

UNIVERSITI TEKNOLOGI MARA

**EFFECTIVENESS OF SENSORY
RE-EDUCATION AS
ADJUNCT THERAPY TO
CONSERVATIVE INTERVENTION
PROGRAM ON HAND FUNCTION
IN THE TREATMENT OF
MODERATE TO SEVERE
CARPAL TUNNEL
SYNDROME: A QUASI-
EXPERIMENTAL STUDY**

ANWAR BIN ABDULLAH

MSc

May 2021

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

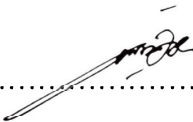
Name of Student : Anwar Bin Abdullah

Student I.D. No. : 2017694978

Programme : Master of Health Sciences (Occupational Therapy) –
HS765

Faculty : Health Sciences

Thesis Title : Effectiveness Of Sensory Re-education As Adjunct
Therapy To Conservative Intervention Program On
Hand Function In The Treatment Of Moderate To
Severe Carpal Tunnel Syndrome: A Quasi-
Experimental Study.

Signature of Student : 

Date : May 2021

ABSTRACT

Introduction: Sensory Re-education (SR) is one of the treatment options for the ongoing discomfort and poor tactile gnosis encountered by clients with Carpal Tunnel Syndrome (CTS). However, there is a little published study on investigating the effectiveness of the SR program with the standard conservative treatment as compared to the option of utilizing the SR program following the surgical procedure.

Purpose: This study was divided into two-phase, i.e., Phase One: was aimed to determine the psychometric properties of the cross-cultural Malay version of the Boston Carpal Tunnel Questionnaire (M-BCTQ) as a preparation for the next phase; Phase Two: was aimed to evaluate the effects of the SR program as an adjunct to standard conservative treatments in improving hand function of clients with moderate to severe CTS as compared to standard conservative treatments alone.

Methodology: A cross-sectional study in Phase One and a quasi-experimental study in Phase Two was conducted in the Hand and Microsurgery Unit at Selayang Hospital, Selangor. In the Phase One study, 65 clients with CTS and ten professional therapists were recruited to participate in the reliability and validity cross-sectional study of M-BCTQ. While, in Phase Two, 108 clients were allocated to either SR program and standard conservative treatments (SR+SCT) group (n=54) or standard conservative treatments (SCT) group (n=54) for eight weeks treatment period. A total of 96 clients completed a 4-week and 8-week follow-up. The primary outcome measures in this study were the Semmes Weinstein Monofilament (SWM), Locognosia, Static two-point discrimination (2PD) and the M-BCTQ. Secondary outcomes were handgrip strength, Visual Analog Scale (VAS), and Purdue Pegboard test for fine motor function.

Results: M-BCTQ has been verified to have excellent test-retest reliability with ICCs value of 0.837 for Symptom Severity Scale (SSS) and 0.893 for the Functional Status Scale (FSS). A strong correlation was found with the Malay version of Disability of Arm, Shoulder and Hand Questionnaire (MVDASH) as Spearman correlation for construct validity was 0.791 for SSS and 0.831 for FSS. While, in Phase Two study, significant group differences in favour to SR+SCT group was shown at 4-week and 8-week follow-up for the primary outcomes measures involves of Locognosia ($p=0.001$, $p=0.027$), Static 2PD ($p<0.001$, $p<0.001$), and M-BCTQ for Overall ($p=0.001$, $p<0.001$), and SSS ($p<0.001$, $p<0.001$). For the secondary outcome, only Purdue Pegboard test in Left hand ($p=0.025$, $p=0.028$) and Assembly ($p<0.001$, $p<0.001$) subtest were shown significant group differences at 4-week and 8-week follow-up. Repeated measure ANOVA showed that there was a significant main effect of all outcome measures within both groups excepts for SWM score and Static 2PD in the SCT group. Although the analysis from linear mixed model has confirmed that gender and severity of numbness were found influenced the effect of the intervention particularly in Purdue Pegboard test, the SR+SCT group showed better improvement in all outcome measures as compared to SCT group.

Conclusion: This study has validated the M-BCTQ as an evaluation tool for CTS's clients with Malay speaking population in Malaysia. This study also highlighted the use of SR program as an adjunct to standard conservative treatments improved the hand function and symptoms of clients with moderate to severe CTS as compared to standard conservative treatments alone. Findings from this study have had a significant impact on the body of knowledge and practice of occupational therapy in hand therapy on the management of CTS via a non-pharmacological and non-surgery approach.

ACKNOWLEDGEMENT

In the name of Allah SWT, Most Gracious, Most Beneficent

Alhamdulillah, all praises to Allah for the strengths and His blessing in completing this thesis. I want to express my deepest gratitude to my supervisor, Dr Ahmad Zamir Che Daud, for his excellent guidance, constant support, patience, and providing me with an incredible atmosphere on doing my research. Not forgotten, my co-supervisors, Dr Akehsan Dahlan and Dato' Dr Rashdeen Fazwi Muhammad Nawawi, for their invaluable help from constructive comments and suggestions as well as providing inspiration that contributed to this long and challenging journey successfully.

My appreciation goes to the medical officers and therapist of the Hand and Microsurgery Unit, Selayang Hospital, Selangor, who provided the facilities and assistance during data collection. Special thanks to Pn. Julia and Pn Raimi Sakinah for the cooperation and helping me to conduct the data collection for this study.

Finally, this thesis is dedicated to my beloved parents and parents in law for their prayers and encouragement. Special thanks to my lovely wife, Noor Amiera Binti Alias and my three lovely kids, Zahin Arfan, Aisy Zhafira, and Ayra Zhiya, who were always there cheering me up and stood by me through the good and bad times. This piece of victory is dedicated to all of you.

I realized this journey is not about the intelligence but your mental strength and blessed to be supported by your surrounding people. May Allah bless them and granted them a special reward for helping me complete this mission.

TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF PLATES	xi
LIST OF SYMBOLS	xii
LIST OF ABBREVIATIONS	xiii
CHAPTER ONE: INTRODUCTION	1
1.1 Research background	1
1.2 Problem Statement	3
1.3 Research questions	5
1.4 Objectives	6
1.4.1 General objectives	6
1.4.2 Specific objectives	6
1.5 Research hypothesis	6
1.6 Conceptual framework	7
1.7 Significance of study	9
1.8 Overview of thesis chapter	11
CHAPTER TWO: LITERATURE REVIEW	13
2.1 Introduction	13
2.1.1 Prevalence of Carpal Tunnel Syndrome	13
2.1.2 Implications of the Carpal Tunnel Syndrome	14
2.1.3 Management of the Carpal Tunnel Syndrome	16
2.1.4 Conservative management of Carpal Tunnel Syndrome	17