Demographic Disparities Amongst Patients Receiving Carpal Tunnel Release: a Retrospective Review of 92,921 Patients

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Introduction

- Carpal tunnel syndrome (CTS) is one of the most common disorders of the hand and wrist in the United States, with nearly 600,000 surgical interventions performed annually
- Carpal tunnel release (CTR) has been demonstrated to be an effective treatment with minimal recurrence or subsequent complications
- Prior studies fail to capture the full breadth of socioeconomic variables impacting access to care
- Social Deprivation Index (SDI) can better quantify social determinants of health
- The aim of this study was to evaluate the demographic factors and social determinants of health affecting whether a patient undergoes CTR after a diagnosis of CTS

Methods

- Adult patients (≥18 years old) diagnosed with CTS in the New York Statewide Planning and Research Cooperative System (SPARCS) database from 2011-2018
- Multivariable logistic regression analysis to determine the likelihood of having CTR (CPT: 64721, 29848)
- Variables included SDI, Charlson comorbidity index, age, sex, race, ethnicity, and insurance status to assess associations with non-surgical or surgical treatment
- SDI is an index from 1-100 based on: percent living in poverty, percent with less than 12 years of education, percent single parent household, percent living in rented housing unit, percent living in overcrowded housing unit, percent of households without a car, and percent non-employed adults under 65 years of age
- P-value ≤0.05 considered significant across all analyses

Table 1: Patient demographics and characteristics by treatment group

	Non-operative n = 62,878	Surgery n = 30,043	P-value
Age, median (mean, SD)	54 (53.7, 14.9)	57 (58, 14.2)	**<.0001**
Sex, n (%)			
Female	45,703 (72.7)	19,692 (65.6)	**<.0001**
Male	17,175 (27.3)	10,351 (34.5)	-
Ethnicity, n (%)			
Non-Hispanic	48,617 (77.3)	26,370 (87.8)	**<.0001**
Hispanic	14,261 (22.7)	3,673 (12.2)	-
Race, n (%)			
White	27,150 (43.2)	21,389 (71.2)	**<.0001**
Asian	1,838 (2.9)	388 (1.3)	**<.0001**
African American	14,590 (23.2)	3,434 (11.4)	**<.0001**
Other	19,300 (30.7)	4,832 (16.1)	**<.0001**
Primary Insurance, n (%)			
Private	30,467 (48.5)	14,319 (47.7)	**0.0237**
Medicare	15,370 (24.4)	9,295 (30.9)	**<.0001**
Medicaid	9,115 (14.5)	2,936 (9.8)	**<.0001**
Workers Compensation	1,564 (2.5)	2,237 (7.5)	**<.0001**
Self-pay	6,165 (9.8)	1,113 (3.7)	**<.0001**
Other	197 (0.3)	143 (0.5)	**0.0001**
Charlson Score, n (%)			
0	55,779 (88.7)	28,056 (93.4)	**<.0001**
≥1	7,099 (11.3)	1,987 (6.6)	-
SDI, median (mean, SD)	82 (70, 30)	55 (53.9, 30.7)	**<.0001**

Table 2: Multivariable logistic regression model for the likelihood of carpal tunnel release

	Rate of Surgery (32.3%)	Odds Ratio (95% CI)	P-value
Age	-	1.017 (1.015 - 1.018)	**<.0001**
Sex			
Males	37.6	-	-
Females*	30.1	0.966 (0.936 - 0.997)	**0.0334**
Race			
White Race	44.1	-	-
Asian Race[ϕ]	17.4	0.378 (0.337 - 0.424)	**<.0001**
African American Race[ϕ]	19.1	0.434 (0.414 - 0.454)	**<.0001**
Other Race[ϕ]	20	0.5 (0.479 - 0.523)	**<.0001**
Ethnicity			
Non-Hispanic Ethnicity	35.2	-	-
Hispanic Ethnicity[γ]	20.5	0.85 (0.811 - 0.891)	**<.0001**
Primary Insurance			
Private	32	-	-
Medicare[δ]	37.7	0.897 (0.862 - 0.934)	**<.0001**
Medicaid[δ]	24.4	0.816 (0.777 - 0.856)	**<.0001**
Workers Compensation[δ]	58.9	2.431 (2.266 - 2.608)	**<.0001**
Self-Pay[δ]	15.3	0.499 (0.465 - 0.534)	**<.0001**
Other[δ]	42.1	1.113 (0.89 - 1.392)	0.3482
Charlson Score			
CCI = 0	33.5	-	-
CCI ≥ 1[ϕ]	21.9	0.568 (0.538 - 0.6)	**<.0001**
SDI	-	0.993 (0.992 - 0.993)	**<.0001**

*compared to males
[ϕ]compared to White race
[γ]compared to non-Hispanic ethnicity
[δ]compared to private insurance
[ϕ]compared to CCI = 0

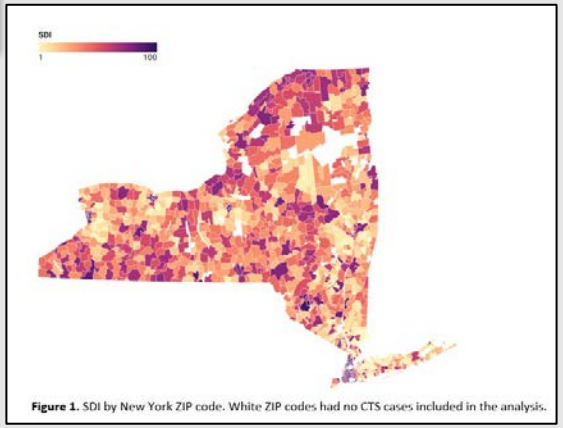

Figure 1. SDI by New York ZIP code. White ZIP codes had no CTS cases included in the analysis.

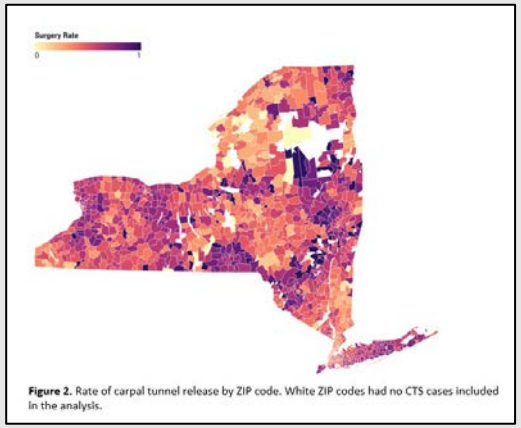

Figure 2. Rate of carpal tunnel release by ZIP code. White ZIP codes had no CTS cases included in the analysis.

Results

Cohort Analysis

- 92,921 patients with CTS; 30,043 (32.3%) patients received CTR
- No surgery group: Younger, higher social deprivation, increased incidence of female sex, Hispanic ethnicity, non-White race, Medicaid, Self-pay, and higher number of comorbidities
- White patients' surgical rate (44.1%), over twice rate among African Americans (19.1%)

Disparities Analysis

- Older age and worker's compensation compared to private insurance had increased odds of surgery
- Female sex had lower odds of surgery compared to males
- Asian, African American, and Other races had decreased odds of surgery relative to White race
- Patients of Hispanic ethnicity had decreased odds of surgery compared to non-Hispanic ethnicity
- Patients with Medicare, Medicaid, or self-pay insurance all had decreased odds of surgery compared to private insurance
- Higher social deprivation was also associated with decreased odds of surgery

Conclusions

- First study to utilize the SPARCS database to evaluate the demographic and socioeconomic differences between patients who did or did not undergo CTR after a diagnosis of CTS
- Patients with non-private insurance, non-White race, and from areas with higher social deprivation scores had decreased odds of receiving CTR
- SDI provides an example of one such strategy that could be used to highlight communities who are more at risk of health inequalities
- Considering the relationship between differential care and health disparities, it is critical to define the disparities involved and to increase physician awareness to promote appropriate management of CTS