



ORIGINAL PAPER

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Association between body mass and physical activity with quality of life in patients with rheumatoid arthritis

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ABSTRACT

Introduction. Rheumatoid arthritis (RA) is a progressive joint condition that leads to joints destruction and complications in the internal organs and significantly affects the a patient's functional, physical, psychological and social condition. Over the last few years, research into the quality of life (QoL) in people with chronic disease has been conducted to assess the results of treatment.

Aim. The aim of the study was to assess QoL in various areas of life in regards to physical and mental functioning, social relations, and environmental influences in people with RA.

Material and methods. The study group (subjects with RA) and the control group (subjects without RA) consisted of 48 people each. Subject age ranged from 19 to 68. In order to assess QoL, the WHOQOL-BREF questionnaire was used, while socio-demographic data were assessed with a questionnaire developed by the authors.

Results. QoL in people with RA was lower than that of healthy individuals. The worst QoL was observed in the physical domain. No statistically significant association was found between BMI and QoL. It was found, however, that subjects with RA and a higher level of physical activity had a better QoL than those with a lower level of physical activity.

Conclusion. There was no association between the body mass of RA patients and QoL assessment. However, an association was found between the level of physical activity in people with RA and QoL in the physical and environmental domain.

Keywords. body mass index, quality of life, physical activity, rheumatoid arthritis

Introduction

Rheumatologic diseases include over 300 distinct disease entities. A significant number of patients have a chronic inflammatory process spreading in the connective tissue which is triggered by autoimmune reactions.¹ One of the most common and aggressive connective

tissue diseases resulting in deterioration of health and quality of life (QoL) is rheumatoid arthritis (RA). Progressive inflammation of the synovial membrane causes damage to articular and periarticular tissues.²

Rheumatoid arthritis is a chronic inflammatory polyarthritis affecting 1% of the general population. In Poland,

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about 400,000 people suffer from RA. Every year between 8,000 and 16,000 new cases are diagnosed. The disease occurs 3-4 times more often in women than men. The peak incidence of this disease is in the fourth and fifth decade of life, although younger and younger people are suffering from this condition. RA is a disease that shortens life of an average of 3 years for women and 7 for men.³

Despite the progressive character, the course of RA can be varied. In 70% of people with RA there are periods of relative remission and exacerbation. However, in 15% of patients, the disease-related process has mild activity with the destruction of a few joints. Only 10% of patients suffer long-term remissions, that may take even

several years. RA develops rapidly - within a few weeks, and in 15% of patients even within a few days. This condition can lead to significant damage to the joints and, consequently, to disability within 2 years from its onset.⁴ It is estimated that every fourth person with RA requires surgical treatment due to the destruction of i.e. a large joint, e.g. a hip or knee joint. Half of the patients become unable to work after five years of illness, and within 10 years this number increases to 100%.⁵

RA has a significant impact on human life. Patients are often dissatisfied with their health and assess their functioning as worsening. The disease is largely associated with suffering due to limitations in performing

Table 1. General characteristics of the studied groups

	Variable	Group		p
		Study	Control	
Education	Primary	n	2	0.36
		%	4.2	
	Professional	n	6	
		%	12.5	
	Secondary	n	15	
		%	31.3	
	Higher	n	25	
		%	52.1	
Marital status	Unmarried	n	12	0.76
		%	25.0	
	Married	n	31	
		%	64.6	
	Divorced	n	4	
		%	8.3	
	Widower	n	1	
		%	2.1	
Financial situation	Very good	n	1	p<0.001. V Kramera=0.50. Chi-kwadrat=24.28 (df=3)
		%	2.1	
	Good	n	25	
		%	52.1	
	Sufficient	n	21	
		%	43.8	
	Poor	n	1	
		%	2.1	
Body mass index	Underweight	n	4	0.47
		%	8.3	
	Healthy	n	25	
		%	52.1	
	Overweight	n	11	
		%	22.9	
	Obesity	n	8	
		%	16.7	
Level of physical activity	High	n	5	p=0.005. V Kramera=0.33. Chi-kwadrat=10.65 (df=2)
		%	10.4	
	Moderate	n	21	
		%	43.8	
	Low	n	22	
		%	45.8	

social roles and pain. As a consequence, it leads to a decrease in social and occupational activity, deterioration of the economic situation, thus lowering QoL.⁶ Therefore, the study of QoL in people with RA is an important indicator of the effectiveness of treatment and rehabilitation.^{7,8}

The aim of the study was to assess the association between body mass, the level of physical activity and QoL in different life domains in people with RA.

Material and methods

Participants

The study group consisted of adults diagnosed with RA whereas the control group were healthy participants. Written consent for participation was obtained from participants prior to the study. All subjects were informed about the possibility of leaving the study at any stage.

Inclusion criteria were as follows: age over 18, diagnosis of rheumatoid arthritis, and the patient's consent

Table 2. Assessment of quality of life in the studied groups

Group	Variable	Domains of quality of life (WHOQOL-BREF)			
		Physical	Psychological	Social relationships	Environment
Study	Mean	42.3	58.0	66.1	57.6
	Median	44.0	56.0	69.0	59.5
	n	48	48	48	48
	SD	13.1	12.7	17.1	13.3
	Minimum	13.0	19.0	19.0	19.0
	Maximum	69.0	81.0	100.0	88.0
Control	Mean	85.5	79.9	82.2	82.2
	Median	88.0	81.0	81.0	81.0
	n	48	48	48	48
	SD	10.0	13.9	12.6	8.2
	Minimum	63.0	44.0	56.0	69.0
	Maximum	100.0	100.0	100.0	100.0
	Maximum	100.0	100.0	100.0	100.0
	U Manna-Whitneya	8.500	302.500	528.500	100.000
	p	.000	.000	.000	.000

Table 3. The association between BMI classification and quality of life

Body mass index	Variable	Study group				Control group			
		Domains of quality of life (WHOQOL-BREF)							
		Physical	Psychological	Social relationships	Environment	Physical	Psychological	Social relationships	Environment
Underweight	Mean	52.0	56.5	68.8	62.5	84.5	72.0	81.5	91.0
	Median	53.5	59.5	72.0	59.5	84.5	72.0	81.5	91.0
	n	4	4	4	4	2	2	2	2
	SD	12.9	13.4	9.0	9.0	4.9	12.7	17.7	4.2
Healthy	Mean	41.4	61.6	67.3	56.4	88.6	86.1	86.2	81.3
	Median	38.0	63.0	69.0	63.0	88.0	88.0	94.0	81.0
	n	25	25	25	25	28	28	28	28
	SD	14.5	13.3	19.9	14.6	8.9	10.4	11.9	7.3
Overweight	Mean	39.9	54.5	61.4	57.0	82.9	74.6	77.2	84.6
	Median	38.0	56.0	56.0	56.0	88.0	81.0	75.0	88.0
	n	11	11	11	11	14	14	14	14
	SD	10.5	6.3	14.1	8.7	10.5	14.2	12.7	10.1
Obesity	Mean	43.8	52.4	67.9	59.6	73.5	59.5	72.0	76.5
	Median	47.0	56.0	65.5	59.5	75.0	59.5	72.0	75.0
	n	8	8	8	8	4	4	4	4
	SD	11.5	16.0	15.6	17.4	7.5	8.3	3.5	3.0
	p Kruskal Wallis test	.440	.230	.776	.827	.018	.000	.049	.126

Table 4. The impact of physical activity assessment on quality of life

Level of physical activity	Variable	Study group				Control group			
		Domains of quality of life (WHOQOL-BREF)							
		Physical	Psychological	Social relationships	Environment	Physical	Psychological	Social relationships	Environment
High	Mean	45.0	57.6	66.2	71.6	89.8	87.2	86.3	85.1
	Median	50.0	56.0	56.0	69.0	88.0	88.0	94.0	88.0
	n	5	5	5	5	15	15	15	15
	SD	10.2	9.3	20.6	10.4	8.4	10.2	11.6	5.4
Moderate	Mean	47.8	61.0	63.7	57.9	85.7	81.1	83.4	83.0
	Median	44.0	56.0	69.0	56.0	88.0	81.0	81.0	81.0
	n	21	21	21	21	24	24	24	24
	SD	12.2	12.3	17.3	11.6	9.9	11.1	12.0	9.7
Low	Mean	36.5	55.2	68.5	54.2	77.9	64.7	72.2	75.7
	Median	38.0	56.0	72.0	56.0	75.0	63.0	75.0	75.0
	n	22	22	22	22	9	9	9	9
	SD	12.5	13.7	16.6	13.8	9.4	15.7	11.8	3.6
p Kruskal Wallis test		.013	.329	.666	.027	.015	.000	.021	.017

to participate in the study. Exclusion criteria were following: significant random events within 2 months before examination (such as the death of a family member, divorce etc.), diagnosis of other diseases.

In total, the surveyed population amounted to 96 people. The study group was comprised of 48 people. A control group was also selected in order to maintain the same age and sex structure in relation to the study group (age and sex-adjustment). Most of the respondents (85.4%) lived in the city.

Outcome measurements

We used the WHOQOL-BREF questionnaire (Polish version) to evaluate QoL in our study subjects. The questionnaire allowed us to assess QoL in four domains: physical health, psychological well-being, social relationships, and environmental. The questionnaire consists of 26 questions about the functioning of a person during the last 2 weeks before the test. Questions are scored on a scale from 1 to 5 (1 - not satisfied at all; 2 - somewhat satisfied; 3 - moderately satisfied; 4 - very satisfied; 5 - extremely satisfied). Answer scores are calculated according to the WHOQOL-BREF algorithm in the range of 0-100 points. Higher score corresponds to higher QoL.⁹

Anthropometric measures

For each participant, height and weight were measured. The height was measured to the nearest 0.1 cm. Body height was measured in standard conditions, with subjects assuming upright and straight body posture and wearing no shoes.

The body mass was determined to the nearest 0.1 kg with the subject dressed in underwear and without

shoes. Body mass index (BMI) was calculated by dividing the average body mass (kg) of each individual by his or her average squared height (m²).

The socio-demographic data and the level of physical activity were obtained using the author's questionnaire.

Data analysis

Data were analysed with IBM SPSS STATISTICS 20, a data analysis program. Descriptive statistics was used in the analysis: mean, median, standard deviation (SD), minimum, maximum. V Kramera, Chi-kwadrat test, Mann-WhitneyU test (for binary variables) and Kruskal-Wallis test (for variables above two categories) were used to examine differences between independent quantitative variables.

Results

Table 1 presents the general characteristics of the groups. Statistically significant differences in the material situation and the level of physical activity was found between the subjects from the study and control groups. People from the study group more often showed a lower physical activity level than those in the control group.

The subjects were classified in terms of Body Mass Index (BMI). There was no statistically significant difference in the BMI classification between the subjects from both groups.

Table 2 presents the results of QoL assessment in the studied groups. The subjects from the study group were characterized by a lower QoL level in every analyzed domain (physical, psychological, social relations and environment).

Table 3 presents the association between the BMI classification and QoL level in the analyzed groups. We

found that the subjects from the control group with obesity assessed their QoL worse in every of four analyzed domains. No association between body mass and QoL was observed in RA patients.

Table 4 presents the association between the level of physical activity and QoL. We observed that the people with RA characterized by a high level of physical activity had better QoL in the physical and environmental domain, compared to the people with low levels of physical activity. In the case of healthy people with a high level of physical activity, QoL was significantly better in every of four analyzed domains.

Discussion

Rheumatoid arthritis is a common chronic autoimmune disorder characterized by inflammation and damage of the articular cartilage, joints and tendons. The progressive nature of RA results in deformity of the small joints of the hands and feet, the joints of wrists and shoulders. RA cause debilitating pain, swelling and stiffness of the affected joints, also can cause extra-articular manifestations (such as anemia, interstitial inflammation of the lungs and glands, and nodules in the lungs, skin and eyes) that reduce survival.¹⁰ Thus, it is important to assess QoL of RA patient in clinical practice. The World Health Organization Quality of Life brief form (WHOQOL-BREF) is one of the best-known instruments developed for cross cultural comparisons of QOL, and it is available in more than 40 languages. It is a shortened version of the WHOQOL-100 that looks at four QoL domains, using all available data from the field trial version of the WHOQOL-100.¹¹

RA is associated with significant morbidity and functional impairment. The results of recent studies have shown that people with RA are dissatisfied with their QoL. The assessment of QoL in people with RA is influenced by both clinical factors (duration of the disease, the number of joints affected), as well as socio-demographic factors, such as gender, age, place of residence and social support. Study results have shown that patients experience a substantial burden on physical functioning and emotional well-being.¹² In addition, RA results in an economic burden to patients, their families, the healthcare system and society at large. It has been reported that the costs associated with rheumatic diseases were even greater than those for either cancer or cardiovascular disease.¹³

In this study, we demonstrated that (1) physical activity level of RA patients as significantly lower than that of the general population, (2) QoL for subjects with RA is significantly worse in every domain than in the general population, (3) there is a significant association between the physical activity level and QoL in physical and environmental domain, (4) there is no association between the BMI and QoL in RA patients. The general

analysis of individual domains of QoL showed that social domain was rated the best, and the worst was the physical domain. Similar results obtained Sierakowska et.al¹⁴ and Moćko and Zurzycka.²

In this study, there were no statistically significant relationships between BMI and QoL in the physical, social, psychological or environmental aspect. However, Jankowska et al. demonstrated that people with obesity had a worse QoL.¹⁵ The authors showed a significant relationship between BMI and QoL. The above results may indicate that obesity in people with RA affects the level of self-esteem and significantly impacts satisfaction that they feel. In obese people, an increased level of stress, lowered mood and depression are often noticeable, which in turn lead to social isolation and deterioration of QoL in the emotional and social sphere. Similarly, the results of the García-Poma et al. indicated that obese patients had lower QoL in three areas (social, psychological and environmental) than overweight patients and patients with normal weight. The association between obesity and impaired QoL was confirmed with a linear regression model and remained significant after adjustment for age, sex, disease activity, extra-articular disease, comorbidities, X-ray erosions, presence of rheumatoid factor, depression, education, and disease duration.¹⁶ On the other hand, Fukuda et al. showed that the QoL of subjects RA was significantly lower in the low BMI group than that in the moderate BMI group, which exhibited the highest score among the three groups. This means that malnutrition is associated with the deterioration of QoL in RA patients.¹⁷

Research has shown that people who have RA do not usually participate in enough physical activity to obtain the benefits of optimal physical activity levels.¹⁸ Most RA patients suffer from muscle loss which contributes to decreased physical function and QoL. The results of our research also indicate a lower level of physical activity in RA patients than in people from the general population. In addition, we have demonstrated that patients with a higher level of physical activity have a better QoL in two domains (physical and environmental). The results of other authors are similar.¹⁹⁻²¹ Lower level of physical activity was found to be associated with progressive motor problems, which in turn leads to a worse QoL assessment. Similar results obtained also Bączyk, who found that a worse QoL results from the limited opportunities to perform basic life activities that was associated with joint pain, limitations in joint mobility.²² Promoting physical activity behavior in the RA population is important, particularly in relation to QoL, mortality and function.¹⁸ The monitoring of physical activity in RA patients might facilitate a more objective evaluation of variations in disease activity, helping physicians to make general and therapeutic recommendations that will improve both the health status and the joint functionality of these patients.

Limitation

This study is not without limitations. The assessment of the level of physical activity using the self-assessment method can be considered as a study limitation. Moreover, our findings are only representative of a specific group of patients and may vary in other geographic areas with different cultures. There may have been selection bias because patients were selected from one health care institution.

Conclusion

There was no association between the body mass of RA patients and QoL assessment. However, association was found between the level of physical activity in people with RA and QoL in the physical and environmental domain.

References

1. Rychlewska-Hańczewska A, Puszczewicz M, Kołczewska A. Coincidence of rheumatoid arthritis and ankylosing spondylitis with ulcerative colitis – case study. *Reumatologia*. 2008;46:32–36.
2. Močko J, Zurzycka P. Quality of life of the patients with rheumatoid arthritis – preliminary result. *Pielęg XXI*. 2013;42:15–19.
3. Pytel A, Wrzosek Z, Demczyszak I, Brzyski J. The usefulness of the latest diagnostic and therapeutic criteria ACR/EULAR in the treatment of rheumatoid arthritis. *Wiad Lek*. 2012;65:225–231.
4. Baran M, Majorczyk M, Jaworek J. Diabetes and obesity in patients with rheumatoid arthritis (RA) as a factor of disease deterioration. *Pielęg Pol*. 2016;60:227–230.
5. Jura-Półtorak A, Olczyk K. Diagnostics and assessment of rheumatoid arthritis activity. *Diagn Lab*. 2011;47:431–438.
6. Ostrzyżek A. Quality of life in chronic diseases. *Probl Hig Epidemiol*. 2008;89:467–470.
7. Jankowska-Polańska B, Polański J. Methods of evaluation of the quality of life in rheumatic diseases. *Reumatologia*. 2014;52:69–76.
8. Bączyk G. The review of investigations of quality of life of patients with rheumatoid arthritis. *Reumatologia*. 2008;46:372–379.
9. Jaracz K. *Jakość życia w naukach medycznych [Quality of life in medical sciences]*. Wołowicka L, ed. Poznań:AM; 2002.
10. Russell A. Quality-of-Life Assessment in Rheumatoid Arthritis. *Pharmacoeconomics*. 2008;26:831–846.
11. The WHOQoL Group. Development of the World Health Organization WHOQOL-BREF quality of life assessment. *Psychol Med*. 1998;28:551–558.
12. Kosinski M, Kujawski SC, Martin R, et al. Health-related quality of life in early rheumatoid arthritis: impact of disease and treatment response. *Am J Manag Care*. 2002;8:231–240.
13. Fautrel B, Guillemin F. Cost of illness studies in rheumatic diseases. *Curr Opin Rheumatol*. 2002;14(2):121–126.
14. Sierakowska M, Matys A, Kosior A, et al. Evaluation of quality of life of patients with rheumatoid arthritis. *Reumatologia*. 2006;44:289–303.
15. Jankowska B, Uchmanowicz I, Polański J, Uchmanowicz B, Dudek K. Clinical and sociodemographic factors determining quality of life in rheumatoid arthritis (RA). *Fam Med Prim Care Rev*. 2010;12:1027–1034.
16. García-Poma A, Segami MI, Mora CS, et al. Obesity is independently associated with impaired quality of life in patients with rheumatoid arthritis. *Clin Rheumatol*. 2007;26:1831–1835.
17. Fukuda W, Omoto A, Ohta T, et al. Low body mass index is associated with impaired quality of life in patients with rheumatoid arthritis. *Int J Rheum Dis*. 2013;16:297–302.
18. Larkin L, Gallagher S, Cramp F, Brand C, Fraser A, Kennedy N. Behaviour change interventions to promote physical activity in rheumatoid arthritis: a systematic review. *Rheumatol Int*. 2015;35:1631–1640. doi: 10.1007/s00296-015-3292-3.
19. Kowalczyk K, Głuszko P. Assessment of the quality of life of patients with rheumatoid arthritis by means of questionnaire research. *Reumatologia*. 2009;47:4–9.
20. Wysocka-Skurska I, Sierakowska M, Sierakowski S. Evaluation of the quality of life of patients with rheumatoid arthritis depending on the used therapy. *Reumatologia*. 2012;50:16–23.
21. Sokka T, Kautiainen H, Pincuset T, al. Work disability remains a major problem in rheumatoid arthritis in the 2000s: data from 32 countries in the QUEST-RA Study. *Arthritis Res Ther*. 2010;12:22. doi: <https://doi.org/10.1186/ar2951>.
22. Bączyk G. The evaluation of the functioning and of the quality of life of patients with Rheumatoid Arthritis. *Ann Acad Med Bialost*. 2005;50:170–173.