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**DISEASE ACCEPTANCE, ADHERENCE TO
RECOMMENDATIONS AND LEVEL OF STRESS
AMONG HEMODIALYZED PATIENTS**

**Akceptacja choroby, przestrzeganie zaleceń terapeutycznych, a poziom stresu u
chorych hemodializowanych**

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A - Koncepcja i projekt badania, B - Gromadzenie i/lub zestawianie danych, C - Analiza i interpretacja danych, D - Napisanie artykułu, E - Krytyczne zrecenzowanie artykułu, F - Zatwierdzenie ostatecznej wersji artykułu

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Abstract (in Polish):

Cel pracy

Celem badań była analiza wpływu czynników socjologicznych i medycznych na poziom akceptacji choroby, przestrzegania zaleceń oraz nasilenia stresu oraz ocena korelacji między nimi u pacjentów hemodializowanych.

Material i metody

Badaniem objęto 66 pacjentów w wieku 32-92 lata, leczonych metodą dializoterapii w Stacji Dializ Da Vita Clinic w Piłę, Polska. Kryteria włączenia do badań stanowiły: wiek >18 r.ż., terapia nerkozastępcza metodą hemodializy oraz wyrażenie świadomej zgody na udział w badaniu. Badania przeprowadzono z zastosowaniem metody sondażu diagnostycznego wykorzystując technikę kwestionariuszową. Wykorzystano następujące narzędzia badawcze: Skala dostosowania się do zaleceń farmakologicznych ARMS, Skala Akceptacji Choroby AIS, Skalę Odczuwanego Stresu PSS10 oraz kwestionariusz ankiety własnej.

Wyniki

Badania wykazały, że pacjenci przyjęli neutralną postawę wobec choroby. Wykazano istotny statystycznie wpływ wieku, aktywności zawodowej, zadowolenia z wyboru leczenia, występowania objawów niepożądanych oraz chorób współistniejących na akceptację choroby pacjentów leczonych hemodializami. Wykazano istotną statycznie korelację pomiędzy AIS a PSS10. Nasilenie stresu istotnie korelowało z uzyskanym ogólnym wynikiem ARMS i skalą przyjmowania leków.

Wnioski

Akceptacja choroby przez pacjentów hemodializowanych jest na neutralnym poziomie, przy czym osoby starsze charakteryzowały się niższym poziomem w porównaniu do młodszych pacjentów. Zadowolenie z leczenia, brak objawów niepożądanych w trakcie terapii czy chorób współistniejących ułatwiają jej akceptację. Długi czas dializoterapii, niezadowolenie z zastosowanej techniki leczenia nerkozastępczego i choroby współistniejące nasilają zjawisko stresu wśród pacjentów z PNN schyłkową. Przestrzeganie zaleceń terapeutycznych było na poziomie średnim. Większe nasilenie stresu przyczyniło się do gorszego przestrzegania zaleceń terapeutycznych. Mniejsze nasilenie stresu wpływa na wyższy poziom akceptacji choroby.

Abstract (in English):

Aim

The aim of this study was to analyze the influence of sociological and medical factors on levels of disease acceptance, adherence to recommendations, and severity of stress, as well as assessing correlations between them in hemodialyzed patients.

Material and methods

The study included 66 patients aged between 32 and 92 years who were treated with hemodialysis in Piła, Poland. The inclusion criteria: the age of 18 or above, treatment with renal replacement therapy with the hemodialysis method, and informed consent for participation in the study. The study was carried out using the diagnostic poll method used: Adherence to Refills and Medication Scale (ARMS), Acceptance of Illness Scale (AIS), Perceived Stress Scale (PSS-10), and author's own questionnaire.

Results

Studies showed that patients had a neutral attitude towards the disease. A statistically significant influence of age, professional activity, satisfaction with treatment choice, presence of adverse effects, and concomitant diseases on patient's acceptance of the disease was established. Statistically significant correlations between AIS and PSS-10 were determined.

Conclusions

The patient's disease acceptance was on a neutral level. The elderly characterize with a lower level of acceptance in comparison with younger patients. Satisfaction with treatment, lack of adverse effects, and concomitant diseases help with disease acceptance. Long treatment duration, discontent with the treatment, suffering from concomitant diseases exacerbate stress. Adherence to therapeutic recommendations was on an average level. Greater stress contributes to worse adherence to therapeutic recommendations. A decrease in stress improves the level of disease acceptance.

Keywords (in Polish): hemodializa, akceptacja choroby, przestrzeganie zaleceń terapeutycznych, stres.

Keywords (in English): hemodialysis, disease acceptance, adherence to therapeutic recommendations, stress.

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Adherence i akceptacja choroby u chorych hemodializowanych

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Authors (short)

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Introduction

Chronic kidney disease (CKD) is considered as one of the affluence diseases which affluences 10-11% of the whole population. CKD in the initial stages has no symptoms and is diagnosed incidentally. Late diagnosis or inadequate treatment led to serious consequences. The results of ongoing disease process in the kidneys are, firstly, chronic kidney disease and secondly chronic renal failure which requires renal replacement therapy. Thus, CKD requires constant observation and specialist treatment, purpose of which is to slow down disease progression and improve patient's quality of life [1, 2].

Patients suffering from chronic diseases are vulnerable to emotional changes. They experience feelings of helplessness, powerlessness, anxiety, purposelessness [3, 4]. Patient's adaptation process consists of 5 adjustment stages. Elizabeth Kübler-Roos distinguished 5 adjustment stages: denial, anger, bargaining, depression and acceptance. Not every patient goes through all the stages. It happens that some stages of the adaptation process to a disease are omitted or patients stop at a specific phase and are not able to undergo further stages [5].

In case of renal replacement therapy, patients conform their life to the chosen treatment method. Hemodialysis (HD) procedures take place 3 times per week and their duration is approximately 4 hours. Depending on the progress of the disease and adherence to therapeutic recommendations, duration of the treatment might be shortened or extended. The need to commute to a dialysis station and time spend on the site are sources of patient's frustration caused by disruptions in their everyday life and emerging sense of limited freedom. Restrictions also interfere with effectiveness and performance of daily routines as well as family, social and professional responsibilities [6, 7]. Majority of patients suffering from end-stage CKD who are treated with hemodialysis find it hard to accept their disease and proposed line of treatment. Individuals in this group are prone to experience stress and depressive disorders [8, 9]. Not only the patients but also their families and the whole therapeutic team should be engaged in the treatment process. Emotional support enables patients to let out their negative emotions, prevents depressive states and feeling of loneliness. Additionally, it encourages disease acceptance and following therapeutic recommendations [10, 11].

Level of disease acceptance in hemodialyzed patients influences quality of life and success of the treatment [6, 9, 12]. By accepting chronic kidney failure and renal replacement therapy patients express an understanding attitude towards their illness, its consequences and treatment methods. Disease acceptance influences the ability to adapt to the reality of the situation as well as to the discomfort caused by the illness. Patients who accept their disease actively participate in the treatment process, follow therapeutic recommendations and cooperate with medical staff [10, 13].

The aim of this study was to analyse the influence of sociological and medical factors on levels of disease acceptance, adherence to recommendations and stress as well as assessment of correlations between them in hemodialyzed patients.

Materials and methods

The study included 66 patients aged between 32 and 92 years who were treated with renal replacement therapy in 'Da Vita Clinic' dialysis station in Piła (Greater Poland Voivodship, Poland). Patients had to meet the following inclusions criteria: the age of 18 or above, renal replacement therapy with hemodialysis method, and informed consent for participation in the study. The study was conducted in accordance with the Declaration of Helsinki and obtained permissions of Da Vita Clinic's Legal Department, with registered office in Wrocław, and its Medical Director. Respondents were informed about the aims of the study and the fact that results will be used for scientific purposes. Participation in the study was anonymous and voluntary. Patients were informed about the possibility of resignation at every stage. The study was carried out using diagnostic poll method via questionnaire technique. The following questionnaires were used:

1. Adherence to Refills and Medications Scale (ARMS) was adapted to pharmaceutical guidelines by przez Jankowska-Polańska B., Lomper K. and Białoszewski A in order to create Polish adaptation. It is used to evaluate patient's adherence to therapeutic recommendations. The scale consists of 12 questions concerning non-compliance with specific aspects of the therapy. Answers to the questions are assigned to numbers on 4-point scale which stand for: 1 - 'never', 2 - 'seldom', 3 - 'often', 4 - 'for majority of time'. The first eight questions enquire upon taking medications by patients and the remaining four concern filling prescriptions. Therefore, the results of this questionnaire are within the range from 12 to 48 points. The higher the number of points, the worse is the adherence [14].

2. Perceived Stress Scale (PSS-10) by Cohen S., Kamarack T. and Mermelstein R. was adjusted by Zygryd Juczyński and Nina Ogińska-Bulik to conduct research in Poland. This standardised tool assesses severity of stress over the past month. It is composed of 10 questions regarding different subjective feelings related to personal problems and events, behaviours as well as ways of dealing with problems. Answers to the questions are assigned to numbers on a scale from 0 to 4. 0 stands for 'never', 1 - 'almost never', 2 - 'sometimes', 3 - 'quite often', 4 - 'very often'. The scale accurately measures subjective feelings arising from personal problems and events as well as ways of dealing with them. The higher the score, the greater severity of stress is experienced by an individual. The scale has sten scores assigned which allow to interpret the results. It has been established that 5th and 6th stens are considered as average values, stens from 1 to 4 are low values and stens from 7 to 10 represent high values [15].
3. Acceptance of Illness Scale (AIS) was developed in New York University by B. J. Felton, T. A. Revenson and G.A. Hinrichs. Polish version was created by Zygryd Juczyński. The scale measures level of patient's disease acceptance. It consists of 8 statements describing negative consequences of the disease. Each statement has a 5-point scale assigned which allows respondents to subjectively evaluate their health. A patient assesses subjective feelings and answers by circling a suitable number: 1 - 'I absolutely agree.', 2 - 'I agree.', 3 - 'I do not know.', 4 - 'I do not agree.', 5 - 'I absolutely disagree.'. A score between 8 and 18 points indicates lack of acceptance of one's disease, a score within the range of 19 to 29 points means an average level of acceptance and a result between 30 and 40 points suggests acceptance of the disease [16].
4. Author's own questionnaire consists of two parts. First one includes questions regarding sociodemographic data (age, sex, marital status, place of residence, level of education, employment status). Second part enquired upon hemodialysis (duration of renal replacement therapy, duration of single session of HD, limitations caused by the disease, adverse effects of HD, concomitant diseases, and frame of mind after HD session).

Statistical analysis

The obtained results were subjected to statistical analysis. The following were used: analysis of quantitative variables via mean, standard deviation, median, quartiles, minimum and maximum. Analysis of qualitative data was carried out by calculating number and percentage of occurrences of each value. Comparison of quantitative values in two groups were carried out using Mann-Whitney U test. Comparison of variables' values in three or more groups was conducted using Kruskal-Wallis test. Correlations between qualitative variables was analysed using Spearman's rank correlation coefficient. The level of statistical significance was set at 0.05. All p values bellow 0.05 were interpreted as relevant correlations. Analysis was carried out using R program, version 3.6.2.

Results

Data analysis showed that respondents aged between 71 and 80 were the most numerous group (36.36%). Respondent's average age was 69.8 years (SD = 12.07). Gender ratio in the group was equal. Majority of respondents were in a formal relationship (48.48%), lived in cities with less than 10 thousand residents (40.91%), had vocational education (36,36%), and did not work (84,85%).

Duration of chronic kidney disease among patients was 11.94 years on average (SD = 8.86) and it varied from 1.5 to 37 years. The largest group consisted of patients who were diagnosed with CKD 0 to 10

years before (53.03%). Average duration of renal replacement therapy was 3.09 years on average (SD = 2.54). Most of respondents had been undergoing dialysis for two years (34.89%). The vast majority of patients were content with the treatment method (84.85%), and 87.88% stated that hemodialysis significantly changed their way of life. Clear majority of individuals had established duration of HD session for 4 h (74.24%). Most challenging parts of suffering from the disease and undergoing hemodialysis were following the fluid regimen (66.67%) and dietary recommendations (50%). Respondents considered significant weight gain in-between dialysis as the main factor responsible for worsening of their mood (46.97%). Factors which worsen mood of respondents are also frequent alarms of arterial pump during HD (39.39%), order of connecting patients to dialysis machines (31.82%), change in lean mass (27.27%), and failure of kidney machine (12.12%). Some individuals (36.36%) did not complain about side effects. Others experienced such symptoms. The most common side effects were muscle spasms (34.85%), blood pressure drops (27.27%), pain in the limb with the AV fistula (18.18%), itching (15.15%). Majority of respondents (87.88%) suffered from concomitant diseases. Most commonly, these included diabetes (45.45%), ischaemic heart disease (31.82%), and hypertension (21.21%).

The study analysed level of the disease acceptance based on AIS questionnaire and it indicated that average score was 23.24 (SD = 8.44). It means that respondents presented a neutral attitude towards the disease (Table 1).

Tab. 1. Akceptacja choroby wg AIS oraz przestrzeganie zaleceń terapeutycznych według skali ARMS
Table 1. Disease acceptance according to AIS and following therapeutic recommendations according to ARMS scale

Scales		Scores range	M	SD	Me	Min-Max
AIS	Overall score	8-40	23.41	8.44	24	10-39
ARMS	Overall score	12-48	19.68	5.43	19	12-39
	Medicine intake	8-32	11.95	3.9	11	8-25
	Filling out prescriptions	5-16	7.73	1.9	8	5-14

M – mean, SD – standard deviation, Me – median, Min – minimal value, Max – maximal value.

Respondent's average score in the ARMS questionnaire was 19.68 (SD = 4.6) while scores ranged between 12 and 48 points. Average frequency of not following therapeutic recommendations ranged between 'never' and 'seldom'. In case of subscales concerning taking medicine, it reached 11.95 points which means that an average frequency of not following recommendations regarding taking medications was between 'never' and 'seldom' while an average score in the subscale regarding filling out prescriptions was 7.73 points – frequency of not following these recommendations was 'seldom' (Table 1).

Almost half of respondents (43.94%) presented with high level of experienced stress, 33.33% had an average level of stress, and 22.73% characterised with low level of stress (Table 2).

Tab. 2. Analiza nasilenia stresu wg PSS10 wśród respondentów
Table 2. Analysis of stress severity among respondents according to PSS-10

PSS10 – number of points	Interpretation	n	%
0-13	Low level of stress	15	22.73
14-19	Average level of stress	22	33.33
Above 19	High level of stress	29	43.94

n – number of people, % - percentage

As far as sociodemographic variables are concerned, a statistically negative relationship ($p < 0.05$) between age and disease acceptance – level of disease acceptance decreased with age. It has been demonstrated that disease acceptance was higher in a statistically significant way in professionally active patients, in respondents who were satisfied with their treatment choice in the dialysis centre, and among patients without concomitant diseases (Table 3).

Tab.3 Wpływ zmiennych na akceptację choroby wg AIS pacjentów hemodializowanych
Table 3. Influence of variables on disease acceptance according to AIS in haemodialyzed patients.

AIS [points]	Professional activity		P
	Employed (n=10)	Unemployed (n=56)	
M±SD	29±9.37	22.41±7.95	0.033
Me	33	22	
Q1-Q3	24.75 – 34.75	15.75 - 28	
Satisfaction with choice of HD treatment			
	Yes (n=56)	No (n=10)	0.016
M±SD	24.43±8.29	17.7±7.24	
Me	24.50	14.50	
Q1-Q3	17 - 31	13 - 23	
Concomitant diseases			
	Yes (n=58)	No (n=8)	0.043
M±SD	22.62±8.18	29.12±8.64	
Me	22.5	32.5	
Q1-Q3	15.25 - 28	25.25 - 35	

n – number of people, M±SD – mean and standard deviation, Me- median, Q1- lower quartile, Q3- upper quartile, p – statistical significance coefficient

Data analysis indicated a statistically relevant negative correlation between number of side effects of HD and disease acceptance ($r = -0.348$, $p = 0.004$). The greater the number of complications, the lower is the disease acceptance among respondents.

No statistically significant relationship between sex, marital status, place of residence, level of education, duration of renal replacement therapy, duration of a single HD procedure, limitations caused by the disease as well as well-being after HD, and level of disease acceptance was established ($p > 0.05$).

Data analysis showed a statistically significant link ($r = 0.417$, $p = 0.001$) between duration of HD and severity of experienced stress according to PSS – the longer was the duration of dialysis, the higher was the stress among respondents. Duration of the disease was the variable which significantly influenced severity of stress ($r = 0.25$, $p = 0.044$) – the longer was the duration of dialysis, the bigger was the severity of stress.

Data analysis showed a statistically significant positive correlation between the number of side effects during HD and severity of stressed according to PSS-10 ($r = 0.439$, $p < 0.001$) – the more numerous are side effects, the greater severity of stress is experienced. Positive relationship between number of

factors worsening the mood and severity of stress ($r = 0.297$, $p = 0.01$) was established - the more factors are worsening the mood, the greater severity of stress is experienced.

Severity of stress was lower in patients who were content with their renal replacement treatment. Suffering from concomitant diseases influenced in a statistically significant way severity of stress. The level of stress was higher when end-stage CKD was accompanied by other diseases (Me - 19 vs 14,5); (Table 4).

Tab.4. Różnice w nasileniu stresu wg PSS10 badanych w zależności od zadowolenia z wyboru leczenia i współwystępowanie innych chorób
Table 4. Differences in severity of stress according to PSS-10 depending on satisfaction from the treatment and concomitant diseases in respondents

PSS10 [points]	Satisfaction with the choice of HD		p
	Yes (n=56)	No (n=10)	
M±SD	17.84±6.09	22.3±6.25	0.037
Me	19	21	
Q1-Q3	13.75 - 22	19.5 - 27	
Concomitant diseases			
	Yes (n=58)	No (n=8)	0.045
M±SD	19.07±6.29	14.5±4.75	
Me	19	14,5	
Q1-Q3	15 - 24	10.75 - 19	

p - Manna-Whitney U test, n - number of people, M±SD - mean and standard deviation, Me-median, Q1-lower quartile, Q3- upper quartile, p - statistical significance coefficient

Data analysis showed that sociodemographic variables had no influence on severity of stress in dialysed patients ($p > 0.05$).

Data analysis showed no statistically significant relationships in terms of sociodemographic data (age, sex, marital status, place of residence, level of education, professional activity) that influenced adherence to therapeutic recommendations.

A statistically significant link between duration of the disease and overall ARMS score ($p = 0.009$, $r = 0.32$), taking medicine scale ($p = 0.021$, $r = 0.286$), duration of dialysis ($r = 0.31$, $p = 0.011$), overall ARMS score and medicine intake scale ($r = 0.296$, $p = 0.016$) was established. The longer was the duration of the disease, the higher were the results in these fields (which stands for worse adherence) (Table 5).

Tab.5. Wpływ czasu trwania choroby i czasu trwania dializoterapii na przestrzeganie zaleceń terapeutycznych wg ARMS
Table 5. Influence of the duration of the disease and dialysis on following therapeutic recommendations according to ARMS

ARMS	Duration of the disease
	Spearman's rank correlation coefficient
Overall ARMS	$R=0.32$, $p=0.009$ *
Medication intake	$R=0.286$, $p=0.021$ *
Filling out prescriptions	$R=0.219$, $p=0.08$

	Duration of dialysis
	Spearman's rank correlation coefficient
Overall ARMS	r=0.31, p=0.011 *
Medication intake	r=0.296, p=0.016 *
Filling out prescriptions	r=0.184, p=0.14

* statistically significant relationship ($p < 0,05$), r- Spearman's rank correlation coefficient, p – statistical significance coefficient

A statistically significant link between adherence to therapeutic recommendations and severity of stress was noted. Severity of stress according to PSS-10 correlated positively with overall ARMS score ($r = 0.311$, $p = 0.011$) and scale of medicine intake ($r = 0.289$, $p = 0.019$). The higher (worse) were the score, the higher was level of stress in respondents (Table 6).

Tab. 6. Korelacja pomiędzy nasileniem stresu wg PSS10 a przestrzeganiem zaleceń terapeutycznych wg ARMS

Table 6. Correlation between PSS-10 and perception of therapeutic recommendations according to ARMS

ARMS	PSS-10
	Spearman's rank correlation coefficient
Overall ARMS	r=0.311, p=0.011 *
Medication intake	r=0.289, p=0.019 *
Filling out prescriptions	r=0.241, p=0.051

* statistically significant relationship ($p < 0,05$), r- Spearman's rank correlation coefficient, p – statistical significance coefficient

A statistically significant negative correlation ($r = -0.269$, $p = 0.029$) between disease acceptance according to AIS and severity of stress according to PSS-10 was demonstrated – the higher level of disease acceptance, the lower the level of experienced stress.

Discussion

Presence of a chronic disease in a patient's life and understanding its consequences influence effectiveness of therapy. Acceptance of the disease allows to adapt to a life with the disease – the higher level of acceptance, the easier and better adaptation and coping with side effects of the disease [17].

According to author's own studies respondents presented a neutral attitude towards the disease. Similar studies were conducted by Niedzielski et al. among patients with chronic kidney disease treated with hemodialysis. These studies have shown that respondents accepted their disease on an average level ($M = 22.76$) [50]. Marzec et al. carried out studies on disease acceptance. The studies concerned a group of patients with CKD treated with dialysis. The obtained results indicated lack of full acceptance of the disease [18].

Patients suffering from end-stage CKD treated with dialysis are mainly the elderly. Author's own studies have shown a statistically significant relationship between age and level of disease acceptance – it decreased with age. Research conducted by Kraczkowska showed that elderly had an issue with admitting their weaknesses and unpleasant feelings related with the illness as well as accepting the disease and renal replacement therapy [20]. Studies carried out by Kurowska and Kasprzyk confirmed obtained test

results. They have demonstrated that level of disease acceptance was higher among individuals before the age of 50. Younger patients have more strength and energy to fight against their illness. They set new life goals and try to meet them without giving in to the limitations forced by the disease [4]. Studies by Niedzielski A. et al. [21] and Łatka et al. [10] obtained different results. Age as a demographic factor had no significant influence on the acceptance of the disease. Author's own studies showed that disease acceptance is influenced by professional activity. It was higher in employed individuals. In the study group majority of respondents were unemployed. Obtained results were confirmed by studies carried out by Misiewicz A et al. – 84% of respondents were unemployed [22]. Their source of income was pension or retirement. Often, financial resources were insufficient to fulfil basic needs. Exclusion from professional life not only significantly lowered standards of daily life but was also a source of negative feelings such as helplessness, powerlessness, anxiety, sadness or depression which hindered the ability to accept the disease. A significant element of disease acceptance is satisfaction from the treatment method. Choice of the treatment method fundamentally influences patient's life and should be adjusted to patient's needs. Choosing the right renal replacement therapy makes it easier to accept the disease and decreases severity of stress. Author's own studies indicated that 84.85% of respondents were satisfied with hemodialysis as a treatment method. The remaining 15.15% of respondents were not content with this treatment method. Results obtained by Kapkę-Skrzypczak et al. in their studies were very similar. 97.5% of respondents were satisfied with this treatment method [23].

Results of Kasprzyk and Kurowska studies established that level of stress severity is influenced by age, sex, marital status and duration of the chronic disease [4]. Independent variables presented in Mianowana et al. studies (age, level of education, marital status, source of income and type of profession) did not confirm statistically significant relationships ($p > 0.05$) [24]. Acceptance of treatment method also causes a decrease in experienced stress in haemodialyzed patients. According to author's own studies severity of stress was significantly greater in patients who were not satisfied with choice of HD. Marcinkowska et al. showed a relevant link between severity of stress and duration of renal replacement therapy. The longer a patient was treated, the higher daily stress [7]. Wawrzyniak A. and Hrost-Sikorska W. established in their studies that duration of the disease and duration of HD did not influence distribution of significant emotions related to renal replacement therapy [25]. Author's own studies showed that medical variables, which is duration of the disease and duration of renal replacement therapy, influence adherenced to therapeutic recommendations. According to studies conducted by Gałuszka, age of respondents correlated with duration of the disease ($r = 0.277$, $p \leq 0.01$), troubling physical symptoms ($r = 0.281$, $p \leq 0.01$) and disease acceptance ($r = -0.253$, $p \leq 0.05$). The older the patient, the lower the acceptance of the disease [26].

Author's own studies showed that suffering from concomitant diseases increased severity of stress in hemodialyzed patients. Only 12.12% of respondents from the study group did not suffer from concomitant diseases. Others (87.88%) suffered also from other diseases. Level of disease acceptance was higher in respondents without concomitant diseases.

Treatment with hemodialysis is associated with numerous complications and side effects during and after HD. Constant anticipation of unpleasant changes during or after HD is the cause of stress and its increasing severity on various levels [27]. Level of experienced stress in hemodialyzed patients depends on factors worsening the well-being during HD. These include longer breaks in-between procedures, frequent alarms, order of connecting patients, changes in lean mass and mechanical kidney failures. The more factors worsening well-being, the greater severity of stress. Among respondents studied by Bojanowska et al. more than half of patients experienced side effects during HD [28]. In author's own studies 36.36% of patients did not experience any side effects during hemodialysis. Remaining

respondents declared that they experienced at least one side effect. The most common complications were muscle spasms (34.85%), hypotonia (27.27%), pain at the site of the AV fistula (18.18%), itching (15.15%). According to Zielińska-Wieczkowska and Krotowska research the most common side effects were blood pressure fluctuations (40%), itching (12.5%) and pain at the site of the AV fistula (11.3%) [29].

Treatment of CKD with hemodialysis requires from patients discipline and self-control. In accordance with medical recommendations patients should take systemic medicine, take blood pressure and blood glucose measurements as well as follow the recommended diet. Diet therapy also applies to fluid regime which is hard to maintain. Results of author's own studies showed that level of adherence to therapeutic recommendations by studied patients was average. Neri et al. conducted studies which confirmed relationship between presence of the disease, amount of taken medication and probability of non-compliance to therapeutic recommendations. Patients who accepted their disease and chosen method of therapy became more disciplined as doses of medications increased. In case of patients who did not accept their disease and chosen therapy, adherence to medical recommendations was all the time on a low level [30].

Cybulska et al. carried out research on the quality of life and adherence to therapeutic regimens among hemodialysis patients. They found that the majority of the patients followed therapeutic regimens, regularly taking prescribed medications and keeping in touch with their physicians [31].

Disease acceptance aims to restore life balance and improve quality of life. Patients who accept their disease actively participate in treatment process, follow therapeutic recommendations and cooperate with medical staff.

Conclusions

1. Disease acceptance among hemodialyzed patients was at a neutral level, however, its level was the lowest among the elderly. Professional activity, satisfaction from the chosen treatment method, lack of concomitant diseases and side effect during hemodialysis improved disease acceptance in studied patients.
2. Greater severity of stress among respondents could be observed in chronically ill, treated with hemodialysis for a prolonged time, dissatisfied with renal replacement therapy, and ones suffering from concomitant diseases.
3. Following therapeutic recommendations by studied patients was on an average level, however patients suffering from the disease for a longer time and treated with renal replacement therapy for a prolonged period required special attention because they had a major issue with following therapeutic recommendations.
4. Individuals who experienced greater severity of stress found it problematic to follow therapeutic recommendations, especially taking medications.
5. Severity of experienced stress in respondents significantly influenced disease acceptance.

Recommendations on nursing practice

The following recommendations on nursing practice refer mainly to promoting adherence to therapeutic regimens among hemodialysis patients, because in our research, it was on a medium level, and had an impact on both perceived stress and acceptance of the disease. Patients undergoing hemodialysis face numerous problems that affect their quality of life. It is important to make patients aware of the need to follow therapeutic recommendations so that the therapy is effective and complications related to the

disease are kept to a minimum. Therefore, an essential element of a nurse's work is educating patients, providing them with support in leading healthy lifestyles, and generating their motivation to take care of themselves and their own health. Patients' education should be planned in advance, and adjusted to their age and abilities. It is also important to provide patients with psychological support.

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