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Wpływ leczenia hemodializami na biologiczne funkcjonowanie pacjentów
An Influence of Hemodialysis Treatment on the Biological Functioning of Patients

Streszczenie

Wstęp: Wśród chorób cywilizacyjnych XXI wieku, do których możemy zaliczyć cukrzycę, nadciśnienie tętnicze, choroby sercowo-naczyniowe oraz otyłość, należy również wymienić przewlekłą chorobę nerek (PChN). Celem pracy było poznanie związku pomiędzy leczeniem hemodializami a biologicznym aspektem funkcjonowania osób leczonych z powodu przewlekłej niewydolności nerek.

Materiał i metody: Badania przeprowadzono w Tarnowie, w Oddziale Dializ Specjalistycznego Szpitala im. Edwarda Szczeklika w okresie od 28 stycznia do 3 marca 2015 roku. Badaniami objęto 35 osobową grupę osób dializowanych w tym ośrodku, w wieku od 40 do 86 lat. Drugą grupę badanych stanowiło 39 osób dializowanych w Centrum Dializ Oddział w Brzesku, w wieku od 25 do 84 lat. Do badań posłużył krótki kwestionariusz zawierający pytania dotyczące danych społeczno-demograficznych badanych pacjentów oraz opracowany w 1994 r. formularz Kidney Disease Quality of Life (KDQOL-SF 1.3), przeznaczony do przekrojowej oceny HRQOL chorych leczonych nerkozastępczo.

Wyniki: Leczenie nerkozastępcze utrudnia chorym wykonywanie wielu codziennych czynności. Najbardziej ograniczone według większości badanych było wchodzenie po schodach na kilka pięter – 96%, przejście ponad 1 km – 91%, przejście

około 500 m – 87%, wchodzenie po schodach na pierwsze piętro – 69%. Dializowani oceniali swoje zdrowie negatywnie. Według badanych osób średnia ocena ogólnego stanu zdrowia wyniosła u mężczyzn 4,11 (z odchyleniem standardowym SD = 0,39). Kobiety istotnie statystycznie gorzej oceniały swój stan zdrowia niż mężczyźni (p=0,031).

Wnioski: Wyniki przeprowadzonego badania dowodzą, iż pomimo ciągłego postępu medycznego i doskonalenia aparatury i sposobów prowadzenia hemodializy, pacjenci odczuwają dyskomfort na wielu poziomach, w tym fizycznym.

Słowa kluczowe: hemodializa, przewlekła niewydolność nerek, choroby nerek

Abstract

Introduction: Among civilisation diseases of the 21st century, which include diabetes, hypertension, cardiovascular diseases and obesity, we should also mention chronic kidney disease (CKD). The aim of the paper. The aim of the paper is to discover the relation between hemodialysis treatment and the biological aspect of the functioning of patients treated for chronic renal failure.

Materials and methods: The survey was conducted in Tarnów, in the Dialysis Unit of Edward Szczeklik Specialist Hospital from 28 January to 3 March 2015. The survey included a group of 35 patients dialysed in that centre, aged 40-86. The other group consisted of 39 patients dialysed in Centrum Dializa (Dialysis Centre), Brzesko Branch, aged 25-84. A short questionnaire was used for the research, which included questions concerning sociodemographic data of the surveyed patients and the Kidney Disease Quality of Life form (KDQOL-SF 1.3) developed in 1994, intended for cross-section assessment of HRQOL of patients undergoing renal replacement therapy.

Results: Renal replacement treatment makes it difficult for patients to perform a number of everyday activities. According to the majority of the survey participants, the most limited was covering a few floors by stairs – 96%, covering the distance of more than 1 km – 91%, covering the distance of about 500 m – 87%, covering one floor by stairs – 69%. The dialysed patients assessed their health negatively. According to the survey participants, the average assessment of their general health was M = 4.11 (with standard deviation SD = 0.39). Women statistically significantly worse assessed their health than men (p=0.031).

Conclusions: The findings of the conducted research prove that in spite of the con-

stant medical progress and improvements in the equipment and ways of performing hemodialysis, patients feel discomfort on many levels, including the physical one.
Keywords: hemodialysis, chronic renal failure, kidney diseases

Introduction

Among civilisation diseases of the 21st century, which include diabetes, hypertension, cardiovascular diseases and obesity, we should also mention chronic kidney disease (CKD). Chronic kidney disease (CKD) is a complex of diseases which is characterised by slow but irreversible and usually progressing deterioration of the functions of kidneys [1]. Epidemiological studies conducted over the last decade have enabled to prove the fact that the issue is not only a medical and economic but also a social problem. In various countries chronic kidney disease occurs very often and concerns 6-15% of the population. According to estimates, it means that the disease concerns around 600 million people all over the world, in Poland over 4 million citizens respectively [2]. The frequency of the occurrence of kidney and urinary system diseases increases in patients in old age and it mainly concerns men. It proves the thesis that sex is one of the risk factors for the development of CKD.

With the first launch of the hemodialysis apparatus, man was given life. However, the connection of the patient to the machine does not always give joy and happiness although it makes it possible to live, be with people one loves, start a new day from the beginning. Treatment of the patient with chronic renal failure requires a lot of mental effort from the patient, his or her cooperation with the therapeutic team of the dialysis centre and the assistance of the family. In order to achieve and maintain the optimum health, dialysis must be done 2-3 times a week, for 3-5 hours each. The treatment of renal failure does not only mean dialyses but also observing numerous rules in everyday life by the patient [3]. It all influences the quality of life of the patient treated with hemodialysis, which is the subject of this paper. The aim of the paper is to discover the relation between hemodialysis treatment and the biological aspect of the functioning of patients treated for chronic renal failure.

Materials and methods

The survey was conducted in Tarnów, in the Dialysis Unit of Edward Szczeklik Specialist Hospital from 28 January to 3 March 2015. The survey included a group of 35 patients dialysed in that centre, aged 40-86. The other group consisted of 39 patients dialysed in Centrum Dializa (Dialysis Centre), Brzesko Branch, aged 25-84. The survey in that centre was conducted from 11 February to 9 April 2015. Before the survey, the patients were informed about the aim of the conducted study, keeping anonymity and voluntary participation in the survey.

A short questionnaire was used for the research, which included questions concerning sociodemographic data of the surveyed patients and the Kidney Disease Quality of Life form (KDQOL-SF 1.3) developed in 1994, intended for cross-section assessment of HRQOL of patients undergoing renal replacement therapy. The results were coded in Excel Microsoft Office 2000, statistical analyses were conducted with the statistical package Statistica Pl 8.0 (StatSoft). The following statistical tests were used for analysis: Chi-Square Test of Independence, Mann-Whitney U Test, Spearman's rank correlation (Spearman's rho).

Results

74 patients took part in the survey. The survey participants were from 25 to 86 years old, the average age of the surveyed patients was M = 66 years old (with standard deviation SD = 11.5 years). The majority of the respondents were men – 58%, women constituted 42% of the population. All the survey participants were hemodialysed – 100%. Hemodialyses in the surveyed patients were performed M = 3 times a week on average (with standard deviation SD = 0.00) for the average period M = 4 years (with standard deviation SD = 1.6 years) and for M = 3 months on average (with standard deviation SD = 1.4 months).

Half of the respondents (50%) assessed their current health as not bad, whereas according to 43% of the respondents it was good. The majority of the survey participants assessed their health as good in comparison with the period a year before – 77%, and 17% said it was not bad. None of the respondents assessed their health as very good or excellent.

Table 1.
The assessment of the level of limitation of the respondents in performing everyday activities because of health

Kind of activities	The level of limitation for health reasons	Total number	Percentage of the total number
Activities requiring effort, e.g. running, lifting heavy objects, tiring sports activities	Yes, limits very much	36	48.65
	Yes, limits a little	38	51.35
	No, doesn't limit	0	0.00
Moderate activities, e.g. moving a table, vacuuming, physical games	Yes, limits very much	32	43.24
	Yes, limits a little	41	55.41
	No, doesn't limit	1	1.35
Carrying shopping	Yes, limits very much	32	43.24
	Yes, limits a little	42	56.76
	No, doesn't limit	0	0.00
Covering a few floors by stairs	Yes, limits very much	71	95.95
	Yes, limits a little	2	2.70
	No, doesn't limit	1	1.35
Covering one floor by stairs	Yes, limits very much	51	68.92
	Yes, limits a little	23	31.08
	No, doesn't limit	0	0.00
Bending or kneeling	Yes, limits very much	50	67.57
	Yes, limits a little	24	32.43
	No, doesn't limit	0	0.00
Covering the distance of more than 1 km	Yes, limits very much	67	90.54
	Yes, limits a little	7	9.46
	No, doesn't limit	0	0.00
Covering the distance of about 500 m	Yes, limits very much	64	86.49
	Yes, limits a little	10	13.51
	No, doesn't limit	0	0.00
Covering the distance of about 100 m	Yes, limits very much	34	45.95
	Yes, limits a little	38	51.35
	No, doesn't limit	2	2.70

Washing or getting dressed	Yes, limits very much	17	22.97
	Yes, limits a little	55	74.32
	No, doesn't limit	2	2.70

Among everyday activities, those which were most limited because of health according to the majority of the respondents were: covering a few floors by stairs – 96%, covering the distance of more than 1 km – 91%, but also covering the distance of about 500 m – 87%, covering one floor by stairs, and bending or kneeling – 68%. According to the majority of the respondents, health somewhat limited washing or getting dressed – 74%, carrying shopping – 57%, moderate activities, e.g. moving a table, vacuuming, physical games – 55%, activities requiring effort, e.g. running, lifting heavy objects, tiring sports activities – 51%, and covering a distance of about 100 m – 51%.

In the performance of everyday activities women felt more limited by their health in carrying shopping than men (p=0.030). In other everyday activities, namely activities requiring effort, covering a few floors by stairs, bending or kneeling, washing or getting dressed, there were no significant differences between women and men.

Table 2.
Correlation coefficients between the age and the time of performing dialysis/hemodialysis and the assessment of the level of limitation in performing everyday activities because of health according to the respondents

Variable	**Age**		**Time of performing dialysis/hemodialysis**	
	Spearman's rho	Level of significance	Spearman's rho	Level of significance
Activities requiring effort, e.g. running, lifting heavy objects, tiring sports activities	**-0.40**	**<0.001**	-0.21	0.066
Moderate activities, e.g. moving a table, vacuuming, physical games	**-0.35**	**0.003**	-0.20	0.093
Carrying shopping	**-0.42**	**<0.001**	-0.18	0.129
Covering a few floors by stairs	**-0.24**	**0.036**	0.01	0.921

Covering one floor by stairs	**-0.29**	**0.011**	**-0.28**	**0.017**
Bending or kneeling	**-0.40**	**<0.001**	-0.23	0.054
Covering the distance of more than 1 km	**-0.24**	**0.043**	-0.20	0.085
Covering the distance of about 500 m	**-0.38**	**0.001**	-0.04	0.711
Covering the distance of about 100 m	**-0.37**	**0.001**	**-0.38**	**0.001**
Washing or getting dressed	-0.22	0.060	-0.09	0.437

The age of the respondents affected the activities performed every day. Correlation analyses showed that the older the respondents were, the more health limited them in activities requiring effort (e.g. running, lifting heavy objects, tiring sports activities), in moderate activities (e.g. moving a table, vacuuming, physical games), in carrying shopping, in covering a few floor and one floor by stairs, in bending or kneeling, in covering the distance of more than 1 km, in covering the distance of about 500 m and in covering the distance of about 100 m. Moreover, the longer the time of performing dialyses/hemodialyses in the respondents was, the more health limited them in covering one floor by stairs and in covering the distance of about 100 m.

Biological health influences everyday life of dialysed people, including doing their job.

Table 3.
The occurrence of problems at work or in everyday activities of the survey participants during the previous 4 weeks because of physical health

Problem	**Total number**	**Percentage of the total number**
Shortening the amount of time spent working or doing other activities	72	97.30
Achieving less than one would like to achieve	73	98.65
Reduction of the kind of the job done or other activities	35	47.30
You had difficulties in doing your job or other activities	28	37.84

Almost all survey participants admitted that over the previous 4 weeks, because of physical health, they achieved less than they would like to achieve – 99%, and that they shortened the amounts of time spent on work or other activities – 97%. Nearly half of the respondents (47%) because of health reduced the kind of the job done or other activities. The analyses proved that women did not statistically significantly differ from men with regard to problems at work or everyday activities due to physical health over the previous 4 weeks.

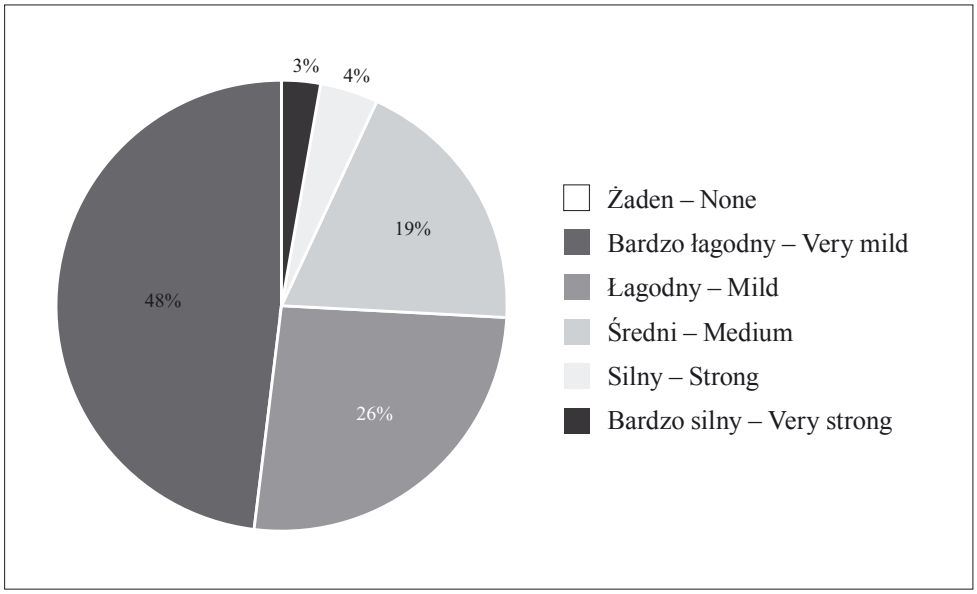

Figure 1. The level of the intensity of physical pain experienced by the respondents in the previous 4 weeks

Nearly half of the respondents (48%) admitted that over the previous 4 weeks they felt very mild physical pain, whereas over one-fourth of the respondents (26%) experienced mild physical pain. The experienced pain made it difficult to normally perform everyday activities. Half of the respondents (50%) admitted that pain slightly obstructed them in normal work (including work outside home and at home) in the previous 4 weeks. Almost one-third of the survey participants (32%) claimed that they are moderately disturbed by pain. The analyses proved that women did not statistically significantly differ from men in respect of the assessment of the intensity of physical pain experienced over the previous 4 weeks.

Age influenced the experience of pain. The correlation analyses proved that the older the surveyed patients were, the stronger physical pain they felt during the previous 4 weeks (p=0.008).

Table 4.
The assessment of the truthfulness of individual statements concerning health according to the respondents in relation to themselves

Variable	M	SD	Min	Max
I seem to be more susceptible to illnesses than other people	2.8	0.4	1	3
I am as healthy as other people I know	3.1	0.6	1	5
I expect the deterioration of my health	3.5	0.8	3	5
My health is excellent	3.9	0.6	2	5

M – median, SD – standard deviation, Min – the lowest result, Max – the highest result

On average, the statement "I seem to be more susceptible to illnesses than other people" was regarded the most true by the survey participants in relation to themselves – with the average M = 2.8. On the other hand, the statement "My health is excellent" was regarded the least true by the survey participants in relation to themselves – with the average M = 3.9. According to women, in relation to themselves, the statement "My health is excellent" was more false than in men's opinion (p=0.010). In the other statements there was no significant difference between women and men. The longer the time of performing dialysis/hemodialysis was in the case of the survey participants, the more true the statements "I seem to be more susceptible to illnesses than other people" (p=0.045) and "Coping with kidney disease takes me too much time" (p=0.018) were for the respondents in relation to themselves. Moreover, the older the respondents were, the more true the statement "I seem to be more susceptible to illnesses than other people" was for the respondents in relation to themselves (p=0.005).

Table 5.
The assessment of the level of nuisance caused by individual symptoms occurring during the previous 4 weeks according to the survey participants

Variable	M	SD	Min	Max
Aching muscles	3.14	0.76	2	6
Chest pain	2.50	0.58	1	3
Contractions	2.53	0.69	1	5
Itchy skin	2.39	0.64	1	4
Skin dryness	2.43	0.68	1	4
Shortness of breath	2.61	0.70	1	4
Syncope or dizziness	2.22	0.76	1	4
Lack of appetite	2.51	0.62	1	4
Lack of energy or exhaustion	2.91	0.67	2	5
Numbness in hands or feet	2.47	0.65	1	4
Nausea or gastric disorders	1.99	0.35	1	3
Problems with the place of connection for dialysis	2.09	0.44	1	4

M – median, SD – standard deviation, Min – the lowest result, Max – the highest result

On average, the survey participants suffered most during the previous 4 weeks from aching muscles (M = 3.14), whereas nausea or gastric disorders (M = 1.99) and problems with the place of connection for dialysis (M = 2.09) were the least nagging over the previous 4 weeks. Women did not differ statistically significantly from men in respect of the assessment of the level of nuisance caused by individual symptoms occurring during the previous 4 weeks.

Table 6.
Correlation coefficients between age and the time of performing dialysis/hemodialysis and the assessment of the level of nuisance caused by individual symptoms occurring during the previous 4 weeks according to the survey participants

Variable	Age		Time of performing dialysis/hemodialysis	
	Spearman's rho	Level of significance	Spearman's rho	Level of significance
Aching muscles	**0.36**	**0.002**	0.21	0.077
Chest pain	**0.26**	**0.025**	0.12	0.305
Contractions	0.09	0.466	0.00	0.992
Itchy skin	0.18	0.122	0.01	0.962
Skin dryness	0.15	0.196	0.04	0.706
Shortness of breath	**0.27**	**0.019**	0.12	0.322
Syncope or dizziness	**0.28**	**0.018**	0.08	0.515
Lack of appetite	**0.25**	**0.034**	0.13	0.285
Lack of energy or exhaustion	0.18	0.123	0.16	0.162
Numbness in hands or feet	0.18	0.124	0.20	0.088
Nausea or gastric disorders	**-0.24**	**0.040**	0.18	0.115
Problems with the place of connection for dialysis	**-0.24**	**0.039**	0.01	0.933

Correlation analyses showed that the older the respondents were, the more they suffered during the previous 4 weeks from: aching muscles, chest pain, shortness of breath, syncope or dizziness, lack of appetite, whereas they suffered less from nausea or gastric disorders and problems with the place of connection for dialysis.

The average assessment of the quality of sleep according to the respondents was M = 4.45 (with standard deviation SD = 0.86) and it was halfway between "very poor" and "very good". On average, difficulties with not falling asleep during the day occurred among the survey participants most rarely – with median M = 2.08, whereas on average, the survey participants most often during the previous 4 weeks woke up at night and had difficulties with falling asleep again – with the average M = 3.09.

According to the respondents, the average assessment of general health was M = 4.11 (with standard deviation SD = 0.39). Women assessed their health statistically significantly worse than men (p=0.031). The older the respondents were, the worse they assessed their health (p=0.034).

Discussion

Hemodialysis is a broadly applied method of renal replacement therapy. In Poland, over 90% of patients undergo the therapy with this method. In spite of constant progress in dialysis techniques, the fatality among hemodialysed patients is still high and the number of organ complications is big. The development of remote complications of therapy with dialysis arises from the constantly prolonging time of patients' survival. The survival of patients undergoing treatment with repeated dialyses depends on a number of factors, such as: age, the presence of other illnesses, patient's cooperation during the treatment and the observation of the developed basic recommendations within that scope [3].

Moreover, attention should be paid to ailments occurring during the dialysis. Renal replacement therapy minimises the effects of uraemia, but it is related to inconveniences in everyday life. What results from the research is that the most frequent side effect the dialysed patients complained about were aching muscles (M=3.14), chronic fatigue (M=2.91) and shortness of breath (M=2.61). Then, contractions of muscles occur very often in people participating in renal replacement therapy, which also occurred in the survey participants (M=2.53). Another disturbing symptom of dialysis is skin itchiness which occurred in the respondents (M=2.39). An alarming side effect of dialyses can be also diarrhoea or constipations the smallest number of the respondents complained about (M=1.99). In the research conducted by Dutkowska and associates, hemodialysed patients often complained about skin itchiness 20.4%, frequent muscle contractions (14.7%). Moreover, patients often complained about backaches (15.5%), headaches (13.5%) and pressure jumps (14.4%) [4]. From the research carried out by Wojewoda and associates it results that 45% of the survey participants suffered from fatigue, then myasthenia gravis 21%, muscle contractions 18%, headaches 17%, insomnia 12%, itchy skin 11%, joints aches 15%, pressure drops 8% [5]. Fatigue and weakness on the days when dialysis is not performed is also indicated by patients in the research conducted by Wojczyk – 39% [6]. Also the research by Hornik and associates shows that hemodialysed patients intensely felt the symptoms of chronic renal disease, such as aching muscles, chest pain, contractions, itchy skin and skin dryness, shortness of breath, syncope or dizziness, lack of appetite, lack of energy or exhaustion, numbness in hands and feet, nausea or gastric disorders [7]. It probably results from complications connected with hemodialysis.

Renal replacement treatment makes it difficult for patients to perform a number of everyday activities. According to the majority of the survey participants, the most limited was covering a few floors by stairs – 96%, covering the distance of more than 1 km – 91%, covering the distance of about 500 m – 87%, covering one floor by stairs – 69%. In the research carried out by Wojczyk, patients indicated the problem of climbing the stairs – 56% [6]. The quality of life of dialysed people can be also significantly influenced by the treatment time. What results from the Authors' own research is that hemodialyses were performed M = 3 times a week on average, for the average period M = 4 years and for the average time M = 3 months. From the research conducted by Wojewoda and associates of 2012 it results that the most numerous group consisted of patients treated with hemodialysis for 1-5 years, namely 36%, then for up to 1 year, 32%, and 10% of the surveyed population was included in the therapy for more than 10 years [5].

The dialysed patients assessed their health negatively. According to the survey participants, the average assessment of their general health was M = 4.11 (with standard deviation SD = 0.39). Women statistically significantly worse assessed their health than men (p=0.031). Similar results are presented in the research conducted by Al-Jumaih and associates, which show that patients undergoing hemodialysis assessed their health negatively in the physical aspect 52.7 (SD=23.4). Also men in that research obtained a higher score than men in the domain of physical health, which indicates that they assessed their health better [8]. Similar results, worse for women, were shown by Sehgal from USA [9].

The findings of the conducted research prove that in spite of the constant medical progress and improvements in the equipment and ways of performing hemodialysis, patients feel discomfort on many levels, including the physical one. However, it should be noted that modern methods of dialysis therapy, matched properly and individually, as well as properly performed may prolong patients' life and improve their everyday functioning.

Conclusions

Based on the conducted research, the following conclusions are drawn:

The age and the duration of dialyses influence the functioning of patients in the physical sphere.

The factor influencing the lower assessment of the quality of life of dialysed patients is the degree to which the disease and dialyses have limited the ability to perform activities which involve physical activity.

The well-being of dialysed patients is worse than the well-being of a healthy person, which results from frequently occurring side effects and complications of renal replacement therapy.

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