COMPARATIVE EFFECTIVENESS OF CLINIC-BASED AND TELEREHABILITATION APPLICATION OF MCKENZIE THERAPY AMONG PATIENTS WITH CHRONIC NON SPECIFIC LOW-BACK PAIN

BY

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CERTIFICATION

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DEDICATION

This work is dedicated to my children, Zainab Opeyemi Olaoye and her siblings for their love and encouragement towards the successful completion of this Master's degree program.

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TABLE OF CONTENTS

CHAPTER TWO: LITERATURE REVIEW

CHAPTER THREE: METHODOLOGY

LIST OF TABLES

LIST OF PLATES

LIST OF FIGURE

LIST OF APPENDICES

ABSTRACT

This study evaluated the effect of Telerehabilitation-Based McKenzie Therapy (TBMT) on Pain Intensity (PI), Back Extensors Muscles' Endurance (BEME), Activity Limitation (AL), Participation Restriction (PR), General Health Status (GHS) and Cost-Utility (CU) in patients with Chronic Non-Specific Low-Back Pain (CNSLBP).Also, the study evaluated the effect of Clinic-Based McKenzie Therapy (CBMT) on PI, BEME, AL, PR, GHSand CU in patients with CNSLBP.In addition, the study compared the effects of TBMT and CBMTon PI, BEME, AL, PR, GHSand CU at 4th and 8th week of the study with a view to providing a validated telerehabilitation platform for management of CNSLBPand to increase cost-effectiveness.

This study was a randomized-controlled trial involving 70 patients with CNSLBP. The patients were randomly assigned into either CBMT or TBMT group using block permuted randomization. Participants in both groups received standard McKenzie extension protocol.The protocol involves a course of specific lumbosacral repeated movements in extension that cause the symptoms to centralize, decrease or abolish. TBMT is the mobile-phone application platform of the CBMT. Treatment was applied thrice weekly for eight weeks. Outcomes' data assessed at the end of 4th and 8th week were used for analysis. Data were analyzed using Independent t-test, Mann Whitney U-test, repeated measure ANOVA, Friedman's ANOVA, Kruskal-Wallis tests and multiple comparisons post-hoc tests. Alpha level was set at $p< 0.05$.

Participants' mean age and pain duration was 48.8±11.1 years and 8.96±3.04 months respectively. Within-group comparison across baseline, 4^{th} and 8^{th} week indicate that TBMT had significant effects on PI (4.95±0.92;3.00±0.71vs;0.76±0.94 F=317.377,p=0.001), BEME (25.8±15.2;35.5±15.0; 40.1±13.6 F=97.815, p=0.001), AL (10.2±4.66; 5.38±3.14; 2.29±2.47 F=78.362, p=0.001), PR (23.9 vs.21.4vs. 22.8; p=0.001) and the eight items of GHS (p=0.001).

CBMT had significant effect on PI (5.31±1.44; 3.46±1.07; 1.77±0.91 F=139.21, 0.001), BEME (20.4±12.8;29.1±12.8;35.4±11.4 F=101.397 p=0.001), AL (11.8±4.78; 6.38±3.02; 2.50±1.72 F=125.265, p=0.001), PR (24.1 vs. 26.1 vs. 25.0; p=0.001) and the eight items of GHS (p=0.001). However, there were no significant differences (p>0.05)in the treatment effects (mean change) between TBMT and CBMT, except for item 'energy fatigue' of the GHS where the TBMT group had significantly higher mean rank than the CBMT (26.7 vs. 21.9; (p=0.010). Estimated treatment cost per patientwas N22, 200.00and N38, 200.00for TBMT and CBMT respectively (cost estimate ratio was 0.58:1). The cost utility values for TBMT per Quality Adjusted Life Years (QALYs) was N75,482.30 for ongoing cost only with a range of N67,934.10 and N83,030.50 for 10% increase and decrease in the QALYs.

In conclusion,McKenzie Therapy (MT) conducted via a telerehabilitation platform has comparable outcomes with clinic-based MT. Therefore, telerehabilitation application of MT is effective in management of chronic non-specific low-back pain and has lower cost estimate compared to clinic-based McKenzie therapy(CBMT).

CHAPTER ONE

INTRODUCTION

I.1 BACKGROUND OF STUDY

Low-Back Pain (LBP) is described as a constellation of symptoms of pain, discomfort, muscle tension or stiffness that often originates from the lumbar spine and it is localized below the costal margin and above the inferior gluteal folds which may present with or without sciatica (Waddell, 1998; Ehrlich, 2003; Burton et al, 2004; van den Bosch et al, 2004). LBP is typically classified based on aetiology as being specific or non-specific (Manek and MacGregor, 2005). The non-specific LBP refers to mechanical back pain of musculoskeletal origin in which symptoms vary with physical activity (Waddell, 1996). On the other hand, LBP is classified as acute, sub-acute and chronic according to duration of pain (Bouter et al, 1998). Chronic LBP is defined as spinal pain persisting for at least twelve weeks (Abenheim et al, 2000).

Statistics on incidence and prevalence of LBP is varied. Commonly, literature shows that about 70 to 85 % of all people have LBP at some time in their life (Waddell, 1998; Andersson, 1999; Goodwin and Goodwin, 2000; van Tulder, 2001; Vinod et al, 2011). About 80-90% of these patients with LBP will get better within 6 weeks, in spite of treatment (Spitzer 1987; Indahl et al, 1995; Bronfort et al, 1996; van Tulder et al, 1997; Jackson, 2001; Deyo 2002). Nonetheless, 5-15% of all cases of LBP will become chronic (i.e. lasting for three months and longer) (Carette 1994; Johannsen et al, 1995; Bigos et al, 2001; Quittan 2002). Over 80% of patients with chronic LBP will develop recurrent episodes (Waddell, 1998), 93% will have intermittent or recurrent episode of LBP again in the following 12 months (de Vet et al, 2002)

and about 66% of subjects with recurrent chronic LBP who sought care for complaints at baseline, will seek care again during follow-up (IJzelenberg and Burdorf, 2004).

Chronic LBP is more resistant to therapeutic intervention (Cottingham and Maitland, 1997; Hildebrandt et al, 1997; Frost et al, 2000; Fersum, 2011). Treatment intervention in these patients (i.e. with long-term LBP) is reported to give variable outcomes (CSAG, 1994; Rainville et al, 1997; Carpenter and Nelson, 1999). There is lack of evidence for single treatment interventions for patients with chronic non-specific LBP despite the substantial amount of randomised controlled trials evaluating treatment outcome for this disorder (Fersum, 2011). The Clinic on Low-Back Pain in Interdisciplinary Practice Guideline (Rossignol et al, 2007) reported that there was strong evidence for multidisciplinary programmes, behavioural therapy and exercise for chronic LBP. Similarly, systematic reviews of the evidence concerning the effectiveness of exercise concluded that exercise may be helpful for patients with chronic LBP in terms of decrease in pain and disability (Hayden et al, 2005a), decrease in fear of avoidance behaviour (van Tulder et al, 1997; Liddle et al, 2004) and return to normal activities of daily living and work (van Tulder et al, 2002).

Exercise is the central element in the physical therapy management of patients with chronic mechanical LBP (Bigos et al, 1994; van Tulder et al, 2003; Hayden et al, 2005). Still, there does not appear to be a consensus of opinion on the most effective programme designed to maintain exercise benefits (Bronfort et al, 1996; Faas, 1996; Lahad et al, 1996; Carpenter and Nelson, 1999; Kenny, 2000; Taimela et al, 2000). Some researchers identified not sub-grouping patient samples as a possible flaw with much of the previous research (Fritz et al, 2003; Long et al, 2004; Brennan et al, 2006). Sub- grouping of patients with LBP according to their signs and symptoms where treatment is then prescribed according to these subgroups is considered as an

important advance in the management of LBP (Fritz et al, 2003; Long et al, 2004; Brennan et al, 2006).

One of the more commonly used methods of sub-grouping amongst physiotherapists is the McKenzie Method (McKenzie and May, 2003). The McKenzie method is a popular classification-based treatment for LBP among physical therapists (Battie et al, 1994; Foster et al, 1999; Ayanniyi et al, 2007) with documented effectiveness in some studies (Ponte et al, 1984; Nwuga and Nwuga, 1985; Stankovic and Johnell, 1990; Reddeck, 1997; Cherkin et al, 1998; Machado et al, 2006).This method is based on the patient's directional preference. Directional Preference is defined as the movement or posture that decreases or centralizes pain that emanates from the spine and/or increases range of movement (McKenzie and May, 2003). Directional preference and centralization occur only in the substantial derangement group (McKenzie and May, 2003). The separate, but associated, phenomenon of centralization refers to the abolition of distal pain in response to repeated movements or sustained postures.

The strong association between certification in the McKenzie Diagnostic Therapy (MDT) to obtain best results (Dreisiger, 2007; Mooney, 2005)is a potential limitation in providing access to proven intervention for patients with chronic mechanical LBP who may not have certified faculties and facilities for care. Telerehabilitation is a potential solution to bridge this service delivery gap, especially, in geographically remote areas with shortage of services and lack of access to physical therapy rehabilitation services (Dansky et al, 2001). Telerehabilitation is described as the remote delivery of healthcare services and clinical information using telecommunications and information technologies such as internet, wireless satellite and telephone media to provide a wide array of clinical rehabilitation