

# Is Psychological Distress Related to Patient Outcomes In Surgical Repair of Rotator Cuffs?

College of Health Sciences Departments of Biomedical Sciences and Occupational Science and Technology

Undergraduate: Sanya Kathuria

Mentors: Dr. Elizabeth Liedhegner and Dr. Bhagwant Singh Sindhu

## Introduction

Prevalence of psychological distress has increased amongst people in the recent years. It has been observed that psychological factors are key determinants of health and can influence patient reported outcomes undergoing a medical treatment (Coronado et al.2018). Thus, it is necessary to understand the different measures to assess psychological distress. The focus of our broad project is understanding the role of psychological distress and its mitigation through mindfulness in patients undergoing rotator cuff repair surgery. The rotator cuff is composed of tendons and muscle that allow for arm movement around the shoulder joint. Damage to the rotator cuff causes shoulder pain and can lead to surgical repair, a problem that affects approximately 20% of the population with incidence increasing with age. As the population ages, the number of rotator cuff surgeries is predicted to increase (Figure.1) (iDatasearch 2018). **We hypothesize that psychological distress can lead to worse outcomes of rotator cuff repair including continued impaired ranger motion and continued pain in use.** Psychological distress can manifest in various ways including hospitalization, pre and post operative stiffness, recovery period , financial burden, social support and absence from work. Furthermore, there is a positive relationship between psychological distress and pain amongst such patients (Kennedy et.al. 2019). *In this study, we aim to understand how psychological distress affects the surgical outcomes in patients undergoing rotator cuff repair surgery through a literature search on ways psychological distress is measured and what outcomes are observed.*

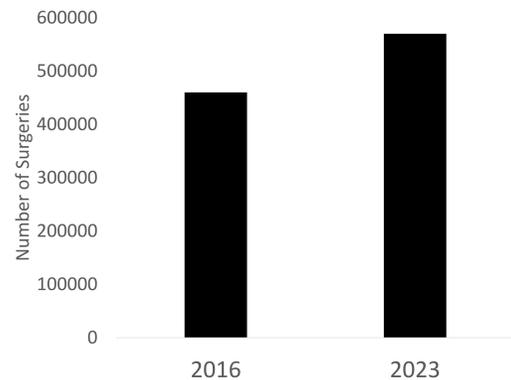


Figure 1: Bar graph comparing the rotator cuff surgeries performed in 2016 to the predicted rotator cuff surgeries to be performed in 2023 ( source-iDatasearch, 2018)

## References

- Basar S. et al. Rotator cuff tears: Functional test versus self-reported questionnaire. *International Journal of Shoulder Surgery*, 8(4), 107 (2014).
- Batterham, P et al. The Distress Questionnaire-5: Population screener for psychological distress was more accurate than the K6K10. *Journal of Clin Epi*, 71(C), 35-42 (2016).
- Böhm, et al. The German Short Musculoskeletal Function Assessment questionnaire: reliability, validity, responsiveness, and comparison with the Short Form 36 and Constant score—a prospective evaluation of patients undergoing repair for rotator cuff tear. *Rheumatol Int* 25, 86-93 (2005).
- Cho, C., Seo, H. et al. The impact of depression and anxiety on self-assessed pain, disability, and quality of life in patients scheduled for rotator cuff repair. *Journal of Shoulder and Elbow Surgery* 22(9), 1160-1166, (2013).
- Cho, C., Seo, H. et al. The impact of depression and anxiety on self-assessed pain, disability, and quality of life in patients scheduled for rotator cuff repair. *Journal of Shoulder and Elbow Surgery* 22(9), 1160-1166, (2013).
- Coronado, R. A., et al. Are Psychosocial Factors Associated With Patient-reported Outcome Measures in Patients With Rotator Cuff Tears? A Systematic Review. *Clinical orthopaedics and related research*, 476(4), 810-823, (2016).
- iDatasearch. Apr. 2018. <https://www.datasearch.com/over-400000-rotator-cuff-surgeries-per-year-reported-in-the-united-states-by-data-research>
- Kennedy, P. et al. The Effect of Psychological Factors on Outcomes in Patients With Rotator Cuff Tears: A Systematic Review. *Arthroscopy: The Journal of Arthroscopic and Related Surgery*, 35(9), 2686-2706 (2015).
- Koorevaar, et al. The Influence of Preoperative and Postoperative Psychological Symptoms on Clinical Outcome after Shoulder Surgery: A Prospective Longitudinal Cohort Study. *PLoS ONE*, 11(11), e0166555 (2016).
- Makihi, Eric & Hamamoto, et al. How Comprehensive and Efficient Are Patient-Reported Outcomes for Rotator Cuff Tears? *Orthopedic Journal of Sports Medicine*, 5, 2325967117693223 (2017).
- Potter, M.G. et al. One-year Patient-reported Outcomes After Arthroscopic Rotator Cuff Repair Do Not Correlate With Mild to Moderate Psychological Distress. *Clin Orthop Relat Res* 473, 3051-3010 (2015).
- Wylie, J., Baran, et al. Comprehensive Evaluation of Factors Affecting Healing, Range of Motion, Strength, and Patient-Reported Outcomes After Arthroscopic Rotator Cuff Repair. *Orthopaedic Journal of Sports Medicine*, 6(1), 232596711750104, (2016).
- Wylie, J., et al. The effect of medical comorbidity on self-reported shoulder-specific health related quality of life in patients with shoulder disease. *Journal of Shoulder and Elbow Surgery*, 19(6), 823-826, (2010).
- Yamamoto, A. et al. Prevalence and risk factors of a rotator cuff tear in the general population. *Journal of Shoulder and Elbow Surgery*, 19(1), 116-120, (2010).
- Henn R.F., Kang L. et al. Patients' preoperative expectations predict the outcome of rotator cuff repair. *J Bone Joint Surg Am*, 89, pp. 1913-1919, (2007).

## Specific Aims

- To determine the relationship between psychological distress and healing processes in patients undergoing surgical repair of rotator cuff tear.
- To compare the existing questionnaires available to measure psychological distress.
- To determine validity, specificity and reliability of the measures currently being used.

## Methodology

Through this research, we aim to understand how psychological distress affects the surgical outcomes in patients undergoing rotator cuff repair surgery through a literature search on ways psychological distress is measured and what outcomes are observed. To find relevant information searches were performed on various data bases like PubMed, Google Scholar and UWM-Libraries using the key words surgical repair, psychological distress, psychological outcomes, rotator cuff, questionnaires and reliability. Our research parameters were to find quantitative methods which explained how distress affected the surgical outcomes, we excluded the articles which did not prevail to musculo-skeletal surgical repairs. Also, we only included articles which were published in year from 2000-2020. Also, all the articles which did not include psychological outcomes of the surgery were excluded. Initial searches yielded 580 articles and after applying exclusion criteria 12 articles remained and were included in the systematic review. Out of 12 articles 7 of them evaluated the relationship between psychological distress and surgical outcome in patients undergoing rotator cuff surgeries.

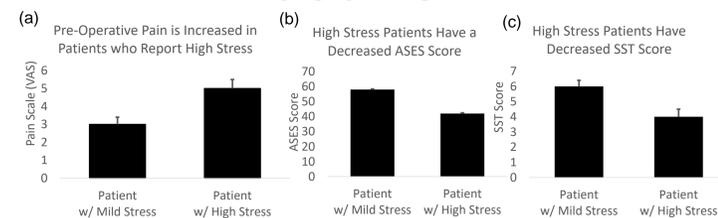
## ASSESSMENT

Type	Definition
VAS	VAS pain scale- Visual Analogue Scale- validated, subjective measure of acute and chronic pain . Score range 0-10.
UCLA	UCLA- University Of California Los Angeles shoulder score is 5 items scale including pain scale, function active forward elevation, forward elevation strength, patient satisfaction (yes/no). Score range 0-35.
DQ-5	Distress questionnaire – 5 population screener for psychological distress. Score range 0-50.
HADS	Hospital Anxiety Depression Scale- 14 items scale that measures anxiety and depression. Score range 0-21.
WORC	WORC- Western Ontario Rotator Cuff Index quality of life questionnaire with 21 items. Score range 0-2100.
SST	Simple Shoulder Test – self reported 12 item shoulder questionnaire. Score range 0-12.
ASES	ASES- American Shoulder and Elbow Surgeons score - physician and patient rated questionnaire. Score range of 0-100 points.
KSS	KSS-Korean Shoulder Scale- KSS includes 5 domains: pain, function, satisfaction, range of motion, muscle power, strength and endurance. Score range 0-100.

## Included Studies

Authors	Patient Population	Methods of Assessment	Outcomes of Interest
Potter et.al , 2014	85 patients with full thickness rotator cuff tears	1. VAS 2. ASES 3. Distress Risk Assessment Method Questionnaire	Distress remained associated with: 1. higher VAS scores (p = 0.001) 2. lower Simple Shoulder Test (p < 0.001) 3. Lower American Shoulder and Elbow Surgeons scores (p < 0.001)
Cho et.al , 2013	107 consecutive patients	1. VAS 2. ASES 3. KSS 4. WHOQOL-BREF	Higher HADS-D score were associated with : 1. Higher VAS pain scores (r = 0.191, P = .048) 2. Lower ASES scores (r = -0.206, P = .034) 3. Lower KSS scores (r = -0.202, P = .037) 4. Lower WHOQOL-BREF scores (r = -0.332, P < .0001) scores
Henn et al., 2007	125 patients before and after rotator cuff repair for chronic tears	1. DASH Score 2. SST score 3. VAS score 4. SF-36 SCORE	Patients with a positive preoperative expectations showed: 1. Higher post operative SST scores 2. Higher postoperative DASH score 3. Higher postoperative SF-36 scores 4. Lower post operative VAS pain scores
Ravindra et.al, 2018	93 patients with rotator cuff tears scheduled to undergo arthroscopic surgery	1. VAS score 2. ASES score 3. SST 4. WORC	Lower pre-operative WORC emotion component was related with: 1. Higher post-operative VAS pain scores. After a period of 1 yr 2. Lower Pre- and Post-operative ASES scores after a period of 1yr 3. Lower Pre- and Post-operative SST scores after a period of 1 yr
Wylie et.al ,2018	81 patients after arthroscopic rotator cuff repair	1. SF-36 score 2. ASES	Decreased SF-36 Mental component Scores scores were associated with: 1. increased post-operative pain ( P = .025) 2. lower post-operative ASES scores ( P = .035)
Cho et.al ,2015	47 patients undergoing rotator cuff surgery	1. VAS score 2. UCLA scale score 3. ASES score 4. HADS score 5. WHOQOL-BREF score	1.HADS Score decreased 4.3 to 1.4 after the rotator cuff repair. 2.HADS score did not correlate with VAS,UCLA or ASES scores
Batterham et.al, 2015	3175 Australians were recruited	1. DQ-5 2. Kessler 10/6	DQ-5 has higher sensitivity and reliability than Kessler's questionnaire

## Results



Patients under high distress present with (a) higher pain scores (VAS) and worse shoulder function via (b) ASES and (c) SST compared to non-stressed patients prior to shoulder surgery. There were 44 patients in the mild stress category and 26 patients in the high stress category(Potter et.al)

**Table III** Correlations between psychological status and preoperative outcome measurements

Psychological measure	VAS pain score	ASES score	KSS score	WHOQOL-BREF
HADS-D score	Coefficient 0.191 P value .048*	-0.270 .005*	-0.227 .004*	-0.419 <.0001*
HADS-A score	Coefficient 0.156 P value .108	-0.206 .034*	-0.202 .037*	-0.332 <.0001*

\* Statistically significant.

Cho et al. studied a cohort of 107 patients and found a positive correlation between reported depression (HADS-D) and anxiety (HADS-A) with VAS pain scores. There was a negative correlation between ASES and reported depression and anxiety results in poor surgical outcomes. However, this study did not assess post-operatively. (Cho et al. 2013)

## Conclusions

- Psychological distress is negatively related with musculo-skeletal surgical outcomes.
- Higher scores on distressed scale was related to higher scores on VAS pain scale and lower scores on functional scales like ASES, SST, KSS, UCLA shoulder score.
- More research should be done to find the reliability and validity of the above-mentioned tests which evaluates the functional and psychological outcome of musculo-skeletal surgeries.
- More research should be done to evaluate how psychological distress affects the pre- and post- operative outcomes of the surgery.

## Future Project

- Assess stress biomarkers like cortisol to determine stress levels in a quantitative fashion
- Determine which subjective psychological distress measure(s) are predictive to use in a pilot study cohort.
- Determine what effect mindfulness has on both subjective and quantitative assessments of psychological distress.