

Quality of life in institutionalized patients with schizophrenia

Jakość życia chorych na schizofrenię przebywających w placówkach psychiatrycznych stałego pobytu

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Abstract

Aim: Research into quality of life has become very important recently, since quality of life is increasingly used to characterise diseases and estimate the efficiency of therapeutics. The aim of this study was to determine significant factors that are associated with the quality of life of patients with schizophrenia accommodated in social welfare institutions. **Material and methods:** The study was conducted at the Institution for the Accommodation of Adults "Male Pcelice," Kragujevac, Serbia. It was designed as a cross-sectional study. The quality of life was measured by using five distinct scales. The data on factors that might be associated with the quality of life were obtained from case records and the patients' questionnaires. The association of every single factor was evaluated by using comparative analysis and the method of multiple linear regression. **Results:** Multiple linear regression shows that EuroQoL Five-dimensions – Five-Level scale score was associated with gender ($B = -0.059 \pm 0.021$; $p = 0.006$) and daily dose ($B = -0.051 \pm 0.015$; $p = 0.001$); Quality of Life Enjoyment and Satisfaction Questionnaire score was associated with the patient's level of education ($B = 2.873 \pm 1.054$; $p = 0.007$); the number of prescribed antipsychotics was associated with the Brief Psychiatric Rating Scale score ($B = 3.150 \pm 1.111$; $p = 0.007$); the physical domain of the World Health Organization Quality of Life-BREF was associated with the year of disease onset ($B = -0.142 \pm 0.055$; $p = 0.011$) and the daily dose ($B = -2.335 \pm 0.787$; $p = 0.004$); the psychological domain of the World Health Organization Quality of Life-BREF was associated with gender ($B = -2.686 \pm 1.216$; $p = 0.029$); the social relationship domain of the World Health Organization Quality of Life-BREF was associated with the level of education ($B = 3.109 \pm 1.289$; $p = 0.017$) and the number of prescribed antipsychotics ($B = -3.297 \pm 1.516$; $p = 0.031$); the environment domain of the World Health Organization Quality of Life-BREF was associated with the number of prescribed antipsychotics ($B = -1.420 \pm 0.653$; $p = 0.031$). **Conclusion:** The quality of life of patients with schizophrenia was higher in males with a university degree, when the duration of the disease was shorter, negative symptoms were less pronounced, and with fewer side effects. Efforts to improve the quality of life in patients with schizophrenia accommodated in social welfare institutions should be made that could contribute to the prevention of adverse outcomes.

Keywords: quality of life, schizophrenia, questionnaires, side effects, antipsychotics

Streszczenie

Cel pracy: Badania nad jakością życia nabrały ostatnio szczególnej wagi – coraz częściej kategoria ta jest stosowana do opisu chorób oraz oceny skuteczności leczenia. Celem badania była określenie istotnych czynników związanych z jakością życia pacjentów chorych na schizofrenię przebywających w placówkach psychiatrycznych stałego pobytu. **Materiał i metoda:** Badanie o charakterze przekrojowym zostało przeprowadzone wśród pacjentów Centrum Pobytu dla Osób Dorosłych „Male Pcelice” w miejscowości Kragujevac w Serbii. Jakość życia chorych na schizofrenię zmierzono za pomocą pięciu skal. Dane dotyczące czynników, które mogły mieć wpływ na jakość życia badanych, zostały pozyskane z dokumentacji medycznej pacjentów oraz z wypełnianych przez nich ankiet. W ocenie zależności pomiędzy jakością życia pacjentów a poszczególnymi czynnikami wykorzystano analizę porównawczą oraz metodę regresji wielorakiej. **Wyniki:** Metodą regresji wielorakiej wykazano, iż wynik skali EuroQoL Five-dimensions – Five-Level korelował z płcią pacjentów ($B = -0,059 \pm 0,021$; $p = 0,006$) oraz dzienną dawką przyjmowanych leków ($B = -0,051 \pm 0,015$; $p = 0,001$), wynik Quality of Life Enjoyment and Satisfaction Questionnaire – z poziomem wykształcenia ($B = 2,873 \pm 1,054$; $p = 0,007$), liczba przyjmowanych leków przeciwpsychotycznych – z wynikiem skali Brief Psychiatric Rating Scale ($B = 3,150 \pm 1,111$; $p = 0,007$), domena fizyczna skali World Health Organization Quality of Life-BREF – z czasem trwania choroby (rokiem wystąpienia choroby) ($B = -0,142 \pm 0,055$; $p = 0,011$) oraz dzienną dawką przyjmowanych leków ($B = -2,335 \pm 0,787$; $p = 0,004$), domena psychologiczna skali World Health Organization Quality of Life-BREF – z płcią ($B = -2,686 \pm 1,216$; $p = 0,029$), domena społeczna skali World Health

Organization Quality of Life-BREF – z poziomem wykształcenia ($B = 3,109 \pm 1,289$; $p = 0,017$) oraz liczbą przyjmowanych leków przeciwpsychotycznych ($B = -3,297 \pm 1,516$; $p = 0,031$), zaś domena środowiskowa skali World Health Organization Quality of Life-BREF – z liczbą przyjmowanych leków przeciwpsychotycznych ($B = -1,420 \pm 0,653$; $p = 0,031$). **Wnioski:** Jakość życia chorych na schizofrenię objętych badaniem była wyższa u pacjentów płci męskiej z wyższym wykształceniem, o krótszym przebiegu choroby, z mniej dotkliwymi objawami oraz mniejszą liczbą skutków ubocznych. Poprawa jakości życia osób chorujących na schizofrenię przebywających w placówkach psychiatrycznych stałego pobytu pozwoli zapobiec niepomyślnym wynikom leczenia psychiatrycznego.

Słowa kluczowe: jakość życia, schizofrenia, ankiety, skutki uboczne, leki przeciwpsychotyczne

INTRODUCTION

A great interest in the quality of life (QoL) of patients with schizophrenia has recently emerged, since QoL is increasingly used in the characterisation of disease and to estimate the efficiency of therapeutics (Awad and Voruganti, 2012). The World Health Organization (WHO) defined QoL as the perception of an individual of their position in life in the context of culture and system of values in their environment, including their own aims, expectations, standards and interests (The WHOQOL Group, 1995). A great number of scales are used for measuring QoL of schizophrenic patients, which mutually differ in their applicability to patients in various stages of the disease. As none of the current scales can measure all aspects of QoL in these patients, new ones continue to emerge, designed with variable success (Bobes et al., 2007; Wilkinson et al., 2000).

QoL of patients with schizophrenia accommodated in long-term residential psychiatric facilities is especially sensitive to inadequate psychotropic medication and to interactions of psychotropic drugs with concomitant medication (Ilickovic et al., 2016). Additional care of clinical pharmacists, who may help psychiatrists to avoid interactions and improve prescriptions, could positively affect QoL (Jankovic et al., 2001). The factors that also adversely affect physical aspects of QoL are sedentary lifestyle, unhealthy dietary habits, and nicotine dependence among the residents of long-term residential psychiatric facilities (Levine et al., 2001). It is interesting that QoL of psychiatric patients in long-term residential facilities is relatively stable, with small fluctuations from month to month, but it could be dramatically improved if appropriate interventions were implemented in the organisation of work and living in such facilities (Lyketos et al., 2003).

Since many factors simultaneously influence the QoL of institutionalised schizophrenic patients, it is especially important to identify their mutual interaction, with the aim of improving their QoL. By accurately measuring QoL, individual satisfaction with the therapy and its economic effectiveness can be evaluated. The aim of the study has been to determine the most significant factors and groups of factors that are associated with the QoL in the population of patients with schizophrenia accommodated in a long-term residential psychiatric facility.

MATERIAL AND METHODS

This study was carried out at the Institution for the Accommodation of Adults “Male Pcelice,” Kragujevac. The institution accommodates adults with chronic psychiatric diseases from Serbia. The total capacity of the institution is 890 beds. The study included all patients suffering from schizophrenia diagnosed by the tenth International Statistical Classification of Diseases and Related Health Problems (ICD-10). The total number of patients who participated in the study was 153. Patients with mental disability and cognitive disorders that prevented them from understanding and answering the offered scales, illiterate patients and those with sight disorders and dementia were excluded from the study. Each patient was approached by the same study investigator (the first author) and received the information related to the participation in the study in oral and written form. The participation was voluntary, and the patients were included in the study only if they provided their consent. The first author interviewed the patients and completed the scales according to the patients’ responses. The approvals of the competent Ethical Committee at the Institution for the Accommodation of Adults “Male Pcelice” and the Ministry of Labour and Social Policy were obtained. The study was observational, of a cross-sectional type. All members of the population who met the the inclusion and exclusion criteria were examined, therefore a special sample was not specified. The QoL was a dependant variable. It was evaluated by using special scales. The following QoL scales were used: (1) the World Health Organization Quality of Life-BREF scale (WHOQOL-BREF) with 26 items and four domains – physical, psychical, social and environmental, the score of each domain ranging from 0 to 100 (Cronbach’s alpha of the domains ranges from 0.751 to 0.856); (2) EuroQoL Five-dimensions – Five-Level scale (EQ-5D-5L) with five items (transformed score ranges from 0.0 to 1.0) and visual analogue scale (VAS) (Cronbach’s alpha = 0.890); (3) and Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form (Q-LES-Q-SF) with 16 questions, with the first 14 summed up in a transformed score which ranges from 0 to 100 (Cronbach’s alpha = 0.730). The WHOQOL-BREF, EQ-5D-5L and Q-LES-Q-SF are generic instruments for measuring QoL, but they were often used in the past to measure QoL of psychiatric patients (especially Q-LES-Q-SF), and for that

reason they were adopted for the study. All three scales were used in order to cross-validate their results and increase the precision of the QoL measurements. The results of EQ-5D-5L and Q-LES-Q-SF could be expressed as total scores, while WHOQOL-BREF does not have the option to calculate total scores, and scores of specific domains are used instead. For measuring the severity of psychiatric symptoms, the Brief Psychiatric Rating Scale (BPRS) was used (24 items, the raw score ranges from 24 to 168) (Andersen et al., 1989), whilst for the evaluation of side effects of drugs we used the Udvalg for Kliniske Undersøgelser Side Effect Rating Scale (UKU scale, 48 items, range of 0 to 144, Cronbach's alpha 0.820) (Lingjærde et al., 1987).

The permission of the author of a given scale or their official sites was requested for each scale in this research. By insight into the medical documentation the values of independent and confounding variables were defined. The independent variables included the diagnosis, length of stay at the institution, year of disease onset, type of antipsychotic (AP), prescribed AP, number of AP per user, daily dose of AP, occurrence and type of side effects and occurrence and types of interactions. The confounding variables included concomitant therapy, gender, age, education, comorbidities, insufficiency of a vital organ, smoking (interview with the patient), coffee intake (interview with the patient), the number of the pavilion (the patients could stay in one of several pavilions which were of the same type) and the type of accommodation. The type and number of chosen variables were determined by the completeness and quality of the patients' files, which contained limited data.

Statistical data processing

Statistical data processing was performed with mathematical-statistical methods, applied depending on the category and type of data and statistical test by using SPSS for Windows, version 18. The normality of distribution of numerical variables was verified with Shapiro–Wilk test and Kolmogorov–Smirnov test. For the comparison of the mean values of variables for two populations, *t*-test for independent samples and Mann–Whitney test were used, and for the comparison of the mean values of several populations, variance analysis and Kruskal–Wallis test were used. The correlation of numerical variables was examined with Pearson and Spearman coefficients. The dependence of a numerical outcome from other variables was checked by multiple linear regression. All variables were initially entered into multiple linear regression simultaneously, but the optimal multiple linear regression model was chosen by backward deletion method containing all variables with significant direct influence on outcomes, and some of the variables without direct but with indirect influence. The following criteria of descriptive statistics were used in the paper: arithmetic means, standard deviation, median, quartiles, frequencies and percentages. The results were considered significant at $p < 0.05$.

RESULTS

The general characteristics of the study participants are presented in the Tab. 1. Tab. 2 shows the values of the scales' scores.

Characteristics	Groups	Number of patients	Percentage or mean \pm standard deviation
Gender	Male	84	54.9
	Female	69	45.1
Age		153	50.8 \pm 10.1
Education	No education	10	6.5
	Primary school	52	34.0
	Secondary school	79	51.6
	University degree	12	7.8
Diagnosis	Residual schizophrenia	25	16.3
	Paranoid schizophrenia	24	15.7
	Hebephrenic schizophrenia	22	14.4
	Inorganic mental disease	39	25.5
	Simple schizophrenia	43	28.1
General comorbidities	No comorbidities	51	33.3
	Overweight	16	10.5
	Bronchial asthma	9	5.9
	Hypertension/Bronchial asthma	13	8.5
	Hypertension	32	20.9
	Diabetes/Hypertension/Thyrototoxicosis	4	2.6
	Hypertension/Diabetes	12	7.8
	Enlarged prostate	4	2.6
Hypertension/Overweight/Diabetes	12	7.8	

Tab. 1. General characteristics of the study participants

Characteristics	Groups	Number of patients	Percentage or mean \pm standard deviation
Psychiatric comorbidities	No comorbidities	65	42.5
	Depression	46	30.1
	Depression/Personality disorder	8	5.2
	Depression/Alcoholism	10	6.5
	Depression/Parkinson disease	5	3.3
	Epilepsy	19	12.4
Group of prescribed AP	Typical	6	3.9
	Atypical	87	56.9
	Combination	60	39.2
Type of prescribed AP	Risperidone/Haloperidol	14	9.2
	Risperidone	54	35.3
	Clozapine	14	9.2
	Olanzapine	17	11.1
	Haloperidol	7	4.6
	Risperidone/Olanzapine	5	3.3
	Clozapine/Olanzapine	6	3.9
	Clozapine/Olanzapine/Haloperidol	10	6.5
	Olanzapine/Haloperidol	3	2.0
	Clozapine/Haloperidol	10	6.5
	Risperidone/Clozapine	13	8.5
Daily dose	Once per day	20	13.1
	Twice per day	65	42.5
	Three times per day	68	44.4
Number of APs per patient	One	90	58.8
	Two	53	34.6
	Three	10	6.5
Smoker or non-smoker	Smoker	115	75.2
	Non-smoker	38	24.8
Drinks coffee or not	Drinks coffee	143	93.5
	Does not drink coffee	10	6.5
Type of accommodation	Room with two beds	4	2.6
	Room with three beds	12	7.8
	Room with four beds	119	77.8
	Room with five beds	18	11.8
Type of pavilion	First pavilion	72	47.1
	Second pavilion	57	37.3
	Third pavilion	24	15.7
Age when acquired the disease		153	28.5 \pm 10.1
Length of stay at the institution (years)		153	14.6 \pm 9.7
Length of therapy (months)		153	9.6 \pm 9.2
CPZ equivalent (mg)		153	359.5 \pm 289.2

AP – antipsychotic; **CPZ equivalent** – chlorpromazine equivalents.

Tab. 1. General characteristics of the study participants (cont.)

EQ-5D-5L score (E-score) was not correlated with the level of education, diagnosis, number of AP, group of prescribed AP, type of prescribed AP, general and psychiatric comorbidities, age, disease onset, length of stay at the institution, length of therapy, smoking, coffee intake, type of accommodation and number of pavilion. E-score was in a negative correlation with chlorpromazine (CPZ) equivalent ($r = -0.182$; $p = 0.024$), while it was in a positive

correlation with VAS ($r = 0.467$; $p = 0.0005$). The difference of E-score mean values between males and females was statistically significant ($U = 2222.0$; $p = 0.011$), with males having a better E-score. The difference of E-score mean values between the number of daily doses was statistically significant ($\chi^2 = 7.526$; $p = 0.023$), with the participants with one daily AP dose having the best E-score. E-score and the score of UKU scale were in a negative

Characteristics	Number of patients	Minimum value	Maximum value	Arithmetic mean	Standard deviation
E-score	153	0.516	1.000	0.86	0.13
VAS	153	79.51	13.79	50.00	100.00
Q-score	153	20.00	93.00	66.65	9.66
PBRs-score	153	24.00	76.00	32.93	8.67
U-score	153	4.00	31.00	12.10	5.94
T1-score	153	13.00	44.00	30.00	6.99
T2-score	153	13.00	56.00	37.30	7.58
T3-score	153	50.00	100.00	82.37	11.80
T4-score	153	6.00	38.00	23.39	5.04

E-score – score for EQ-5D-5L scale – EuroQoL Five-dimensions; **VAS** – EQ-5D visual analogue scale; **Q-score** – score for Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form (Q-LES-Q-SF); **BPRS-score** – score for the Brief Psychiatric Rating Scale; **U-score** – score for the UKU scale – Udvalg for Kliniske Undersøgelser Side Effect Rating Scale; **T1-score, T2-score, T3-score, T4-score** – mental, physical, social and domain of environment. Transformed scores for the World Health Organization Quality of Life-BREF questionnaire – the WHOQOL-BREF.

Tab. 2. Values of the scale scores

correlation ($r = -0.361$; $p = 0.0005$). Multiple linear regression showed that E-score was associated with gender ($B = -0.059 \pm 0.021$; $\beta = -0.218$; $t = -2.813$; $p = 0.006$) and daily dose ($B = -0.051 \pm 0.015$; $\beta = -0.264$; $t = -3.358$; $p = 0.001$), while the influence of age ($B = -0.002 \pm 0.001$; $\beta = -0.170$; $t = -1.962$; $p = 0.052$) and the length of stay at the institution ($B = 0.002 \pm 0.001$; $\beta = -0.147$; $t = 1.700$; $p = 0.091$) was only indicative. Multiple linear regression also showed that E-score was associated with weakness ($B = -0.048 \pm 0.011$; $\beta = -0.309$; $t = -4.393$; $p = 0.0005$), paraesthesia ($B = -0.055 \pm 0.015$; $\beta = -0.259$; $t = -3.725$; $p = 0.0005$), nausea ($B = -0.058 \pm 0.024$; $\beta = -0.163$; $t = -2.399$; $p = 0.018$), headache ($B = -0.044 \pm 0.017$; $\beta = -0.181$; $t = -2.659$; $p = 0.009$) and decrease of salivation ($B = -0.025 \pm 0.011$; $\beta = -0.157$; $t = -2.322$; $p = 0.022$) ($R^2 = 0.336$).

Q-LES-Q-SF score (Q-score) was not correlated with gender, diagnosis, daily dose, groups of prescribed AP, general and psychiatric comorbidities, age, disease onset, length of stay at the institution, length of therapy, smoking, coffee intake, type of accommodation and number of pavilion. Q-score and CPZ equivalent were in a positive correlation ($r = 0.366$; $p = 0.0005$) and also CPZ with VAS ($r = 0.309$; $p = 0.0000$). The best Q-score was obtained in the participants with a university degree ($r = 0.182$; $p = 0.007$). The differences of Q-score mean values between the number of APs were statistically significant ($r = 0.089$; $p = 0.025$), and the best Q-score was achieved by the study participants who took two APs. Q-score and the score of UKU scale had a negative correlation ($r = -0.171$; $p = 0.034$). Multiple linear regression showed that Q-score was influenced by the level of education ($B = 2.873 \pm 1.054$; $\beta = 0.217$; $t = 2.725$; $p = 0.007$) ($R^2 = 0.047$), reduced memorisation ($B = -2.207 \pm 0.968$; $\beta = -0.177$; $t = -2.279$; $p = 0.0005$), intensified salivation ($B = -1.992 \pm 0.922$; $\beta = -0.167$; $t = -2.161$; $p = 0.024$) and vertigo ($B = -3.414 \pm 1.265$; $\beta = -0.210$; $t = -2.698$; $p = 0.008$).

BPRS-score (B-score) was not correlated with gender, the level of education, daily dose, general and psychiatric comorbidities, age, disease onset, length of stay at

the institution, length of therapy, smoking, coffee intake, type of accommodation and number of pavilion. B-score had a positive correlation with CPZ equivalent ($r = 0.260$; $p = 0.001$). The difference in B-score mean values between diagnoses was statistically significant ($c^2 = 12.397$; $p = 0.015$). The best B-score was found in the participants with simple schizophrenia. The differences in B-score mean values between the groups of the prescribed APs were statistically significant ($c^2 = 13.482$; $p = 0.004$), the patients with the AP combination having the best B-score. The study participants who were prescribed risperidone and olanzapine had the best B-score ($c^2 = 19.720$; $p = 0.020$). The score of UKU scale and B-score were in a positive correlation ($r = 0.447$; $p = 0.0005$). Multiple linear regression shows that BPRS-score was influenced by the number of prescribed APs ($B = 3.150 \pm 1.111$; $\beta = 0.225$; $t = 2.835$; $p = 0.007$) ($R^2 = 0.051$), difficulties in concentration ($B = 1.104 \pm 0.610$; $\beta = 0.130$; $t = 2.304$; $p = 0.023$), weakness ($B = 1.576 \pm 0.562$; $\beta = 0.158$; $t = 2.804$; $p = 0.006$), tension ($B = 3.325 \pm 0.603$; $\beta = 0.335$; $t = 5.514$; $p = 0.000$), reduced length of sleep ($B = 2.300 \pm 0.631$; $\beta = 0.195$; $t = 3.842$; $p = 0.000$), rigidity ($B = 18.326 \pm 3.644$; $\beta = 0.294$; $t = 5.028$; $p = 0.000$), enhanced sexuality ($B = 2.662 \pm 0.735$; $\beta = 0.207$; $t = 3.566$; $p = 0.000$), erectile functions ($B = 1.189 \pm 0.579$; $\beta = 0.1113$; $t = 2.052$; $p = 0.042$) and headaches ($B = 1.812 \pm 0.862$; $\beta = 0.115$; $t = 2.102$; $p = 0.037$).

The physical domain of WHOQOL-BREF (T1-score) was not correlated with gender, the level of education, diagnosis, daily dose, type and group of the prescribed AP, general and psychiatric comorbidities, age, disease onset, length of stay at the institution, length of therapy, smoking, coffee intake, type of accommodation and number of pavilion. T1-score and score of UKU scale were in a negative correlation ($r = -0.357$; $p < 0.0005$). T1-score and VAS were in a positive correlation ($r = 0.314$; $p < 0.0005$). Multiple linear regression showed that T1-score was influenced by gender ($B = -2.435 \pm 1.103$; $\beta = -0.174$; $t = -2.207$; $p = 0.029$), disease onset ($B = -0.142 \pm 0.055$; $\beta = -0.205$; $t = -2.585$; $p = 0.011$) and daily dose ($B = -2.335 \pm 0.787$; $\beta = -0.231$; $t = -2.966$; $p = 0.004$), while the level of education had

only indicative influence ($B = 1.480 \pm 0.055$; $\beta = -0.205$; $t = 1.964$; $p = 0.051$).

The psychological domain of WHOQOL-BREF (T2-score) was not correlated with the level of education, daily dose, group and type of the prescribed AP, general and psychiatric comorbidities, age, disease onset, length of stay at the institution, length of therapy, smoking, coffee intake, type of accommodation and number of pavilion. The difference of T2-score mean values between genders was statistically significant ($U = 2283.0$; $p = 0.006$), with the male patients having better T2-score. The differences in T2-score mean values between diagnoses were statistically significant ($c^2 = 13.613$; $p = 0.009$). T2-score and score of UKU scale were in negative correlation ($r = -0.262$; $p = 0.001$). T2-score and VAS were in positive correlation ($r = 0.421$, $p < 0.0005$). Multiple linear regression shows that T2-score was influenced only by gender ($B = -2.686 \pm 1.216$; $\beta = -0.177$; $t = -2.209$; $p = 0.029$).

The social relationship domain of WHOQOL-BREF (T3-score) was not correlated with gender, the diagnosis, daily dose, group and type of prescribed AP, general and psychiatric comorbidities, age, disease onset, length of stay at institution, length of therapy, smoking, coffee intake, type of accommodation and number of pavilion. The differences of T3-score between patients with various levels of education were statistically significant ($c^2 = 12.774$; $p = 0.005$). The differences of T3-score values between the number of prescribed psychotics were statistically significant ($c^2 = 6.649$; $p = 0.036$). T3-score and the score of UKU scale were not correlated ($r = -0.045$, $p = 0.577$). T3-score and VAS were in a positive correlation ($r = 0.213$; $p = 0.008$). Multiple linear regression showed that T3-score was influenced by the level of education ($B = 3.109 \pm 1.289$; $\beta = 0.192$; $t = 2.412$; $p = 0.017$) and the number of prescribed APs ($B = -3.297 \pm 1.516$; $\beta = -0.173$; $t = -2.174$; $p = 0.031$) ($R^2 = 0.060$).

The environment domain of WHOQOL-BREF (T4-score) was not correlated with gender, the level of education, diagnosis, daily dose, number of APs, group and type of prescribed AP, general and psychiatric comorbidities, age, year of beginning of disease, length of stay at the institution, length of therapy, smoking, coffee intake, type of accommodation and number of pavilion. T4-score and the score of UKU scale were not correlated ($r = -0.078$; $p = 0.338$). T4-score and VAS were in a positive correlation ($r = 0.257$; $p = 0.001$). Multiple linear regression showed that T4-score was influenced by the number of prescribed APs ($B = -1.420 \pm 0.653$; $\beta = -0.174$; $t = -2.174$; $p = 0.031$) ($R^2 = 0.030$).

T1-score, T2-score, T3-score and T4-score were not correlated with CPZ equivalent.

DISCUSSION

Our study has shown that QoL of long-term patients in a residential psychiatric facility decreased in those who

experienced significant adverse effects of APs and were taking larger doses of these drugs. Interestingly, the combination of APs and the once-daily dose regimen had a protective effect on QoL, as did male gender and a higher level of education.

An inverse correlation between QoL and the adverse effects of APs has been shown in other studies. Some of them also demonstrated that second-generation APs were associated with increased QoL in comparison with first-generation drugs. In our study, the association of the generation of the used APs and QoL was not proven, likely due to the fact that a large majority of the patients were taking second-generation drugs, which are now recommended by guidelines as first-line therapy (Montes et al., 2003; Prieto et al., 2004). It is not surprising that atypical APs offer better QoL to the patients, considering the lower rates of motor and autonomic side effects than with typical, first-generation drugs.

Since the response of patients with schizophrenia to APs is individual, there are large differences in the doses of these drugs in patients with the same therapeutic result. However, the motor, autonomic and metabolic adverse effects of these drugs are dose-dependent, and it is clear that larger doses are accompanied by an increased frequency of adverse effects, which in turn decreases QoL. Administering APs in smaller daily doses could also help to decrease the frequency of adverse effects (the patient will only have one peak concentration of the drug in the blood instead of two or three), thereby increasing QoL (de Araújo et al., 2014; Prieto et al., 2004; Ritsner et al., 2004; Whynes, 2008).

Why combination APs therapy was related to an improved QoL has no straightforward explanation, as the majority of guidelines recommend monotherapy as a better choice. The likely explanation for our result could be the special characteristics of our patients, who were hospitalised for long periods of time as they could not be adequately treated at home due to the severity of the disease. Such patients are frequently therapy-resistant, and require either augmentation of the antipsychotic effect with other drug groups, or administration of a combination of APs. The positive correlation between QoL and a combination of APs is most likely the result of a better control of the disease with combination rather than monotherapy, which was already attempted in the past (Endicott et al., 1993; Gureje et al., 2003; Revicki et al., 1999; Ritchie et al., 2003; Shoja Shafti and Gilanipoor, 2014).

There is no plausible explanation why the male patients in our study showed better QoL than the female ones. On the other hand, the protective effect of a higher education level was consistently found in many other studies of QoL in schizophrenia. It seems that how individuals perceive their mental health problems is of great importance for the success of therapy (Theodore et al., 2012), and therefore for QoL. A high level of education helps patients to have a better understanding of the nature of their disease and to achieve better treatment results.

There are certain limitations of our study. In the first place, the study was conducted in only one psychiatric facility, which introduces bias due to local treatment policies and varying availability of drugs. Second, the patients' files were of limited quality, since sometimes the medical staff did not register all necessary data, hence the files were incomplete. This limited the choice of study variables and eliminated some patients, leading to a possible distortion of the results.

Our findings imply that appropriate choice of AP(s), the use of minimal effective doses in once-daily regimen and the use of a combination of APs where necessary may improve QoL of patients in long-term residential psychiatric facilities, primarily by improving the therapeutic effect, and by decreasing the frequency of adverse effects.

Studies on quality of life have become significant in clinical research, since quality of life is increasingly used to specify the influence of disease and therapeutic efficiency. Better understanding of the factors that influence quality of life can provide new therapeutic strategies which might result in an improved quality of life and prognosis for the patients. Measuring the quality of life can significantly help with the psychological development of schizophrenic patients in the long term.

Conflict of interest

Authors declare no conflict of interest.

Acknowledgements

The authors are grateful for the help of the medical staff of the Institution for the Accommodation of Adults "Male Pcelice," Kragujevac, in collecting the data for this study. The study was partially financed by the grant No. 175007 from the Ministry of Education of the Republic of Serbia.

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