

Effect of Social Risk Factors on Patient Outcomes in Carpal Tunnel Syndrome

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INTRODUCTION:

There is little data on which social determinants of health can affect severity of carpal tunnel syndrome (CTS) on presentation to a hand surgeon. In this study, we hypothesize that low health literacy, lower education status, lower social support, and government insurance will be associated with worse objective and subjective measures of CTS.

METHODS:

In our Aim1 cross-sectional study, patients with CTS were recruited from a tertiary care, urban hand surgery clinic. Participants that agreed to participate completed the Boston Carpal Tunnel Questionnaire (BCTQ), PROMIS Upper Extremity computer adaptive (PROMIS UE) questionnaire, Visual analog scale (VAS) survey, sociodemographic measures (Education, Income), health literacy scores (Brief Health Literacy Survey), and CTS-6 measures that were entered into a secure electronic database. Patients also underwent a routine physical examination during their visit with documentation of objective severity of disease. Independent t-tests were used to determine if an association exists between patient subjective and objective measures (BCTQ, PROMIS UE, and CTS -6) and specific social risk factors (income, education, insurance, social support, and health literacy).

In our Aim2 prospective study, patients with CTS undergoing carpal tunnel release (CTR) completed the same questionnaires as listed above preoperatively. Patients then underwent BCTQ, PROMIS UE, and VAS questionnaires at their two week and six week postoperative clinic visits. Independent t-tests were used to determine if an association exists between patient subjective and objective measures following CTR (BCTQ, PROMIS UE, and VAS) and specific social risk factors (income, education, insurance, social support, and health literacy).

RESULTS:

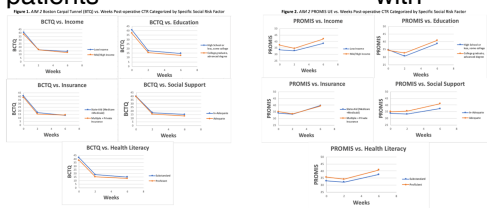
A total of 102 patients agreed to participate in our Aim1 cross-sectional study. Sociodemographic features of our study population for Aim1 can be seen in table 1. Participants with low health literacy scores, less education, government insurance, and lower income had statistically significant worse BCTQ scores. Patients with government insurance and lower income had statistically significant worse PROMIS UE function scores. Patients reporting less social support did not display a significant difference in BCTQ, PROMIS UE, or CTS-6 scores (Table 2). There was no association between the social risk factors measured and CTS-6 scores.

Seventy patients agreed to participate in our Aim2 prospective study. Sociodemographic features of our study population for Aim2 can be seen in table 1. Participants with low health literacy scores, less education, less social support, and lower income had statistically significant worse BCTQ scores at their 6 week postoperative CTR clinic visit. Patients with low health literacy scores, less social support, and lower income had statistically significant worse PROMIS UE function scores. Patients with low health literacy scores, less education had statistically significant worse VAS scores (Table 3). Patients have similar response to CTR but disadvantaged patients start at lower and finish at lower symptom and function measures (Figure 1, Figure 2).

DISCUSSION AND CONCLUSION:

This study identifies several specific social risk factors including health literacy, education, income, and government insurance that are associated with worse reported patient-reported symptoms of carpal tunnel syndrome. This study also identifies several specific social risk factors including health literacy, education, income, and social support that are associated with worse patient-reported symptoms after carpal tunnel release.

Despite lower patient-rated outcome scores, CTS-6 scores which includes objective measures did not differ between groups. Further research is needed to 1) understand why patients with social risk factors present with worse patient-rated function but no difference in objective measures of CTS and 2) understand how this affects outcomes after treatment in patients with social risk factors.



| | Aim 1 | Aim 2 |
|-----------------------------------|---------------|-------------|
| N | 56/38 (23/30) | 58/5 (25/3) |
| Age (Years) | | |
| Female | 80 (78.4%) | 47 (87.3%) |
| Male | 22 (21.6%) | 7 (12.7%) |
| Race | | |
| White | 54 (53.2%) | 39 (67.3%) |
| Asian American | 56 (54.8%) | 28 (50.9%) |
| Ethnicity | | |
| Asian | 2 (2.0%) | 0 (0.0%) |
| Hispanic or Latinx | 12 (11.7%) | 12 (21.7%) |
| Other | 52 (50.8%) | 9 (16.3%) |
| Income | | |
| Low Income | 45 (83.7%) | 50 (71.3%) |
| Mid-High Income | 9 (16.3%) | 9 (16.3%) |
| Education | | |
| High School or less, some college | 68 (83.7%) | 47 (87.3%) |
| College graduate, advanced degree | 37 (56.3%) | 23 (32.9%) |
| Insurance Status | | |
| State Aid (Medicaid) | 56 (54.9%) | 35 (50.0%) |
| Multiple Private Insurance | 46 (45.1%) | 35 (50.0%) |
| Social Support | | |
| In-adequate | 39 (38.2%) | 28 (40.0%) |
| Adequate | 49 (41.8%) | 48 (60.0%) |
| Health Literacy | | |
| Proficient | 60 (58.8%) | 42 (60.0%) |

Table 1. Sociodemographics of CTS patients for Aim1 and Aim2

| | BCTQ | CT6 | PROMIS UE |
|-----------------------------------|------------|------------|-------------|
| Income | | | |
| Low-income | 41.8 ± 6.8 | 16.1 ± 4.4 | 32.8 ± 8.2 |
| Mid-High Income | 38.6 ± 9.9 | 15.2 ± 2.9 | 34.2 ± 11.1 |
| <i>p</i> -value | 0.0002 | 0.24 | 0.14 |
| Education | | | |
| High School or less, some college | 42.2 ± 9.1 | 16.3 ± 4.1 | 33.0 ± 7.7 |
| College graduate, advanced degree | 34.0 ± 8.8 | 16.3 ± 4.5 | 34.2 ± 7.1 |
| <i>p</i> -value | 0.01 | 0.90 | 0.22 |
| Insurance Status | | | |
| State Aid (Medicaid) | 42.4 ± 8.5 | 16.2 ± 4.7 | 32.9 ± 7.7 |
| Multiple Private Insurance | 34.6 ± 9.8 | 16.4 ± 3.5 | 34.7 ± 7.1 |
| <i>p</i> -value | 0.0002 | 0.41 | 0.18 |
| Social Support | | | |
| In-adequate | 42.0 ± 8.4 | 17.0 ± 3.6 | 32.8 ± 8.7 |
| Adequate | 39.3 ± 9.3 | 15.4 ± 4.4 | 33.9 ± 6.7 |
| <i>p</i> -value | 0.01 | 0.01 | 0.24 |
| Health Literacy | | | |
| Substandard | 42.7 ± 9.2 | 16.2 ± 4.0 | 33.1 ± 7.9 |
| Proficient | 39.2 ± 8.9 | 16.4 ± 4.3 | 33.8 ± 7.3 |
| <i>p</i> -value | 0.0002 | 0.42 | 0.14 |

Table 2. Aim 1 (Cross-Sectional) Mean BCTQ, CT6, and PROMIS UE scores categorized by social risk factors

| | 6Week BCTQ | 6Week PROMIS UE | 6Week VAS |
|-----------------------------------|------------|-----------------|-----------|
| Income | | | |
| Low-income | 14.8 ± 4.9 | 38.3 ± 7.3 | 12 ± 1.6 |
| Mid-High Income | 13.8 ± 3.2 | 41.9 ± 7.1 | 8.9 ± 1.3 |
| <i>p</i> -value | 0.02 | 0.04 | 0.14 |
| Education | | | |
| High School or less, some college | 14.6 ± 4.9 | 38.0 ± 7.7 | 12 ± 1.6 |
| College graduate, advanced degree | 12.3 ± 2.2 | 40.9 ± 6.7 | 8.9 ± 1.2 |
| <i>p</i> -value | 0.0002 | 0.12 | 0.0002 |
| Insurance Status | | | |
| State Aid (Medicaid) | 13.8 ± 4.7 | 38.7 ± 7.3 | 11 ± 1.8 |
| Multiple Private Insurance | 14.1 ± 4.2 | 39.3 ± 7.6 | 8.9 ± 1.2 |
| <i>p</i> -value | 0.76 | 0.02 | 0.26 |
| Social Support | | | |
| In-adequate | 15.1 ± 5.2 | 37.3 ± 7.4 | 14 ± 1.5 |
| Adequate | 12.9 ± 3.5 | 41.0 ± 7.1 | 8.9 ± 1.3 |
| <i>p</i> -value | 0.02 | 0.02 | 0.10 |
| Health Literacy | | | |
| Substandard | 13.0 ± 5.1 | 37.5 ± 6.7 | 14 ± 1.8 |
| Proficient | 13.0 ± 3.6 | 40.8 ± 7.6 | 8.9 ± 1.3 |
| <i>p</i> -value | 0.01 | 0.01 | 0.01 |

Table 3. Aim 2 (Prospective) Mean 6-Week Postoperative Boston Carpal Tunnel Questionnaire (BCTQ), CT6, and PROMIS UE scores categorized by social risk factors