1.8	66.2 $\pm$ 1.2	55.2 $\pm$ 1.6	45.1 $\pm$ 1.5	41.1 $\pm$ 1.6
GH	84.1 $\pm$ 1.1	87.4 $\pm$ 0.9	54.8 $\pm$ 1.1	56.8 $\pm$ 1.0	48.2 $\pm$ 1.2	40.0 $\pm$ 1.5
<b>PH*</b>	53.1 $\pm$ 1.1	46.8 $\pm$ 1.5	44.3 $\pm$ 0.9	44.4 $\pm$ 1.1	38.8 $\pm$ 1.3	35.6 $\pm$ 1.4
<i>Mental component of health</i>						
VT	72.6 $\pm$ 1.5	80.4 $\pm$ 2.0	54.3 $\pm$ 1.5	60.2 $\pm$ 1.3	49.8 $\pm$ 1.0	34.4 $\pm$ 1.6
SF	87.4 $\pm$ 1.2	82.8 $\pm$ 1.3	47.2 $\pm$ 1.1	50.0 $\pm$ 1.2	36.6 $\pm$ 0.9	33.8 $\pm$ 1.6
RE	73.2 $\pm$ 1.2	78.2 $\pm$ 1.3	51.6 $\pm$ 0.9	57.2 $\pm$ 1.0	48.6 $\pm$ 1.2	37.9 $\pm$ 1.7
MH	67.2 $\pm$ 1.2	74.4 $\pm$ 1.8	50.2 $\pm$ 0.8	52.4 $\pm$ 1.0	47.1 $\pm$ 1.1	40.2 $\pm$ 1.4
<b>MH*</b>	48.2 $\pm$ 0.9	52.6 $\pm$ 1.5	38.1 $\pm$ 1.0	39.4 $\pm$ 0.8	35.9 $\pm$ 0.8	33.3 $\pm$ 0.9

**PH\*** – physical component of health; **MH\*** – mental component of health.

Among urban residents of group 2, the average indices of the physical component of health were as follows: physical functioning (PF) –  $62.4 \pm 1.4$  points, pain intensity (BP) –  $66.2 \pm 1.2$  points, role activity (RP) –  $52.4 \pm 1.2$  points, general health (GH) –  $54.8 \pm 1.1$  points, while patients from the village had the following average values: physical functioning (PF) –  $66.2 \pm 1.1$  points, pain intensity (BP) –  $55.2 \pm 1.6$  points, role activity (RP) –  $64.1 \pm 1.0$  points and general health (GH) –  $56.8 \pm 1.0$  points. While the mental component of health was, on average, somewhat higher in rural patients by all indices, namely, the level of social activity (SF) –  $50.0 \pm 1.2$  points, emotional state (RE) –  $57.2 \pm 1.0$  points, mental health (MH) –  $52.4 \pm 1.0$  points, vital activity (VT) –  $60.2 \pm 1.3$  points. At the same time, the level of social activity (SF) of urban residents was on average –  $47.2 \pm 1.1$  points, emotional state (RE) –  $51.6 \pm 0.9$  points, mental health (MH) –  $50.2 \pm 0.8$  points, vital activity (VT) –  $54.3 \pm 1.5$  points. In this group, among urban residents, the index of the physical component of health was clinically expressed – pain intensity (BP) –  $66.2 \pm 1.2$  (95 % CI 63.60-68.63) against  $55.2 \pm 1.6$  points (95 % CI 51.97-58.50,  $p < 0.001$ ). At the same time, the indicator of physical functioning – role functioning due to physical condition (RP) – in rural residents, on the contrary, was higher than in urban residents,  $64.1 \pm 1.0$  (95 % CI 62.04-66.26) versus  $52.4 \pm 1.2$  (95 % CI 49.97-54.79,  $p < 0.001$ ).

Regarding urban patients of 3 groups, the mean level of physical functioning (PF) was  $56.5 \pm 1.1$  points, general health (GH) –  $48.2 \pm 1.2$  points, pain intensity (BP) –  $45.1 \pm 1.5$  points, and the lowest indicator of the physical component of health – the impact of the physical condition on life activities (RP)

–  $40.1 \pm 1.3$  points. At the same time, in patients of 3 groups of rural residents, the average indicator of physical functioning (PF) was  $44.8 \pm 1.8$  points, the mean index of the impact of physical condition on vital activity (RP) –  $34.4 \pm 1.1$  points, the mean level of pain intensity (BP) –  $41.1 \pm 1.6$  points, the average indicator of general health (GH) –  $40.0 \pm 1.5$  points. A clinically expressed indicator of the physical component of health was the index of physical functioning (PF) in urban residents –  $56.5 \pm 1.1$  points (95 % CI 54.14–58.86), which is 11.7 points more than in rural residents  $44.8 \pm 1.8$  (95 % CI 41.02–48.58,  $p < 0.001$ ). Regarding the mental component of health, a clinically pronounced difference was observed only in patients of group 3, in the vital activity index (VT) –  $49.8 \pm 1.0$  points in urban patients (95 % CI 47.67–51, 82), which is 44.8 % higher than in rural patients –  $34.4 \pm 1.6$  (95 % CI 30.98–37.82,  $p < 0.001$ ).

Thus, in patients with an isolated course of hypertensive disease, the highest level of mental and physical health components was observed among rural and urban patients of the compared groups. Therefore, we can assume that the uncomplicated course of hypertension has little effect on the patient's quality of life, thereby not limiting him in performing his daily tasks. At the same time, a relatively lower overall quality of life was observed in patients whose hypertension was complicated by coronary heart disease due to health's mental and physical components. However, it is worth noting that the clinically significant index for city residents was pain intensity (BP), while for rural residents, the clinically significant index was the effect of functional status on vital activities (RP). That is, rural residents could not engage in their daily activities (for example, housework, working in the field, etc.) due to heart pain, headache, dizziness, and so on. At the same time, the city's residents were more characterized by symptoms of overwork and general exhaustion, which also did not allow them to perform their daily tasks freely. In patients of group 3, the quality of life was lower than in patients of both previous groups, in terms of physical and psychological components, regardless of their territorial affiliation. However, a clinically pronounced difference in the indices of physical functioning (PF), vital activity (VT) and emotional state (RE) should be noted. Thus, in patients from rural areas, in whom the course of hypertension was accompanied by coronary heart disease and type 2 diabetes, rapid fatigue occurred more often with minor or moderate physical exertion, and emotional disorders, which in turn led to difficulties in performing their daily tasks, reduced productivity in work and reduced vital activity in general.

According to the study results, a significant decrease in the quality of life of rural and urban residents was observed, with an increase in hypertension comorbidity. Thus, the average value of the total indicator of the “physical component of health” (PH\*) in patients of Group 1 was determined at the level of  $50.44 \pm 1.0$ , which was 6.09 less than in patients of Group 2 –  $44.35 \pm 0.71$  (95 % CI 48.42–52.46,  $p < 0.001$ ) and at the same time 12.88 more than the same index in Group 3 (95 % CI 35.58–39.55,  $p < 0.001$ ). A similar situation was observed during the analysis of the Mental component of health (MH\*) indicator. Namely: in the group with an isolated course of hypertensive disease, the level of MH\* was  $49.89 \pm 0.84$ , which was higher than the similar index in the group with the comorbid course of hypertensive disease and coronary heart disease by 11.14 (95 % CI 48.19–51.59,  $p < 0.001$ ), and also higher than in patients with a combined course of hypertension with coronary heart disease and type 2 diabetes mellitus by 14.99 (95 % CI 33.62–36.17,  $p < 0.001$ ) (Fig. 2).

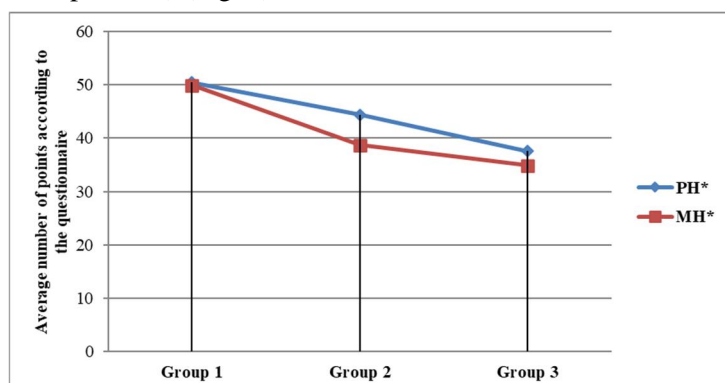


Fig. 2. Indicators of changes in the level of quality of life in patients of the compared groups depending on the increase in comorbidity.

Therefore, as a result of the conducted study of the quality of life of patients in the compared groups, the dependence of the quality of life on the severity of the course of the disease is monitored [2, 9]. Thus, in patients with hypertension, high indices of physical and mental health components indicated a minimal impact of hypertension on the level of quality of life. At the same time, patients with comorbid hypertension associated with coronary heart disease and type 2

diabetes had difficulty performing their daily activities. Thus, urban residents, compared to rural residents, had clinically expressed symptoms of overwork and general exhaustion (RP). In contrast, rural patients had clinically defined pain sensations (BP), which further affected the ability to perform everyday tasks, which coincides with the studies of Sinelnik V. P. and Tkachenko N. A. [10]. In patients with hypertension, coronary heart disease and type 2 diabetes, the quality of life was at the lowest level, more pronounced in

rural patients, mainly due to the mental component of health (MH\*). The clinically pronounced difference between urban and rural residents was determined in the emotional state (RE), manifested by clinically pronounced reduced vital activity (VT). Regarding the physical component of health, the difference in physical functioning (PF) was clinically pronounced.

### Conclusions

1. The quality of life of patients with hypertension reliably decreases with the growth of comorbid pathology, regardless of the territorial affiliation of the patients.

2. Clinically significant decrease in the quality of life of hypertensive patients in urban residents occurs exclusively at the expense of the physical component. In contrast, in rural residents, the mental component often prevails.

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