Treatment Preferences of Physical Therapists in Management of Carpal Tunnel Syndrome: A Cross Sectional Survey

Maryam Misal Khan[1], Muhammad Uzair Khan[2], Karishma Kumari[3], Felicianus Anthony Pereira[4]

[1]Postgraduate Student, University of Illinois (Chicago Campus), Chicago, United States of America, (Study Conducted While Student at Dow University of Health Sciences), [2]Lecturer, National Institute of Physical Therapy and Rehabilitation Sciences, Karachi, Pakistan, [3]Clinician, Dow University of Health Sciences, Karachi, Pakistan, [3]Lecturer, Shaheed Benazir Bhutto Dewan University, Karachi, Pakistan

Abstract

Background: Carpal tunnel syndrome affects one out of ten people throughout their lives, and repetitive work related conditions affecting wrist and hand are the most common cause of prolonged absenteeism from work and limited functional ability. Multiple physical therapy interventions have been used by physical therapists for reducing pain severity, increasing range of motion and decreasing functional limitations in carpal tunnel syndrome.

Methods: A cross-sectional survey was conducted among 196 physical therapists in Karachi, Pakistan. Demographic data of physical therapists was obtained, as well as information regarding carpal tunnel syndrome and its intervention techniques used.

Conclusion: There existed variability among the treatment preferences of physical therapists regarding the management of carpal tunnel syndrome. A majority of respondents (72.4%) used nerve mobilization techniques, and therapeutic ultrasound was given by 66.3%. The least common intervention used was myofascial release (28.1%). Different approaches had been given in combination as well, which showed that physical therapists are also aware about the recent approaches and their effects for the management of CTS.

Keywords: *Carpal Tunnel Syndrome, Physical Therapist; Splint, Therapeutic Ultrasound*

Introduction

Carpal tunnel syndrome (CTS), a disorder in which there is entrapment of median nerve, is estimated to influence one out of ten people[1]. Most medical conditions affecting office workers are related to ergonomic etiologies that affect muscles, tendons and nerves, and are termed as musculoskeletal disorders[2]. In a survey of occupation related complains, illnesses related to repetitive work were 65%; and repetitive work related musculoskeletal conditions affecting wrist and hand were found to be the most common cause of prolonged leave from work[3].

Females are affected more commonly than males, particularly those consuming contraception pills, experiencing menopause, or undergoing estrogen therapy[4]. A retrospective cohort study conducted in Denmark among workers in slaughter houses, and on technicians who were exposed to high forces; concluded that carpal tunnel syndrome risks have increased due to repeated forces on both the hands after several years in the occupation[4].

As CTS is highly prevalent among all compression neuropathies[5], treatment guidelines suggest that management should be based on the duration and severity of the CTS[6]. Patients who do not experience severe symptoms and only mild to moderate functional limitations are managed through physical therapy treatment that includes cryotherapy, nerve mobilization, therapeutic ultrasound, bracing, education and home exercise plans[4,6,7]. Conservative treatment was recommended initially by the American Academy of Neurology. This comprises of bracing over wrist, and adjustment of daily activities[8]. Some hand exercises, therapeutic ultrasound and yoga have profound benefits supported by evidence, but they are not being administered widely[9].

Several studies have compared different treatment techniques for resolving CTS. A randomized trial found ultrasound-guided pulsed radiofrequency effective for resolving symptoms of median nerve entrapment[10]. A study conducted in Pakistan concluded that nerve mobilization treatment yields superior results in reducing pain severity as compared to therapeutic ultrasound[11].

Literature on the use of ultrasound as a treatment modality in CTS presents a conflicting view. Few articles advocate the use of ultrasound as an effective treatment modality[7]. The main objective of management is to reduce pressure, swelling and obstruction of blood flow in the carpal tunnel. A systematic review performed by the American Academy of Surgeons stated that in order to increase the quality of medical treatments, interventions should be based upon the recovery and improvement from the disease at moderate and suitable cost. Additionally, approaches directed towards patients' interests, demands and preferences are important and essential in the management of patients' condition[15].

The purpose of this study was to identify the most used approaches for the treatment of median nerve compression. This research not only highlighted the frequency of particular treatment but also focused on the physical therapist's opinions and relationships of their expertise, experience and gender with the use of specific modality and technique. This study also emphasized on physical therapists' awareness about current home management programs and patient-centered approaches that are vital in order to reduce the increasing severity of CTS.

Materials and Methods

Approval for this study was given by Institute of Physical Medicine & Rehabilitation, Dow University of Health Sciences. A cross sectional survey was conducted among physical therapists working in public/private sector hospitals and clinical settings in Karachi, Pakistan. At least one year of clinical experience was required in order to be included in the study. Exclusion criteria included therapists working in academic settings, and never having treated a patient of CTS. A sample size of 196 was calculated using OpenEpi version 3, with hypothesized frequency of 85% (for the intervention, physical therapists implement home exercise) and design effect of 1% at 95% confidence interval[19]. A self-designed questionnaire was used to collect data. Participants were explained the aim of the study, after which an informed consent form was obtained. The questionnaire was self-designed mixed structured, which consisted open and close-ended questions and was divided into two parts; first that required the demographic details of the physical therapists and second part was comprised of sixteen subjective questions. Data was entered and analyzed using SPSS v21 and descriptive variables were reported using frequencies and percentages. For association, Pearson's chi-squared test was applied, and p- value

less than 0.05 was considered significant.

Results and Discussion

A majority of participants (57.7%) were practicing in private sector, and average age of physical therapists was 30.02±6.90 years, with average clinical experience 6.77±5.32 years. Gender was distributed almost equally (47.4% males and 52.6% females). Regarding different therapeutic interventions given by physical therapists for CTS, nerve mobilization technique was used by 72.4% (n=142), therapeutic ultrasound was given by 66.3% (n=130), and myofascial release was given by only 28.1% (n=55) of respondents. Qualifications of the physical therapists are highlighted in Figure 1.

Our research found that qualification is statically significant with splinting as a treatment regimen (p=0.021), as well as an association between specialty of physical therapists and the treatment intervention preferred for the management of CTS (p=0.03), as well as myofascial release (p=0.015). Nerve mobilization did not have a significant relationship with clinical settings of physical therapists (p=0.60). Similarly, no association was found between clinical experiences of physical therapists with management technique of CTS (nerve mobilization p=0.270, therapeutic ultrasound p=0.968, and cryotherapy and ergonomic modification were p=0.539 and p=0.271 respectively).

The purpose of this study was to find the treatment preferences for the management of CTS among physical therapists of Karachi, Pakistan. The results of this study highlighted that nerve mobilization was the only treatment which was given by a majority of physical therapists, with therapeutic ultrasound the next most preferred intervention. Splinting and cryotherapy were utilized to some extent, but ergonomic modification and myofascial release were least likely to be used. As compared to neurological and orthopedic, physiotherapists were significant in number who had specialty in MSK and most of them did not have any specific training for the management of CTS. In addition to the treatment strategies, this study had also highlighted the opinion of physiotherapists regarding the gender and age group who was more affected by this complication. Scott Blumenthal et al proved that older adults having CTS showed more severe median nerve compression as compared to younger adults confirmed by diagnostic testing, concerning muscle wasting and weakness but there was no significant difference related to physical symptoms[17]. In our current practice survey, we discovered that responders have treated the majority of patients from the age group of 30-39 years and least were reported from 50-59 years.

Vikranth G. R. et al compared the effect of carpal bone mobilization versus neural mobilization in improving pain, functional status and symptoms severity in patients with CTS and according to the author, both treatments are effective in improving pain and decreasing functional limitation, and there is no noticeable difference among the intervention regimen[18]. In our survey, nerve mobilization was applied by more than half of responders and none of them reported carpal bone mobilization. Similarly, Cantero-Tellez R, et al reported that majority of therapists advised home exercise program in CTS[18] but our study identified avoidance of prolonged and repetitive movements as the major method of home management program.

Dincer et al evaluated and confirmed the efficacy of ultrasound, splinting and low-level laser therapies for the management of carpal tunnel syndrome, and reported that low-level laser therapy with splinting was more efficient than therapeutic ultrasound, for the alleviation of symptoms and pain associated with

CTS[20]. However, in our survey responders preferred therapeutic ultrasound over splinting. No participant reported low-level laser therapy as their choice of treatment technique.

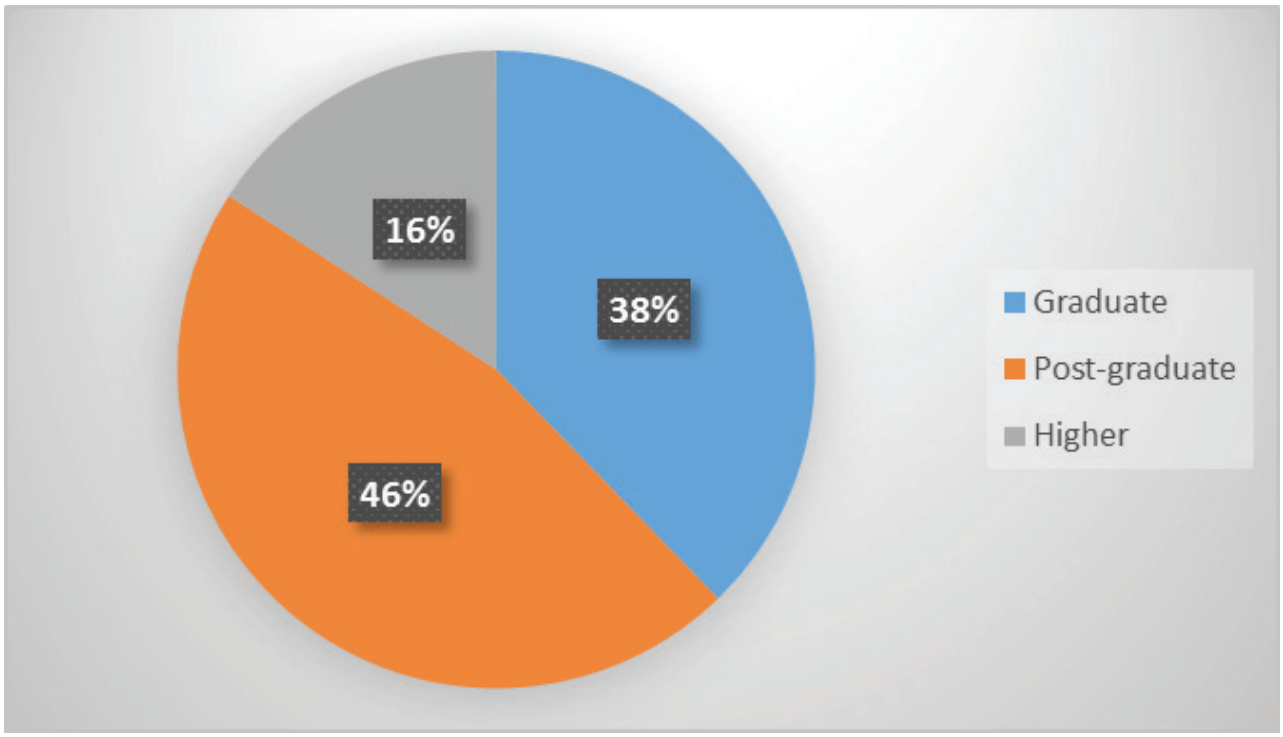

Figure 1: qualifications of physical therapists

Conclusion

Physical therapists in Karachi have a preference for nerve mobilization and therapeutic ultrasound for the management of CTS. There is an association between the qualification (postgraduates) of physical therapists, and splinting. It was also found that there is some relationship between specialty of physical therapists i.e. musculoskeletal with splinting and musculoskeletal with myofascial release. This study had also revealed that age, gender, clinical setting, and clinical experience do not have any significant effect on preference of treatment for CTS.

Acknowledgements

The authors would like to acknowledge the participants of this study, for their valuable time.

Conflicts of Interest: There are no conflicts of interest to report.

Ethical Clearance: Ethical clearance to conduct this study was obtained from Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences.

Source of Funding: The authors received no external funds to conduct this study. All expenses were borne by the authors.

References

1. Ibrahim I, Khan W, Goddard N, Smitham P. Suppl 1: carpal tunnel syndrome: a review of the recent literature. The open orthopaedics journal. 2012;6:69.

2. Sommerich CM, McGlothlin JD, Marras WS. Occupational risk factors associated with soft tissue disorders of the shoulder: a review of recent investigations in the literature. Ergonomics. 1993;36(6):697-717.

3. Barr AE, Barbe MF, Clark BD. Work-related musculoskeletal disorders of the hand and wrist: epidemiology, pathophysiology, and sensorimotor changes. Journal of orthopaedic & sports physical therapy. 2004;34(10):610-27.

4. Calandruccio JH, Thompson NB. Carpal tunnel syndrome: making evidence-based treatment decisions. Orthopedic Clinics. 2018;49(2):223-9.

5. Carlson H, Colbert A, Frydl J, Arnall E, Elliot M, Carlson N. Current options for nonsurgical management of carpal tunnel syndrome. International journal of clinical rheumatology. 2010;5(1):129.

6. Baker NA, Stevans J, Terhorst L, Haas AM, Kuo Y-F, Al Snih S. What Types of Treatment Are Provided for Patients With Carpal Tunnel Syndrome? A Retrospective Analysis of Commercial Insurance. PM&R. 2018.

7. Baysal O, Altay Z, Ozcan C, Ertem K, Yologlu S, Kayhan A. Comparison of three conservative treatment protocols in carpal tunnel syndrome. International journal of clinical practice. 2006;60(7):820-8. Wilgis EF. Treatment options for carpal tunnel syndrome. Jama. 2002;288(10):1281-2.

9. Wong S, Hui AC. Controversies surrounding the diagnosis and treatment of carpal tunnel syndrome. Clinical Practice. 2007;4(2):111.

10. Chen L-C, Ho C-W, Sun C-H, Lee J-T, Li T-Y, Shih F-M, et al. Ultrasound-Guided Pulsed Radiofrequency for Carpal Tunnel Syndrome: A Single-Blinded Randomized Controlled Study. PloS one. 2015;10(6):e0129918-e.

11. Alam M KM, Ahmed SI, Ali SS. Effectiveness of neural mobilization and ultrasound therapy on pain severity in carpal tunnel syndrome. Biomedical Research and Therapy. 2018.

12. Gerritsen AAM, de Vet HCW, Scholten RJPM, Bertelsmann FW, de Krom MCTFM, Bouter LM. Splinting vs Surgery in the Treatment of Carpal Tunnel SyndromeA Randomized Controlled Trial. Jama. 2002;288(10):1245-51.

13. Keir PJ, Bach JM, Rempel DM. Effects of finger posture on carpal tunnel pressure during wrist motion. Journal of Hand Surgery. 1998;23(6):1004-9.

14. Michlovitz S, Hun L, Erasala GN, Hengehold DA, Weingand KW. Continuous low-level heat wrap therapy is effective for treating wrist pain¹. Archives of Physical Medicine and Rehabilitation. 2004;85(9):1409-16.

15. Ono S, Clapham PJ, Chung KC. Optimal management of carpal tunnel syndrome. International journal of general medicine. 2010;3:255-61.

16. R1 C-T, * KV, GOS, VJ. Current Practice Patterns After Carpal Tunnel Release. A Survey of Clinical Practice Trends Across the World. Mathews Journal of Orthopedics. 2018(21 Feb 2018).

17. Blumenthal S, Herskovitz S, Verghese J. Carpal tunnel syndrome in older adults. Muscle & nerve. 2006;34(1):78-83.

18. Vikranth .G .R VKKC, Lawrence Mathias. COMPARATIVE EFFECT OF CARPAL BONE MOBILIZATION VERSUS NEURAL MOBILIZATION IN IMPROVING PAIN, FUNCTIONAL STATUS AND SYMPTOMS SEVERITY IN PATIENTS WITH CARPAL TUNNEL SYNDROME. International Journal

of Physiotherapy. 2015;2(3):524-30.

19. Cantero-Tellez R. Valdes k, Garcia-Orza S and Villa-fañe JH.(2018). Current Practice Patterns After Carpal Tunnel Release. A Survey of Clinical Practice Trends. MJ Orth. 3 (1): 019. Citation: Cantero-Tellez R, Valdes k, Garcia-Orza S and Villafañe JH. 2018.
20. Dincer U, Cakar E, Kiralp MZ, Kilac H, Dursun H. The effectiveness of conservative treatments of carpal tunnel syndrome: splinting, ultrasound, and low-level laser therapies. Photomedicine and laser surgery. 2009;27(1):119-25.