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THE QUALITY OF LIFE AND ADHERENCE TO THERAPEUTIC RECOMMENDATIONS OF HEMODIALYSIS PATIENTS

Jakość życia i przestrzeganie zaleceń terapeutycznych przez chorych hemodializowanych

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Abstract (in Polish):

Cel pracy

Celem niniejszych badań była ocena jakości życia pacjentów hemodializowanych i przestrzeganie przez nich zaleceń terapeutycznych.

Materiał i metody

Badania przeprowadzono wśród 71 pacjentów z przewlekłą chorobą nerek, leczonych nerkozastępczo metodą hemodializy. Metodą badawczą był sondaż diagnostyczny przeprowadzony przy użyciu kwestionariusza jakości życia SF – 36 (ang. Short Form Health Survey), skali ARMS (ang. Adherence to Refills and Medication Scale) oraz kwestionariusza ankiety własnego autorstwa.

Wyniki

W badaniach wykazano istotny wpływ wieku, miejsca zamieszkania, wykształcenia oraz aktywności fizycznej badanych na jakość życia pacjentów hemodializowanych. Nie zaobserwowano istotnych statystycznie zależności pomiędzy płcią, stanem cywilnym, aktywnością fizyczną, a jakością życia chorych. W badaniach zauważono, że przestrzeganie zaleceń terapeutycznych istotnie wpływa na jakość życia w następujących domenach: sprawność (PF), witalność (VT), funkcjonowanie społeczne (SF), ograniczenia aktywności wywołane problemami emocjonalnymi (RE) i funkcjonowanie w wymiarze psychicznym (MCS). W badaniach zaobserwowano, że im wyższy wynik ARMS czyli słabsze stosowanie się do zaleceń

tym niższa jakość życia w tych domenach

Wnioski

Wiek pacjentów poddanych leczeniu nerkozastępczym jest istotną determinantą pogarszającą jakość życia. Hemodializa jako metoda leczenia PCHN w znacznym stopniu przyczynia się do pogorszenia jakości życia badanych chorych, dotyczy to zwłaszcza mieszkańców wsi, osób z wykształceniem podstawowym i zawodowym, a także chorych dłużej leczonych hemodializami. Przestrzeganie zaleceń terapeutycznych wpływa pozytywnie na jakość życia pacjentów hemodializowanych.

Abstract (in English):

Aim

The purpose of this study was to assess the quality of life of hemodialysis patients and adherence to therapeutic recommendations.

Material and methods

This survey-based study involved 71 patients with CKD receiving hemodialysis as renal replacement therapy. The research instruments were: the 36-Item Short Form Health Survey (SF–36), the Adherence to Refills and Medications Scale (ARMS), and the author's questionnaire.

Results

The study demonstrated that age, place of residence, education, and physical activity of hemodialysis patients have a significant impact on their quality of life. No statistically significant relationships were observed between gender, marital status, physical activity, and the quality of patients' lives. Adherence to therapeutic recommendations had as a significant effect on the quality of life in the domains of physical functioning (PF), vitality (VT), social functioning (SF), and role emotional (RE), as well as on mental functioning (Mental component score, MCS).

Conclusions

The age of patients receiving renal replacement therapy is a significant negative contributor to their quality of life. Hemodialysis as a method of treatment for CKD substantially deteriorates the quality of patients' lives, especially those living in rural areas, those with primary and vocational education, and those receiving hemodialysis treatment for a longer time. Adherence to therapeutic recommendations has a positive effect on the quality of life of hemodialysis patients.

Keywords (in Polish):

hemodializa, przewlekła choroba nerek, jakość życia, przestrzeganie zaleceń terapeutycznych.

Keywords (in English):

hemodialysis, chronic kidney disease, quality of life, adherence to therapeutic recommendations.

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Short title

Przestrzeganie zaleceń przez osoby hemodializowane

Authors (short)

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Introduction

Kidney Disease Outcome Quality Initiative (KDOQI) describes chronic kidney disease (CKD) as a multi-symptom syndrome which develops due to reduction of the number of active nephrones throughout the process of the disease which attacks renal parenchyma [1]. Additionally, it is every renal damage persisting longer than three months with visible abnormalities in imaging studies (i.e. cysts, scars in parenchyma) or in laboratory test (hematuria and proteinuria). A threshold value for renal failure is calculated based on estimated glomerular filtration rate (eGFR) and measures 60 mL/min compared to average body surface area (1.73 m^2) [2]. The most common reason for CKD among adults are primary and secondary renal diseases, diabetic nephropathy, hypertensive chronic kidney disease, glomerular or tubulointerstitial nephritis, acute kidney injury (AKI) and atherosclerosis [3-4]. CKD is both progressive and irreversible illness thus the main goal of treatment is to slowdown the progression of renal damage and reduce the risk of complications [5]. Delayed disease progression is characterized by slower decrease in the eGFR in given time frame which results in postponement of renal replacement therapy [6, 7]. Recommendations for the patients with CKD are based mainly on modifications of lifestyle, including reduction of body mass, smoking cessation, increase in physical activity, a properly balanced diet for patients with kidney diseases, limitation of sodium intake, glycaemia control and treatment of arterial hypertension or anemia [8]. Taking medications as prescribed and regular follow up appointments at the nephrology clinic [9].

Due to progressing renal damage patients at the end stage of CKD require renal replacement therapy. Currently, the following treatment options exist: peritoneal dialysis, hemodialysis and kidney transplant [10-12]. Hemodialysis (HD) is the most frequently used method of renal replacement therapy. Additionally, the patients require replacement, hormonal, pharmacological and dietetic treatment [12]. All of these components force patients to change their lifestyle and become a burden on everyday life both in the mental, physical and social aspect. They also influence the patient's quality of life and therefore in order to effectively prevent complications patients with CKD ought to follow therapeutic recommendations.

At present, the lack of effective cooperation between the patient and the doctor and unsystematic drug use are a significant issue [10]. In the literature a term "adherence" stands for following therapeutic recommendations according to the treatment plan. World Health Organization estimates that every other patient with chronic disease does not act in accordance with doctor's recommendations [11]. In consequence, the therapy becomes inefficient and disease becomes drug resistant.

The Aim

The aim of this study is to asses:

1. The quality of life and adherence of hemodialysis patients.
2. An influence of sociodemographic variables (age, gender, education, place of residence) on the quality of life of hemodialysis patients.
3. An influence of therapeutic recommendations on the quality of life of hemodialysis patients.

Materials and methods

The study was conducted on a group of 71 patients hemodialyzed in DaVita Clinic Dialysis Station in Piła. Diagnosed chronic kidney disease treated with hemodialysis and informed consent for the participation in the study were the criteria for the participation in the study. The research was conducted in

accordance with the Declaration of Helsinki after receiving a positive opinion of the Bioethical Commission of Pomeranian Medical University in Szczecin. Each respondent was informed about the aim of the study and the use of the results for research purposes. Participation was anonymous and voluntary.

The study was conducted with the diagnostic poll method using two standardized tools:

1. Short Form Health Survey SF-36 consists of 36 questions assessing quality of life in 11 aspects such as: physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), general health perception (GH), vitality (VT), social functioning (SF), role limitation due to emotional problems (RE), mental health (MH), health transition (HT), Physical Component Summary (PCS), Mental Component Summary (MCS). Each section is expressed on a scale from 0 to 100 and the higher the score the better the quality of life. There are no official thresholds for SF-36 thus the scales are compared with one another in order to identify the best and the worst aspects of the quality of life.
2. ARMS questionnaire (Adherence to Refills and Medication Scale) is a tool assessing patient's adherence to pharmacological recommendations and rules of prescribed therapy. It consists of twelve points, eight of which asses level of prescribed medication and the other four apply to filling the prescribed prescriptions. The scale does not have set out standards regarding the level of prescribed medications. However, the results range from 12 to 48 and an increased number is associated with lower adherence to recommendations.
3. Additionally, the author's questionnaire form was used. The questionnaire consisted of 24 questions regarding sociodemographic characteristics (gender, age, place of residence, level of education, employment status, marital status), treatment aspects (way the disease was diagnosed, coexisting diseases, duration of treatment with hemodialysis, adherence to therapeutic recommendations) and level of knowledge about the disease.

The acquired information has been subjected to statistical analysis. A comparison of quantitative variables was performed using t-Student test and correlations between quantitative variables were assessed using Pearson correlation coefficient. During analysis 0.05 was adopted as a significance level. All calculations were performed using program R, version 3.5.2.

Results

Data analysis showed that among 71 respondents 50.7% were male. Patient's average age was 70. The largest group were citizens who live in cities with number of residents ranging between 10 and 100 thousand (38%) followed by rural population (35%). The majority of questioned patients were married (57%), had a vocational education (38%) and had already retired (55%).

The majority was diagnosed with chronic renal failure by their general physician (33.8%) followed by others who were incidentally diagnosed during a stay in a hospital (32.4%). Analysis of information regarding coexisting diseases showed that 59.2% of patients also suffers from arterial hypertension, 57.75% from diabetes and 39.44% from cardiovascular diseases.

Duration of renal replacement therapy ranged between 1 month and 21 years, 2.92 years on average. The majority was treated only with hemodialysis. Additional oral medication was used by 49.3% of patients and insulin was used by 42.3%. Diet and oral medications were used by 33.8% of respondents.

84.5% of respondents were informed about dietary guidelines regarding limitation of protein, potasium, phosphorus and fluids intake. Others (8.5%) did not receive sufficient information on dietary restrictions or were not informed about them at all. The majority of respondents (57.9%) tried to follow

guidelines regarding fluid intake (2000 – 2500 ml) or strictly followed the guidelines (43.7%). Others either did not follow the recommendations (7%) or did not answer this question (1.4%). The vast majority of respondents occasionally did not follow the diet and 16.9% claimed that thy always follow dietary guidelines.

Analysis of data on physical activity showed that 38% of respondents exercised less frequently than once a week and 28.2% a few times a week. Others exercised daily (18.3%), once a week (12.7%) and 2.8% of respondents did not answer this question. In case of 59.2% of studied patients their medical condition prevented them from physical activity. Others were physically active in a moderate (39.4%) or intensive (1.4%) degree.

Analysis of adherence to therapeutic recommendations and quality of life assessment

An average score in ARMS questionnaire was 17.8 (SD=4.1). The results ranged from 12 to 30 points, 2 of which were minimal scores standing for the best adherence. No one, on the other hand, got the maximal score. Data analysis regarding the quality of life among he-modialysis patients indicated that respondents had the best quality of life in domains such as: sense of mental health (MH), bodily pain (BP) and mental component summary (MCS). On the other hand, the results were the worst in case of physical functioning (PF), general health perception (GH) and physical role functioning (RP). Additionally, it has been noted that the patients function better in terms of mental (MCS) than physical component summary (PCS).

Table 1. Adherence and quality of life of hemodialysis patients

VARIABLES (pts)		**N ***	**M**	**SD**	**Me**	**Min**	**Max**	**Q1**	**Q3**
Adherence acc. ARMS		**71**	**17.8**	**4.1**	**17**	**12**	**30**	**15**	**20**
Quality of life	PF- Physical functioning	70	38.2	29.3	35	0	100	11.3	60
	RP- Physical role functioning	70	32.1	22.1	31.3	0	75	12.5	50
	BP- Bodily pain	71	60.1	29.0	55.6	11.1	111.1	44.4	77.8
	GH- General health perceptions	71	35.2	15.1	35	5	75	25	45
	VT- Vitality	71	51.5	18.0	50	12.5	87.5	37.5	62.5
	SF- Social role functioning	71	48.8	23.7	50	0	100	37.5	62.5
	RE- Emotional role functioning	70	46.3	27.1	45.8	0	100	25	58.3
	MH- Mental health	69	64.1	21.1	65	15	100	55	80
	HT- Health transition	71	42.3	28.1	25	0	100	25	50
	PCS- Physical component summary	69	39.1	18.9	38.5	10.8	81.5	24.6	52.3
	MCS- Mental component summary	68	55.0	18.3	53.6	14.3	91.1	41.1	68.8

*Some respondents omitted single questions, which made the calculation of the results for some domains impossible

N – number, M – arithmetic average, SD – standard deviation, Me – median, Min – Max – minimum – maximum, Q1 – Q3 quartiles

Based on the survey results it has been concluded that age correlates in a statistically significant way with the quality of life across all the domains ($p< 0.05$) except for bodily pain (BP) and general health perception (GH). It means that the higher the age the lower the quality of life in terms of pain and general perception of health.

Table 2. Influence of age on the quality of patients' lives

Quality of life	Correlation with age	
	Correlation coefficient	p *
PF- Physical functioning	-0.395	0.001
RP- Physical role functioning	-0.279	0.021
BP- Bodily pain	-0.166	0.174
GH- General health perception	-0.18	0.14
VT- Vitality	-0.311	0.009
SF- Social role functioning	-0.255	0.035
RE- Emotional role functioning	-0.326	0.007
MH- mental health	-0.377	0.002
HT- Health transition	-0.257	0.033
PCS- Physical component summary	-0.339	0.005
MCS- Mental component summary	-0.412	0.001

Analysis showed a statistically relevant correlation ($p<0.05$) between place of residence and physical role functioning (RP), general health perception (GH), vitality (VT) emotional role functioning (RE), physical component summary (PCS) and mental component summary (MCS). Meaning, that the quality of life is better among residents of cities in comparison with rural population. Other domains did not demonstrate statistically relevant differences.

The study has examined the influence of level of education on the quality of life. Since the group of patients with higher education was small (5 respondents) it has been incorporated into the group of patients with secondary education. Statistically significant differences have been observed in terms of physical functioning (PF) and health transition (HT) ($p<0.05$). In order to thoroughly assess the relationship post-hoc analysis has been conducted. It indicated that the quality of life is better both in case of physical functioning (PF) and health transition (HT) in the group of patients with higher/secondary education comparing with the patients with basic/vocational education ($p<0.05$). Other domains did not demonstrate statistically relevant differences. In case of other sociodemographic variables (gender and marital status) statistically relevant differences have not been shown.

Table 3. Influence of selected sociodemographic variables on the quality of life of hemodialysis patients

Variable			PF	RP	BP	GH	VT	SF	RE	MH	HT	PCS	MCS
Gender	M	M±SD	42.6±27	31.8±21.9	64.2±29.2	34.9±14.5	51.7±15.9	49.0±23.6	45.7±24.0	65.7±20.6	44.4±28.1	40.9±16.5	55.8±16.8
	F	M±SD	33.9±31.3	32.4±22.7	55.9±28.5	35.6±15.9	51.3±20.1	48.6±24.2	46.9±30.1	62.5±21.8	40±29.2	37.2±21.2	54.2±19.9
	p		0.136	0.934	0.172	0.844	0.91	0.946	0.856	0.53	0.47	0.267	0.717
Place of residence	Rural	M±SD	29.8±24.1	24.7±20.5	52±27.5	31.2±15.8	45±16.5	43.5±20.8	33±23,75	60.8±19.2	37±28.1	32.2±17	47.9±15.9
	City	M±SD	43±31.1	35.9±22.2	64.5±29.0	37.4±14.4	50±17.9	48.6±24.2	53.7±26.2	66±22.1	45.1±28.7	42.8±19	59.1±18.6
	p		0.091	0.045	0.07	0.043	0.024	0.17	0.003	0.278	0.199	0.023	0.014
Level of education	Higher/ secondary	M±SD	51±31.4	37.5±24.9	69.3±31.5	36.8±14.1	55±20,09	54±25.7	54.17±27.4	65.4±23.3	55±28	46.5±21.1	60.2±20.7
	vocational	M±SD	32.6±29.2	31.3±19.8	56±25.1	33.5±16	50.7±14.7	49.5±23.1	42.9±26.1	64.8±17.1	32.4±27.6	35.8±18.2	53.9±15.6
	basic	M±SD	30±21.8	25.7±20.8	53.8±29	35.5±15.5	48±19.3	40.8±20.7	41.2±27.1	61.6±24.2	39.5±25.4	34.2±19	50.4±18.3
	p		0.049	0.045	0.132	0.737	0.431	0.185	0.212	0.828	0.01	0.023	0.214
Marital status	Married	M±SD	39.4±23.3	31.7±23.6	62.4±31	36±15.1	52.2±18.8	52.1±26.6	44.1±29.6	66.6±19.8	38.7±27.7	40.2±20.5	56.5±19.6
	Single	M±SD	36.6±25.7	32.5±20.3	56.7±25.8	34.1±15.2	50.4±17	44±18.2	49.4±23.1	60.5±22.6	47.4±29.4	37.6±16.8	52.9±16.6
	p		0.886	0.867	0.493	0.622	0.681	0.158	0.362	0.228	0.188	0.724	0.426

PF-Physical functioning, RP- Physical role functioning, BP- Bodily pain, GH- General health perception, VT – Vitality, SF – Social functioning, MH- Mental health, RE- Emotional role functioning, HT- Health transition, PCS – Physical component summary, MCS – Mental component summary, p- statistical dependency rate, M- arithmetic average, SD- standard deviation

Duration of dialysis significantly negatively correlates with the quality of life in domains such as physical functioning (PF), general health perception (GH), emotional role functioning (RE) and mental component summary (MCS) ($p<0.05$) hence the longer the duration of dialysis the lower the quality of life in listed domains.

Table 4. Influence of duration of hemodialysis treatment on the quality of life of hemodialysis patients

Quality of life	**Correlation with dialysis period**	
	Correlation coefficient	**p ***
PF- Physical functioning	-0.251	0.036
RP- Physical role functioning	-0.106	0.38
BP- Bodily pain	-0.167	0.165
GH- General health perception	-0.248	0.037
VT- Vitality	-0.169	0.159
SF- Social functioning	-0.134	0.266
RE- Emotional role functioning	-0.293	0.014
MH- Mental health	-0.217	0.073
HT- Health transition	-0.223	0.062
PCS- Physical component summary	-0.223	0.065
MCS- Mental component summary	-0.29	0.016
P = Normal distribution of correlated variables, Pearson correlation coefficient; p – statistical significance rate		

An influence of current treatment on the quality of life of hemodialysis patients was also assessed. A statistically significant difference has been observed between physical role functioning (RP) and insulin treatment ($p<0.05$). Patients treated with insulin had a lower quality of life. No statistically significant correlation has been observed between taking oral drugs ($p>0.05$) and the quality of life. Similarly, there was no relationship between following the diet and taking oral medications and the quality of life (Table 5).

Table 5. Influence of the therapy on the quality of life of hemodialysis patients

Variables			PF	RP	BP	GH	VT	SF	RE	MH	HT	PCS	MCS
Insulin therapy	No	M±SD	40.6±22.2	37.7±20.1	64.5±31.2	36.8±16.4	53.2±19.5	51.2±24.2	48.8±25.7	66.5±22.6	42.1±28.2	42.3±18.8	57±19.8
	Yes	M±SD	34.8±29.6	24.6±22.8	54.1±24.9	33±13.1	49.2±15.6	45.4±23.1	42.8±29	61±18.8	42.5±29.5	34.8±18.5	52.2±16
	p		0.399	0.015	0.264	0.294	0.354	0.312	0.367	0.173	0.946	0.11	0.289
Oral medications	No	M±SD	43.5±31.9	36.8±24.2	66.7±29.9	34.6±15.3	54.7±18.4	51.7±22.8	46±28.5	63.9±20	45.1±28.5	42.3 ±21.1	55.8±19.2
	Yes	M±SD	32.6±25.6	27±18.8	53.3±26.7	35.9±15	48.2±17.2	45.4±23.1	46.6±25.9	64.4±22.4	39.3±28.6	35.6±15.8	54.1±17.5
	p		0.176	0.105	0.061	0.725	0.13	0.312	0.897	0.914	0.382	0.143	0.713
Diet and oral medications	No	M±SD	40.1±30.4	32.9±22.7	61.7±30.6	36.3±15.2	53.2±16.8	51.9±22.4	48.2±27.7	66.3±19.8	42.5±27.1	40.4±19.3	56.9±17.4
	Yes	M±SD	34.6±27.4	30.4±21.4	56.9±25.7	33.1±14.9	48.2±20	42.7±25.5	42.4±25.7	60±23.1	41.7±31.9	36.5±18.3	51.2±19.8
	p		0.527	0.655	0.69	0.409	0.269	0.125	0.401	0.237	0.724	0.414	0.234

PF-Physical functioning, RP- Physical role functioning, BP- Bodily pain, GH- General health perception, VT – Vitality, SF – Social functioning, MH- Mental health, RE- Emotional role functioning, HT- Health transition, PCS – Physical component summary, MCS – Mental component summary, p- statistical dependency rate, M- arithmetic mean, SD- standard deviation

The study analyzed an influence of adherence to therapeutic recommendations according to ARMS on the quality of life. A statistically significant relationship between following the therapeutic recommendations and the quality of life has been observed. It applies to the following aspects of life: physical functioning (PF), vitality (VT), social functioning (SF), emotional role functioning (RE) and mental component summary (MCS) ($p<0.05$). On this basis, it was conducted that the higher the ARMS score, which stands for lower adherence, the lower the quality of life in the listed domains of life.

Table 6. The effect of therapeutic adherence on the quality of life of hemodialysis patients

Quality of life	**Correlation with ARMS**	
	Correlation factor	**p ***
PF- Physical functioning	-0.244	0.042
RP- Physical role functioning	-0.141	0.243
BP- Bodily pain	-0.024	0.84
GH- General health perception	-0.152	0.205
VT- Vitality	-0.284	0.016
SF- Social functioning	-0.308	0.009
RE- Emotional role functioning	-0.238	0.048
MH- Mental health	-0.199	0.102
HT- Health transition	0	0.999
PCS- Physical component summary	-0.178	0.143
MCS- Mental component summary	-0.293	0.015
P = Normal distribution of correlated variables, Pearson correlation coefficient; p – statistical significance rate		

Discussion

The quality of life is one of the most important indicators which allows an assessment of the functioning of patients with different medical conditions. This variable is influenced by many factors which are both subjective (mental, social, physical and interpersonal) and objective (diagnosis and clinical manifestation, medical condition, socioeconomic status and social interactions). Nowadays, one can observe an increasing interest of scientists in the quality of life of patients with chronic medical conditions. It stems from the need to improve patients' quality of life due to increased life expectancy of these patients.

Own studies showed that patients' quality of life is significantly influenced by socio-demographic factors like age, place of residence and education level. It has been observed that the older the patients the lower the quality of life in terms of experienced pain and general perception of health. Place of residence, on the other hand, seems to influence restriction of physical activity due to medical condition, general perception of health, vitality, restriction of activity due to emotional issues and functioning in both mental and physical aspect. Moreover, it has been found that patients with higher/secondary education declared higher activity levels than patients with basic/vocational education. Similar results have been achieved by Grochans et al. in studies conducted in Dialysis Stations in Szczecinek and Gorzów Wielko-polski [13]. The studies showed a correlation between age and self-assessment of quality of life in aspects

like physical functioning and mental fatigue. Studies of Kocka et al. [14] have also showed a significant relationship between age of hemodialysis patients on the quality of life in somatic aspect and between level of education and social aspect. Similar results were obtained by Strugała et al. [15] who have observed an influence of age on the patient's quality of life and of educational level on everyday activity. Studies conducted by Lemos et al. [16] among patients with CKD in Hospital Universitario in Brasil also confirm the influence of age on patients' quality of life both in functional and social scope.

Based on the data collected, patient's adherence has been subjected to assessment and it has been concluded that most of the patients follow therapeutic recommendations by regu-larly taking prescribed medications and keeping in touch with threating physician. Identical results were obtained by Wajdlich et al. in their studies [12]. Metaanalysis conducted by De Souza et al. [17] showed that among patients with arterial hypertension following a non-pharmacological treatment such as taking part in educational interventions did not influence significantly the mental aspect of the quality of life however it has significantly improve the physical aspect.

Pudło et al. [18] established that the vast majority of patients suffering from cardio-vascular diseases did not follow medical recommendations by not taking or modifying dose of prescribed drugs. Similar results were demonstrated by Milaniak [19] who showed that more than half of respondents skipped doses or did not remember about the right time to take drugs. In case of studies conducted in the USA, Canada and Australia it has been established that 30-50% of patients takes their drugs regularly [20].

Analysis of conducted studies has led to conclusion that respondents functioned better in physical than mental aspect. Both mental and physical experiences influence an assessment of the quality of life. Hemodialysis patients struggle with everyday problems which influences their quality of life. Physical capability strongly restricts dealing with regular activities such as functioning in a society, activities associated with work or recreation. It is worth noticing that education of patients is a crucial component which increases the adherence. Studies on the quality of life and adherence are conducted in the conviction that they may prove valuable to doctors' studies. Especially, when patients struggle with a chronic disease and are expected to be active throughout the therapeutic process and to understand their disease.

Conclusions

Age of patients treated with renal replacement therapy is a significant variable which worsens quality of life.

- Hemodialysis as a treatment method of CKD significantly contributes to
- Adherence to therapeutic recommendations positively influences quality of life of hemodialysis patients'.
- Hemodialysis as a treatment method in CKD significantly contributes to decreased quality of life of treated patients, especially when it comes to the rural population, people with primary or vocational education and patients treated for a prolonged peri-od of time with this method.

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