The Impact of Socioeconomic Deprivation on Functional and Patient-Reported Outcomes After Nonoperative Management of Proximal Humerus Fractures

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INTRODUCTION:

Area Deprivation Index (ADI) is a tool used to measure a neighborhood's socioeconomic condition based on variables including education, employment, income and housing. The purpose of this study is to evaluate the effect of social determinants of health, assessed through ADI, on patient reported outcomes (PROs) and range of motion (ROM) after nonoperative management of proximal humerus fractures. METHODS:

Patients >55 years old who sustained proximal humerus fractures treated nonoperatively were retrospectively identified. ADI values were obtained according to the patient's home address and are reported as a national percentile, with higher scores representing greater social deprivation. Visual analog scale (VAS) pain scores and PROMIS physical function (PF), pain interference (PI), and depression scores were obtained up to 1 year postoperatively. ROM values including active forward flexion (AFF), passive forward flexion (PFF), and external rotation (ER) were also recorded. Patients were stratified into quartiles based on ADI values and outcomes were compared using independent t-tests (continuous) and chi square analysis (categorical). Statistical significance was set at p<0.05.

RESULTS: 234 patients were identified, with 60 patients in the Least Deprived Quartile (ADI≤46) and 65 in the Most Deprived Quartile (ADI≥74). The Most Deprived patients were more likely to be obese and smokers. Least Deprived patients had greater PFF (66° vs 49°, p=0.02) and ER (22° vs 14°, p=0.04) at 6 weeks, and greater AFF (85° vs 56°, p<0.01), PFF (97° vs 72°, p=0.03), and ER (36° vs 24°, p=0.02) at 3 months. There was a trend toward greater AFF and PFF at 6 months in the Least Deprived group, though this did not reach statistical significance (p=0.08 and p=0.09, respectively). PROs were largely similar between groups up to one year post-injury. All results are detailed in Table 1.

DISCUSSION AND CONCLUSION:

Patients with greater socioeconomic deprivation experienced less improvement in ROM in the early recovery period after nonoperative management of proximal humerus fractures, without significant effect on PROs. Socioeconomic barriers should be considered in the management of these injuries to optimize outcomes.

	Least Deprived Quartile	Most Deprived Quartile (N=65)	†n.value
	(.1-00)	(.1-05)	·p-value
Active Forward Flexion (Mean ± SD, *)	00:00	00:00	
2-week tollow up	0.0 ± 0.0	0.0 ± 0.0	
6-week tollow up	18.0 ± 32.5	18.2 ± 29.0	0.98
3-month follow up	85.1 ± 54.8	56.2 ± 51.6	<0.01
6-month follow up	120.6 ± 33.2	104.4 ± 39.4	0.08
Passive Forward Flexion (Mean ± SD, -)			
2-week follow up	0.7 ± 3.6	1.5 ± 11.2	0.57
6-week tollow up	66.1 ± 40.8	48.8 ± 42.2	0.02
3-month follow up	96.9 ± 57.5	71.9 ± 60.6	0.03
6-month tollow up	133.0 ± 27.3	118.6 ± 32.3	0.09
External Rotation (Mean ± SD, °)	00.01		0.50
2-week follow up	0.9 ± 7.1	0.3 ± 1.7	0.50
6-week follow up	21.7 ± 16.6	13.8 ± 20.0	0.04
3-month follow up	36.0 ± 24.3	24.0 ± 25.4	0.02
6-month follow up	53.2 ± 18.4	45.0 ± 23.0	0.16
VAS Pain Score (Mean ± SD)			
2-week follow up	5.2 ± 3.4	6.2 ± 3.1	0.11
6-week follow up	3.3 ± 2.5	3.9 ± 2.7	0.19
3-month follow up	2.2 ± 2.3	2.9 ± 2.6	0.15
6-month follow up	1.1 ± 1.9	2.2 ± 2.5	0.03
1-year follow up	1.5 ± 2.3	2.0 ± 2.4	0.50
PROMIS Pain Interference (Mean ± SD)			
2-week follow up	68.3 ± 6.6	67.0 ± 6.5	0.39
6-week follow up	60.1 ± 6.8	60.3 ± 8.7	0.91
3-month follow up	58.5 ± 7.1	57.9 ± 8.5	0.78
6-month follow up	56.2 ± 8.3	55.4 ± 7.6	0.74
1-year follow up	57.8 ± 7.5	53.7 ± 6.5	0.11
PROMIS Physical Function (Mean ± SD)			
2-week follow up	28.6 ± 5.2	32.6 ± 9.6	0.02
6-week follow up	33.1 ± 6.2	34.2 ± 9.3	0.54
3-month follow up	38.3 ± 7.7	39.5 ± 10.0	0.57
6-month follow up	40.9 ± 6.9	39.5 ± 11.1	0.59
1-year follow up	40.5 ± 7.3	43.2 ± 6.0	0.25
PROMIS Depression (Mean ± SD)			
2-week follow up	55.5 ± 9.0	51.8 ± 10.6	0.10
6-week follow up	53.0 ± 8.0	49.3 ± 10.1	0.07
3-month follow up	51.6 ± 9.4	50.4 ± 10.4	0.62
6-month follow up	49.3 ± 9.6	49.6 ± 9.3	0.93
1-year follow up	51.7 ± 7.6	48.3 ± 7.4	0.22

SD = Standard deviation; VAS = Visual ar system

*Boldface indicates statistical significance. †p-value calculated using independent t-tests