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Quality of life of patients with hypertension and treatment compliance

Gulmira Mendigereyevna Muldayeva, Almagul Bolatovna Kuzgibekova, Ibatullakyzy Arystan Leyla, Kenzhebayevich Koichubekov Berik, Sabatayevna Kaliyeva Sholpan, Tattigul Alievna Kenzhetayeva

Karaganda State Medical University, Karaganda, Republic of Kazakhstan

RESEARCH

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Corresponding Author:
Dr Gulmira Mendigereyevna Muldaeva
Professor, Head of Department
Karaganda State Medical University
Departament of Pediatrics and Pediatric Surgery
40 Gogolya Str. Karaganda, Kazakhstan
Email: Gulmira_Muldayeva@outlook.com

ABSTRACT

Background
The research was held within the framework of the program "Correction of the components of the metabolic syndrome by the method of biofeedback".

Method
The study involved 90 patients, specifically 33 men and 57 women with Stages 1–3 hypertension as well as 25 healthy persons who live in various districts of Karaganda and are monitored on outpatient basis. We used analysis of variance, namely Fisher's exact test, to gauge statistically significant differences in quality of life between the groups of treatment.

Results
The results of survey using questionnaire SF-36 showed that while hypertension leads to the statistically significant reduction of all components of quality of life, three of the components - PF; RP and BP - are statistically significantly reduced in case of patient's low or no compliance with treatment.

Conclusion
The research suggests that antihypertensive therapy as a whole is noted for a low level of compliance. This, in turn, leads to insufficient control of arterial hypertension and results in a decrease in quality of life.

Key Words
Compliance, blood pressure, arterial hypertension, cardiovascular system, cardiology

What this study adds:

1. What is known about this subject?
Taking everything into account, there can be a statement that modern systems of monitoring of life's quality are stable and effective. Giving research aimed to clear up this problem.

2. What new information is offered in this study?
Hypertension is a key factor in the structure of cardio-vascular diseases. Its complications cause high mortality and incapacity for work at working age around the globe. A comprehensive research of the quality of life of hypertensive patients and their compliance with the course of treatment has been held for the first time. Recommendations were elaborated as regards the methods of biofeedback in case of hypertension.

3. What are the implications for research, policy, or practice?
This research is an important and necessary instrument for adequate characterization of the range of social-behavioural (personality) factors that decrease the patients' compliance with antihypertensive treatment. Moreover, it allows outlining measures for enhancing people's motivation to change their health attitudes for the better.

Background

Arterial hypertension (AH) is a leading cause in the structure of the circulatory system diseases. Its complications are the cause of high mortality and disability in the working-age population in all countries of the world. According to

various researchers the prevalence of hypertension in Kazakhstan varies from 15.2–27 per cent. The prevalence of hypertension in urban and rural areas is almost the same. From 2009–2013 we noted an increased incidence of hypertension from 915.6 to 1172.5 cases per 100,000 population, broadly comparable to international data.[1,2] Currently, the purpose of the treatment of this disease is not the recovery by itself, but rather the improvement in the function of blood circulation accompanied by a satisfactory quality of life (QOL).[3]

The concept of quality of life is multidimensional at its nature, i.e., includes information on the basic fields of life: physical, psychological, social, spiritual and economic.[4,5] It shows that regardless of sex, severity of hypertension, type of therapy or duration of hypertension have a greater impact on the quality of life than the individual conditions associated with hypertension.[6] Hypertensive patients differ from healthy subjects in terms that they had significantly higher values of somatization, aggression/hostility, index of psychological distress and neuroticism, and lower QOL.[7] There are significant differences between the clinical trials and actual practice.[8] These differences are caused both with inactivity of doctors[9] and low adherence to the conducted treatment.[10] An adherence to the treatment of patients with hypertension has not been studied in the Karaganda region. By the way the causes of low compliance were not identified. In this regard we performed a study of compliance in patients with hypertension and interactions of adherence to treatment with QOL.

Method

The research was conducted within the framework of the investigation "Adjustment of the Components of the Metabolic Syndrome by the Method of Biofeedback", decision of the Committee on Bioethics of Karaganda State Medical University No. 25, Record of Proceedings No. 7, November 19, 2012. The study included 90 patients (33 men, 57 women) with grade I-III hypertension and 25 healthy subjects, living in different districts of Karaganda and monitored on the outpatient basis (polyclinics No. 1, No. 4).

The study involved 90 patients observed in specialized clinics by general practitioners, including 33 men and 57 women, and 25 healthy subjects in the control group. Distribution of subjects by age was as follows: 50 years - 6 subjects (6.6 per cent), 50–60 years - 15 subjects (16.6 per cent), 60-70 years - 30 subjects (33.4 per cent), 70-80 years - 34 (37.8 per cent), older than 80 years - 5 subjects (5.6 per cent). The average age of the subjects was 66.8±1.4 years, and the vast majority of subjects (63.3 per cent) were women. 17 per cent of patients had higher education and 83 per cent had secondary or secondary specialized education.

In determining the sample size, we have taken into account that the population of Karaganda is 480,000 people (40 per cent men, 60 per cent women), prevalence (p) of hypertension is about 10 per cent according to the latest revised data in the city of Karaganda. The sample size was calculated according to the formula:

$$n = \frac{p \times q \times Z_\alpha^2 \times N}{\Delta^2 \times N + p \times q \times Z_\alpha^2}$$

where, Zα are the critical values of standard allocation for given α=0,05 (a one-tailed test), N=400,000 - the population of Karaganda, Δ=0,05 – sample error, q=1-p =1-0,1=0,9. Based on these data, n=98 people

Inclusion criteria were the following: patient's consent to participate in the study; age over 18 years; grade I-III hypertension. Exclusion criteria were the following: the lack of informed consent; the presence of severe chronic somatic diseases in the stage of decompensation, mental disorders, infectious diseases; pregnancy.

According to the design of the study we filled an individual card for all enrolled patients, which included socio-demographic data (name, age, sex, education, occupation), anthropometric data (height, weight, waist circumference, BMI), and additional information (the level of blood pressure, taken drugs, bad habits, disease duration). In order to assess noncompliance to treatment for all 90 patients we used Moriscos-Green questionnaire.[11] In this test we considered patients who scored 4 points as being adherent to the treatment. Poor adherence to treatment was 3 points; non- adherence – 2 points or less.

The study of the quality of life was performed using standard SF-36 questionnaire developed by the Institute of Health, USA by John E. Ware (Thea Health Institute, New England Medical Centre, Boston, Massachusetts).[12] SF-36 questionnaire provides a quantitative determination of the quality of life on these scales. At the same time indicators may vary from 0–100 points. The higher the index value, the better the score on the selected scale (100 points is the highest indicator of health). We have used the Russian version of the software to assess Quality of Life SF-36, which has the necessary psychometric properties.[13]

We used factorial analysis of variance (Fisher's exact test) in order to assess statistically significant differences in quality

of life between the treatment groups. Differences were considered statistically significant at $p<0.05$. We calculated the mean value, standard deviation, and 95 per cent confidence interval for each indicator.

Results

The sample consisted of 90 respondents considering the amount of patients registered on file with arterial hypertension at the time of the study. The following data was obtained in the study of patients' adherence to treatment: 33 per cent of patients were adherent, 28 per cent were poorly adherent, and 39 per cent were non-adherent to the treatment. The provision of free medicine outpatient care was of great importance, as almost 1/4 (23 per cent) of the respondents indicated that one of the reasons was occasional absence of free drug, 10 per cent of respondents indicated failure of the treatment effect. The Fisher test (ANOVA test) was used to compare experimental groups (Table 1).

In many cases patients explained deviations from the recommendations made by the physician by forgetfulness, loss of memory and attention, absent-mindedness – i.e., early signs of the formation of vascular dementia. It is known that by 2040 due to the increase in life expectancy we expect an increase in the number of patients with cognitive impairment in the form of dementia from 3.3 to 81.1 million people. At the same time the life expectancy of patients with vascular dementia after diagnosis is about 5 years. The immediate cause of death in these patients was stroke (often recurrent) or myocardial infarction on the background of the uncontrolled increase in the level of blood pressure.

Due to the existing long-term projection it becomes clear that even the latest achievements of modern medicine in the treatment of hypertension will not be realized in real-life if we don't increase treatment compliance, introduce modern methodological approaches including patient education in conjunction with measures that improve cognitive function and reduce the rate of development and progression of dementia. In the study of quality of life using special questionnaires and analysis of the SF-36 questionnaire we have found that 24 per cent of patients assessed their physical activity as high according to the scale "physical functioning" (PF), 23 per cent - as good, 12 per cent as satisfactory. 41 per cent of patients reported that their level of physical activity is significantly limited by the state of their health.

According to the scale "role functioning" (RP) half of the respondents (49 per cent) performed their tasks without difficulties, while the other half (51 per cent) indicated that their daily activities were severely limited by their physical condition. The presence and the intensity of pain (BP) in 29 per cent of subjects considerably limit their activity; in 44 per cent of respondents this value was sufficiently high (from 70–100 per cent). 48 per cent of patients rated emotional state (RE) as unsatisfactory, interfering with work or other daily activities. Social activity, communication (SF) in the majority of the respondents (61 per cent) was satisfactory (50–80 points), in 22 per cent it was reduced due to the deterioration of physical and emotional state. More than one third of respondents (32 per cent) indicated the decrease of vitality (VT). 42 per cent reported a satisfactory vitality, and only 4 per cent felt themselves particularly full of strength and energy.

An indicator of mental health (MH) on the average was regarded as satisfactory in 46 per cent of cases, good – in 22 per cent of cases. Poor performance by this scale in 27 per cent of subjects indicated the presence of anxiety and a tendency to experience depression. The general health status was as follows: only 7 per cent of patients had high levels (90–100 points) of health. 48 per cent of the subjects rated their health condition as "good" and "satisfactory". At the same time almost half of patients had very low values by this scale (below 30 points). Comparative analysis of quality of life in the control group of hypertensive patients showed a statistically significant decrease in physical and mental health component (Table 2).

As it can be seen from the table in the group of patients with hypertension there is a decrease in all the integral parameters of quality of life compared with patients without hypertension. Evaluation of the data of the physical health component (Physical health - PH) of hypertensive patients compared with the control group showed a statistically significant decrease in performance in all scales. Thus physical functioning (PF) in patients with hypertension was 48.56 points (CI, 41.84, 55.27) and in healthy ones - 95.4 points (CI 93.43, 97.37), $p<0.05$; the intensity of pain (BP) in hypertensive patients was 54.2 points (CI 48.75, 59.65), in the control group - 81.76 points (CI 73.75, 89.77), $p<0.05$; general health (GH) in patients with hypertension was 44.51 points (CI 40.38, 48.65), in the control group 64.8 points (CI 56.51, 73.09), $p<0.05$. At the same time the role of functioning due to physical condition (RP) has been violated to a greater extent, which was equal to 27.54 points in hypertensive patients (CI 20.01, 35.08), and in healthy subjects - 76 points (CI, 62.19, 89, 81), $p<0.05$. Thus, the comparative analysis showed a statistically significantly

decrease in these parameters, indicating a decrease in health status in patients with hypertension, causing restriction of vitality, performance of physical activity (self-care, walking, climbing stairs, carrying heavy loads, etc.). Patients assessed their health as poor and requiring treatment. The lowest indicator of a role functioning indicated a considerable role in limiting the physical problems of life.

An examination of the psychological component of health (Mental Health - MH) of hypertensive patients compared with the control group also showed a statistically significant decrease in performance through all scales, so the mental health (MH) in patients with hypertension was 53.99 points (CI, 50.04, 57, 93) and in healthy subjects - 65.52 points (CI 60.45, 70.59), $p<0.05$; role functioning due to emotional state (RE) in hypertensive patients was equal to 35.48 points (CI 26.61, 44.35), in subjects of the control group - 77.4 points (CI 61.19, 93.61), $p<0.05$; vital activity (VT) in patients with hypertension was 43.74 points (CI 39.46, 48.03), in the control group - 67.52 points (CI 61.79, 73.25), $p<0.05$. Such component as social functioning (SF) was reduced in both groups, both in hypertensive patients - 43.79 points (CI 40.61, 46.97) and in patients of the control group - 43.68 points (CI, 37.66; 49 70), so probably it did not have a statistically significant deviation.

The performed comparative analysis of the psychological component of health in patients with hypertension is indicative of fatigue of patient; lowering of vitality, limitation in performing daily work caused by the worsening of the emotional state and the presence of depression, anxieties, and mental troubles. Thus, the quality of life in patients with hypertension was significantly reduced on all scales of SF-36questionnaire. Such patients developed dramatically reduced physical and social activity, emotional status falls considerably, as well as subjective evaluation of emotional state, mood and overall health in general. The SF-36 questionnaire proved to be a highly sensitive tool for the analysis of the decline in the quality of life in patients with hypertension and allowed to quantify various components on all its scales. Patients with hypertension were evaluated for the effect of compliance on the QOL. The study showed a statistically significant interaction between low treatment compliance and decreased quality of life. Thus indicators of performance scale of physical functioning (PF) were equal to 42.4 points (CI 32.8, 51.9) ($p\leq0.05$); role functioning caused by physical condition (RP) – 19.4 (CI 10.5, 28.3) ($r\leq0.02$) and the intensity of pain (BP) - 48.9 points (CI 42.3, 55.4) ($r\leq0.04$) indicating that poor treatment compliance influences the physical condition of patients with hypertension. The obtained data allow us to identify causes leading to decrease in quality of life in order to develop outpatient activities aimed at improving QOL and treatment compliance in hypertensive patients.

Discussion

The study revealed low adherence (33 per cent) to the treatment of the interviewed patients. The main reasons of the low compliance were forgetfulness, lack of free agents, and lack of treatment effect. The study of quality of life in hypertensive patients using the SF-36 questionnaire and determination of the impact of compliance on the quality of life showed that the disease leads to a statistically significant reduction in all components of QOL. The most pronounced statistically significant reduction in quality of life of hypertensive patients was identified in the scales RF and RE, indicating that there are significant physical problems in the disability and reducing emotional status. Investigation of the interaction of compliance and quality of life showed a statistically significant impact of a poor compliance on such parameters of the quality of life as PF, RP and BP. These data confirm that hypertension leads to a reduction of all components of QOL (physical, psychological).[10] Assessment of compliance and quality of life of hypertensive patients and obtaining quantitative indicators can help with the development of measures aimed at elimination of the causes of poor adherence to treatment, contribute to the individualization of treatment of particular patients and correction of its management at different stages, and enhance the quality of life.

As the above-mentioned results show, the antihypertensive therapy was characterized by a low level of compliance, which entailed unsatisfactory control of arterial hypertension and resulted in the lowering of QOL. This investigation is an important instrument for identifying social-behavioural (personality) factors that decrease patients' compliance with hypertension treatments. It may help to elaborate preventive health messages for the future. Since the most sensitive QOL criteria of hypertensive patients were linked to their mental states, we may conclude that along with medications, the main factors that affected the compliance with treatment and the QOL were relations with the doctor, the doctor's ability to make the patient interested in the therapy, discussion of the plan of treatment, regularity of examinations and the patient's ability to control himself/herself. In view of this, in order to enhance the patients' compliance with treatment, we devised a plan of measures.[4] It included interactive classes called 'the Hypertension School' at a polyclinic during which patients were given hand-outs about ways of monitoring

their hypertension, followed by outpatient observations and once-a-month telephone communications with the doctor. They were taught to monitor their conditions themselves. In subsequent classes the patients' knowledge was tested. The observation period was six months and was completed by an evaluation in both groups with regard to QOL dynamics, adherence to treatment as well as the number of hospital admissions, ambulance calls and references to a doctor, and hypertension aggravation in both groups was.[13] The impact of this awareness-building on the QOL and compliance of hypertensive patients will be assessed at the next stage of research.

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Table 1: Statistical comparing of the group of persons exposed to compliance and the group of persons not exposed to compliance

	df - Effect	MS - Effect	df - Error	MS - Error	F	p
age	1	155,8	90	119,8	1,30	0,26
experience of the disease	1	736,8	90	706,4	1,04	0,31
general health condition	1	24,7	90	393,8	0,06	0,80
physical functioning	1	3929,1	90	994,5	3,95	0,05
role functioning due to physical condition	1	6829,7	90	1231,8	5,54	0,02
role functioning due to emotional state	1	5815,8	90	1746,7	3,33	0,07
social functioning	1	1,1	90	233,5	0,00	0,95
intensity of the pain	1	2893,8	90	650,8	4,45	0,04
vital activity	1	893,9	90	408,1	2,19	0,14
mental health	1	73,8	90	354,1	0,21	0,65
waist measurement	1	74,3	90	191,9	0,39	0,54

Table 2: Quality of life in patients with hypertension and normal level of BP

Scale	Subjects	Average value	- 95% CI,	+ 95% CI	SD	n
General health (GH)	patients	44.51	40.38	48.65	19.74	90
	healthy subjects	64.8	56.51	73.09	20.09	25
Physical functioning (PF)	patients	48.56	41.84	55.27	32.05	90
	healthy subjects	95.4	93.43	97.37	4.77	25
Role functioning caused by physical condition (RP)	patients	27.54	20.01	35.08	35.98	90
	healthy subjects	76	62.19	89.81	33.45	25
Role functioning caused by the emotional state (RE)	patients	35.48	26.61	44.35	42.34	90
	healthy subjects	77.4	61.19	93.61	39.28	25
Social functioning (SF)	patients	43.79	40.61	46.97	15.2	90
	healthy subjects	43.68	37.66	49.7	14.59	25
Intensity of pain (BP)	patients	54.2	48.75	59.65	26	90
	healthy subjects	81.76	73.75	89.77	19.41	25
Vital activity (VT)	patients	43.74	39.46	48.03	20.34	90
	healthy subjects	67.52	61.79	73.25	13.87	25
Mental health (MH)	patients	53.99	50.04	57.93	18.73	90
	healthy subjects	65.52	60.45	70.59	12.29	25