



Evaluation of the quality of life and functional status of patients with chronic diseases

Kazimiera Hebel^A✉, Sylwia Jałtuszevska^B

^A Pomeranian University in Słupsk, Institute of Health Sciences, Arciszewskiego 22a, 76-200 Słupsk, Poland

^A ORCID: 0000-0002-1243-0409; ^B ORCID: 0000-0002-9297-1984

✉ kazimiera.hebel@apsl.edu.pl

ABSTRACT

Introduction: A chronic disease adversely affects human function in all areas of life. Therefore, an assessment of the quality of life of patients with chronic diseases is incredibly important. The main objective of this work is to present an assessment of the quality of life and functional status of patients with chronic diseases.

Materials and methods: The study was conducted on 294 adults diagnosed with chronic diseases, lasting for at least 3 months. The mean age of patients was 60.14 years. The study was performed with the EORTC QLQ-C30, Barthel Index and Cantril's Ladder.

Results: The mean result of the general quality of life in all patients was 47.04 (SD ± 22.19). The best quality of life was found

in cognitive functioning (mean = 73.86; SD ± 24.12), and the worst in social role functioning (mean = 59.51; SD ± 37.78). Being independent in self-care significantly affected the quality of life ($p < 0.001$). In terms of sociodemographic factors, only age ($p = 0.0012$) and sex ($p = 0.0176$) had a statistically significant effect on the general quality of life of patients. Cantril's Ladder of life satisfaction scores in the past, present and anticipated future (3 years from now) were 8.07, 5.44 and 5.16, respectively.

Conclusions: The functional status of patients, the age and sex of patients had a statistically significant effect on the quality of life.

Keywords: chronic diseases; quality of life; functional status.

INTRODUCTION

There are various ways of classifying diseases. One of the most common classifications is whether it is an acute or chronic disease. The term "acute diseases" refers to conditions that are evaluated according to 3 criteria: a rapid onset of the disease, a short duration and a significant exacerbation of symptoms. Contrary to the above, chronic diseases are conditions with a long duration, slow onset and less intense symptoms. The National Center for Health Statistics (NCHS) uses the duration of 3 months to categorise diseases as either acute or chronic. Acute diseases are diseases lasting less than 3 months, whereas chronic diseases and disabilities last longer. As such, the definition of a chronic disease according to the NCHS is mainly based on the duration of symptoms. On the other hand, the WHO has a less precise definition as they specify that chronic diseases are conditions that last for a long time and have a slow progression [1]. The National Commission on Chronic Illness defines a chronic illness as having 1 or more of the following characteristics: it is long-term or permanent; its causes, natural course, and treatment are ambiguous; it leaves a residual disability or dysfunction; the patient requires special training for rehabilitation; and it requires a long period of supervision, observation or care [2].

A chronic disease is associated with negative consequences affecting various aspects of the patient's life; it impairs biological and psychological functions of the body; it changes the social role of the patient in their families, social and professional lives, it is often necessary to adapt to a new lifestyle, and

patients must comply with the recommendations of a given therapy, for example, to introduce renal replacement therapy in patients with end-stage chronic kidney disease. Treatment is also often long-term and burdensome without the certainty of a beneficial prognosis, e.g. in cancer patients who also experience chronic pain. In the case of such patients, there are processes that are responsible for a possible discrepancy between a subjective evaluation of health status and an objective assessment. A patient's approach to their disease is a key contributing factor, and consists of elements such as their approach to symptoms, assessment of symptoms, finding ways to cope with physical, mental or social consequences, the assessment of the possibility of normal functioning or finding ways that allow one to regain control over a disease. A patient's personality as well as environmental factors may also have a high significance, e.g. in patients with asthma. Additionally, the assessment of health status also depends on factors such as sex, age, education, economic and social status, and cultural influences [3]. Therefore, the quality of life of patients with chronic diseases has special significance.

Within the last 20 years, there has been an increased interest in studies on the quality of life of patients. Health has become the most precious value and at the same time the most important component of the quality of life [4, 5]. The concept of health included in the WHO definition is multidimensional and includes 5 different concepts, i.e. physical health, mental health, social functioning, role functioning and general well-being [6]. Quality of life, according to the WHO definition,

includes all aspects of human life. In the medical field, the concept of Health-Related Quality of Life is used most often [7].

The main objective of this work is to present an assessment of the quality of life and functional status of patients with chronic diseases.

MATERIALS AND METHODS

The study was conducted in 2017–2018. At the 1st stage of recruitment, we selected 378 consecutive patients of 4 primary care providers diagnosed with a chronic disease of various aetiology – referred to in further parts of the text as the primary disease. Participation in the study was voluntary. The inclusion criteria were: an expressed informed consent of the patient, an age of over 18 years, and a chronic disease confirmed in the patient's medical documentation with a duration of at least 3 months. The exclusion criteria were: no consent from the patient, a chronic disease diagnosed with a duration shorter than 3 months, significant cognitive impairment, and mental illness. Finally, 294 patients were enrolled in the study. Patients were given The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire – Core 30 v. 3.0 (EORTC QLQ-C30) quality of life questionnaire and Cantril's Ladder for self-completion, while the patient's functional status was assessed by a nurse using the Barthel Index. The study protocol was approved by the Bioethics Committee (decision no. KB21/16).

The quality of life of the studied population was assessed using the EORTC QLQ-C30. This tool was adapted by Walden-Gałaszko in 1993–1994 to be used in Polish research [8]. In general, this questionnaire studies the quality of life of cancer patients irrespective of the diagnosis and location of the cancer. However, its scope also includes aspects that can be used in reference to chronic diseases in general. Its psychometric usefulness, with regard to the assessment of the quality of life of patients with chronic kidney disease, was confirmed by a study conducted by Majkowicz et al. [9]. The questionnaire includes 30 sections including multi-item scales and 1-item measurements. Results obtained can be divided into 4 parts:

- 5 functioning scales (physical, roles – work, cognitive, emotional, social),
- 3 symptom scales (fatigue, nausea and/or vomiting, pain),
- global quality of life assessment (general quality of life – GQOL),
- 1-item measurements of single symptoms (dyspnoea, sleep disturbances, lack of appetite, constipation, diarrhoea, effects of the disease on financial status).

In order to make the scale uniform, the results obtained in various categories have to be recalculated as per the 0–100 scale according to the authors. With regard to the GQOL and functioning scales, a higher score indicates a better, higher level of functioning. With regard to the symptom scale, a score of 100 points indicates the maximum intensity of a given symptom [10, 11, 12].

The assessment of functional status was performed based on the Barthel Index that allows to measure ten basic activities of daily living. It is the most frequently used scale to assess functional status. It includes an assessment in points of self-independence regarding 10 categories of activities: grooming, feeding, transfers, mobility on level surfaces, climbing stairs, incontinence, dressing, bathing, walking, toilet use. The range of points is 0–100. For the purposes of statistical analysis, the patients were divided into 3 categories according to their scores: total dependence (0–40 points), moderate disability (45–80 points), and independence (85–100 points).

Cantril's Ladder was used to assess the general satisfaction of life, happiness and well-being in the studied population. It also allows for an assessment of well-being “before the disease”, “currently” and “in 3 years” on a scale 0–10. It has been assumed that a score of at least 6 indicates positive satisfaction from life, whereas lower values are associated with a lack of satisfaction [13].

Methods of statistical analysis

Statistical analysis was performed with Statistica 10.0 by StatSoft. The arithmetical mean, and standard deviation were calculated. The distribution of each quantitative variable was presented using a normal distribution function stating, according to the Fisher statement, that if a sample number increases, the distribution of the test statistics approaches a normal distribution even if a tested variable does not have a normal distribution. A correlation between variables was determined using a correlation matrix and the Pearson correlation coefficient was used for quantitative variables. For categorical and nominal quantitative variables, the ANOVA variance analysis, Kruskal–Wallis test, and Mann–Whitney U test were used. Statistical significance was determined at $p < 0.05$. Statistical significance was determined at a level of $p < 0.05$ in order to measure the effects of various functional scales and symptoms covered by the EORTC QLQ-C30 on the GQOL and assessment of function with regard to daily living.

RESULTS

The study group included 67.69% of women. The age of the patients ranged 21–95 years with a mean age of 60.14 years. The largest group (72.45%) consisted of patients over the age of 50 years. In the group of respondents, the largest group were people with secondary education (38.10%) and those who are retired (44.22%). Other demographic data are presented in table 1.

The most commonly diagnosed underlying diseases included arterial hypertension (31.63%), diabetes mellitus (19.05%), motor system disorders (13.27%) and cancer (12.25%). Patients with a disease lasting more than 10 years were most common (48.64%). Other clinical data are presented in table 2.

TABLE 1. Social-demographic characteristics of the study population

Variable	Number of patients	%
Sex		
female	199	67.69
male	95	32.31
Age		
mean age	60.14	
range	21–95	
≤50 years	81	27.55
>50 years	213	72.45
Educational background		
elementary school	62	21.09
vocational school	83	28.23
high school	112	38.10
university	37	12.58
Professional activity		
employed	72	24.49
disability pension	69	23.47
old-age pension	130	44.22
unemployed	23	7.82

TABLE 2. Clinical characteristics of the study population

Variable	Number of patients	%
Primary diseases		
hypertension	93	31.63
diabetes mellitus	56	19.05
musculoskeletal diseases	39	13.27
cancer	36	12.25
chronic kidney disease (stage 5)	23	7.82
other	22	7.48
heart disease	17	5.78
stroke	8	2.72
Disease duration		
less than 1 year	21	7.14
1–5 years	69	23.47
5–10 years	61	20.75
>10 years	142	48.64

These results indicate that, in terms of sociodemographic factors, only age ($p = 0.0012$) and sex ($p = 0.0176$) had a statistically significant effect on the GQOL of patients.

The duration of the chronic disease had no statistically significant effect on the GQOL ($p = 0.5546$), or on the functional status assessed with the Barthel Index ($p = 0.3945$).

The european organization for research and treatment of cancer quality of life questionnaire – core 30 v. 3.0

It has been assumed that with regard to the GQOL and scales of function, a higher result indicates better functioning levels in a given category. With regard to the scale for symptoms, a higher result indicates greater symptoms.

The mean result of the GQOL in all patients was 47.04 (SD ± 22.19). Cognitive function was assessed highest (mean = 73.86;

SD ± 24.12), and social role functioning was assessed lowest (mean = 59.51; SD ± 37.78).

With regard to the symptom scales, fatigue and pain were the most severe symptoms (mean 47.39; SD ± 24.47 and 45.97; ± 28.74 , respectively), whereas nausea and vomiting were least severe (mean = 8.95; SD ± 19.10). Other data are presented in table 3.

TABLE 3. Mean values of functional and symptom scales in the study group

EORTC QLQ-C30			
functional scales	acronym for functional scales	mean	standard deviation ($\pm$)
physical functioning	PF2	60.88	27.90
role functioning	RF2	59.51	37.78
cognitive functioning	CF	73.86	24.12
emotional functioning	EF	67.77	26.68
social functioning	SF	61.73	29.99
symptom scales/ITEMS	acronym for functional scales/ITEMS	mean	standard deviation ($\pm$)
fatigue	FA	47.39	24.47
nausea and/or vomiting	NV	8.95	19.10
pain	PA	45.97	28.74
dyspnoea	DY	30.83	28.64
insomnia	SL	44.10	32.25
appetite loss	AP	22.10	26.81
constipation	CO	26.75	31.31
diarrhoea	DI	10.20	21.37
financial difficulties	FI	39.00	31.12
global health status	QL2	47.04	22.19

PF2 – physical functioning; RF2 – role functioning; CF – cognitive functioning; EF – emotional functioning; SF – social functioning; QL2 – global health status; FA – fatigue; NV – nausea and/or vomiting; PA – pain; DY – dyspnoea; SL – insomnia; AP – appetite loss; CO – constipation; DI – diarrhoea; FI – financial difficulties

When the analysis of the mean values in various spheres of life was performed, tests indicated that the highest result was observed in patients with chronic kidney disease for physical functioning (mean = 68.69), and lowest in patients after a stroke (mean = 32.50). In role functioning, the highest result was observed in patients with arterial hypertension (mean = 65.05), and the lowest in patients after a stroke (mean = 6.25). Cognitive functioning and emotional functioning were assessed most positively by patients with chronic kidney disease (mean = 86.95 and 80.43, respectively), whereas the lowest values in both areas of functioning were observed in patients after a stroke (mean = 60.41 and 56.25, respectively). Social functioning was assessed as highest in patients with diabetes (mean = 71.13), and lowest in patients after a stroke (mean = 41.66).

With regard to QL2 (Global health status), patients with arterial hypertension indicated the highest quality of life (mean = 47.87), and the lowest values were observed in patients after a stroke (mean = 36.45). Other data are presented in table 4.

TABLE 4. Mean value in functional scales categorized by primary disease

Scales	Hypertension	Diabetes	Cancer	Chronic kidney disease	Musculoskeletal diseases	Stroke	Heart diseases
Physical functioning	61.07	67.50	54.44	68.69	54.35	32.50	54.11
Role functioning	65.05	64.28	59.72	58.69	50.00	6.25	52.94
Cognitive functioning	74.91	75.00	73.14	86.95	65.81	60.41	63.72
Emotional functioning	70.34	66.07	64.12	80.43	60.25	56.25	63.23
Social functioning	65.41	71.13	54.16	58.69	52.56	41.66	54.86
Global health status	47.87	45.08	44.67	55.56	45.94	36.45	43.62

The results of the analysis of the intensity of individual symptoms in relation to a disease type are presented in table 5.

TABLE 5. Mean value in symptom scales categorized by primary disease

Symptoms	Hypertension	Diabetes	Cancer	Chronic kidney disease	Musculoskeletal diseases	Stroke	Heart diseases
Fatigue	43.84	45.63	50.30	39.61	55.27	66.66	57.51
Nausea and/or vomiting	6.63	8.03	14.35	5.07	5.12	6.25	8.82
Pain	43.54	41.96	52.77	27.53	55.98	54.16	54.90
Dyspnoea	29.74	30.35	34.25	26.08	27.35	45.83	39.21
Insomnia	40.14	41.07	47.22	44.92	49.57	50.00	52.94
Appetite loss	20.07	18.45	35.18	11.59	23.07	25.00	19.60
Constipation	25.44	18.45	38.88	18.84	27.35	29.16	41.17
Diarrhoea	8.60	13.69	14.81	10.14	5.12	0.00	9.80
Financial difficulties	34.40	37.50	44.44	43.47	40.17	58.33	47.05

The results of the statistical analysis indicated that functioning in each assessed sphere of life significantly correlated with an assessment of the GQOL. In the group of symptoms studied, only the intensity of diarrhoea had no statistically significant effect on the assessment of the GQOL in respondents. On the other hand, fatigue ($r = -0.6323$; $p = 0.000$) and pain ($r = -0.5263$; $p = 0.000$) had the most significant correlation with quality of life. Correlation coefficients are presented in table 6.

Barthel Index

Table 7 presents the numbers of patients in each ability category, assessed using the Barthel Index. The analysis of the

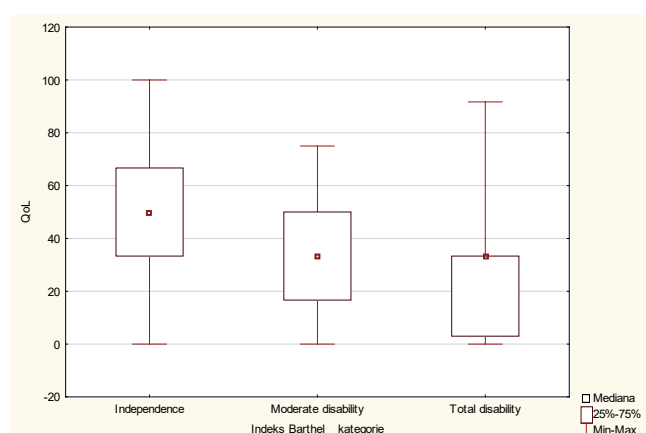
results indicated that the mean value of the functional status in the whole study group was 87.94 (SD ± 20.14) – these patients were classified as patients fully able to perform activities of daily living.

This demonstrates that functional status had a statistically significant effect on the GQOL of patients ($p = 0.000$). The highest quality of life was indicated by patients with complete independence in terms of self-care (mean = 51.41), followed by patients with a moderate disability who assessed their quality of life as slightly worse (mean = 33.33), and finally in patients with a severe disability where the mean was only 25.49 (Fig. 1).

TABLE 6. The correlation coefficient between scales and global health status and Barthel Index

Variable	r	
	BI	QL2
Functional scales		
physical functioning	r = 0.6838 p = 0.000	r = 0.5681 p = 0.000
role functioning	r = 0.5582 p = 0.000	r = 0.4717 p = 0.000
cognitive functioning	r = 0.3919 p = 0.000	r = 0.5326 p = 0.000
emotional functioning	r = 0.2935 p = 0.000	r = 0.5259 p = 0.000
social functioning	r = 0.5300 p = 0.000	r = 0.5458 p = 0.000
Symptom scales		
fatigue	r = -0.4099 p = 0.000	r = -0.6323 p = 0.000
nausea and/or vomiting	r = -0.1167 NS	r = -0.2354 p = 0.000
pain	r = -0.3374 p = 0.000	r = -0.5263 p = 0.000
dyspnoea	r = -0.3124 p = 0.000	r = -0.4082 p = 0.000
insomnia	r = -0.2310 p = 0.000	r = -0.3084 p = 0.000
appetite loss	r = -0.3566 p = 0.000	r = -0.4424 p = 0.000
constipation	r = -0.1099 NS	r = -0.2445 p = 0.000
diarrhoea	r = -0.0250 NS	r = -0.0579 NS
financial difficulties	r = -0.2235 p = 0.000	r = -0.3497 p = 0.000

r – Pearson product-moment correlation coefficient; p – level of statistical significance $p \leq 0.001$; NS – statistically non-significant; BI – Barthel Index; QL2 – global health status

**FIGURE 1.** Value of global health status depending on the categories of disability based on Barthel Index**TABLE 7.** Number of patients in defined categories of disability based on Barthel Index

	Total dependence (0–40)	Moderate disability (45–80)	Independence (85–100)
Number of patients	19	44	231
%	6.46	14.97	78.57

The study results demonstrated a lack of a statistically significant correlation between the GQOL and the type of underlying disease ($p = 0.2911$). After the analysis of the mean values of the GQOL and functional status with regard to the type of underlying disease, it was demonstrated that patients who had a brain stroke had the lowest mean value in GQOL – 36.45 (SD ± 21.79) and obtained the lowest score in the Barthel Index – 61.25 (SD ± 30.20). A statistically significant correlation between the functional status and the type of underlying disease has been demonstrated ($p = 0.0004$), and a *post-hoc* test (the Scheffé test) indicated that a brain stroke and cancer had significant effects on the Barthel Index score. The results are presented in table 8.

TABLE 8. Mean value of global health status and Barthel Index categorized by primary disease

Primary disease	QL2		BI	
	mean	$\pm$ SD	mean	$\pm$ SD
Hypertension	47.87	22.57	89.83	18.81
Diabetes	45.08	20.21	93.75	11.08
Cancer	44.67	24.65	81.38	25.51
Chronical kidney disease	55.56	24.26	87.60	18.14
Musculoskeletal diseases	45.94	20.31	86.41	23.67
Stroke	36.45	21.79	61.25	30.20
Heart diseases	43.62	24.03	83.52	23.10

QL2 – global health status; BI – Barthel Index; SD – standard deviation

Cantril's Ladder

The study of life satisfaction using Cantril's Ladder indicated that the mean score of satisfaction from life in the period prior to disease was 8.07 and is currently at 5.44, whereas the expected level of satisfaction from life in 3 years was 5.16 (Tab. 9). The analysis of results obtained indicated a statistically significant difference between the mean score of satisfaction from life in the period prior to disease and the mean score of satisfaction from life currently ($p = 0.000$). The difference between the mean scores for the current period and predicted satisfaction from life in the future (in 3 years) was not statistically significant ($p = 0.065$).

TABLE 9. Mean value Cantril Ladder of Life Satisfaction

	Cantril 1 Satisfaction with life before illness	Cantril 2 Satisfaction with present life situation	Cantril 3 Satisfaction with anticipated life situations of the next three years
Mean (range)	8.07 (0–10)	5.44 (0–10)	5.16 (0–10)

DISCUSSION

A chronic disease undoubtedly affects the quality of life in all its aspects. Hunt and McKenna were the first to formulate which human needs affect well-being and concluded that meeting these needs affects the GQOL [15].

This study aimed to assess the GQOL of patients with chronic diseases.

In her study on the quality of life in elderly people with chronic diseases, Muszalik and Kędziora-Kornatowska demonstrated that the quality of life of patients was dependent on age, and the type and duration of the disease [16]. Additionally, Zawadzka et al. confirmed that the age of patients affects quality of life assessments in a study on the effects of sociodemographic factors on the quality of life of patients after a stroke [17]. The mean age of the patients in their study was 65.05 years. The results of the study presented in this work indicate that, in groups of patients with a mean age similar to those studied by Muszalik and Kędziora-Kornatowska (namely 60.15 years), the GQOL was significantly dependent on the patients' age. In our study group, the most frequently observed conditions included arterial hypertension, diabetes mellitus and motor system diseases. In the study performed by Muszalik and Kędziora-Kornatowska, the most common diseases included diabetes mellitus, motor system diseases and chronic kidney disease [16]. The researchers demonstrated differences to the assessment of individual components of the quality of life depending on the type of underlying disease. The results of our study did not demonstrate any statistically significant correlation between the effects of the type of chronic disease and the assessment of the GQOL. However, it is worth noting that patients who had a brain stroke assessed functioning in all aspects of life and the GQOL lower than patients with other conditions. In their study on the quality of life of patients with multiple sclerosis, Humańska et al. did not indicate significant effects of the duration of the disease on the assessment of the quality of life [18]. Additionally, our own study demonstrated that the duration of the disease did not have a significant effect on the quality of life of the studied patients.

The most common group in this study were patients with arterial hypertension and they assessed their quality of life as moderate. In the study group, the quality of life was assessed highest by patients with chronic kidney disease, and lowest by patients after a stroke. The differences, however, were not statistically significant. The studies of other authors indicated significantly lower values of GQOL among patients with arterial

hypertension compared to patients with normal values of arterial blood pressure. Researchers have demonstrated a lower assessment of the quality of life in patients with hypertension, especially with regard to physical activities, activities associated with health status, general energy and general health assessment [19, 20, 21, 22].

The results of our own study demonstrate that the functional status has a significant effect on the assessment of the GQOL. Additionally, a statistically significant relation between the type of chronic disease and functional status has been demonstrated. The functional status of patients after a brain stroke and patients with cancer was significantly lower compared to other patients. Similar results were obtained by other researchers who demonstrated that the quality of life of patients after a stroke strictly correlated with a degree of self-independence in activities of daily living [23, 24]. In another study regarding the quality of life of patients with multiple sclerosis, the assessment of the quality of life was significantly related to their functional status [18]. The study of Krawczyk-Wasilewska et al. regarding the quality of life of patients with rheumatoid arthritis also demonstrated that impaired physical skills significantly correlated with a lower assessment of the quality of life [25].

Cantril's Ladder was used to assess general life satisfaction and well-being. The author of this scale assumed that if a score for a current patient's situation is lower than that for the anticipated future, then the patient's health status is expected to improve [26]. Results of other authors evaluating the assessment of satisfaction from life in a group of women undergoing haemodialysis therapy demonstrated that patients assessed their future situation as worse than their current situation, namely, their predictions regarding the future were negative [27]. The results of the studies presented demonstrate that patients do not expect their satisfaction from life will change in the future. The results obtained were lower than the mean of 6.00 which is assumed to be a value indicating satisfaction from life.

Considering the aim to prolong the life of patients with chronic diseases, it is also necessary to include all factors affecting their quality of life, both in subjective and objective aspects. Only a holistic approach and regular assessments will allow to draw reliable conclusions and to undertake a discussion.

CONCLUSIONS

1. The functional status of patients assessed based on the Barthel Index as well as the age and sex of patients are factors that statistically significantly affect the quality of life.
2. The type of chronic disease and its duration does not have significant effects on the quality of life in the studied group. Patients after a stroke had the lowest assessment of their GQOL, and their functioning in all analysed aspects of life was the poorest.
3. Chronic diseases had the smallest effect on cognitive function, and fatigue was the most intense symptom.
4. In a group of analysed diseases, cerebral stroke and cancer had significant effects on the functional status of patients.

REFERENCES

1. Tąpór-Mądry R. Choroby przewlekłe. Obciążenie, jakość życia i konsekwencje ekonomiczne. *Zdrowie Publiczne i Zarządzanie* 2011;9(1):25-49.
2. Ostrzyżek A. Jakość życia w chorobach przewlekłych. *Probl Hig Epidemiol* 2008;89(4):467-70.
3. Turska W, Skowron A. Metodyka oceny jakości życia. *Farmacja Pol* 2009;65(8):572-80.
4. Brzezinski JM, Cierpiałowska L. *Zdrowie i choroba. Problemy teorii, diagnozy i praktyki*. Gdańsk: GWP; 2000.
5. Jaracz K. Sposoby ujmowania i pomiaru jakości życia. Próba kategoryzacji. *Pielęgniarstwo Polskie* 2001;2(12):219-26.
6. Tobiasz-Adamczyk B. *Wybrane elementy socjologii zdrowia i choroby*. Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego; 2000.
7. Kłócek M, Kawecka-Jaszcz K. Jakość życia u ludzi z nadciśnieniem. In: Kawecka-Jaszcz K, Kłócek M, Tobiasz-Adamczyk B, editors. *Jakość życia w chorobach układu sercowo-naczyniowego: metody pomiaru i znaczenie kliniczne*. Poznań: Termedia; 2006.
8. Majkowicz M. Wielopoziomowa ocena subiektywna pacjentów z chorobą nowotworową. Gdańsk: Uniwersytet Medyczny w Gdańsku; 2005.
9. Majkowicz M, Afeltowicz Z, Lichodziejewska-Niemierko M, Dębska-Ślizień A, Rutkowski B. Comparison of the quality of life in hemodialysed (HD) and peritoneally dialysed (CAPD) patients using the EORTC QLQ C-30 questionnaire. *Int J Artif Org* 2000;23(7):423-8.
10. Scott NW, Fayers PM, Aaronson NK, Bottomley A, de Graeff A, Groenvold M, et al. EORTC QLQ-C30 reference values. www.eortc.be/qol/files/SCManualQLQ-C30.pdf [28.07.2015/6.41P.A (10.04.2020)].
11. Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, et al. The European Organization for Research and Treatment for Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. *J Nat Cancer Inst* 1993;85(5):365-76.
12. McLachlan SA, Devins GM, Goodwin PJ. Validation of the European Organization for Research and Treatment for Cancer Quality of Life Questionnaire (QLQ-C30) as a measure of psychosocial function in breast cancer patients. *Eur J Cancer* 1998;34(4):510-7.
13. Mazur J, Małkowska-Szkućnik A, Oblacińska A, Kołło H. Drabina Cantrila w badaniach stanu zdrowia i nierówności w zdrowiu uczniów w wieku 11-18 lat. *Probl Hig Epidemiol* 2009;90(3):335-61.
14. Electronic Handbook on Statistics. StatSoft. <http://www.statsoft.pl>. (24.03.2020).
15. Hunt SM, McKenna SP. The QLDS: a scale for the measurement of quality of life in depression. *Health Policy* 1992;22(3):307-19.
16. Muszałik M, Kędziora-Kornatowska K. Jakość życia przewlekłe chorych pacjentów w starszym wieku. *Gerontol Pol* 2006;14(4):185-9.
17. Zawadzka J, Beyer A, Kwolek A. Wpływ wybranych czynników społeczno-demograficznych na jakość życia pacjentów po udarze – wstępne wyniki. *Przegląd Medyczny Uniwersytetu Rzeszowskiego i Narodowego Instytutu Leków w Warszawie* 2014;1:36-46.
18. Humańska MA, Śnieg P, Rezmerska L, Haor B, Głowacka M, Felsmann M, et al. Jakość życia a sprawność funkcjonalna chorych na stwardnienie rozsiane. *Pielęg Neur Neurochir* 2013;2(5):188-94.
19. Banegas JR, Guallar-Castillón P, Rodríguez-Artalejo F, Graciani A, López-García E, Ruilope LM. Association between awareness, treatment, and control of hypertension, and quality of life among older adults in Spain. *Am J Hypertens* 2006;19(7):686-93.
20. Kwaśniewska M, Drygas W. Jakość życia u osób obciążonych czynnikami ryzyka choroby niedokrwiennej serca. *Przegl Lek* 2005;62(9):863-70.
21. Manolis A, Doumas M. Sexual dysfunction: the 'prima ballerina' of hypertension-related quality of life complications. *J Hypertens* 2008;26(1):2074-84.
22. Zygmontowicz M, Olszanecka-Glinianowicz M, Chudek J. Jakość życia u osób z nadciśnieniem tętniczym. *Endokrynol Otyl Zab Przem Mat* 2011;7(3):179-85.
23. Jaracz K, Kozubski W. Quality of life in stroke patients. *Acta Neurologica Scandinavica* 2003;107(5):324-9.
24. Łanocha A, Zdziarska B, Kazimierczak A. Assessment of quality of life in patients with chronic myeloid leukaemia on diagnosis and after treatment with imatinib. *Pomeranian J Life Sci* 2017;63(4):116-21. doi: 10.21164/pomjlifesci.34.
25. Krawczyk-Wasilewska A, Gajewska E, Samborski W. Płeć jako jeden z czynników mogących determinować jakość życia w reumatoidalnym zapaleniu stawów. *Nowiny Lek* 2012;81(4):347-53.
26. Czapiński J. *Psychologia szczęścia*. Warszawa: Polskie Wydawnictwo Naukowe PWN; 1994.
27. Kutniewska M, Majkowicz M. Model jakości życia pacjentów poddawanych hemodializie. Różnice w jakości życia w zależności od przyczyny niewydolności nerek. In: Opla T, editor. *Jakość życia kobiet w różnych okresach życia i wybranych chorobach*. Pelplin: Publisher Bernardinum; 2011. p. 152-67.