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Musculoskeletal Health Literacy in patients with Carpal Tunnel Syndrome: Pilot Results of a Cross-sectional Study

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Introduction

Health literacy is a measure of an individual's ability to obtain, process, and understand basic health information and services needed to make appropriate health decisions and is the most important predictor of one's health status.[1-4] Those with inadequate health literacy are more frequently associated with decreased medical knowledge, infrequent use of preventative services, increased hospitalization and use of emergency care, worse control of chronic diseases, and bad disease outcomes.[2-4] Conversely, patients with adequate health literacy experience more effective and meaningful interactions with their physicians and are better equipped to make informed and appropriate treatment decisions.[5,6]

In the United States, studies of health literacy have estimated that between 33% and 48% of Americans possess inadequate health literacy.[7-10] This is troubling, as the annual cost of low health literacy is estimated to range from $106 to $238 billion.[11]

In this study, the Literacy in Musculoskeletal Problems (LiMP) questionnaire was used to evaluate the prevalence of limited musculoskeletal health literacy in patients undergoing elective carpal tunnel release, a common procedure associated with significant health and socioeconomic implications (Figure 1).[12] It is crucial that we identify individuals with limited musculoskeletal health literacy, as they may be susceptible to inferior outcomes and a more complicated recovery following surgery.[13]

Methods

Setting and Study Sample

This cross-sectional study was approved by the Institutional Review Board at our medical center. A convenience sample of 65 English-speaking adults (age $\geq$ 18) was obtained from our institution's orthopaedic surgery outpatient practice between 03/01/2014 – 05/31/2014. Inclusion was limited to patients presenting for their routine pre-surgical office visit prior to elective, primary carpal tunnel release from a single surgeon. Patients were excluded if they didn't meet the aforementioned criteria, were unable to read English, or unable to sign their own consent.

Data Collection and Literacy Assessment

Participants first completed a five-minute demographic questionnaire, followed by the nine question, self-administered LiMP survey, which took five to seven minutes to complete. The LiMP scores ranged from 0-9, with scores $\geq$ 6 indicative of adequate musculoskeletal health literacy. This cutoff was determined in a validation study based on the methodology of Pendlimari et al.[5,18]

Statistics

Performance on the LiMP survey was evaluated as a function of the mean score and the prevalence of adequate and inadequate musculoskeletal literacy amongst participants. A chi-squared analysis was performed to assess whether demographic parameters significantly correlated with categorical outcome variables (limited or adequate musculoskeletal health literacy), with p-values < 0.05 considered significant.

Results

A total of 65 participants completed both the demographic and LiMP surveys. Participants were predominantly Caucasian (94%), female (62%) and had some college education (74%). Additionally, 69% reported that they had been seen in the past for a non-carpal tunnel related musculoskeletal complaint. Less than one-third of the participants were either currently or previously employed in the healthcare industry (29%).

The mean LiMP score was 6 $\pm$ 1.4. The prevalence of inadequate musculoskeletal literacy amongst participants was 34% (22/65). There was no significant correlation between the prevalence of adequate musculoskeletal health literacy and participants' gender, race, level of education, or history of healthcare employment ($p > 0.05$, Table 1). However, females, Caucasians, participants with a level of education $\geq$ college, and those with a current or prior occupation in healthcare experienced higher rates of adequate musculoskeletal

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1. **A "fractured" bone is _____**
   - ☐ The same as a broken bone
   - ☐ Worse than a broken bone
   - ☐ When bone pops through the skin
   - ☐ Easier to treat than a broken bone
   - ☐ I don't know

2. **All of the following facts about X-rays are true EXCEPT:**
   - ☐ X-rays involve more radiation exposure than an MRI
   - ☐ X-rays lead to the same amount of radiation exposure as a CT scan
   - ☐ X-rays lead to less radiation exposure than a CT scan
   - ☐ X-rays can be safely performed on pregnant women
   - ☐ I don't know

3. **What is the name of the bone in your thigh?**
   - ☐ Humerus
   - ☐ Radius
   - ☐ Femur
   - ☐ Tibia
   - ☐ I don't know

4. **An Orthopedic Surgeon is _____**
   - ☐ A doctor that cares for the heart
   - ☐ A doctor that cares for the ears, nose and throat
   - ☐ A doctor that specializes in care of the feet
   - ☐ A doctor that specializes in the care of bones and muscles
   - ☐ I don't know

5. **What is sciatica?**
   - ☐ Pain in your back and leg(s) caused by hip arthritis
   - ☐ Pain in your back and leg(s) caused by compression of nerve roots originating in your spine
   - ☐ Severe thigh pain due to a muscle spasm
   - ☐ Pain in your back and leg(s) due to a blood clot
   - ☐ I don't know

6. **The knee is a _____**
   - ☐ Bone
   - ☐ Ligament
   - ☐ Muscle
   - ☐ Joint
   - ☐ I don't know

7. **Arthritis is _____**
   - ☐ A joint disorder to due inflammation of one or more joints
   - ☐ Due to wear and tear of a joint
   - ☐ Sometimes develops due to an infection
   - ☐ All of the above
   - ☐ I don't know

8. **How does Rheumatoid Arthritis (RA) differ from Osteoarthritis (OA)?**
   - ☐ RA is due to the "wear and tear of joints", while OA is due to a chronic, systemic inflammatory disorder
   - ☐ RA is due to a chronic, systemic inflammatory disorder, while OA is due to the "wear and tear" of joints
   - ☐ OA only affects older people while RA only affects younger people
   - ☐ RA only affects the hips and knees, while OA can affect all joints
   - ☐ I don't know

9. **If you break your wrist, what might your doctor give you to help you heal?**
   - ☐ A surgery
   - ☐ A cast
   - ☐ A surgery or cast
   - ☐ I don't know

Figure 1. The LiMP questionnaire. Questions 3, 4, and 6 assess each patient's knowledge of anatomy and terminology. Questions 1, 5, 7 and 8 evaluate each patient's familiarity with musculoskeletal conditions. And questions 2 and 9 measure each patient's understanding of diagnostic tests and treatment modalities.

literacy. A significant correlation was found with adequate musculoskeletal health literacy in those individuals who had previously seen a physician for a musculoskeletal complaint ($p = 0.0001$,Table 1).

Discussion

Carpal tunnel syndrome (CTS) is the most common compressive neuropathy of the upper extremity, with an incidence of 3.46 cases per 100,000 person-years.[14] Carpal tunnel release (CTR), which is required in an estimated 43%-71% of patients with CTS, is performed over 500,000 times a year, at a cost of approximately $2 billion.[12,15,16] Although the reported success rates of CTR have ranged from 70% to greater than 90%, patient selection remains important as complications do occur.[17,18] Factors that have been shown to correlate with suboptimal outcomes include poor scores on patient-reported measures of upper extremity function and mental health status, pending legal action, and excessive alcohol intake.[19]

Adequate health literacy is required for patients to make informed decisions regarding their care.[5,6] Further, patients with limited health literacy have been shown to experience inferior outcomes.[2-4] Health literacy in patients with CTS has never been assessed, so we sought to evaluate the prevalence of and factors related to inadequate health literacy in patients undergoing elective CTR in order to help orthopaedic surgeons identify "at risk" populations who may be undergoing CTR.

This investigation demonstrated a 34% prevalence of inadequate musculoskeletal literacy among patients undergoing elective, primary CTR. This is consistent with the lower end of national estimates of limited general health literacy and greater than that seen in other specialty-specific literacy studies related to diabetes and heart disease, which found 15.1% and 17.5% of afflicted patients to have low health literacy, respectively.[7-10,20,21] We believe that the actual rate of limited musculoskeletal literacy may be even higher, as the participants in our study were predominantly Caucasians and had received at least partial college education. Several studies

Table 1. The rates of adequate musculoskeletal health literacy amongst subjects as a function of demographic characteristics. Those values highlighted in bold represent demographic characteristics associated with statistically significant ($p < 0.05$) differences in literacy.

Percentage with Adequate Literacy	
Gender	
Male	60%
Female	70%
Race	
Caucasian	68%
African American	50%
Other	N/A
Education	
≥ College	70%
< College	58%
Healthcare Employee/Profession (current or previous)	
Yes	85%
No	58%
Prior physician visit for musculoskeletal complaint	
Yes	80%
No	35%

have identified increased rates of adequate health literacy in such individuals, supporting our hypothesis.[22,23]

There was a statistically significantly higher proportion of adequate musculoskeletal literacy observed in those participants who had previously seen a physician for an orthopaedic-related problem. This is consistent with the added familiarity one would presumably have with the musculoskeletal system and orthopaedic conditions after such an interaction.

This study has several limitations. As a cross-sectional study utilizing a convenience sample, selection bias is a significant concern. Our high rates of Causasian, female and college educated participants might not accurately approximate the general population afflicted with CTS and a larger scale study is warranted to confirm our findings. The homogeneity of our sample across multiple demographics makes comparative analysis difficult. A larger sample size may identify statistically significant demographic risk factors. As with other patient-reported questionnaires, response and volunteer bias are potential confounders.

Conclusions

Our study suggests that approximately at least one-third of patients scheduled for elective, primary CTR may lack the necessary skills required for making informed decisions regarding their care. These patients may be at risk for suboptimal outcomes given their poor health literacy. Although patient education materials are widely available for patients with carpal tunnel syndrome through the American Academy of Orthopaedic Surgery (AAOS) and American Society of Surgery of the Hand websites, it has been shown that the readability of these materials may be too difficult for many to comprehend.[24] It is therefore essential that revised education campaigns be developed and geared toward those individuals most at risk for limited musculoskeletal health literacy.

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