

# Recognizing Neuropathic Pain as a Symptom of Charcot-Marie-Tooth Disease that Impairs Quality of Life

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## BACKGROUND

- Charcot Marie Tooth (CMT) Disease represents a spectrum of inherited sensorimotor neuropathies associated with 40+ gene mutations, with an estimated prevalence of 1:3,300 worldwide.
- Patient-reported outcome (PRO) data advance clinician understanding of disease burden from the perspective of the patients, helping prioritize underrecognized contributors to disease burden.

## OBJECTIVE

The primary goal of this study was to evaluate PRO data assessing the impact of CMT-associated pain on psychosocial well being.

## METHODS

### STUDY DESIGN

Participants with CMT recruited from North and South America, Europe, and Australia completed 3 discrete online surveys exploring demographics (N=1679), lifestyle (N=851), and psychosocial factors (N=251). Validated PROMIS® scales were used to generate T-scores describing the degree of neuropathic pain, life satisfaction, and social isolation compared to the provided control population.

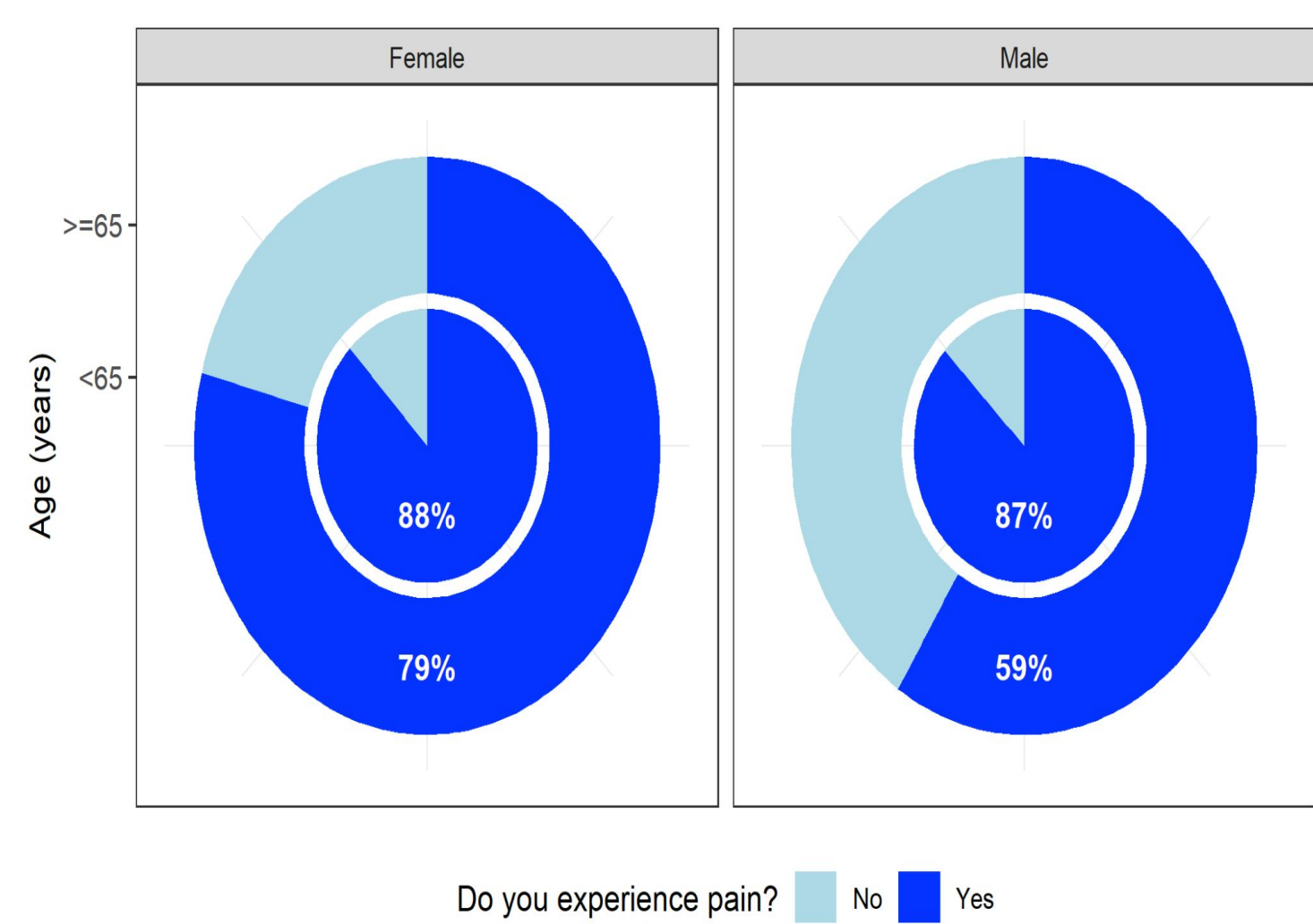
### DATA COLLECTION

Participants were recruited via Centers of Excellence, patient-focused summits, CMT Update quarterly newsletters, social media, and word of mouth. A self-reported diagnosis of CMT of any subtype was the only inclusion criteria. Surveys were completed from November 2019 through March 2022.

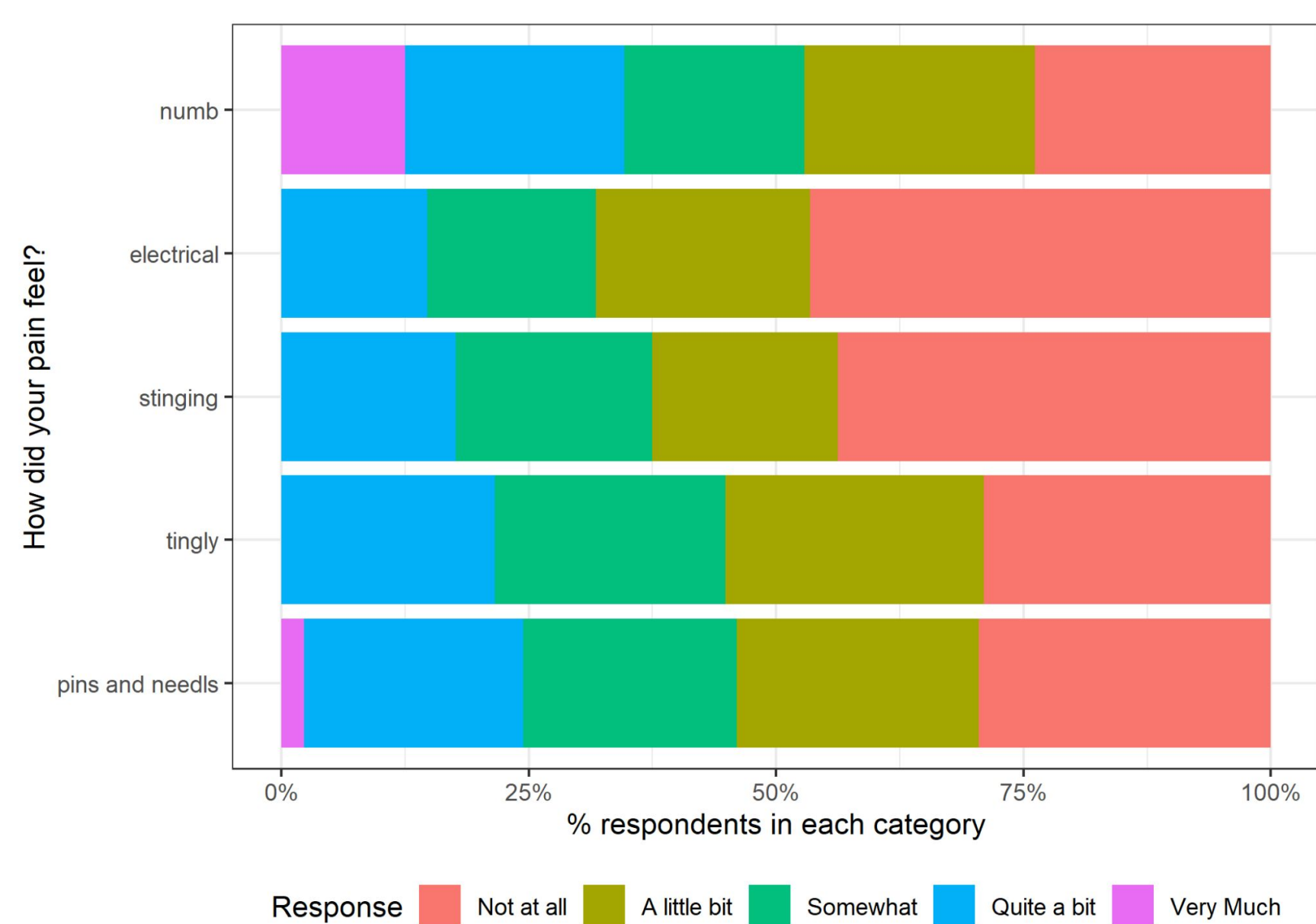
### ANALYSIS

Statistical analysis was performed utilizing chi-square analysis, Pearson's product-moment correlation, and Wilcoxon rank sum tests.

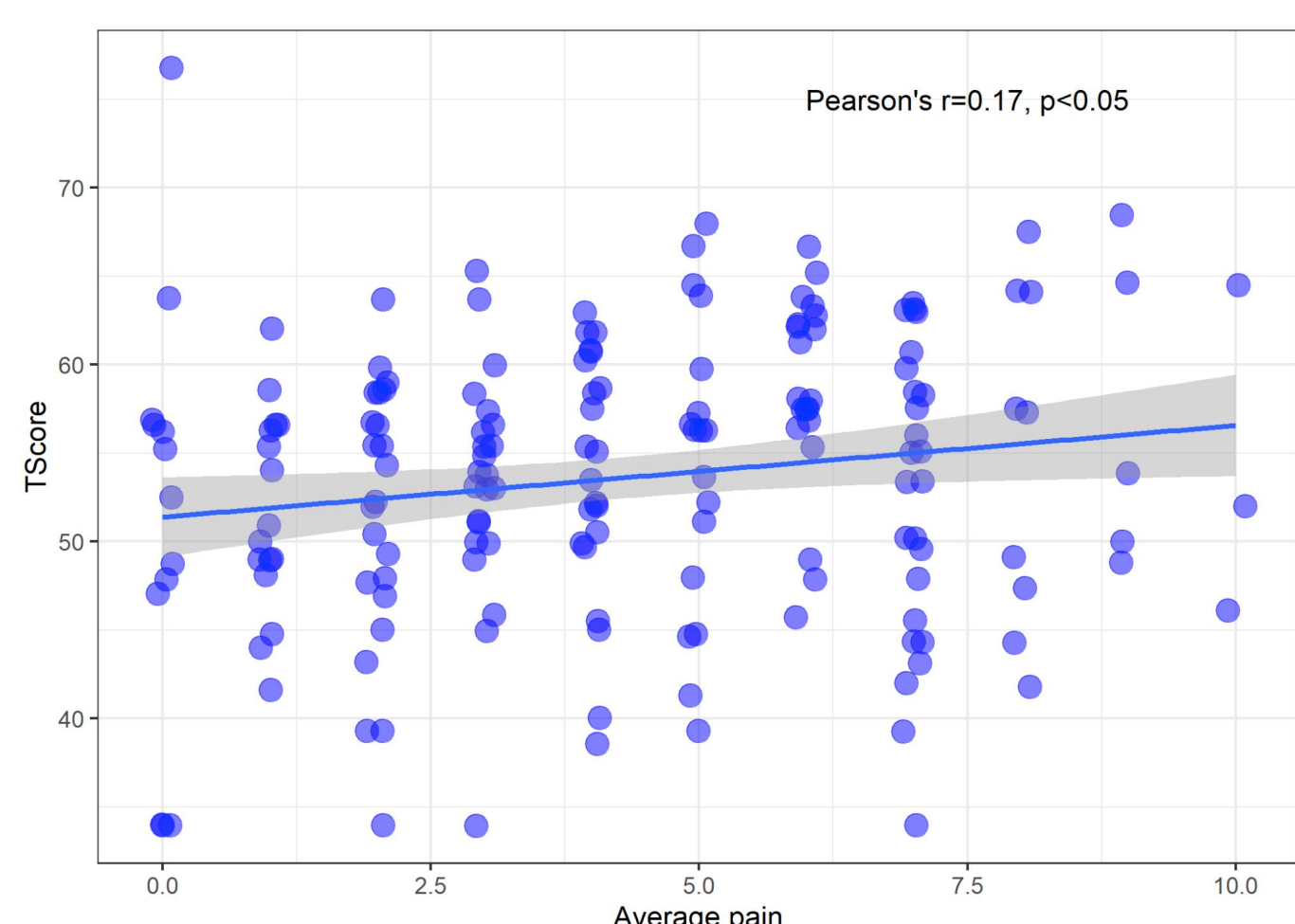
### Pain Severity Rating By Age & Gender



A majority of respondents (81.6%) reported pain in the past 7 days, with a mean (SD) severity of 4.2 ±2.5 out of 10.

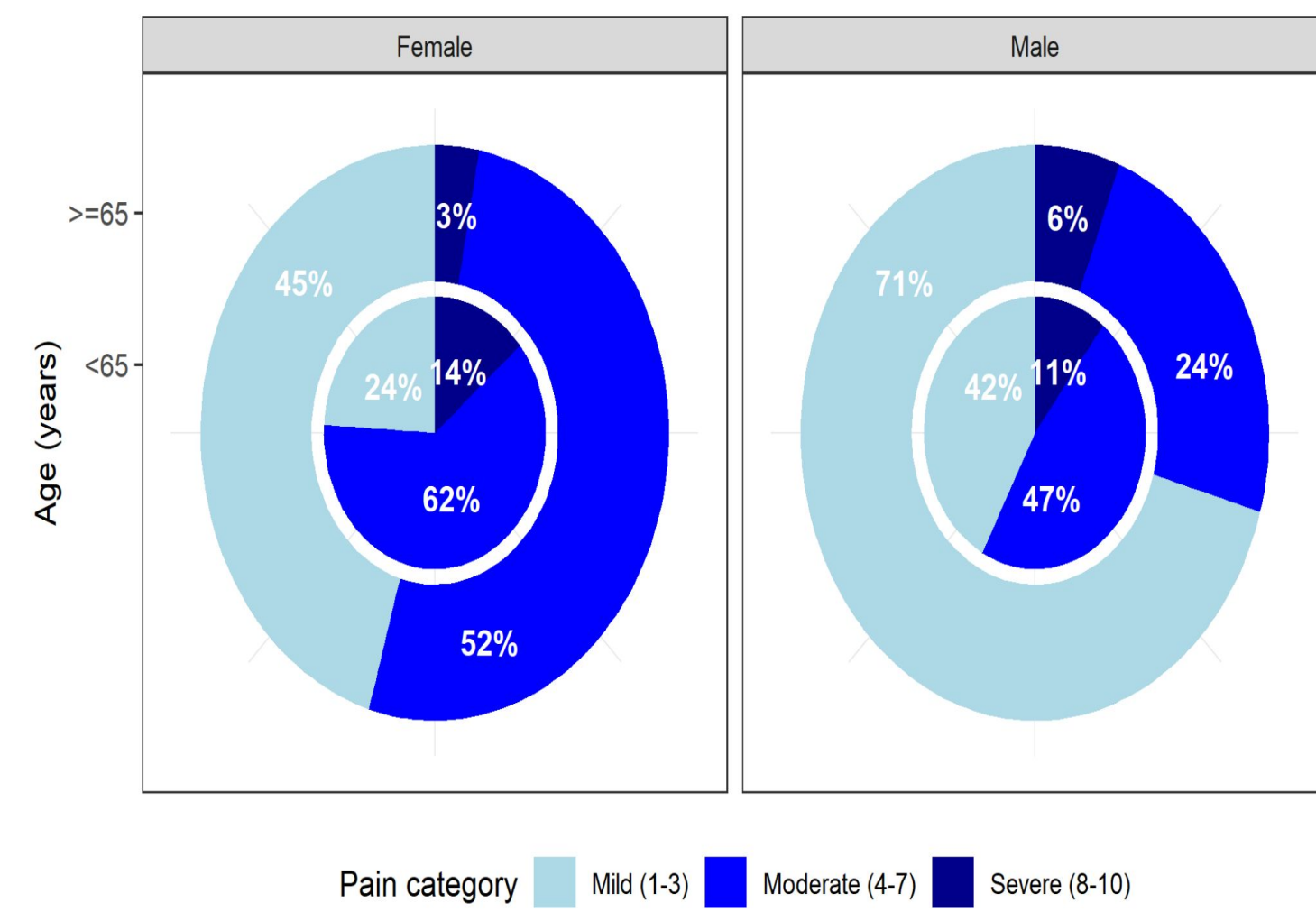


### Social Isolation T-Score By Pain Severity



Social isolation was correlated with pain severity ( $r=0.167$ ,  $p=0.02597$ ).

### Pain Reported in the Past 7 Days By Age & Gender

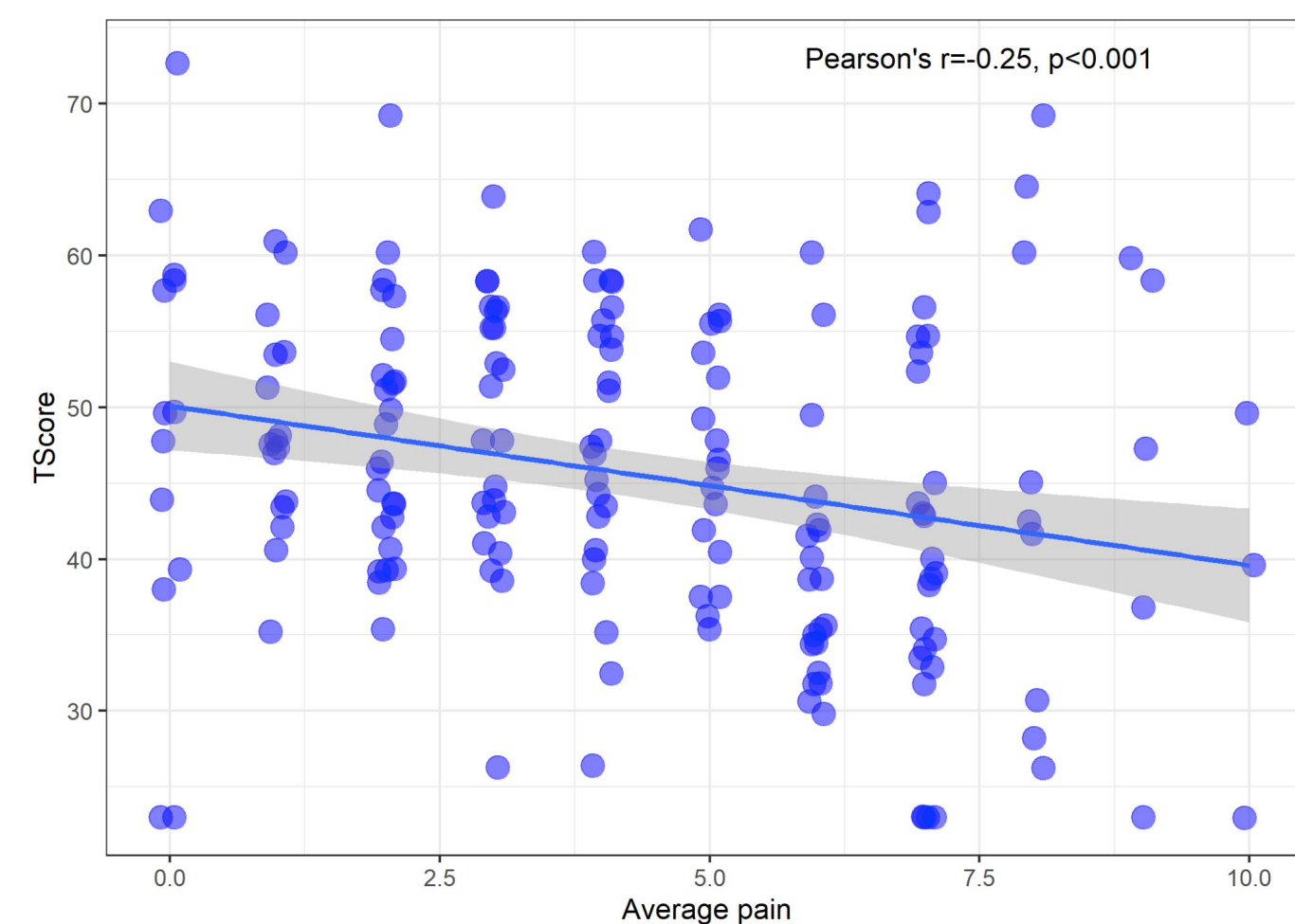


Females younger than 65 years old reported more severe pain than females older than 65 ( $p=0.035$ ), males younger than 65 ( $p=0.035$ ), and males older than 65 ( $p=0.03$ ).

### Neuropathic Pain Categorization Questions

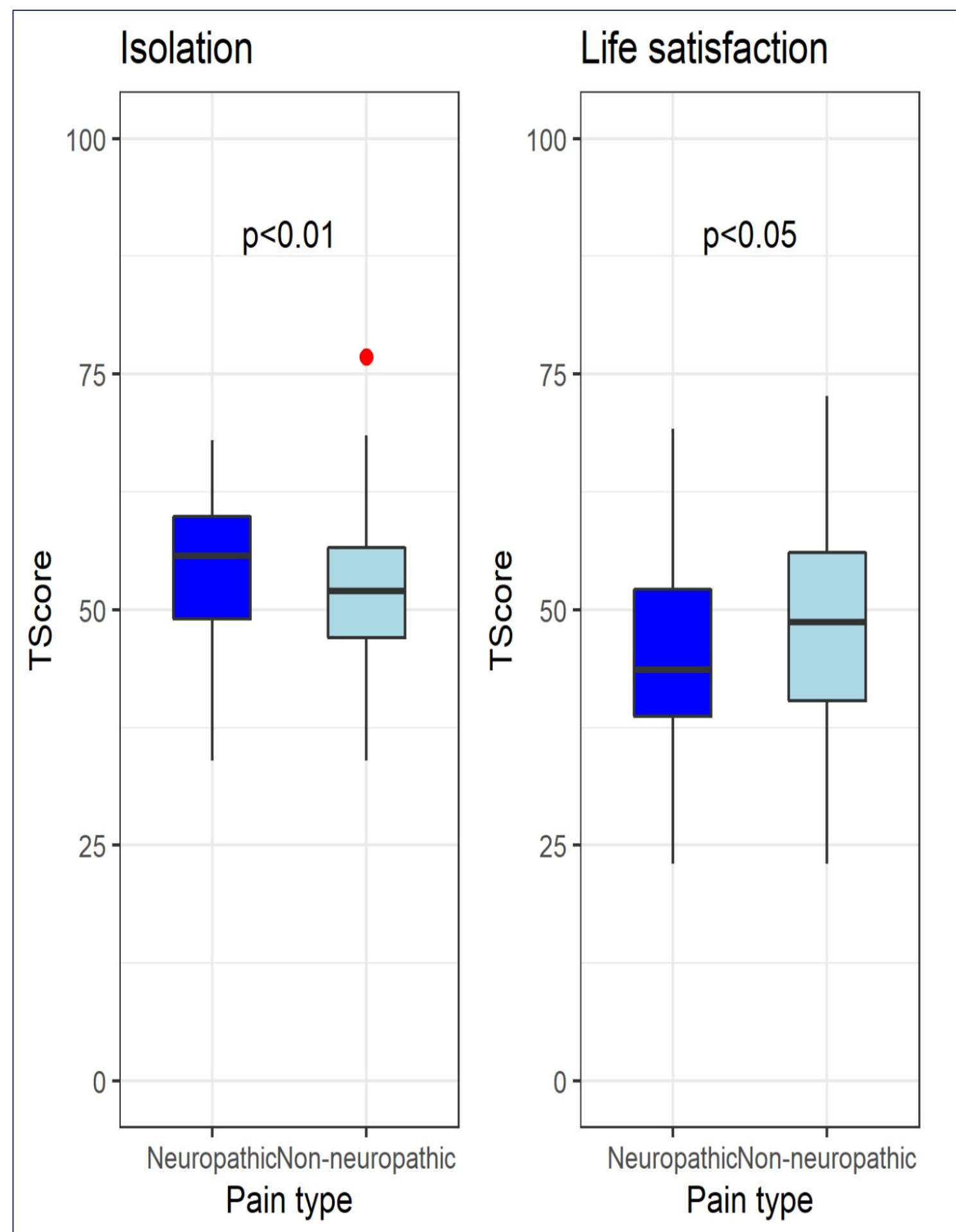
From these responses, a T-score was generated for each participant. A T-score threshold of 50 was used to categorize pain as neuropathic (Askew et al.). The majority of respondents experienced neuropathic-type pain (63.95%).

### Life Satisfaction T-Score By Pain Severity

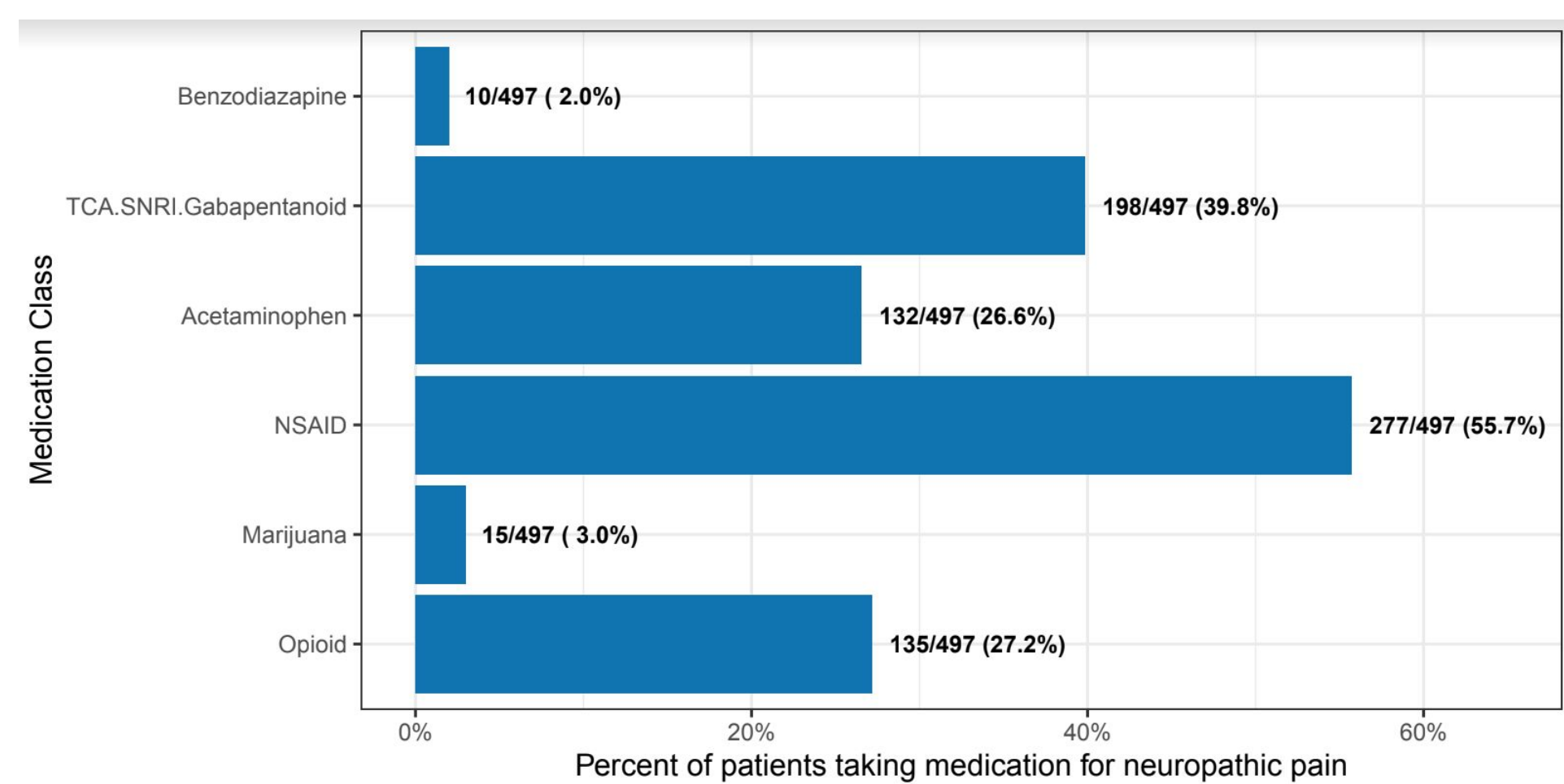


Life satisfaction scores decreased with increasing pain severity ( $r=-0.253$ ,  $p=0.00059$ ).

### Social Isolation and Life Satisfaction in Neuropathic vs. Non-neuropathic Pain



Compared to patients with non-neuropathic pain, patients with neuropathic pain reported increased social isolation ( $p=0.005967$ ) and decreased life satisfaction ( $p=0.03558$ ).



### Medications Prescribed for Neuropathic Pain

Of the 497 patients reporting use of prescription medications for neuropathic pain, 135 (27.2%) were prescribed opioids. Note that some participants took multiple drugs for neuropathic pain.

## CONCLUSIONS

- Patients with CMT report neuropathic pain as a significant contributor to disease burden.
- The majority of patients with CMT experience mild-moderate pain at least once per week.
- Severe, neuropathic-type pain was associated with heightened social isolation, diminished life satisfaction, and lower exercise engagement.
- High rates of opioid use for neuropathic pain in the survey population suggest opportunities for prescriber and patient education regarding evidence-based pain treatment.
- Interprofessional treatment of neuropathic pain may improve psychosocial and physical outcomes in CMT.

## LIMITATIONS

- Self-reported diagnoses of CMT were not confirmed with genetic reports. The study population may include some individuals with misdiagnosed CMT.

## FUTURE DIRECTIONS

- Based on the results of this survey and others, a second generation of the Global Registry for Inherited Neuropathies (GRIN) was commissioned.
- This registry will acquire more genetic reports, allowing for diagnostic confirmation and stratification by CMT subtype.

## ACKNOWLEDGEMENTS

We thank the Hereditary Neuropathy Foundation for its support to our research with funds raised via the University of Pennsylvania's Million Dollar Bike Ride.

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## REFERENCES

1. Askew RL, et al. A PROMIS Measure of Neuropathic Pain Quality. Value in Health 2016; 19:623-30
2. Hahn EA, et al. New English and Spanish social health measures will facilitate evaluating health determinants. Health Psychology 2014;33:490-9
3. Salsman J, et al. Assessing Psychological Well-Being: Self-Report Instruments for the NIH Toolbox. Quality of Life Research 2014;23:205-15