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**FUNCTIONAL EFFICIENCY AND THE QUALITY
OF LIFE OF PATIENTS OVER 60, HOSPITALIZED
IN THE REHABILITATION DEPARTMENT**

**Sprawność funkcjonalna a jakość życia pacjentów po 60. roku życia,
hospitalizowanych w oddziale rehabilitacji**

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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

Zadaniem współczesnej medycyny jest zapewnienie seniorom wysokiego poziomu jakości życia. Sprawność funkcjonalna jest jednym z głównych czynników determinujących niezależność i aktywne uczestnictwo w życiu społecznym, wpływając korzystnie nie tylko na długość życia, ale i pozytywną ocenę jego jakości.

Celem pracy było dokonanie oceny wpływu sprawności funkcjonalnej na jakość życia pacjentów po 60. roku życia, hospitalizowanych w oddziale rehabilitacji.

Materiał i metody

Badania zrealizowano w grupie 92 pacjentów oddziałów rehabilitacji, po 60. roku życia. W badaniach wykorzystano metodę sondażu diagnostycznego z użyciem autorskiego kwestionariusza ankiety, skali WHOQOL-AGE oraz skale NOSGER i Barthel.

Wyniki

Średnia wyników skali Barthel wynosiła $72,12 \pm 30,34$. Największą grupę stanowiły osoby w „stanie lekkim” (46,7%). Średnia wyników skali NOSGER wynosiła $46,71 \pm 12,60$ – badani najlepiej funkcjonowali w obszarze pamięci ($5,37 \pm 0,89$) i zachowań destrukcyjnych, zakłócających i asocjalnych ($6,04 \pm 1,36$), a najgorzej w zakresie instrumentalnych aktywności codziennego życia ($10,10 \pm 3,52$). Średnia wyników skali WHOQOL-AGE w badanej grupie wynosiła $66,46 \pm 11,41$. Im wyższy poziom sprawności funkcjonalnej w skali NOSGER, tym wyższa była jakość życia badanych ($p=0,000$, $r=-0,55456$). Podobną zależność zaobserwowano w odniesieniu do skali Barthel ($p=0,000$).

Wnioski

1) Poziom sprawności funkcjonalnej badanych oceniono jako dobry według skali NOSGER, a według skali Barthel – jako przeciętny. 2) Poziom sprawności funkcjonalnej był czynnikiem istotnie determinującym poziom jakości życia badanych, niezależnie od zastosowanej skali oceny (NOSGER vs Barthel). 3) Poziom jakości życia w badanej populacji oceniono jako przeciętny.

Abstract (in English):

Aim

One of the tasks of modern medicine is to provide seniors with a high quality of life. Functional efficiency important factor which determine independence, having a positive effect on a assessment of its quality. The aim of the study was to assess the influence of functional efficiency on the quality of life in patients over 60.

Material and methods

The study was carried out in a group of 92 patients. A diagnostic survey was used in the study with the use of an original questionnaire, WHOQOL-AGE, NOSGER and Barthel Index.

Results

The mean score of Barthel scale was 72.12 ± 30.34 - the largest group was in “light condition” (46.7%). The mean score of NOSGER scale was 46.71 ± 12.60 - the subjects functioned best in the area of memory (5.37 ± 0.89) and destructive, disruptive and associative behaviors (6.04 ± 1.36), and worst in the area of instrumental activities of daily living (10.10 ± 3.52). The mean score of WHOQOL-AGE scale in the study group was 66.46 ± 11.41 . The higher the level of functional ability in NOSGER scale, the higher was the quality of life of the subjects ($p=0.000$, $r=-0.55456$). A similar relationship was observed in relation to the Barthel Index ($p=0.000$).

Conclusions

1) The level of functional ability was assessed as good according to NOSGER and as average according to Barthel Index. 2) The level of functional ability was a factor significantly determining the level of quality of life of the subjects. 3) The level of quality of life in the study population was assessed as average.

Keywords (in Polish): jakość życia, osoby starsze, sprawność funkcjonalna.

Keywords (in English): quality of life, the elderly, functional efficiency.

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Sprawność funkcjonalna a jakość życia osób starszych.

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Authors (short)

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Introduction

A natural consequence of an escalating phenomenon of ageing society in Poland is a growing percentage of elderly people, which is a major challenge for the healthcare system. Although lack of self-reliance is not a physiological consequence of an aging process, this phenomenon tends to intensify with age along with an advancing process of decreasing efficiency and physical fitness or with the problem of multiple morbidities also typical of an old age [1]. In Poland, difficulties with performing activities of daily living or self-reliance are reported by every third person aged 65 and over, where as in the population aged over 80 such problems affect almost 6 in 10 people [2].

An important task of modern medicine is to provide senior citizens with a high quality of life. Therefore, it is extremely important to popularize findings of the research on the quality of seniors' life and factors which determine this quality including functional efficiency. It is, in fact, one of the main factors determining independence and active participation in social life, having an impact not only on life expectancy but also on a positive assessment of its quality [3,4].

The aim of the study was to assess the influence of functional efficiency on the quality of life in patients over 60, hospitalized in the rehabilitation department.

Materials and methods

The study was conducted between November 2018 and March 2019 in a group of patients treated in two rehabilitation departments located in Małopolska region. The following inclusion criteria were applied for the study: 1) age of 60-plus; 2) patient's written consent for participation in the study; 3) the score of at least 7 points in the AMTS test (Abbreviated Mental Test Score) [5,6]. The research was carried out following the principles of the Declaration of Helsinki. Participation in the study was voluntary and patients were advised on its aim and course before giving their informed written consent.

The actual research was carried out by means of a diagnostic survey with the application of a questionnaire designed by the authors which allowed for obtaining respondents' socio-demographic data as well as the data related to the selected aspects of their health condition including the period and cause of current hospitalization. WHOQOL-AGE scale was applied to assess the quality of patients' life [7,8]. The assessment of patients' mental, emotional and social condition was conducted by means of the NOSGER scale [9,10,11], whereas the Barthel Index was used to assess patients' functional condition [10].

The most numerous group was made up of patients aged from 70 to 79 – 46.7%, whereas those aged from 60 to 69 accounted for 36.9% of respondents. As many as 15.2% of respondents were aged from 80 to 89, and only 1.1% aged 90 or more. The average age of respondents was 73.34 ± 7.08 . Socio-demographic characteristics of the examined group are presented in Table 1.

Table 1. Socio-demographic characteristics of the studied group

Variable	Total (n=92)	
	n	%
Sex		
Female	54	58.7
Male	38	41.3
Place of residence		
Village	28	30.5
Small town (up to 100 thousand residents)	21	22.8
Big city (100 thousand residents)	43	46.7
Education level		
Elementary education	7	7.6
Vocational education	23	25.0
Secondary education	41	44.6
Higher education	21	22.8
Marital status		
Single	37	40.2
In a relationship (formal or informal)	55	58.8
Residential situation		
Living alone	21	22.8
Apartment with family / relatives	71	77.2
Material status		
Very good	2	2.2
Good	38	41.3
Average	45	48.9
Bad	7	7.6
Very bad	0	0.0

Source: study based on the results of own research.

The most frequent cause of hospitalization in the examined group was orthopedic treatment including spinal rehabilitation – 50.0%. Patients suffering from paresis as a result of ischemic or hemorrhagic stroke accounted for 20.6% of the examined population, where as 17.4% of respondents suffered from degenerative or rheumatic diseases. Prior brain neurosurgery was responsible for hospitalization of 8.7% of respondents. Patients after amputations or with Guillain-Barré syndrome belonged to the least numerous groups of respondents – 2.2% and 1.1% respectively. The most common comorbidities included arterial hypertension (70.7%), type 2 diabetes (37.0%) and ischemic heart disease (22.8%).

The most numerous group of respondents was made up of patients treated in the rehabilitation department for the period between 1 and 4 weeks – 48.9%. Patients hospitalized for less than 1 week accounted for 31.5% of respondents, between 4 and 8 weeks – for 18.5%, and longer than 8 weeks – for 1.1%.

Collected results were subsequently analyzed with the application of an integrated package of StatSoft – STATISTICA 10. Calculations were carried out by means of Kruskal-Wallis test, Mann-Whitney U-test, chi-square test and Spearman rank correlations coefficient. In all the analyses the significance level was assumed at 0.05.

Results

Functional efficiency

Respondents' functional efficiency was assessed with the application of the Barthel Index and NOSGER scale. Descriptive statistics of the obtained results are presented in Table 2.

Table 2. Descriptive statistics for the Barthel Index and NOSGER

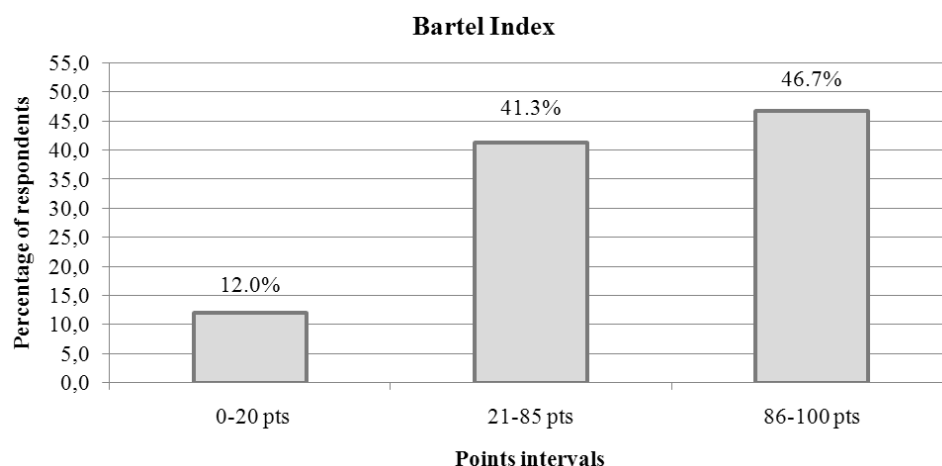
Variable	N	χ	Me	Min.	Max.	Q1	Q3	SD
Barthel Index	92	72.12	82.50	10	100	55	100	30.34
NOSGER overall score	92	46.71	45	30	86	37	52.5	12.60
NOSGER – memory	92	5.37	5	5	10	5	5	0.89
NOSGER – IADL	92	10.10	9.5	5	20	7.5	11.5	3.52
NOSGER – ADL	92	8.75	7	5	21	5	10	4.33
NOSGER – mood	92	8.14	8	5	15	6	10	2.60
NOSGER – social behavior	92	8.30	8	5	17	7	9	2.22
NOSGER – disturbing behaviour	92	6.04	6	5	12	5	6.5	1.36

χ – average value, Me – median, Mo – modal value, Min – minimum, Max – maximum, Q1 i Q3 – 1st and 3rd quartile, SD – standard deviation

Source: study based on the results of own research

Most examined patients obtained between 86 and 100 Barthel scores, which may be interpreted as a „light condition” – 46.7%. The least numerous group consisted of people whose Barthel scores ranged between 0 and 20, which means a „very severe condition” – 12.0%, Figure 1.

Figure 1. Patient assessment results using the Barthel Index



Interpretation of points intervals: 0–20 pts – „severe condition”, 21–85 pts – „moderately severe condition”, 86–100 pts – „light condition”

Source: study based on the results of own research.

An analysis confirmed that there is a statistically significant relationship between the results obtained by patients in the aforementioned scales ($p=0.000$). The median of the results obtained on NOSGER scale had the lowest values for the group of patients with „light condition” according to the Barthel Index and the highest ones for patients whose condition was defined as „very severe”, Table 3.

Table 3. The results of the Kruskal-Wallis rank test of the NOSGER scale results depending on the level of functional fitness of the subjects according to the Barthel Index

Dependent variable: NOSGER	ANOVA ranks Kruskal-Wallis		
	NOSGER		
	Independent (grouping) variable: Barthel Index		
	The Kruskal-Wallis rank test: $H(2, n=92) = 57.16411$ $p=0.000$		
	n important	sum of ranks	average rank
„light condition”	43	1104.500	25.686
„moderately severe condition”	38	2240.000	58.947
„severe condition”	11	933.500	84.864

p – significance level

Source: study based on the results of own research.

Quality of life

In the examined group of respondents the mean value of the assessment of patients’ quality of life measured on the WHOQOL-AGE scale reached 66.46 ± 11.41 , Table 4.

Table 4. Descriptive statistics for the WHOQOL-AGE

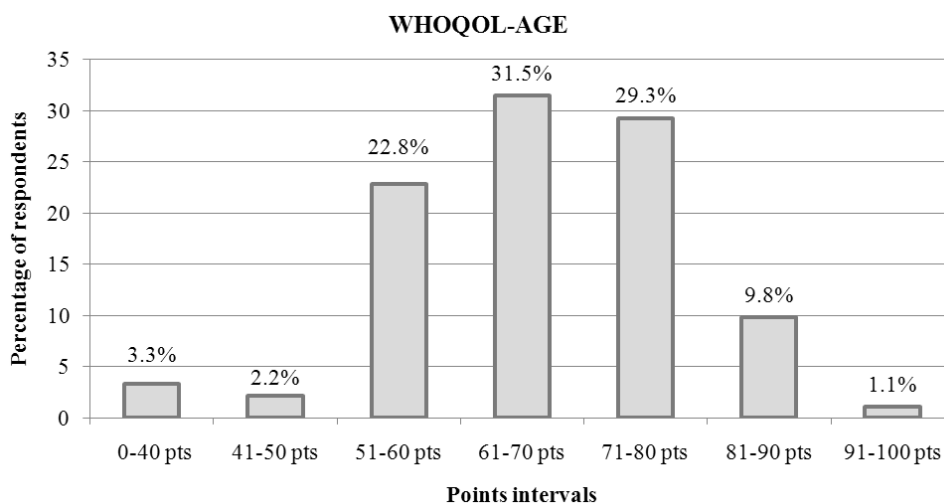
Variable	n	χ	Me	Min.	Max.	Q1	Q3	SD
WHOQOL-AGE	92	66.46	66.80	32.80	92.60	58.70	74.30	11.41

χ – average value, Me – median, Mo – modal value, Min – minimum, Max – maximum, Q1 i Q3 – 1st and 3rd quartile, SD – standard deviation

Source: study based on the results of own research.

The highest percentage of patients were the ones who scored between 60 and 70 points on the WHOQOL-AGE scale – 31.5%. Only one patient (1,1%) scored higher than 90 points, Figure 2.

Figure 2. Histogram of the variable WHOQOL-AGE quality of life rating scale



Source: study based on the results of own research.

Functional efficiency and the quality of life

Another analysis conducted during the study confirmed that there is a statistically significant correlation between the level of functional efficiency assessed according to the NOSGER scale and the level of respondents' quality of life as the higher level of functional efficiency the respondents presented, the higher their quality of life was ($p=0.000$, $r=-0.55456$); Table 5.

Table 5. The results of the Spearman's rank order correlation for the WHOQOL-AGE scale and the NOSGER scale

A pair of variables: WHOQOL-AGE and NOSGER	Correlation of Spearman's rank order for the WHOQOL-AGE scale and the NOSGER scale			
	n important	r Spearman	t (n-2)	p
NOSGER overall score	92	-0.545	-6.176	0.000
NOSGER – memory	92	-0.372	-3.718	0.000
NOSGER – IADL	92	-0.532	-5.957	0.000
NOSGER – ADL	92	-0.351	-3.561	0.000
NOSGER – mood	92	-0.565	-6.493	0.000
NOSGER – socialbehavior	92	-0.488	-5.303	0.000
NOSGER – disturbingbehaviour	92	-0.428	-4.495	0.000

p – significance level

Source: study based on the results of own research.

Moreover, the conducted analysis showed that there is a statistically significant relationship between the level of functional efficiency assessed by means of the Barthel Index and the level of the quality of life in the examined group ($p=0.000$). The median of the result on the WHOQOL-AGE scale was the highest

for patients whose condition was defined as „light” according to the Barthel Index and the lowest for patients whose condition was considered to be „severe”, Table 6.

Table 6. The results of the Kruskal-Wallis rank test on the WHOQOL-AGE scale depending on the level of functional fitness of the subjects according to the Barthel Index

Dependent variable: WHOQOL-AGE	ANOVA ranks Kruskal-Wallis WHOQOL-AGE Independent (grouping) variable: Barthel Index The Kruskal-Wallis rank test: $H(2, n=92) = 14.27815$ $p=0.000$		
	n important	sum of ranks	average rank
	„light condition”	43	2361.000
„moderately severe condition”	38	1682.000	44.263
„severe condition”	11	235.000	21.364

p – significance level

Source: study based on the results of own research.

Discussion

The aim of the study was to assess the impact of functional efficiency on the quality of life of patients aged 60 and over. According to the Barthel Index the condition of the highest percentage of respondents was „light” (46.7%), subsequently – „moderately severe” (41.3%), and the lowest percentage was in a „severe condition” (12.0%). A similar distribution of results was obtained in the study conducted by Lewko et al. [12]. Their research was carried out in a group of patients aged over 65 and staying at their place of residence. A light condition was diagnosed in 53% respondents, a „moderately severe condition” in 43%, where as a „severe condition” in 4% of respondents. On the other hand, better functional efficiency was observed in the case of seniors living in the country and aged 70 and over who were examined by Bogusz et al. [13]. In this study its authors diagnosed a „light condition” in 71% of respondents, a „moderately severe condition” in 23% and a „severe condition” in only 6% of seniors [13]. In turn, Fidecki et al. analyzed functional efficiency of patients staying at long-term care facilities. In this population a „moderately severe condition” was observed in the highest number of respondents (51.5%), a „severe condition” in 44.6% and a „light condition” in only 3.8% of the examined patients [14]. In all the aforementioned studies functional efficiency was assessed by means of the Barthel Index.

The higher level of functional efficiency in the case of respondents examined by Lewko et al. [12] and Bogusz et al. [13] as compared to the authors’ own study can be explained by different group selection criteria – in both cases surveyed seniors were staying in their home environment as the level of their self-reliance allowed them to do so. On the other hand, Fidecki et al. [14] examined patients staying at long-term care facilities who required round-the-clock care due to significant limitations in their independence within satisfying their basic needs.

The authors’ own study included also the assessment of patients’ efficiency based on the NOSGER scale. The average score obtained for the examined group was 46.71 ± 12.60 points, which reflects their good biopsychosocial condition. Most patients obtained the score lower than 60 points. The score of more than 60 points, which indicates functional disorders, was observed in 15.2% of respondents. The NOSGER scale does not have specific point ranges for interpretation. However, the authors of the scale propose the following scores as upper limits of normal values: memory – 10 points, IADL - 11 points, mood – 8 points, social behaviour – 10 points, disruptive and destructive behaviour – 7 points

and ADL – 8 points [11]. Taking into account average results obtained in particular subscales it was found out that the respondents' functioning was the best within memory dimension (5.37 ± 0.89) and destructive, disturbing and asocial behavior (6.04 ± 1.36), whereas their functionality was the lowest as far as instrumental activities of daily living were concerned (10.10 ± 3.52).

Fidecki et al. [15] applied NOSGER scale to assess self-reliance of 113 seniors aged between 65 and 90 and hospitalized in neurosurgical departments. The average score obtained for this population was higher and reached 54.43 ± 18.96 points. In comparison to the authors' study, those respondents obtained lower scores within the dimension of destructive, disturbing and asocial behavior (8.12 ± 2.92 points), memory (8.38 ± 4.39 points) and social behavior (10.17 ± 4.54 points), whereas comparable results were obtained for activities of daily living (8.55 ± 3.56 points) as well as mood and emotions (8.80 ± 3.21 points). Just as in the authors' own study, respondents functioning was the worst as far as instrumental activities of daily living were concerned (10.42 ± 4.61 points). Slightly lower scores, as compared to the authors' own study, obtained in the study by Fidecki et al. [15] result from different characteristics of the department in which the study was conducted. Patients hospitalized in neurosurgical departments are usually in the acute period of the disease and require intensive treatment, hence they are less independent than patients hospitalized in rehabilitation departments. In turn, in a study published in 2016 by Fidecki et al. [16], which was conducted in a group of 195 residents of nursing homes aged over 65, the average score was 60.41 ± 18.61 points. The examined patients' functioning was worse in all assessed dimensions (destructive behavior – 8.87 ± 2.93 , memory – 9.58 ± 3.59 , activities of daily living – 9.85 ± 4.43 , moods and emotions – 10.04 ± 10.16 , social behavior – 10.94 ± 3.99) as compared with the results obtained in the authors' own study – with the worst results obtained for instrumental activities of daily living (11.13 ± 3.60). Worse results obtained by the respondents of Fidecki et al. study [16] result from the characteristics of the selected group – among the residents of nursing homes there are often people incapable of independent functioning. On the other hand, in rehabilitation departments, where the authors' own study was conducted, patients are prepared for independence and self-care.

Głowacka et al. [17] applied NOSGER scale in the study assessing a group of seniors aged over 75 and living in home environment. The examined population comprised 100 people and the average result obtained by respondents was 57.65 ± 21.88 points, which indicates their good physical and psychosocial condition. However, functional disorders (score >60 points) were found in a much higher percentage of respondents (38%) than in the authors' own study. Taking into account particular dimensions of the scale, the best results were obtained for activities of daily living (7.96 ± 4.56 points) and destructive, disturbing and asocial behavior (8.51 ± 2.49 points). Seniors' functioning was the worst in instrumental activities of daily living (10.94 ± 5.38 points) and social behavior dimension (12.22 ± 4.51 points). The differences between these results and the results obtained in the authors' own study may result from a different age structure of the examined groups (for the authors' own study younger patients, aged 60 and over, were qualified).

In the authors' own study a statistically significant correlation was observed between the results of the Barthel Index and NOSGER scale ($p < 0.05$). The median of the results obtained on NOSGER scale had the lowest values in the group of patients whose condition was defined as light according to the Barthel Index and the highest values for patients whose condition was severe. The aforementioned observation is confirmed in the studies by Fidecki et al. [18], which showed a negative correlation between NOSGER scale and the Barthel Index in all component domains. Higher values of the Barthel Index correspond to lower values of NOSGER scale. Similarly, Biercewicz while examining 117 geriatric patients after ischemic stroke confirmed that there was a strong negative correlation between the assessment of functional efficiency based on the Barthel Index and NOSGER scale in ADL dimension [19].

The assessment of the quality of life in the authors' own study was conducted with the application of WHOQOL-AGE scale, which was introduced relatively recently in Poland to assess the quality of life of elderly people. The average score on WHOQOL-AGE scale was 66.46 ± 11.41 points. The results obtained in the authors' own study were comparable to those obtained by Nowicki et al. [20]. The aforementioned study comprised a group of 100 people aged over 65 and living in home environment. The average score assessing the quality of life in this group was 64.45 ± 13.47 points. The results of the authors' own study can also be compared with the results of the validation study of the tool, which was conducted by Zawisza et al. [8] in a representative group of 1337 elderly people aged over 65 from the general population of Poland. The average score obtained on WHOQOL-AGE scale in this group was lower and reached 58.6 ± 14.8 – the difference between these results and the ones obtained in the authors' own research may be explained by the size of the examined population and its diversity.

The authors' own study analyzed also the correlation between the level of functional efficiency assessed by means of NOSGER scale and the Barthel Index and the level of patients' quality of life. Both the general score and the results obtained in particular dimensions of NOSGER scale tended to decrease along with an increase of the results on WHOQOL-AGE scale. A similar relationship between the quality of life and functional efficiency was observed in relation to the Barthel Index. The median of the results on the WHOQOL-AGE scale had the highest values for patients whose condition was classified as „light” and the lowest for the group of patients characterized by a „severe condition”.

These results were confirmed in the studies conducted by Fidecki et al. [21], in which the assessment of the quality of life of orthopedic patients aged over 65 was carried out with the application of WHOQOL-BREF scale. The higher the level of functional efficiency according to the Barthel Index was, the better respondents assessed the quality of their life.

Conclusions

1. The level of respondents' functional efficiency was assessed as good according to the NOSGER scale and as average according to the Barthel Index. A statistically significant correlation was observed between the results obtained by patients as regards the NOSGER scale and the Barthel Index.
2. The level of the quality of life in the examined population was assessed as average.
3. The level of functional efficiency, no matter whether assessed by the NOSGER scale or the Barthel Index, was a factor which determined the quality of life in the examined group of patients.

Implantation for nursing practice

Although aging is a process which may take a different course in various individuals, in consequence, it inevitably leads to impairment of functional efficiency, which is one of the major factors affecting elderly people's self-assessment of their quality of life. Recognition of this correlation makes us aware of the necessity to introduce multidirectional preventive, therapeutic and rehabilitation measures aimed at increasing elderly people's activity potential, which is an indispensable condition in achieving the sense of satisfaction with life.

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