

The effect of selected factors on the quality of life of patients after arthroscopic reconstruction of a rotator cuff 1–2 years after surgery

Wpływ wybranych czynników na jakość życia pacjentów po artroskopowej rekonstrukcji stożka rotatorów w ciągu 1–2 lat od zabiegu

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Słowa kluczowe: jakość życia, staw ramienny, stożek rotatorów, artroskopia.

Abstract

Introduction: One of the key goals in the recovery process in patients after the procedure of surgical repair of the rotator cuff is the reduction of pain complaints and achievement of satisfactory improvement in such domains as occupational activity, lifestyle, sports, recreation, or mood.

Aim of the research: To evaluate the effect of selected factors on the quality of life of patients who had undergone arthroscopic reconstruction of the rotator cuff within 1–2 years of the surgery.

Material and methods: The study was conducted in a group of 69 patients aged 40–65 years, after arthroscopic reconstruction of the rotator cuff in the Specialist Hospital in Rudna Mała. The quality of life was measured using the WORC, which is a disease-specific research instrument.

Results: The highest quality of life was noted subsequently in the following domains: physical symptoms ($\bar{x} = 22.28$), emotions ($\bar{x} = 24.21$), and lifestyle ($\bar{x} = 26.74$), whereas the lowest quality of life was seen in the domains of work ($\bar{x} = 38.48$) and sports and recreation ($\bar{x} = 36.18$). The highest overall quality of life was observed in patients with university education level ($p = 0.011$), occupationally active ($p = 0.017$), who performed intellectual work ($p = 0.001$), and received rehabilitation for a period longer than 8 weeks ($p = 0.003$).

Conclusions: The respondents' university education level, occupational activity, intellectual work, and rehabilitation for a period longer than 8 weeks were the factors that strongly determined the quality of life of patients. Physical symptoms, such as the domain of the WORC, most strongly determined the overall quality of life of the respondents.

Streszczenie

Wprowadzenie: W procesie zdrowienia pacjentów po zabiegu rekonstrukcji pierścienia rotatorów jednym z kluczowych celów jest zmniejszenie dolegliwości bólowych i osiągnięcie zadowalającej poprawy w takich obszarach jakości życia, jak aktywność zawodowa, styl życia, sport, rekreacja czy nastrój.

Cel pracy: Ocena wpływu wybranych czynników na jakość życia pacjentów po artroskopowej rekonstrukcji stożka rotatorów w okresie 1–2 lat od zabiegu.

Materiał i metody: Badania przeprowadzono u 69 osób po artroskopowej rekonstrukcji stożka rotatorów w wieku 40–65 lat, operowanych w latach 2015–2016 w Szpitalu Specjalistycznym im. Świętej Rodziny w Rudnej Małej. Pomiaru jakości życia dokonano przy użyciu kwestionariusza WORC, który jest specyficznym narzędziem badawczym umożliwiającym ocenę jakości życia pacjentów w pięciu kategoriach.

Wyniki: Najlepszą jakość życia odnotowano kolejno w następujących dziedzinach: objawy fizyczne ($\bar{x} = 22,28$), emocje ($\bar{x} = 24,21$) i styl życia ($\bar{x} = 26,74$), a najgorszą jakość życia w dziedzinach praca ($\bar{x} = 38,48$) oraz sport i rekreacja ($\bar{x} = 36,18$). Lepszą ogólną jakością życia cechowały się osoby z wyższym wykształceniem ($p = 0,011$), aktywne zawodowo ($p = 0,017$), pracujące umysłowo ($p = 0,001$) oraz rehabilitowane przez okres powyżej 8 tygodni ($p = 0,003$).

Wnioski: Wyższe wykształcenie, aktywność zawodowa, praca umysłowa oraz rehabilitacja powyżej 8 tygodni są czynnikami, które silnie determinują jakość życia pacjentów. Objawy fizyczne jako dziedzina WORC najsilniej warunkują ogólną jakość życia badanych.

Introduction

The shoulder girdle, also referred to in literature as the shoulder complex, is one of the most biomechanically complex structures in the human motor system. It is composed of three anatomical joints and two functional joints [1]. Its structure provides very high mobility with a simultaneously sufficient stability of the upper extremity while performing movements in space, provided that the proper balance between all muscles engaged in movement is maintained. Unfortunately, this is also the cause of frequent injuries related mainly with an abnormal distribution of the pulling forces exerting an effect on the periarticular soft tissues [2].

Muscular imbalance most often affects the so-called rotator cuff muscles, which insert into the greater tubercle of the humerus where, during motion, they enter the structural system with the acromion and other soft tissues, which increases the risk of tissue conflict [3, 4]. The subsequent overloads and micro-injuries ultimately contribute to damage to the rotator cuff muscles. Such damage is manifested, among others, by the lack of active shoulder abduction while maintaining passive motion, weakening of muscle strength or atrophy of rotator cuff muscles, and a partial or total loss of function, manifested by an incapability of performing occupational activity, physical work, or other simple activities such as dressing, hygiene activities, etc. [5, 6].

At present, arthroscopic reconstruction of the rotator cuff, followed by complex rehabilitation, is one of the most common and effective minimally invasive methods of treatment of this type of injury. Such a scheme of therapeutic management results in a considerable improvement in the quality of life of patients affected by this dysfunction [7–10].

The World Health Organisation (WHO) defines quality of life as ‘an individual’s 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’ [11]. The quality of life is the concept widely assessing several basic aspects of life related with the physical and mental health of a patient and his/her social position [12]. One of the key goals in the recovery process in patients after the procedure of surgical repair of the rotator cuff is the reduction of pain complaints and achievement of satisfactory improvement in such domains as occupational activity, lifestyle, sports, recreation, or emo-

tional sphere. The quality of life may be assessed using global scales and disease-specific scales. The global (generic) scales assess the quality of life of patients in a relatively general way, usually considering several dimensions, and serve mainly for the evaluation and comparison between various study groups. Examples of such scales include, among others: the Short Form Health Survey (SF-36) and the EQ-5D. In turn, disease-specific scales are applied to assess the quality of life of patients with a particular disease entity and focus on symptoms typical of a given entity. These scales allow the monitoring of a patient’s responses to treatment and application of various forms of therapy. They are characterised by high sensitivity to changes, and compared to global scales, apart from the typical domains of life, they also include examples of actions or functions which might have been negatively affected by an injury or disease [13, 14].

Unfortunately, in Polish literature, the number of reports concerning the quality of life of patients who have undergone the rotator cuff repair surgery using standardised research instruments is scarce; therefore, the presented study was undertaken using a disease-specific questionnaire.

Aim of the research

The objective of the study was to assess the domains of the quality of life in which patients after arthroscopic reconstruction of the rotator cuff functioned best within the distant period after the surgery, and which domains were still affected by the injury. The relationships were also evaluated between the quality of life of these patients and selected factors, such as: gender, age, place of residence, education level, occupational activity, type of work performed, marital status, dominance of the surgical limb, physical activity, and participation in physiotherapy.

Material and methods

The study was conducted among patients who had undergone arthroscopic reconstruction of the rotator cuff performed in the Holy Family Specialist Hospital in Rudna during 2015–2016. The criteria of qualification for the study were: age from 40–65 years and the patient’s informed and voluntary consent to participate in the study. The exclusion criteria were as follows: past surgeries within the shoulder complex, past fractures of the proximal end of the humerus, acetabular cup, collarbone or acromion, past disloca-

tions within the shoulder complex, and concomitant neurological disorders.

The study comprised 69 patients: 20 (29%) females and 49 (71%) males, 36 (52%) of whom lived in rural areas, and 33 (48%) of whom urban inhabitants; 55 (80%) were married or lived in a non-marital partnership, whereas 14 (20%) respondents were divorced, unmarried, or widowed. Only in 11 (16%) patients was the surgery performed on the non-dominant limb. Forty-three (62%) respondents were occupationally active, among whom 25 (58%) performed physical work and 18 (42%) intellectual work. Only 29 (42%) respondents were engaged in physical activity, while the remaining 40 (58%) patients preferred passive leisure. After the surgery, as many as 68 (99%) patients participated in physiotherapy, including 37 (54%) who had undergone therapy lasting up to 8 weeks altogether, and 31 (46%) participated in physiotherapy for longer than 8 weeks.

Research instrument

The Western Ontario Rotator Cuff Index (WORC) is a disease-specific research tool for the assessment of the quality of life of patients with various rotator cuff problems. It contains 21 items grouped into five domains – physical symptoms (six items), sports and recreation (four items), work (four items), lifestyle (four items), and emotions (three items). The respondents provide answers concerning symptoms and problems observed within the last week. The total score may be calculated for each domain (Physical symptoms/600; Sports and recreation/400; Work/400; Lifestyle/400; Emotions/300). The highest possible result in the whole questionnaire is 0, while the lowest is 2100.

In order to make scoring more understandable the authors of the test recommend the conversion of raw results to percentage scores. The percentage result is obtained by inverting the raw score and expressing it in the form of a percentage in relation to the possible maximum result. Zero per cent is the worst possible, while 100% is the best possible result [15, 16].

An author-designed questionnaire was used to collect personal and clinical data, including: age, gender, place of residence, marital status, education, occupational activity, type of occupation performed, dominance of the surgical limb, and participation in physiotherapy.

Statistical analysis

Statistical analysis of the collected material was performed using the software package Statistica 13.1. The normality of distribution of the sub-scales of the WORC and aggregate score was assessed by means of the Shapiro-Wilk Test. The distributions of the analysed variables significantly differed from normal distribution; therefore, exclusively non-parametric tests were used for analyses. The differences between two groups were assessed using Mann-Whitney *U* test, whereas the differences between three or more groups were assessed by means of Kruskal-Wallis test. If the result of Kruskal-Wallis test was statistically significant, post-hoc analysis was applied using multiple comparison procedure in order to determine the sub-groups that were significantly different from one another. Correlations between the variables were evaluated using Spearman's rank-order correlation coefficient. The *p*-values < 0.05 were considered statistically significant.

Results

The respondents presented the lowest quality of life in the domain of work ($\bar{x} = 61.52$) and sports and recreation ($\bar{x} = 63.83$), whereas they achieved the highest results in the domain physical symptoms ($\bar{x} = 77.72$), followed by emotions ($\bar{x} = 75.79$) and lifestyle ($\bar{x} = 73.26$). The highest level of functioning assessed according to the WORC is 100%, while the patients in this study obtained 70.86% on average (within the range 24–100%) (Table 1).

It was investigated which domains of life exerted the greatest effect on the overall quality of life of the respondents. It was found that all domains of the WORC strongly and statistically significantly deter-

Table 1. Respondents' quality of life according to the WORC – overall result and individual domains

WORC [%]	Descriptive statistics							
	<i>N</i>	\bar{x}	<i>Me</i>	<i>Min.</i>	<i>Max.</i>	<i>Q1</i>	<i>Q3</i>	<i>SD</i>
Physical symptoms	69	77.72	83.33	33.50	100.00	59.83	94.67	20.42
Sports and recreation	69	63.83	74.50	7.75	100.00	40.00	90.50	29.17
Work	69	61.52	64.50	0.00	100.00	33.25	92.50	31.31
Lifestyle	69	73.26	81.25	18.75	100.00	53.00	97.25	26.02
Emotions	69	75.79	85.00	18.00	100.00	58.33	97.33	24.69
Total	69	70.86	78.14	24.00	100.00	49.57	93.95	24.50

WORC – Western Ontario Rotator Cuff Index, *n* – number of observations, \bar{x} – arithmetic mean, *Me* – median, *Min.* – minimum, *Max.* – maximum, *Q1* – lower quartile, *Q3* – upper quartile, *SD* – standard deviation.

mined the overall quality of life. However, physical symptoms occupied the first position, as the domain that most strongly determined the overall result of the scale (Table 2).

Subsequently, an assessment was undertaken of the effect of selected factors on the quality of life. The overall quality of life of females was higher ($\bar{x} = 75.77\%$) than that of males ($\bar{x} = 68.86\%$); however, these differences were statistically insignificant ($p = 0.355$). The results in all domains of the WORC were higher in females than in males but were statistically insignificant. No statistically significant correlations were observed between the respondents' quality of life and their age ($p = 0.249$). Also, no relationship was found between the quality of life of the examined patients and their marital status ($p = 0.612$). No statistically significant differences in overall quality of life were noted between respondents living in rural or urban areas ($p = 0.220$). Nor were any such relationships discovered in any of the WORC domains in the above-mentioned groups.

While analysing the effect of education on the quality of life, a clear relationship may be observed

Table 2. Correlations between particular domains of life and overall result according to the WORC

WORC domains vs. overall WORC	R	P-value
Physical symptoms vs. overall WORC	0.9634	< 0.001
Sports and recreation vs. overall WORC	0.9481	< 0.001
Work vs. overall WORC	0.9606	< 0.001
Lifestyle vs. overall WORC	0.9335	< 0.001
Emotions vs. overall WORC	0.8252	< 0.001

WORC – Western Ontario Rotator Cuff Index, R – value of Spearman rank correlation, p – level of significance of differences.

that the higher the level of education the better the quality of life ($p = 0.011$), and the quality of life in the following domains: physical symptoms ($p = 0.010$), sports and recreation ($p = 0.017$), work ($p = 0.010$), and lifestyle ($p = 0.046$) (Table 3).

Table 3. Relationships between respondents' quality of life according to the WORC and education level

WORC [%]	Primary/vocational			Secondary school			University			H	P-value
	\bar{x}	Me	SD	\bar{x}	Me	SD	\bar{x}	Me	SD		
Physical symptoms	71.72	74.67	21.26	76.73	83.00	20.66	91.98	93.50	9.88	9.10	0.010
Sports and recreation	57.25	50.63	29.62	60.91	54.25	28.29	84.70	90.00	16.59	8.06	0.017
Work	50.81	50.13	32.03	61.72	61.00	30.71	83.18	88.75	19.22	9.21	0.010
Lifestyle	68.51	69.13	25.22	70.70	80.00	27.59	90.02	94.50	13.64	6.15	0.046
Emotions	74.39	84.33	25.64	71.93	79.00	23.53	88.11	96.67	19.44	4.88	0.086
Total	64.75	62.76	24.14	69.02	73.71	24.98	87.99	92.52	14.59	8.94	0.011

WORC – Western Ontario Rotator Cuff Index, \bar{x} – arithmetic mean, Me – median, SD – standard deviation, H – result of Anova Kruskal-Wallis test, p – level of significance of differences.

Table 4. Relationships between quality of life according to WORC and occupational activity

WORC	Occupationally active			Occupationally inactive			Z	P-value
	\bar{x}	Me	SD	\bar{x}	Me	SD		
Physical symptoms	83.30	92.67	18.32	68.49	63.75	20.69	-2.56	0.010
Sports and recreation	70.89	83.00	27.69	52.14	42.88	28.24	-2.35	0.019
Work	70.47	79.75	27.27	46.72	35.63	32.42	-2.76	0.006
Lifestyle	78.71	92.25	24.22	64.24	63.38	26.83	-1.93	0.053
Emotions	79.11	85.33	22.43	70.31	79.33	27.61	-0.92	0.358
Total	77.02	83.38	22.31	60.68	53.64	24.97	-2.38	0.017

WORC – Western Ontario Rotator Cuff Index, \bar{x} – arithmetic mean, Me – median, SD – standard deviation, Z – result of Mann-Whitney U test, p – level of significance of differences.

Analysis performed using post-hoc multiple comparison procedure showed the presence of significant differences between the results obtained in group 1 (Primary/vocational) and group 3 (University) in the domains: physical symptoms ($p = 0.008$), sports and recreation ($p = 0.017$), work ($p = 0.007$), lifestyle ($p = 0.045$), and overall quality of life ($p = 0.009$). However, in none of the above-mentioned domains were significant differences observed between the results obtained in group 1 (Primary/vocational) and group 2 (Secondary school) and group 3 III (University).

It was confirmed that respondents who were occupationally active presented a higher overall quality of life ($p = 0.017$), and in the following domains: physical symptoms ($p = 0.010$), sports and recreation ($p = 0.019$) and work ($p = 0.006$), compared to those inactive occupationally (Table 4).

At the same time, the respondents who performed intellectual work showed a statistically higher quality of life than those who performed physical work ($p = 0.001$), and in all the domains assessed: physical symptoms ($p = 0.001$), sports and recreation ($p = 0.002$), work ($p = 0.002$), lifestyle ($p = 0.002$), and emotions ($p = 0.010$).

No relationship was found between the respondents' quality of life and the surgical upper limb according to dominance ($\bar{x} = 0.796$). However, slightly better results were obtained when the surgery concerned the non-dominant limb.

The respondents who were physically active showed a higher overall quality of life, and in all domains; nevertheless, these relationships were statistically insignificant ($p = 0.706$).

Very clear relationships were observed between the duration of rehabilitation and the quality of life. The respondents who visited a physiotherapist for therapy for a period longer than 8 weeks showed a statistically higher quality of life than those participating in physiotherapy for a period shorter than 8 weeks (Table 5).

Discussion

In the presented study, an attempt was undertaken to assess the quality of life of patients who had undergone arthroscopic reconstruction of the rotator cuff, using the Polish version of the WORC questionnaire. This research instrument was also applied in the studies by Holtby *et al.*, Kirkley *et al.*, and de Witte *et al.*, who emphasised the reliability, validity, and sensitivity of this questionnaire to changes [17–20].

Osti *et al.* evaluated the quality of life of patients after rotator cuff repair using for this purpose, among others, the SF-36 questionnaire assessing eight indicators of the quality of life. The examined patients demonstrated the highest quality of life in the domains: social functioning, mental health, and physical functioning, and the lowest in the domains: general health, role physical, and bodily pain [21].

The presented study showed that patients functioned best in the domains – physical symptoms and emotions, and worst in the domains work, and sports and recreation, which is consistent with the results obtained by Osti *et al.* In turn, Kang *et al.*, in a retrospective study carried out in a group of 63 patients treated using the 'mini open' rotator cuff repair and 65 patients treated using arthroscopic reconstruction, reported a statistically significant improvement in all the parameters evaluated in the patients ($p \leq 0.001$), except for the categories: general health, role physical, and mental health, assessed by means of the SF-36 questionnaire [22].

In addition, in the presented study the effect was also evaluated of the selected factors on the quality of life of patients after arthroscopic reconstruction of the rotary cuff. It was confirmed that from among all the factors analysed in this study a better quality of life was observed in patients with a higher level of education, occupationally active, performing intellectual work, and receiving rehabilitation for a period longer than 8 weeks. A similar study concerning the effect

Table 5. Relationships between quality of life according to the WORC and participation in physiotherapy

WORC	Up to 8 weeks			Longer than 8 weeks			Z	P-value
	\bar{x}	Me	SD	\bar{x}	Me	SD		
Physical symptoms	71.63	71.33	21.34	86.63	93.25	15.38	3.02	0.002
Sports and recreation	56.41	50.00	30.37	74.69	82.50	23.87	2.36	0.018
Work	51.85	42.50	32.02	75.68	81.13	24.48	2.85	0.004
Lifestyle	65.58	64.75	27.50	84.50	93.25	19.08	2.63	0.009
Emotions	69.34	81.67	26.68	85.24	95.00	18.03	2.55	0.011
Total	63.49	60.24	25.52	81.66	88.62	18.52	2.96	0.003

WORC – Western Ontario Rotator Cuff Index, \bar{x} – arithmetic mean, Me – median, SD – standard deviation, Z – result of Mann-Whitney U test, p – level of significance of differences.

of the selected factors on patient satisfaction after reconstructive shoulder surgery was also conducted by Baettig *et al.* [23] in a group of 505 patients, considering 21 personal and socio-demographic parameters. Their study demonstrated that patients at an older age, who possessed private health insurance, had undergone the surgery for the first time, were non-smokers, and did not abuse alcohol showed higher satisfaction after the surgery. Occupational activity and the type of work (light physical work) were related with considerably higher patient satisfaction. According to the presented study, occupational activity and intellectual work were also associated with higher patient satisfaction.

Moreover, in compliance with the presented study, the researchers did not find any correlation between patient satisfaction and marital status ($p = 0.442$), affected side ($p = 0.502$), dominance of the surgical limb ($p = 0.521$), and gender ($p = 0.238$) [23].

Kim *et al.* also conducted investigations concerning the prognostic factors exerting an effect on the quality of life (patient satisfaction and shoulder function) in patients after reconstruction of the rotator cuff tendon. In their study, these researchers used a questionnaire assessing patient satisfaction with surgical treatment of the rotator cuff from the aspect of physical activity and shoulder function. Analysis of the results showed that factors such as younger age, claims for workers' compensation, and lower education level were significant predictors of worse results assessed by means of the ASES ($p < 0.05$), and a lower education level was the only independent predictor of a lower result evaluated using the SST ($p < 0.01$) [24]. These reports are consistent with the results of the presented study, in which a clear relationship may be observed that a higher education level is related with a better overall quality of life ($p = 0.011$).

In turn, Abtahi *et al.* investigated the effect of selected factors on the regeneration process after rotator cuff repair. They analysed, among other things, patient's age, tear size, fatty infiltration, and the effect of rehabilitation. Their study indicated that older age of a patient is a significant factor determining worse outcomes of healing of the rotator cuff tendons [25]. In their studies, Boileau *et al.* [26], Tashjian *et al.* [27], and Cho *et al.* [28] also arrived at similar conclusions.

In orthopaedic literature, the patient's age as a determining factor is discussed in a very controversial way. Our study did not reveal any statistically significant correlations between the respondents' quality of life, also with respect to symptoms and age. Abtahi *et al.* [25] also concluded that the size of tendon tears is a significant factor exerting an effect on the healing process, which is consistent with the results presented by Galatz *et al.* [29] and Chung *et al.* [30], who demonstrated that the tear size is the factor resulting in more frequent failure in tendon healing.

Lee *et al.* and Kim *et al.* examined the effect of rehabilitation as a prognostic factor for healing after arthroscopic regeneration. These researchers concluded that an early aggressive rehabilitation may result in an increase in insufficiency of the tendons repaired, while a mild long-lasting rehabilitation with limited scope of motion and exercises during an early period after surgery is better for the process of tendon healing [31, 32]. The presented study also showed that rehabilitation carried out for the period of longer than eight weeks was one of the factors exerting an effect on a higher quality of life of patients.

In their study, Chung *et al.* analysed the effect of prognostic factors related with structural outcome after arthroscopic rotator cuff repair. Based on multiple-factor analysis they concluded that bone mineral density BMD ($p = 0.001$), fatty infiltration of the infraspinatus ($p = 0.01$), and tear size ($p = 0.03$) are independent factors determining post-operative treatment [33].

In other studies, also conducted by Chung *et al.*, the researchers evaluated the quality of life and analysed clinical factors in patients with arthroscopic reconstruction of the rotator cuff using the SF-36 questionnaire. The study included 309 patients followed-up for a mean of 26.3 months (range: 12–48 months) after arthroscopic procedure, whose quality of life was periodically measured using the SF-36 – before the surgery, a year after surgery, and at the final examination (after a maximum of 48 months). The results obtained using SF-36 for physical and mental domains indicated a considerable improvement a year after the surgery, from 40.40 to 47.53 and from 44.45 to 50.55, respectively, while in the final period of follow-up the improvement remained on the level of 48.24 and 50.45, respectively. According to the researchers, after 12 months and after the last examination following surgery, only the factors such as older age, female gender, presence of diabetes, and low level of sports activity exerted a negative effect on postoperative quality of life in the physical domain [34]. In the study conducted by Baysal and Balyk concerning functional outcomes and the quality of life of patients who had undergone rotator cuff repair using the 'mini-open' technique, an improvement was observed in mean results according to WORC, from 43.2 prior to surgical intervention to 87.2 after the procedure ($p < 0.001$). According to the above-mentioned researchers, this indicates an improvement in shoulder function and health-related quality of life within the period of 5 years after surgery [35].

In the subsequent comprehensive study carried out by Feng *et al.* concerning the prognostic indicators associated with the outcomes of retrospective assessment of 1120 patients after rotator cuff repair, positive correlations were observed between tear type, degree of degeneration, surgical technique and pre-operative

pain. Interestingly, in contrast to the presented study, the researchers also indicated that ageing (age) should be considered as the most important factor contributing to the deterioration of the quality of life through its effect on the pathogenesis of rotator cuff tears [36]. In turn, Charousset *et al.*, who evaluated 114 patients (53 males and 61 females) using arthroscopic reconstruction of the rotator cuff, observed that female gender is a negative prognostic factor for clinical outcomes at a minimum of two years after surgery. Similar findings were reported in the study by Cho *et al.*, who suggested that female gender exerts an effect on early prognostic results [37, 38]. Nevertheless, O'Holleran *et al.*, who examined a group of 216 males and 95 females, reported that gender was not a factor that affects satisfaction and improvement of the quality of life after rotator cuff repair [39]. Similar results were also reported by Kim *et al.* [24] and Baettig *et al.* [23]. In addition, in the previously mentioned study by Feng *et al.* [36], who assessed 1120 shoulders (872 males and 248 females), the researchers also found that gender was not the factor correlated with post-operative outcome. Analysis of the results of the presented study showed that the quality of life of females after surgery was better than that of males; however, these differences were statistically insignificant ($p = 0.355$).

As can be seen from the examples of reports by other researchers, various clinical factors, such as: age, gender, tear size, physical activity, rehabilitation process, and others, to various degrees exert an effect on the quality of life of patients with rotator cuff tears. Frequently, studies by various researchers provide divergent results with respect to the quality of life and its relations with the determining factors. Therefore, it is advisable to conduct further studies and analyse the results with the consideration of a larger number of prognostic factors, as well as a larger group of patients.

Conclusions

The highest quality of life of patients after arthroscopic reconstruction of the rotator cuff was observed in the following domains: physical symptoms, emotions, and lifestyle, whereas the lowest quality of life was in the domains: work, and sports and recreation. The respondents' university education level, occupational activity, performance of intellectual work, and rehabilitation lasting for a period longer than 8 weeks are factors that strongly determine the quality of life of patients. No significant relationships were found between the quality of life of the examined patients and their age, gender, place of residence, marital status, and dominance of the surgical limb. Physical symptoms as a domain of the WORC most strongly determined the respondents' overall quality of life.

Conflict of interest

The authors declare no conflict of interest.

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