

## The quality of life of patients with damage to knee joint cartilage

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### Summary

**Introduction.** For many years, osteoarthritis (OA) had been considered a natural consequence of aging. According to statistics, it should be assumed that several million people affected by osteoarthritis live in Poland. The aim of the paper was to study the quality of life and the acceptance of the disease in patients with damage to knee joint cartilage.

**Material and methods.** The study was conducted from January to December 2017 in the group of 100 people who were treated in the Clinical Department of Orthopedic and Traumatology of Locomotor System of Wrocław Medical University. The research was conducted anonymously using the standard questionnaires WHOQoL-BREF. The inclusion criterium was a diagnosed injury to knee joint.

**Results.** The mean evaluation of the quality of life carried out by the patients is 3.56 point (SD=0.9), which means that they assess their quality of life between good and average (not good, nor bad). The mean evaluation of the health status carried out by the patients equals 2.8 point (SD=1.1), which means that they assess their health status between unsatisfying and average (not satisfying, nor unsatisfying).

**Conclusions.** The decreased perception of the quality of life in psychological and social domains was observed in relation to patients' decision to undergo surgical treatment. These correlations are negative which means that the higher the pain intensity, the lower the quality of live in the above domains.

**Key words:** chondromalacia, cartilage, the quality of life.

## **Introduction.**

For many years, osteoarthritis (OA) had been considered a natural consequence of aging. Current knowledge allows to conclude that this disease is caused by numerous genetic, biochemical, inflammatory and mechanical factors. Only in 1907 was osteoarthritis described as a separate disease entity [1]. According to its definition, OA is a process consisting of multiple factors leading to disorders of formation as well as degradation of cartilage with its subchondral layer, which eventually affects every tissue of the joint. The basic symptom of OA is pain located in a joint, often accompanied by motility disorders, crackling in the joint as well as the inflammatory lesions of various intensity. Osteoarthritis is the most common disease affecting the locomotor system and most often occurs between the age of 40 and 60. The prevalence in women and men is similar, however, it is of greater severity in the former [1].

According to statistics, it should be assumed that several million people affected by osteoarthritis live in Poland. The increase in the prevalence is caused by various factors. Moreover, it should be stressed that OA is a civilization disease. Currently, in times of dynamic industrial development, automotive, competitive as well as recreational sport and constantly increasing pace of life, a third of all injuries to locomotive system concerns knee joints. Such situation frequently leads to degenerative changes. Many academic centers have been conducting large-scale research that allows to better understand the structure and biomechanics of a joint cartilage. Rapid development of arthroscopy and other diagnostic methods has enabled significant progress in diagnosing various injuries to joint cartilage.

According to many authors, formation of degenerative changes is connected with the overload of one of the joint compartments, which is caused by the incorrect axis of the lower extremity. Osteoarthritis is a disorder of biomechanics in the joint which is not only caused by the disorders of axis but also instabilities and abnormalities in the biochemical processes of joint cartilage, synovial membrane and synovial fluid. Gradually occurring changes in the affected joint form a causal chain that leads to the creation of vicious circle that requires multidirectional and complex treatment to break it.

The social aspect of the disease leads to the patients consulting doctors of many specialties, whose diagnostic process and treatment are not always correct, and the outcomes are unsatisfying. The treatment is most often symptomatic and leads only to short-term remission of the symptoms. In such a case, steroid anti-inflammatory drugs are injected into joints and bring quick results, however, their long-term use leads to extensive scarring and adhesions of synovial membrane as well as the intensification of the cartilage lesions.

The aim of the paper was to study the quality of life in patients with damage to knee joint cartilage.

## **Material and methods**

The research was conducted from January to December 2017 in the group of 100 people who at that time were treated in the Clinical Department of Orthopedic and Traumatology of Locomotor System of Wrocław Medical University located at 213 Borowska Street. A standardized questionnaire WHOQOL-BREF was used to evaluate, for information and clinical purposes, the subjective quality of life of healthy people and patients suffering from OA. The questionnaire allows to create the profile of QOL in four basic domains: physical, psychological, social and environmental. The score for each of the domains is calculated based on the arithmetic mean of all components comprising the particular domain. The questionnaire consists of 26 questions. The scoring of each domain reflects the individual perception of life in a given area and its positive directions means that the higher score, the better QOL is. There are two additional questions, that request a separate analysis, which concern individual general QOL perception and individual health perception [76]. The definition of QOL created by WHO in 1991 is the theoretical base of the questionnaire. According to that definition, QOL is "individuals perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns; it is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment" [76]. Stressing the multidimensionality and subjectivity of QOL, the definition focuses on universal aspects, excluding specific symptoms of the disease as well as side effects of the treatment [77].

Normal distribution of variables was studied using the Shapiro-Wilk test. Statistical inference was carried out at standardized statistical significance  $\alpha=0.05$ . The following rules were adopted:

- $p < 0.05$  indicates statistically significant correlation;
- $p < 0.01$  indicates highly significant correlation;
- $p < 0.001$  indicates high statistically significant correlation;

The analysis was performed using R software, version 3.4.3.

## Results

Out of 100 participants, there were 74 women (74.0%) and 26 men (26.0%). In terms of age, the largest group (54 participants - 54.0%) comprised people aged 20-29. The second age group consisted of 27 people aged 30-39 (27%), followed by the group of responders aged 40-49, which comprised of 11 people (11%). The eldest group was represented by 8 participants (8.0%).

85 people lived in a city (85.0%), whereas the remaining part, 15 people, lived in a rural area (15.0%).

In terms of concomitant diseases, the majority of respondents, which was 82 people (82%), answered that they do not suffer from any additional disease. 3 people suffer from Lyme disease (3.0%) and 2 from diabetes and arthritis each (2.0%). 11 respondents chose hypertension as the coexistent disease (11.0%).

The most frequent test confirming the injury to knee joint was MRI and was performed in 75 patients (75.0%), followed by X-ray (13 patients - 13.0%) and ultrasonography (12 patients - 12.0%).

Among the responders, sportspeople were the largest group (56 people - 56.0%). 41 people chose other occupations (41.0%) and 3 people were students (3.0%).

56 responders practiced competitive sports (56%) whereas the remaining 44 - recreational physical activity (44%).

55 people of the study group had previously suffered from a knee injury (55%) and the remaining group of 45 responders had no history of such an injury (45%).

Among the study group, stage I of the injury to knee joint cartilage was the most frequent, affecting 36 patients (36%). Stage II was diagnosed in 33 responders (33%) and stage III in 22 people (22%). 9 responders were diagnosed with stage IV of the disease (9.0%).

The above correlations have been presented in Table 1.

**Table 1. Socio-clinical characteristics of the patients**

Variable		N	%	p *
Sex	Women	74	74.0%	0.253
	Men	26	26.0%	
Age	20-29	54	54.0%	0.072
	30-39	27	27.0%	
	40-49	11	11.0%	
	50 and more	8	8.0%	
Residence	City	85	85%	0.342
	Country	15	15%	
Concomitant diseases	Diabetes	2	2.0%	0.798
	Hypertension	11	11.0%	
	Lyme disease	3	3.0%	
	Rheumatism	2	2.0%	
	None	82	82.0%	
Imaging tests confirming the diagnosis	MRI	75	75.0%	0.55
	X-ray	13	13.0%	
	Ultrasonography	12	12.0%	
Occupation	Sportsperson	56	56.0%	0.104
	Student	3	3%	
	Other	41	41%	
Physical activity	Competitive	56	56%	0.16
	Recreational	44	44%	
Previous knee injuries	Yes	55	55.0%	0.927
	No	45	45%	
Stage of the disease	I	36	36.0%	0.092
	II	33	33.0%	
	III	22	22.0%	
	IV	9	9.0%	

Due to non-normal distribution of the results in the analyzed groups ( $p < 0.05$  obtained from the Shapiro-Wilk test), the analysis was performed using the Mann-Whitney test. In the case of QOL domain, the median value for women and men equaled 4 and 3, respectively. Standard deviation for that parameter was 0.88 for women and 0.93 for men. In terms of health status perception, the man value for both women and men equaled 3. Differences in the values of standard deviation were noted as the parameter was higher in the group of men and had the value of 1.21 while in the group of women the parameter had the value of 1.06. In the physical domain, the median was equal for both groups and equaled 13, contrary to the standard deviation which had the value of 1.96 in women and 2.18 in men. In the psychological domain, the median equaled 14 for women and 13 for men whereas the standard deviation had the value of 2.51 for women and 2.83 in men. In the social domain, the median had the value of 15 for females and 14 for males while the standard deviation equaled 3.8 and 3.44 for women and men, respectively. In the environmental domain, the median equaled 13 for women and 12 for men, with the standard deviation at the level of 2.33 and 2.67 respectively. Since each value of  $p$  is higher than 0.05, no statistically significant relationship between the quality of life and sex was noted. The results were presented in the Table 2.

**Table 2. The scale of QOL in relation to sex [own elaboration].**

WHOQoL BREF	Sex	N	Mean	SD	Median	Min	Max	Q1	Q3	p*
The quality of life perception	Woman	74	3.65	0.88	4	1	5	3	4	0.081
	Man	26	3.31	0.93	3	1	5	3	4	
Health status perception	Woman	74	2.88	1.06	3	1	5	2	4	0.188
	Man	26	2.58	1.21	3	1	5	2	3	
Physical domain	Woman	74	12.51	1.96	13	6	18	11	14	0.581
	Man	26	12.77	2.18	13	9	18	11	14	
Psychological Domain	Woman	74	13.74	2.51	14	4	20	12	15	0.11
	Man	26	13	2.83	13	8	20	11	14.75	
Social Domain	Woman	74	14.7	3.8	15	4	20	12	17	0.534
	Man	26	14.54	3.44	14	9	20	12	17	
Environmental domain	Woman	74	13.18	2.35	13	4	20	12	14	0.287
	Man	26	12.88	2.67	12	10	20	11	14	

\* Mann-Whitney test

**Quality of life (WHOQoL BREF)**

**Perception of the quality of life and health status**

The mean evaluation of the quality of life carried out by the patients is 3.56 point (SD=0.9), which means that they assess their quality of life between good and average (not good, nor bad). The mean evaluation of the health status carried out by the patients equals 2.8 point (SD=1.1), which means that they assess their health status between unsatisfying and average (not satisfying, nor unsatisfying). The above correlations were presented in Table 3.

**Table 3. Score distribution of the quality of life perception [own elaboration].**

WHOQoL BREF	N	Mean	SD	Median	Min	Max	Q1	Q3
The quality of life perception	100	3.56	0.9	4	1	5	3	4
Health status perception	100	2.8	1.1	3	1	5	2	4

**Domains of the quality of life**

The responders evaluated the quality of life in the social domain as the highest, with the median equal 15. The quality of life in the psychological domain was assessed slightly lower as the median had the value of 14. The median of the physical domain equaled 13. The quality of life in the environmental domain had the lowest score as the median had the value of 12. The above correlations were presented in Table 4.

**Table 4. Score distribution of the domains of the quality of life [own elaboration].**

<b>WHOQoL BREF</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Median</b>	<b>Min</b>	<b>Max</b>	<b>Q1</b>	<b>Q3</b>
<b>Physical domain</b>	100	12.58	2.01	13	6	18	11	14
<b>Psychological domain</b>	100	13.55	2.6	14	4	20	12	15
<b>Social domain</b>	100	14.66	3.69	15	4	20	12	17
<b>Environmental domain</b>	100	13.1	2.43	12	4	20	12	14

Due to non-normal distribution of the results in the analyzed groups ( $p < 0.05$  obtained from the Shapiro-Wilk test), the analysis was performed using the Kruskal-Wallis test. In terms of the domain of the QOL perception, the median for the following age groups of 20-29, 30-39 and 40-49 equaled 4 while, for the group aged 50 and above, the indicator had the value of 3. The standard deviation in that category equaled 0.83 for the age group of 20-29, 1 for people aged 30-39, 0.94 for the patients aged 40-49 and 0.89 for the eldest group. In terms of health status perception, the median was the same for all age groups and equaled 3. Differences in the value of standard deviation were noted, with the parameter at the level of 1.15 in the youngest group, 1.19 in the group aged 30-39, 0.87 among the patients aged 40-49, and 0.71 in the eldest group aged 50 and above. In the physical domain, the median was equal for the first three age groups and equaled 13 whereas in the eldest group, the indicator had the value of 11. Differences in the value of standard deviation were noted, with the parameter at the level of 2.06 in the youngest group, 2.01 in the group aged 30-39, 1.89 among the patients aged 40-49, and 1.98 in the eldest group aged 50 and above. In the psychological domain, the median for the first three age groups equaled 14, with the value for the eldest group at the level of 13. The standard deviation had the following values for each group: 2.77 in the youngest group, 2.78 in the group aged 30-39, 1.64 among the patients aged 40-49, and 1.77 in the eldest group aged 50 and above. The mean value in the social domain was equal for the first three groups whereas in the eldest one it was again lower and had the value of 13. The standard deviation had the following values for each group: 3.62 in the youngest group, 3.41 in the group aged 30-39, 5.12 among the patients aged 40-49, and 2.93 in the eldest group aged 50 and above. In the environmental domain, the mean in the age group of 20-29 equaled 12.5 and standard deviation had the value of 2.44. In the age group of 30-39, the above parameters had the value of 12 and 2.77, respectively. The median and standard deviation for the patients aged 40-49 equaled 14 and 1.86. The above parameters in the eldest group had the values of 12 and 1.81, respectively. Each value of  $p$  is above 0.05, hence, the quality of life in each domain did not depend on age. The above correlations were presented in Table 5.

**Table 5. Score distribution of the influence of age on the acceptance of the disease [own elaboration].**

WHOQoL BREF	Age	N	Mean	SD	Median	Min	Max.	Q1	Q3	p *
<b>Perception The quality of life</b>	20- 29	54	3.65	0.83	4	1	5	3	4	0.164
	30-39	27	3.33	1	4	1	5	3	4	
	40-49	11	3.91	0.94	4	2	5	3.5	4.5	
	50 and more	8	3.25	0.89	3	2	5	3	3.25	
<b>Health status perception</b>	20- 29	54	2.74	1.15	3	1	5	2	4	0.762
	30-39	27	2.78	1.19	3	1	5	2	4	
	40-49	11	3.18	0.87	3	2	5	3	3.5	
	50 and more	8	2.75	0.71	3	2	4	2	3	
<b>Physical domain</b>	20- 29	54	12.57	2.06	13	6	18	11	14	0.769
	30-39	27	12.74	2.01	13	10	18	11	14	
	40-49	11	12.82	1.89	13	10	17	11.5	13.5	
	50 and more	8	11.75	1.98	11	9	14	10.7 5	14	
<b>Psychological Domain</b>	20- 29	54	13.43	2.77	14	4	20	12	15	0.427
	30-39	27	13.89	2.78	14	8	20	12	16	
	40-49	11	14.09	1.64	14	12	17	13	15	
	50 and more	8	12.5	1.77	13	9	14	11.7 5	14	
<b>Social domain</b>	20- 29	54	14.54	3.62	15	4	20	12	16.75	0.646
	30-39	27	15.44	3.41	15	9	20	12	19	
	40-49	11	13.82	5.12	15	5	19	11.5	18	
	50 and more	8	14	2.93	13	11	20	12	15.25	
<b>Environmental domain</b>	20- 29	54	13.06	2.44	12.5	4	20	12	14	0.395
	30-39	27	13.26	2.77	12	10	20	11	15	
	40-49	11	13.64	1.86	14	11	17	12	14.5	
	50 and more	8	12.12	1.81	12	10	16	11	12.25	

\* Kruskal-Wallis test

Due to non-normal distribution of the results in the analyzed groups ( $p < 0.05$  obtained from the Shapiro-Wilk test), the analysis was performed using the Mann-Whitney test. In the case of QOL domain, the median value for women and men equaled 4. The standard deviation had the value of 0.97 for the people with concomitant diseases and 0.89 for the group of people with no additional conditions. In terms of health status perception, the median was the same for both groups and equaled 3. Differences in the value of standard deviation were noted, with the value of 0.8 for the patients suffering from additional diseases, and 1.15 for the group with no coexistent conditions. In the physical domain, the median was equal for both groups and equaled 13. Standard deviation differed in both groups, with the value of 1.98 for the patients suffering from concomitant diseases and 1.98 for the respondents with no additional conditions. In the psychological domain, the median for the responders suffering from additional diseases equaled 13.5, and 14 for the patients with no coexistent conditions. Standard deviation for both groups equaled 1.89 and 2.74, respectively. In the social domain, the median had the value of 15 for both groups. Differences were noted in the standard deviation which equaled 4.29 in the first group and 3.56 in the second group. In the environmental domain, the mean and the standard deviation in the group of patients suffering from coexistent diseases equaled 12.5 and 1.94, respectively. In the group of people with no additional conditions, the parameters had the values of 12 and 2.53, respectively. Each value of  $p$  is above 0.05, hence, the quality of life in each domain did not depend on the existence of concomitant diseases. The above correlations were presented in Table 6.

**Table 6. Score distribution of the influence of concomitant diseases on the quality of life [own elaboration].**

WHOQoL BREF	Concomitant diseases	N	Mean	SD	Median	Min	Max.	Q1	Q3	p *
Health The quality of life	Yes	18	3.67	0.97	4	2	5	3	4	0.69
	No	82	3.54	0.89	4	1	5	3	4	
Health status perception	Yes	18	3.06	0.8	3	2	5	3	3	0.384
	No	82	2.74	1.15	3	1	5	2	4	
Physical domain	Yes	18	12.44	1.98	13	9	17	11	14	0.77
	No	82	12.61	2.03	13	6	18	11	14	
Psychological Domain	Yes	18	13.44	1.89	13.5	9	17	12.25	14.75	0.684
	No	82	13.57	2.74	14	4	20	12	15	
Social domain	Yes	18	14.06	4.29	15	5	20	12	16.75	0.625
	No	82	14.79	3.56	15	4	20	12	17	
Environmental domain	Yes	18	13.11	1.94	12.5	10	17	12	14	0.923
	No	82	13.1	2.53	12	4	20	12	14	

\* Mann-Whitney test

Due to non-normal distribution of the results in the analyzed groups ( $p < 0.05$  obtained from the Shapiro-Wilk test), the analysis was performed using the Mann-Whitney test. In the case of QOL domain, the median value for both groups equaled 4. Differences were noted in terms of the standard deviation which equaled 0.87 for the group of sportspeople and 0.95 for other occupations. In terms of health status perception, the median was the same for both groups and equaled 3. The values of standard deviation differed for both groups and equaled 1.12 for sportspeople and 1.03 for other occupations. In the physical domain, the median was equal for both groups and equaled 13. Standard deviation differed in both groups, with the value of 1.92 for the group of sportspeople and 1.98 for other occupations. In the social domain, the median had the value of 14 for both groups. Similarly to previous domains, differences were noted in the values of standard deviation which equaled 2.36 for the group of sportspeople and 2.56 for other occupations. In the social domain, the median had the value of 15 for both groups. Standard deviation for the group of sportspeople had the value of 2.46, and 3.75 for other occupations. In the environmental domain, the mean and the standard deviation in the group of sportspeople equaled 13 and 2.11, respectively. In the group of other occupations, the above domains had the values of 12 and 2.46, respectively. Each value of p is above 0.05, hence, the quality of life in each domain did not depend on occupation. The above correlations were presented in Table 7.



**Table 7. Score distribution of the influence of occupation on the quality of life [own elaboration].**

WHOQoL BREF	Occupation	N	Mean	SD	Median	Min	Max	Q1	Q3	p *
<b>Health The quality of life</b>	Sportsperson	56	3.57	0.87	4	1	5	3	4	0.639
	Other	41	3.51	0.95	4	1	5	3	4	
<b>Health status perception</b>	Sportsperson	56	2.79	1.12	3	1	5	2	4	0.793
	Other	41	2.88	1.03	3	1	5	2	4	
<b>Physical domain</b>	Sportsperson	56	12.66	1.92	13	9	18	11	14	0.899
	Other	41	12.66	1.91	13	9	18	11	14	
<b>Psychological Domain</b>	Sportsperson	56	13.73	2.36	14	8	20	12	15	0.704
	Other	41	13.56	2.56	14	8	20	12	15	
<b>Social domain</b>	Sportsperson	56	14.91	3.46	15	8	20	12	17.5	0.768
	Other	41	14.66	3.75	15	5	20	12	17	
<b>Environmental domain</b>	Sportsperson	56	13.3	2.11	13	10	20	12	14	0.409
	Other	41	13.1	2.46	12	10	20	12	14	

\* Mann-Whitney test

Due to non-normal distribution of the results in the analyzed groups ( $p < 0.05$  obtained from the Shapiro-Wilk test), the analysis was performed using the Mann-Whitney test. In the case of QOL domain, the median value for both groups equaled 4. Differences were noted in terms of the standard deviation which equaled 0.87 for the group professional sportspeople and 0.95 for non-professional sportspeople. In terms of health status perception, the median was the same for both groups and equaled 3. Standard deviation for professional sportsperson had the value of 1.12 and 13 for the group of non-professional sportspeople. In the physical domain, the median was equal for both groups and equaled 13. Standard deviation differed in both groups, with the value of 1.92 for the group of professional sportspeople and 1.98 for non-professional sportspeople. In the psychological domain, the median for professional sportspeople equaled 14 and 13.5 for non-professional sportspeople. Standard deviation in the first group had the value of 2.36, and 2.89 for the second one. In the social domain, the median had the value of 15 for both groups. Differences were observed in the values of standard deviation, which equaled 3.46 for the group of professional sportspeople and 3.99 for the non-professional sportspeople. In the environmental domain, the mean and the standard deviation in the group of professional sportspeople equaled 13 and 2.11, respectively. In the group people practicing recreational sport, the above parameters had the values of 12 and 2.78, respectively. Each value of p is above 0.05, hence, the quality of life in each domain did not depend on physical activity. The above correlations were presented in Table 8.

**Table 8. Score distribution of the influence of physical activity on the quality of life [own elaboration].**

WHOQoL BREF	Physical activity	N	Mean	SD	Median	Min	Max.	Q1	Q3	p *
<b>Quality of life perception</b>	Competitive	56	3.57	0.87	4	1	5	3	4	0.763
	Recreational	44	3.55	0.95	4	1	5	3	4	
<b>Health status perception</b>	Competitive	56	2.79	1.12	3	1	5	2	4	0.957
	Recreational	44	2.82	1.08	3	1	5	2	4	
<b>Physical domain</b>	Competitive	56	12.66	1.92	13	9	18	11	14	0.904
	Recreational	44	12.48	2.14	13	6	18	11	14	
<b>Psychological Domain</b>	Competitive	56	13.73	2.36	14	8	20	12	15	0.524
	Recreational	44	13.32	2.89	13.5	4	20	12	15	
<b>Social domain</b>	Competitive	56	14.91	3.46	15	8	20	12	17.5	0.528
	Recreational	44	14.34	3.99	15	4	20	12	17	
<b>Environmental domain</b>	Competitive	56	13.3	2.11	13	10	20	12	14	0.27
	Recreational	44	12.84	2.78	12	4	20	11	14	

\* Mann-Whitney test

Due to non-normal distribution of the results in the analyzed groups ( $p < 0.05$  obtained from the Shapiro-Wilk test), the analysis was performed using the Mann-Whitney test. In the case of QOL domain, the median value for both groups equaled 4. Differences were noted in terms of the standard deviation which equaled 0.82 for the people with previous knee injuries and 0.99 for the responders with no history of such injuries. In terms of health status perception, the median was the same for both groups and equaled 3. Standard deviation had the value of 1.04 for the people with previous knee injuries, and 1.17 for the responders with no history of such injuries. Standard deviation had the value of 1.04 for the people with previous knee injuries, and 1.17 for the responders with no history of such injuries. In the physical domain, the median equaled 13 for the patients with the history of knee injuries whereas for the people with no previous knee injuries the parameter had the value of 13. Standard deviation for the first group equaled 1.72, and 2.3 for the second one. In the psychological domain, the median for the patients with previous knee injuries equaled 13. In the group of the people with no history of such injuries, the parameter had the value of 14. Standard deviation for the first group equaled 2.14, and 3.1 for the second one. In the social domain, the median had the value of 15 for both groups. Differences were observed in the values of standard deviation, which equaled 3.54 for the group with previous knee injuries, and 3.88 for the patients with no such history. In the environmental domain, the mean and the standard deviation in the group of people with the history of knee injuries equaled 13 and 93, respectively. In the group people with no previous knee injuries, the above parameters had the values of 12 and 2.94, respectively. Each value of  $p$  is above 0.05, hence, the quality of life in each domain did not depend on previous injuries. The above correlations were presented in Table 9.

**Table 9. Score distribution of the influence of the occurrence of previous knee injuries on the quality of life [own elaboration].**

WHOQoL BREF	Previous Knee injuries	N	Mean	SD	Median	Min	Max .	Q1	Q3	p *
Quality of life perception	Yes	55	3.64	0.82	4	2	5	3	4	0.497
	No	45	3.47	0.99	4	1	5	3	4	
Health status perception	Yes	55	2.73	1.04	3	1	5	2	3	0.483
	No	45	2.89	1.17	3	1	5	2	4	
Physical domain	Yes	55	12.82	1.72	13	10	17	11	14	0.153
	No	45	12.29	2.3	12	6	18	11	14	
Psychological Domain	Yes	55	13.45	2.14	13	9	18	12	15	0.442
	No	45	13.67	3.1	14	4	20	12	15	
Social domain	Yes	55	14.38	3.54	15	5	20	12	16.5	0.309
	No	45	15	3.88	15	4	20	13	19	
Environmental domain	Yes	55	13.18	1.93	13	10	18	12	14	0.468
	No	45	13	2.94	12	4	20	11	14	

\* Mann-Whitney test

Due to non-normal distribution of the results in the analyzed groups ( $p < 0.05$  obtained from the Shapiro-Wilk test), the analysis was performed using the Mann-Whitney test. In the case of QOL domain, the median value for both groups equaled 4. Differences were noted in terms of the standard deviation which equaled 0.88 for people living in a city, and 1.01 for the respondents living in a country. In terms of health status perception, the median was the same for both groups and equaled 3. Standard deviation for the city residents equaled 1.07, and 1.28 for the responders living in a country. In the physical domain, the median was equal for both groups and equaled 13. Standard deviation for both groups was different and equaled 1.96 for the people living in a city, and 2.31 for the country residents. In the psychological domain, the median for the patients living in a city equaled 2.45. In the group of city residents, the parameter had the value of 13. Standard deviation for both groups equaled 2.45 and 3.37, respectively. In the social domain, the median had the value of 15 for both groups. Differences were observed in the values of standard deviation, which equaled 3.54 for the people living in a city, and 4.55 for the country residents. In the environmental domain, the mean and the standard deviation in the group of city residents equaled 12 and 2.27, respectively. In the group people living in a city, the above parameters had the values of 12 and 3.24, respectively. Each value of p is above 0.05, hence, the quality of life in each domain did not depend on residence. The above correlations were presented in Table 10.

**Table 10. Score distribution of the influence of residence on the quality of life [own elaboration].**

WHOQoL BREF	Residence	N	Mean	SD	Median	Min	Max .	Q1	Q3	p *
Quality of life perception	City	85	3.52	0.88	4	1	5	3	4	0.168
	Country	15	3.8	1.01	4	1	5	3.5	4	
Health status perception	City	85	2.78	1.07	3	1	5	2	4	0.551
	Country	15	2.93	1.28	3	1	5	2	4	
Physical domain	City	85	12.64	1.96	13	9	18	11	14	0.616
	Country	15	12.27	2.31	13	6	17	11	13	
Psychological Domain	City	85	13.66	2.45	14	8	20	12	15	0.704
	Country	15	12.93	3.37	13	4	17	12	15	
Social	City	85	14.56	3.5	15	5	20	12	17	0.45

<b>domain</b>		5		4						3
	Country	1 5	15.2	4.5 5	15	4	20	13. 5	19	
<b>Environmenta l domain</b>	City	8 5	13.18	2.2 7	12	10	20	12	14	0.89 8
	Country	1 5	12.67	3.2 4	12	4	17	12	15	

\* Mann-Whitney test

Due to non-normal distribution of pain intensity ( $p < 0.05$  obtained from the Shapiro-Wilk test), Spearman's correlation coefficient was used for the analysis. In each domain, the correlation coefficient was negative. Very poor strength of the relationship was obtained in the domain of the quality life perception as well as physical, psychological and environmental domains. The parameter was defined as poor in the domain of health status perception as well as social domain. The intensity of pain significantly influences the quality of life perception and health status perception as well as psychological, social and environmental domains of the quality of life ( $p < 0.05$ ). The above correlations are negative which means that the higher the pain intensity, the lower the quality of live in the above domains. The above correlations were presented in Table 11.

**Table 11. Correlation coefficient between the pain intensity and the quality of life [own elaboration].**

<b>WHOQoL BREF</b>	<b>Correlation with pain intensity</b>			
	<b>Correlation coefficient</b>	<b>p</b>	<b>Direction of the relationship</b>	<b>Strength of the relationship</b>
<b>Quality of life perception</b>	-0.258	0.01	negative	very poor
<b>Health status perception</b>	-0.258	0.01	negative	very poor
<b>Physical domain</b>	-0.103	0.30 7	---	---
<b>Psychological Domain</b>	-0.227	0.02 3	negative	very poor
<b>Social domain</b>	-0.316	0.00 1	negative	poor
<b>Environmenta l domain</b>	-0.225	0.02 4	negative	very poor

## Discussion

Degenerative disease is one of the most frequently diagnosed pathology of the locomotory system. It has been proved by a range of clinical research concerning the causes of the development and the possibilities to carry prevention activities to slow down the progress of the disease [3].

World Health Organization and United Nations proclaimed the years of 2000-2010 the decade of bones and joints and, thus, stressed osteoarthritis as a significant clinical and social issue [4]. OA has been determined as a social disease of the locomotory system due to its prevalence among the population. Degeneration of knee occurs frequently, which is associated with the greatest static and dynamic loads on all components of the joint. The symptoms of the disease are related to ageing of the body. This is reflected in the percentage of people suffering from degenerative hip disease

increasing with the ageing of the population [6]. Our own research, due to its specificity, has not confirmed the occurrence of the pathology of knee joint cartilage in older age groups. On the contrary, the group age of 20-29, with 54 participants, was found to be the largest (54%), whereas there were only 8 people aged 50 and above (8%).

The main aim of the treatment of degenerative lesions is to eliminate the patient's pain. Hence, the treatment is most often symptomatic and has to be suited individually. It also has to be adjusted to the nature of the disorder as well as the patient's preferences. However, the degenerative disease still progresses regardless of chosen treatment. One of the consequences of the disease is physical deterioration of the patients, which also influences the decline in the quality of life perception [7].

While studying the joint cartilage, Klimiuk et al. concluded that people with rheumatic and immunological diseases experience faster wear of the joint cartilage. However, the analyses carried by the authors proved no correlation in the group of 100 people. It might be caused by the fact that the majority of respondents were young people who may be diagnosed with rheumatic diseases later in life.

Many papers by Kuś state that the type of work performed significantly influences the development of injuries of joint cartilage [9,10]. Indeed, the more load on knee joints, the sooner the injuries to knee joint occur. Among the respondents, the significant group consisted of sportspeople, with 54 people practicing competitive sports (66.67%). They may seem to be at risk of various injuries. However, the carried analyses show no relationship between the occupation and injuries to joint cartilage.

The obtained results stress the influence of the pain intensity on the decrease in the quality of life. It does need to be proved how the quality of life perception is influenced by an ordinary headache. The worst imaginable pain is 100 more intense than that. Such characteristics are ascribed to bone pain in the works by Widuchowki [7].

## Conclusion

1. The obtained results showed no influence of age on the quality of life of patients with damage to knee joint cartilage.
2. The influence of certain concomitant diseases on the quality of life of patients suffering from chondromalacia in knee joint was not proved.
3. The carried analyses show no relationship between the occupation and the quality of life of patients with damage to knee joint cartilage.
4. In terms of physical activity and previous knee injuries, both factors were proved to have no influence on the decrease in the quality of life perception in patients with damage to cartilage.
5. Moreover, the influence of residence on the quality of life was not confirmed.
6. The study proved that the intensity of pain influences the quality of life perception and health status perception as well as psychological, social and environmental domains of the quality of life. These correlations are negative which means that the higher the pain intensity, the lower the quality of life in the above domains.

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