Original Article

Health-related quality of life of patients with rotator cuff injuries, Cofee Triangle, Colombia, 2013[☆]

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ABSTRACT

Objective: To determine the quality of life related to health and its related factors in patients diagnosed with rotator cuff lesions in the Municipality of Pereira, Colombia, 2013.

Methods: Cross-sectional study. Simple random sampling of 239 patients over 18 years of age attended at five health care institutions in the urban area of Pereira. Socio-demographic, biological, clinical and self-perception aspects of the disability were collected regarding the quality of life related to health. Use of measures of frequency, Chi-square and logistic regression for analysis.

Results: 72% (173) reported poor quality of life related to health in the physical health status component and 60% (144) in the mental health status component. Factors associated with poor quality of life related to health according to physical health status were: schooling, having caregiver, and shoulder disability in manual activities, daily activities and pain and physical limitation. While the factors associated with poor quality of life related to health in mental health status components were: schooling, having caregiver and shoulder disability due to pain and physical limitation. The greater the perception of shoulder disability, the worse the perception of health status.

Conclusion: The introduction of psychometric measures for the evaluation of the health status of patients with shoulder injuries contributes to a treatment adjusted to individual requirements and daily activities of the patient.

Calidad de vida relacionada con la salud de pacientes con lesiones de manguito rotador, Eje Cafetero, Colombia, 2013

R E S U M E N

Palabras clave:
Calidad de vida
Dolor de hombro
Sistema musculoesquelético
Manguito de los rotadores
Hombro
Colombia

Objetivo: Determinar la Calidad de Vida Relacionada con la Salud y sus factores relacionados en pacientes diagnosticados con lesiones de manguito rotador del Municipio de Pereira, Colombia, 2013.

Métodos: Estudio de corte transversal. Muestreo aleatorio simple de 239 pacientes mayores de 18 años atendidos en cinco Instituciones Prestadoras de Salud del área urbana de Pereira. Se recogen aspectos sociodemográficos, biológicos, clínicos y de autopercepción de la discapacidad respecto de la Calidad de Vida Relacionada con la Salud. Utilización de medidas de frecuencia, Chi-cuadrado y regresión logística para análisis.

Resultados: 72%(173) reportaron mala Calidad de Vida Relacionada con la Salud en el componente del estado de salud física y 60%(144) en componente del estado de salud mental. Los factores asociados con mala Calidad de Vida Relacionada con la Salud según estado de salud física fueron: escolaridad, tener cuidador, y discapacidad del hombro en actividades manuales, en actividades cotidianas y por dolor y limitación física. Mientras los factores asociados a mala Calidad de Vida Relacionada con la Salud en componente del estado de salud mental fueron: escolaridad, tener cuidador y la discapacidad de hombro por dolor y limitación física. A mayor percepción de discapacidad del hombro, peor percepción del estado de salud.

Conclusión: La introducción de medidas psicométricas para la evaluación del estado de salud de pacientes con lesiones de hombro contribuye a un tratamiento ajustado a requerimientos individuales y a las actividades diarias del paciente.

Introduction

The rotator cuff lesion is a multifactorial etiology entity that affects daily life essential tasks, negatively impacting health-related quality of life (HRQoL), both for its high health cost, and the disability and absenteeism that it produces.[1] For the Centers for Disease, Control and Prevention (CDC), HRQoL refers to those aspects of quality of life that can affect both physical and mental health; these, on an individual scale, have subdomains that include: perception of physical health, perception of mental health, health risks, functional status, social support, and socioeconomic status.[2] Although musculoskeletal conditions are the most prevalent occupational diseases,[3–7] information about measurements of the quality of life of patients with shoulder disabilities, as well as other related factors, is very limited in low and middle-income countries.[8–10]

It should be noted that quality of life is affected in situations in which individuals change their daily role, or face sudden changes that alter their well-being in one way or another.[1,2] Rotator cuff lesions account for about 70% of episodes of pain in the shoulder,[9] which are derived from a complex interaction of physical, biomechanical, psychological and social causes in different human activities and economic sectors.[10] This set of musculoskeletal disorders is characterized by musculoskeletal pain, and functional deterioration associated with traumatic situations in young individuals, while in elderly patients it is related to repetitive microtraumas associated with aging, cumulative trauma injuries, tendon hypovascularization, and subacromial trauma,[11–13]

and cause great changes on physical and emotional performance, changing, in one way or another, the quality of life of both the individual and his/her social group.[14] In addition to this, the healthcare provision model focuses on the patient as a whole, omitting or ignoring subjective aspects that are dependent on the link of physiological conditions, functional abilities, psychological well-being, and social support.[8,9] According to several authors and the National Institute for Occupational Safety and Health of the United States (NIOSH), none of the musculoskeletal disorders, including rotator cuff lesions, can be explained exclusively by risk factors at work, but it is necessary to measure the related individual psychosocial and sociocultural factors.[15–17]

It is estimated that the prevalence of shoulder lesions in the community can be between 4% and 26%, and affects 7–30% of adults.[3,18,19] As a result, there has been a growing interest in studies that analyze concrete aspects of quality of life in shoulder joint disorders, such as rotator cuff lesions among others, that can cause disability and pain.[14–16,20,21]

In Colombia, musculoskeletal disorders are the main source of diagnosis among occupational diseases and, within these, rotator cuff lesions are among the first five causes of occupational musculoskeletal morbidity in the country, with an increase of 118%; they are more prevalent in men than in women, according to the Executive Report of the Second National Survey of Occupational Safety and Health of the General System of Occupational Hazards.[19]

The purpose of this study was to determine HRQoL in a group of patients with rotator cuff lesions treated in Healthcare Facilities (IPSs) in the city of Pereira, Colombia. The

objectives were to establish the sociodemographic, biological, and functional factors related to HRQoL, as well as the self-perception of shoulder disability due to this type of lesion, using generic measurement instruments such as the SF-36v2, which has allowed the evaluation of the multidimensional health status, and the questionnaire Disabilities of the Arm, Shoulder and Hand Questionnaire (DASH) that focus on the functional outcome through orthopedic clinical assessment.

Materials and methods

This is a cross-sectional observational study. The target population was 412 adult orthopedic and traumatology patients diagnosed in 2013 with unilateral or bilateral rotator cuff lesions according to ICD-10: M750, M751, M752, M754, M755, M758, M759, and S460 in the 5 health facilities of grades II and III of complexity that operate in the urban area of Pereira (coffee triangle). It is worth noting that these patients reported limitations of shoulder abduction and rotation, positive signs of subacromial impingement, and some degree of inflammatory or structural involvement. From the sample calculation, a sample size of 239 participants was obtained. Simple random sampling (SRS) without replacement was performed by a table of numbers.

After a pilot test, based on the patients' medical records from participating health facilities, a database was consolidated that included: gender, health guidelines, diagnostic code (ICD-10), diagnostic name, diagnostic type, date of consultation, telephone number, address and full name. The participants were contacted until the estimated sample size was completed and, through an interview, questions were asked about what happened on the week before; therefore, information and selection biases were controlled. The people who accepted signed an Informed Consent Form. The study was approved by the Ethics Committee of the Health School of Universidad del Valle (Approval No. 01-012).

The theory that guided the selection of the variables and their measurement method was based on the theoretical model of Wilson and Cleary[22] (Fig. 1) about HRQoL, where the independent variables were sociodemographic, biological and clinical aspects; and shoulder disability self-perception through DASH questionnaire. However, the outcome variable was HRQoL using SF-36v2 questionnaire. A standardized operating procedure was designed for the supervision, collection and typing of the questionnaires.[23] Data were entered into a spreadsheet that was previously created in Epiinfo 7 and in the application of QualityMetric Health Outcomes™ Scoring Software 4.5.1, adjusted by reference population from the United States in 2009 for the analysis of the HRQoL outcome variable. The standardized scores of the SF-36v2 component summary were two. The first corresponds to physical health status (PHS), which measures physical aspects of quality of life grouped by the dimensions: physical functioning (PF), physical role (PR), body pain (BP) and general health (GH). The second component summary is the mental health status (MHS), which determines subjective or mental aspects grouped by the dimensions: vitality (VT), social functioning (SF), emotional role (ER) and mental health (MH). The component PHS consists of 21 items, while the component MHS has 14 items (Fig. 2).

To check typing, 20% of the questionnaires in the database were reviewed through the comparison with the physical records, and corrected (typing the error located in the database). The database was refined by choosing the variables of interest. Personal data were deleted, and codes were assigned for each record. Subsequently, the database was transferred to Stata® version 9.0 for analysis. In the exploratory analysis, the measures of central tendency and dispersion were calculated. To convert the DASH values, the level of disability was adjusted on a scale from 0 to 100 where 0 is "with no disability" and 100 "maximum disability" (Fig. 3). For the SF36v2 questionnaire, the calculated scale was from 0 to 100, where 0 is "worst health" and 100 "best health". For the association between the variables of exposure and outcome, the Chi-square test was applied, both for the component summary of the physical and mental health status, and finally, odds ratio (OR) were calculated. The multivariate analysis consisted of a logistic regression modeling between poor quality of life and good quality of life, taking into account the qualitative variables that, in the Chi-square
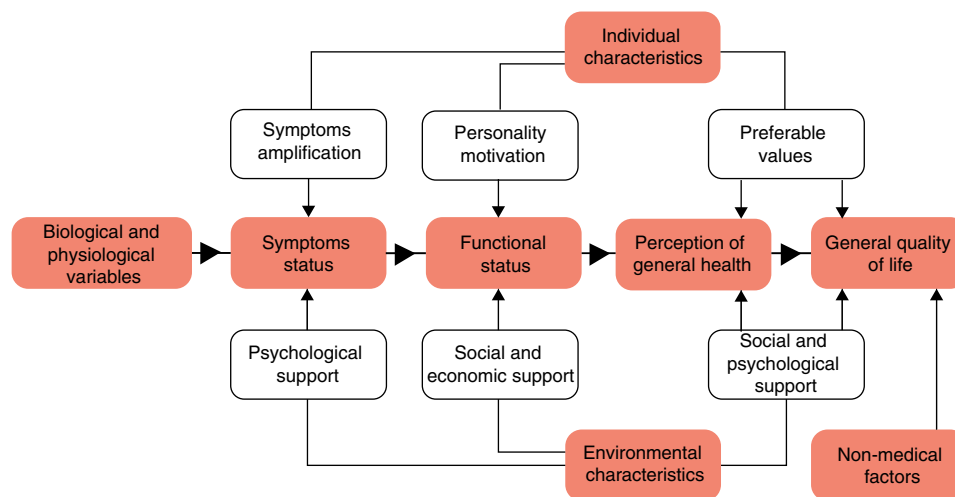

Fig. 1 – Theoretical model of Wilson and Cleary. Adapted from Wilson and Cleary.[22] Orange, determinant factors of general life quality; white, intermediate variables.
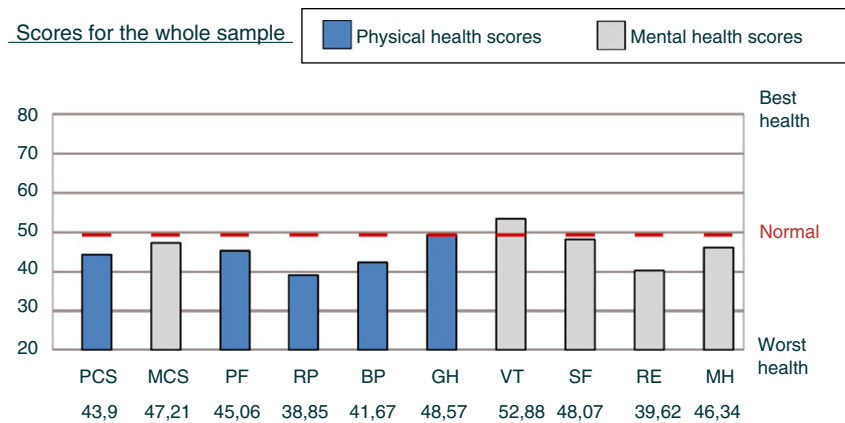
Fig. 2 – Standardized scores of questionnaire SF-36v2 in the study population (*n* = 239). *Source*: Data from the sample calculated with Scoring software 4.5, QualityMetric, adjusted for reference population of the United States in 2009.
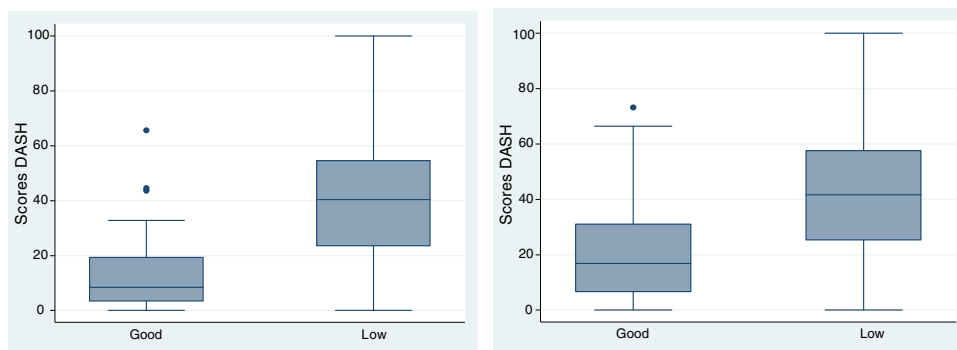

Fig. 3 – Score distribution in a scale from 0 to 100 DASH in the components summary of the physical and mental health status according to HRQoL (*n* = 239).

test, had statistical significance. The logistic regression models of variables associated with HRQoL were validated by the Hosmer and Lemeshow goodness-of-fit test.[24]

Results

Most of the surveyed population consisted of women, with an average age of approximately 55 years. Sixty-six percent (158) were over 50 years of age. Two thirds of the patients have a partner, one third have complete secondary education, one third belong to socioeconomic status 3, almost half are formal workers, and three quarters are affiliated to the contributory regime of the social security system. Half of the respondents also stated that they live in their own homes, half of them earn less than or equal to two minimum wages, three-quarters live with family members, two-thirds are heads of household, more than a half have a good relationship with their family, and a quarter require a caregiver.

Regarding the biological and clinical variables of the sample, most patients 89% (214) reported being right-handed. The most affected injured side was the right shoulder in 58.1% (139); 28.4% (68) reported an injury on the left shoulder, and 13.3% (32) showed an injury to both shoulders. The average time elapsed between the date of diagnosis and the time of the interview was 15 months with a minimum time of 3

months and a maximum of 43 months. The most frequent diagnosis was rotator cuff tear in 57.7% (138) of the patients, while 28% (67) had rotator cuff tendinitis. Additionally, it was observed that 42.9% (103) had more than one diagnosis, and of these the most frequent was tendon trauma of the shoulder rotator cuff. Regarding treatment received, it was found that 78% (189) had received physical therapy, 33.8% (81) had shoulder infiltration with corticosteroids, 28% (67) underwent shoulder arthroscopy surgery, and 17.5% (43) underwent open procedure surgery. Based on the abilities of the respondents to develop manual activities, it was found that most of them did not present any difficulty or symptoms; however, in those activities involving mobility of the injured shoulder over the head, 56.4% (135) showed moderate, considerable or extreme difficulty. Daily activities with the greatest disability were highlighted: washing one's back and putting on one's clothes; however, 42% (102) reported limitations in daily activities. Regarding the activities that implied greater limitation and shoulder pain, sports activities were reported by 31% (74). More than 70% of the respondents reported having permanent shoulder pain when performing an activity, as well as difficulty in sleeping, or impact on their self-esteem due to the shoulder injury, be it mild, moderate, considerable or extreme (Table 1).

The standardized mean scores ranged from 52.88 in VT to 38.85 in PF. Regarding the summary components of the

Table 1 – Functional status of the study population measured with DASH questionnaire (n = 239).

Question	No difficulty		Mild		Moderate		A considerable		Extreme	
	n	%	n	%	n	%	n	%	n	%
To open a new or tightly closed vial	85	36	42	18	41	17	24	10	47	20
To write	164	69	31	13	29	12	11	5	4	2
To turn a key	164	69	31	13	28	12	9	4	7	3
To prepare food	160	67	36	15	23	10	12	5	8	3
To push a heavy door	102	43	46	19	38	16	21	9	32	13
Put an object above your head	69	29	35	15	46	19	29	12	60	25
Heavy home chores	70	29	37	15	42	18	29	12	61	26
To shear or tend a garden	142	59	21	9	22	9	21	9	33	14
To make up a bed	128	54	48	20	23	10	22	9	18	8
To carry a bag or briefcase	82	34	49	21	40	17	23	10	45	19
To carry an object of more than 5 kg	57	24	31	13	45	19	33	14	73	31
To change a high light bulb	86	36	32	13	29	12	21	9	71	30
To wash or dry one's hair	133	56	29	12	28	12	30	13	19	8
To wash one's back	75	31	33	14	43	18	35	15	53	22
Put on a closed sweater or jacket	90	38	28	12	44	18	47	20	30	13
Cut food with a knife	150	63	25	10	25	10	22	9	17	7
Recreational activities of low effort	152	64	34	14	24	10	11	5	18	8
Recreational activities that demand an effort	71	30	29	12	34	14	31	13	74	31
Recreational activities to move one's arm freely	73	31	23	10	34	14	33	14	76	32
Use of means of transportation	129	54	19	8	43	18	32	13	16	7
Intimate couple activities	159	75	16	8	17	8	14	7	6	3
Social activities	175	73	19	8	25	10	14	6	6	3
Limited daily activities	99	41	38	16	54	23	37	15	11	5
Shoulder pain	35	15	65	27	57	24	64	27	18	8
Pain when performing activities	41	17	47	20	61	26	66	28	24	10
Tingling sensation	130	54	25	10	41	17	35	15	8	3
Disability	111	46	20	8	41	17	57	24	10	4
Stiffness	133	56	27	11	34	14	34	14	11	5
Difficulty in sleeping	66	28	36	15	62	26	45	19	30	13
Impact on self-esteem	83	35	31	13	28	12	62	26	35	15

Source: Sample data.

SF-36v2, it was observed that both scores were below 50, which shows that the PCS with 43.90 points, and the MHS with 47.21 points have considerable limitations. The percentage of risk of having depression in the study population, compared with the reference population, was 37% (88) versus 18%; with 26% (62) versus 15% for men, and 43% (103) versus 19% for women. The most affected dimensions in men were PF, BP and PE; and in women were PE, PF and BP.

Regarding the behavior of the disability scores measured with DASH in relation to the groups of poor and good quality of life in both components of the SF36v2, it was observed that the greater the perception of disability of the shoulder, the worse the health status perceived by the patients. The poor and good quality of life in the physical health status showed an association with sociodemographic variables, for instance, with the marital status, with the socioeconomic status one and two, with the primary school level or none, with a monthly salary between $1,070,000 and $1,605,000 (Colombian pesos), and with the presence of a caregiver. Likewise, it was reported that there is a lower risk of poor physical health-related quality of life when there is a higher level of education (OR: 0.73), when there is a better salary (OR: 0.81), and when the person has a caregiver (OR: 0.90).

Four logistic regression models were developed to find associated factors to present poor quality of life related to physical and mental health status. The model selected was number 4, from which a value of p = 0.32 was obtained for the physical health component and p = 0.21 for mental health, because it was the model with the most significant variables and good adjustment, rejecting the null hypothesis (Table 2). Regarding the association of poor quality of life related to physical health status, it was observed that people with university education have 0.83 times less chance to have poor quality of life (95% CI 0.03–0.93), while the people who have a caregiver are those who present 2.86 times a chance of having poor quality of life (95% CI 1.03–14.53). Regarding the association of poor quality of life and mental health status, it was observed that people who have a caregiver have 5.64 times more chance to have poor quality of life (95% CI 1.01–7.68), while there is less chance of having poor quality of life related to mental health when the activity corresponds to that of a student, 0.96 times less chance (95% CI 0.0–0.7), and if the person has a university degree, 0.8 times less chance (95% CI 0.06–0.68). The three factors evaluated in the DASH questionnaire are related to poor physical HRQoL. However, only factors 2 and 3 evaluated in the DASH questionnaire are related to poor mental HRQoL (Table 3).

Table 2 – Goodness of fit test of the logistic regression models of variables associated with HRQoL in the component summary of physical health (A) and mental health status (B).

	Model 1	Model 2	Model 3	Model 4
A. *Physical health criterion*				
Verisimilitude	−57.855	−51.12	−53.15	−61.15
Significant variables	2	3	3	4
Pseudo *r*	0.52	0.57	0.56	0.54
Hosmer & Lemeshow (*p* value)	0.84	0.83	0.28	0.32
AIC	141.71	140.24	140.31	140.89
BIC	185.34	203.93	197.3	191.23
B. *Mental health criterion*				
Verisimilitude	−91.179	−99.15	−99.2	−99.78
Significant variables	2	2	3	4
Pseudo *r*	0.31	0.31	0.31	0.3
Hosmer & Lemeshow (*p* value)	0.59	0.54	0.27	0.21
AIC	221.7	220.31	218.4	217.5
BIC	261.9	257.23	251.9	247.7

Source: Sample data.

Discussion

Several scales in clinical practice are designed to obtain initial information about a disease, monitor possible changes in symptoms, and evaluate the efficacy of the therapeutic process.[25] The analyses of dimensionality and reliability of the surveys used in the study showed that they fully comply with the methodological requirements to evaluate by means of reliability and validity the multidimensional profile of the health concept of patients with this type of injury. When the patients with the highest score on the DASH scale were located in the group with poor HRQoL, this finding is related to the study by Henn et al.[5] The extreme values were for the mean scores in the physical function with 38.85 and vitality with 52.88 points in the whole population.

The rotator cuff injury was presented, in this study, in 66% (158) of people over 50 years of age, mainly women, 64% (101), which is consistent with what was reported in the study by De Almeida et al.,[7] where women report a greater perception of disability. Gialanella et al.[25] report that the ability to work at home as housewives with a rotator cuff tear of full thickness is more limited, and up to 84% require help to perform some activities, such as vacuum cleaning. Another interesting observation in this study was that women showed lower average scores in SF36 compared with the men in the study and the reference population, and the most affected dimensions in this group are emotional role (ER), physical role (PR) and body pain (BP); this can be explained by the fact that the greater the perception of shoulder disability, the worse the health status perceived by the patients.

Regarding the biological and clinical variables, the most frequent diagnosis of patients in the study was rotator cuff tear in 57.7% (138), and this was a risk factor for presenting poor HRQoL in the component summary of mental health status, when the clinical diagnosis of rotator cuff tear was on the left side, compared with people who had tendinitis in the rotator cuff on the same side. This is consistent with what was reported in the meta-analysis conducted by Hermans et al.,[26] where it was reported that the incidence of rotator cuff tear

ranges from 33% to 81% in the general population, that usually limits the range of motion.[27,28]

However, in the physical health component summary, none of the biological and clinical variables showed statistically significant differences to present poor physical HRQoL. Such inconsistency may be explained by the generic nature of SF36v2 as in other studies of shoulder diseases, as described by Razmjou et al.,[10] where this type of generic measures have not shown a significant difference in the total scores of the physical health status and biological characteristics.

As described by MacDermid et al.,[9] and Razmjou et al.[10] it was observed that this pathology causes a great functional impairment, affecting both the social and occupational environments, producing high disabilities in the upper limbs, even after treatment. In this study, the presence of poor HRQoL at the functional variables was associated with the disability perceived by the group studied when performing several activities, represented in the 3 DASH factors, which compromise manual activities, daily activities, pain and physical limitation in the shoulder, and is related, in the expected direction, with the scores obtained in the group of poor HRQoL, in both component summaries reported by the SF36v2.[9,10]

In view of the restrictions on activities of daily living that are related to rotator cuff problems, different studies report that patients experienced nocturnal pain in the shoulder, and muscle weakness during shoulder elevation.[25,26,29] In this study, among the variables that contributed the most with the perception of mental health-related poor quality of life, we find pain and physical limitation; in the perception of shoulder disability, for each unit that increases the score in factor 3 DASH: pain and limitation, the probability of presenting poor quality of life increases 1.18 times (95% CI 1.07–1.3) in the group studied.

In general, when comparing the standardized scores of the study population with the reference population of the United States 2009, patients with rotator cuff lesions living in Pereira showed low levels of HRQoL due to physical functioning, physical role, body pain, social functioning, emotional role, and the component summary measured by the SF36v2. The comparison between data showed that these shoulder injuries affect

Table 3 – Model 4 of logistic regression of variables associated with HRQoL in the component summary of physical and mental health (*n* = 239).

Physical health					
Variable	B	OR	*p*	95% CI	
Gender					
Female		1			
Male	−0.92	0.4	0.13	0.12	1.34
Grouped age					
Younger than 50		1			
50 or over	0.54	1.71	0.36	0.52	5.61
Marital status					
No partner		1			
With partner		2.91	0.06	0.92	9.15
Level of education					
Primary		1			
Secondary	−1.77	0.17	0.01	0.04	0.68
Technical	−2.81	0.06	0	0	0.49
University	−1.77	0.17	0.04	0.03	0.93
Monthly salary (Colombian pesos)					
Lower than or equal to $535,000		1			
Between $535,000 and $1,070,000	0.62	1.85	0.38	0.46	7.44
Between $1,070.000 and $1,605,000	−1.71	0.18	0.07	0.02	1.2
More than $1,605,000	0.01	1.01	0.99	0.13	7.65
Not applicable	−0.6	0.55	0.44	0.12	2.47
Has a caregiver					
No		1			
Yes	1.35	3.86	0.04	1.03	14.53
Factor 1 DASH: manual activities	0.12	1.13	0.02	1.01	1.27
Factor 2 DASH: daily activities	0.22	1.25	0.15	0.91	1.71
Factor 3 DASH: pain and physical limitation	0.36	1.44	0	1.18	1.75
Mental health					
Variable	B	OR	*p*	95% CI	
Gender					
Female		1			
Male	0.26	1.3	0.63	0.45	3.81
Age					
Younger than 50		1			
50 or older	−0.21	0.81	0.64	0.33	1.96
Level of education					
Primary		1			
Secondary	−0.6	0.55	0.21	0.22	1.4
Technical	−0.03	0.97	0.97	0.27	3.49
University	−1.61	0.2	0.01	0.06	0.68
Main activity in the previous month					
Unemployed		1			
Employed	−0.87	0.42	0.27	0.09	1.96
Student	−3.22	0.04	0.03	0	0.79
Retired	−1.43	0.24	0.17	0.03	1.86
Permanent disability	−1.77	0.17	0.14	0.01	1.84
Hogar	−0.45	0.64	0.6	0.11	3.47
Other	−0.09	0.91	0.93	0.1	7.86
Has caregiver					
No		1			
Yes	1.89	6.64	0	1.01	7.86
Received treatment for right lesion					
Rotator tendinitis		1			
Rotator tear	0.79	2.21	0.09	0.87	5.63
Other					
Factor 2 DASH: Daily activities	0.14	1.15	0.02	1.01	1.3
Factor 3 DASH: Pain and physical limitation	0.17	1.18	0.001	1.07	1.3

Source: Sample data.

the perception of the general health status of the patient, which should serve as a basis to document the impact of this type of musculoskeletal disorder on all aspects of the patients' welfare.

The strengths of this study were the use of instruments that are infrequently used and validated in this type of lesion, as well as its low cost and high representativeness. It should be noted that people's perception of their health status, the magnitude of their symptoms, and of their disabilities is limited by the use of self-report questionnaires, and the number of questions influences the use of a lot of time for the development of the interview. Thus, the evaluation of surgically treated patients, which in principle could be asymptomatic, is a factor that could influence the results of the proven quality of life.

Conclusions

The results of these two surveys regarding shoulder lesions, in the presence of rotator cuff injuries, are consistent with previous studies published that inquire about the perception of health-related quality of life.

The need to incorporate measurements to the needs of healthcare, and to the evaluation of health status through the use of different social, economic and psychological indicators requires the use of psychometric measures for the evaluation of the health status of patients with shoulder lesions, which contributes to a treatment adjusted to individual requirements and to the daily activities of the patient, where the rotator cuff repair has an important role in minimizing the social burden of the disease and the health-related quality of life.

Conflicts of interest

The authors declare no conflicts of interest.

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