

EFFECTIVENESS OF BENSON'S RELAXATION TECHNIQUE ON PERCEIVED STRESS AND PAIN AMONG PATIENTS UNDERGOING HEMODIALYSIS IN AMMAN, JORDAN



ABU MALOH HAYA IBRAHIM ALI

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

February 2023

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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February 2023

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Jordanian hemodialysis patients are required to dedicate four hours to every hemodialysis session, three times per week. The long-term hemodialysis treatment increases their perceived stress and pain levels. Jordanian hemodialysis patients lack coping strategies to manage their perceived stress and pain in clinical practice. There was no intervention utilized in hemodialysis units for reducing perceived stress and pain among Jordanian hemodialysis patients. This study aimed to evaluate the effectiveness of Benson's Relaxation Technique in reducing perceived stress and pain among hemodialysis patients at governmental hospitals in Amman, Jordan. A clusterrandomized, active-control trial was conducted in two large governmental hospitals in Amman, Jordan that were randomly assigned to intervention and active-control hospitals. A total of 132 hemodialysis patients were selected randomly, and data were collected over four data collection periods using the Perceived Stress Scale (PSS-10) and the Short-Form McGill Pain Questionnaire (SF-MPQ). The intervention group received a training session of Benson's Relaxation Technique and they were asked to perform it twice a day for 10 minutes over eight weeks. Both descriptive and inferential statistics were conducted (mean, standard deviation, frequencies, chi-squared, independent t-tests, one-way analysis of variance, Pearson correlation coefficient, and mixed between-within subject analysis of variance). The study results revealed that most hemodialysis patients were male (54.5%), had a mean age (years) of (38.06 ± 11.247), were unmarried (44.7%), had a mean length of time on hemodialysis (years) of (7.11 ± 3.898) , and held a high school qualification (35.6%). All hemodialysis patients had dialysis three times per week for a total of four hours per session. The total perceived stress mean score was (30.70 ± 4.237) , the total pain rating index mean score was (32.56 ± 4.202) and the total visual analogue scale mean score was (7.53 ± 1.251) . Many patients (43.9%) described their present pain intensity as 'distressing' and the lower extremities were the most commonly reported location of pain (38.6%). The participants' ages (years) and lengths of time on hemodialysis (years) were strongly positively correlated with their perceived stress and pain levels. Findings indicated a non-statistically significant reduction in the

perceived stress and pain scores between pre-intervention and post-intervention at two weeks (P>0.05). However, a statistically significant reduction was noted in the perceived stress and pain scores of the intervention and active-control groups between: pre-intervention and post-intervention at one month (P<0.001); pre-intervention and post-intervention at two months (P<0.001); post-intervention at two weeks and post-intervention at one month (P<0.001); post-intervention at two weeks and post-intervention at two months (P<0.001); post-intervention at two weeks and post-intervention at two months (P<0.001); and post-intervention at one month and post-intervention at two months (P<0.001). Based on the findings, Benson's Relaxation Technique is a beneficial and cost-effective technique that enables significant reductions in perceived stress and pain among hemodialysis patients, but not after two weeks of performing the technique. Performing Benson's Relaxation Technique for at least one month led to a significant reduction in perceived stress and pain among hemodialysis patients. Therefore, the implementation of Benson's Relaxation Technique at hemodialysis units is likely to help hemodialysis patients reduce their perceived stress and pain.

Keywords: Benson's Relaxation Technique; Perceived stress; Pain; Hemodialysis patients; Jordan.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

KEBERKESANAN TEKNIK RELAKSASI BENSON TERHADAP TEKANAN DAN KESAKITAN YANG DIRASAI DALAM KALANGAN PESAKIT YANG MENJALANI HEMODIALISIS DI AMMAN, JORDAN

Oleh

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Pesakit hemodialisis Jordan dikehendaki memperuntukkan empat jam bagi setiap sesi hemodialisis, tiga kali seminggu. Rawatan hemodialisis jangka panjang meningkatkan tahap tekanan dan kesakitan yang dirasakan. Pesakit hemodialisis Jordan kekurangan strategi berdaya tindak untuk menguruskan tekanan dan kesakitan yang dirasakan mereka dalam amalan klinikal. Tiada intervensi dilaksanakan dalam unit hemodialisis untuk mengurangkan tekanan dan kesakitan yang dirasakan dalam kalangan pesakit hemodialisis Jordan. Kajian ini bertujuan untuk menilai keberkesanan Teknik Relaksasi Benson dalam mengurangkan tekanan dan kesakitan yang dirasakan dalam kalangan pesakit hemodialisis di hospital kerajaan di Amman, Jordan. Percubaan kawalan aktif terawak kelompok telah dijalankan di dua buah hospital besar kerajaan di Amman, Jordan. Percubaan ini dibahagikan secara rawak antara hospital intervensi dan kawalan aktif. Sejumlah 132 pesakit hemodialisis telah dipilih secara rawak, dan data telah dikumpul dalam empat tempoh pengumpulan data menggunakan Skala Tekanan yang Dirasakan (PSS-10) dan Soal Selidik Kesakitan McGill Versi Pendek (SF-MPQ). Kumpulan intervensi menerima sesi latihan Teknik Relaksasi Benson dan mereka diminta mempraktikkannya dua kali sehari untuk 10 minit selama lapan minggu. Keduadua statistik deskriptif dan inferensi telah dijalankan (min, sisihan piawai, frekuensi, khi kuasa dua, ujian-t bebas, analisis varians sehala, pekali korelasi Pearson, dan campuran antara subjek analisis varians). Hasil kajian menunjukkan bahawa kebanyakan pesakit hemodialisis ialah lelaki (54.5%), mempunyai purata umur (tahun) (38.06 ± 11.247), belum berkahwin (44.7%), mempunyai purata tempoh masa hemodialisis (tahun) sebanyak (7.11). ± 3.898), dan memegang kelayakan sekolah menengah (35.6%). Semua pesakit hemodialisis menjalani dialisis tiga kali seminggu selama empat jam setiap sesi. Jumlah min skor tekanan yang dirasakan adalah (30.70 ± 4.237), jumlah min skor indeks pengkadaran kesakitan adalah (32.56 ± 4.202) dan jumlah min skor skala analog visual adalah (7.53 \pm 1.251). Ramai pesakit (43.9%) menyatakan keamatan kesakitan mereka sekarang sebagai 'menyedihkan' dan bahagian bawah badan adalah kawasan kesakitan yang paling kerap dilaporkan (38.6%). Umur (tahun) dan tempoh masa para peserta

menjalani rawatan hemodialisis (tahun) sangat berkorelasi secara positif dengan tahap tekanan dan kesakitan yang dirasakan mereka. Hasil kajian menunjukkan pengurangan yang tidak signifikan secara statistik dalam skor tekanan dan kesakitan yang dirasakan antara praintervensi dan pascaintervensi pada dua minggu (P>0.05). Walau bagaimanapun, pengurangan signifikan secara statistik telah dicatatkan dalam skor tekanan dan kesakitan yang dirasakan bagi kumpulan intervensi dan kawalan aktif antara: praintervensi dan pascaintervensi pada satu bulan (P<0.001); praintervensi dan pascaintervensi pada dua bulan (P<0.001); pascaintervensi pada dua minggu dan pascaintervensi pada satu bulan (P<0.001); pascaintervensi pada dua minggu dan pascaintervensi pada dua bulan (P<0.001); dan pascaintervensi pada satu bulan dan pascaintervensi pada dua bulan (P<0.001). Berdasarkan hasil kajian, Teknik Relaksasi Benson ialah teknik yang bermanfaat dan kos-berkesan; membolehkan pengurangan signifikan dalam tekanan serta kesakitan yang dirasakan dalam kalangan pesakit hemodialisis, tetapi bukan selepas dua minggu mempraktikkan teknik tersebut. Mempraktikkan Teknik Relaksasi Benson sekurang-kurangnya selama satu bulan akan menghasilkan pengurangan signifikan dalam tekanan dan kesakitan yang dirasakan dalam kalangan pesakit hemodialisis. Oleh itu, implementasi Teknik Relaksasi Benson di unit hemodialisis berkemungkinan dapat membantu pesakit hemodialisis mengurangkan tekanan dan kesakitan yang dirasakan mereka.

Kata kunci: Teknik Relaksasi Benson; Tekanan yang Dirasai; Kesakitan; pesakit hemodialisis; Jordan.

ACKNOWLEDGEMENTS

I am very grateful to the Almighty God for leading me through my academic pursuit. Without the will of God (Allah), the provider of all good and faultless blessings, this research would not have been possible. I pray that with his blessing and mercy, I would be able to communicate and share my knowledge and skills to benefit other researchers and educators. May Allah grant our *prophet Mohammed* peace and blessings upon him.

It is a pleasure to thank the many people who have made this dissertation possible. First and foremost, I wish to thank my thesis supervisor and committee chair, Professor Soh Kim Lam her valuable recommendations and suggestions about my topic. I was honored to have such a gifted scientist as my mentor through this journey. She supported and challenged my thoughts and ideas in a way that enhanced my growth as a researcher and she continually provided me with additional opportunities for learning and research development. Her ongoing mentorship, guidance and confidence in my ability to make a contribution to this field are a continued source of inspiration as I develop my future program of research. Without her guidance, patience, kindness, and encouragement this doctoral dissertation could not be done.

I am also grateful to my Co-advisors: Dr. Seng Choi Chong and Dr. Siti Irma Fadhilah Ismail. I am greatly thankful to you all, for your guidance and support, both academically and otherwise. Special thanks for my external Co-advisor: Dr. Mohannad Eid AbuRuz, for sharing is research expertise as well as his critical lens and for encouraging my growth as a researcher, and also for lending his expertise in relation to nursing ethics and for empathetically supporting me throughout this journey.

I would like to thank my parents who encouraged and supported me throughout my journey spiritually and financially; my great father Mr. Ibrahim Ali Abu Maloh, who taught me that the best kind of knowledge to have, is that which is learned for its own sake. My great mother Mrs. Wafa Abu Rabea, who taught me that even the largest task can be accomplished if it is done one step at a time. I also would like to thank my siblings; Shereen, Ghassan, Dima and Mahmoud who encouraged my spirit during this journey. Special thanks to my best friend Lubab Haroon for being there for me throughout the entire PhD program she has been my best cheerleader.

Special thanks to all the patients undergoing maintenance hemodialysis who completed the questionnaire. Special thanks to the nurses of the hemodialysis unit. Warm thanks to the data collector; Dr. Dima Abu Maloh and Lubab Haroon for their continuous support, for offering their time and effort with patience.

Special thanks to my friends and family, for their love, support, encouragement and endless belief in me. I would like to thank all those who contributed either directly or indirectly towards the completion of this doctoral dissertation. I remained grateful to Almighty Allah and thank you all.

This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

BRT	Benson's Relaxation Technique
CKD	Chronic Kidney Disease
CRCT	Cluster Randomized Controlled Trial
DEFF	Design Effect
DM	Diabetes Mellitus
ESRD	End-Stage Renal Disease
HD	Hemodialysis
HTN	Hypertension
ICC	Intra-Cluster Correlation Coefficient
JPMR	Jacobson's Progressive Muscle Relaxation
KS	Kolmogorov-Smirnov
PUMH	Patients Undergoing Maintenance Hemodialysis
PS	Perceived Stress
S&P	Stress and Pain
PS&P	Perceived Stress and Pain
PRF	Performance Record Form
RCTs	Randomized Controlled Trials
RoB	Risk of Bias
SW	Shapiro-Wilk
SR	Systematic Review

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CHAPTER 1

INTRODUCTION

1.1 General Overview

Millions of people around the world suffer from Chronic Kidney Disease (CKD) (Hasan et al., 2018). CKD is an emergent worldwide public health problem (Isina et al., 2018). Kidney failure, also called End-Stage Renal Disease (ESRD), is defined as the last phase of CKD. When the kidneys fail, that means they are not functioning sufficiently to sustain life and replacement therapy is required (Kalantar-Zadeh et al., 2021). The standard recommended kidney replacement therapies are hemodialysis (HD), peritoneal dialysis, and renal transplantation (Saran et al., 2020).

HD is considered the best ESRD management method; nearly 86.9% of ESRD patients in the United States are treated in this way (Saran et al., 2020). In Jordan, the prevalence of ESRD is increasing; in 2019, the overall number of ESRD patients in the country was 6,316, of whom 6,165 (97.6%) received HD treatment (Hashemite Kingdom of Jordan Ministry of Health, 2019). In the same year, among Jordanian individuals, there were 719 new cases of ESRD (Hashemite Kingdom of Jordan Ministry of Health, 2019). The most prevalent cause of ESRD is diabetes mellitus (DM) (32.2%), followed by hypertension (HTN) (24.7%) and DM with HTN (22.7%), according to the most recent National Registry of ESRD data published in 2019 (Hashemite Kingdom of Jordan Ministry of Health, 2019).

Perceived Stress (PS) occurs when an individual considers that their interaction with the environment is threatening or dangerous such that it negatively affects their well-being (García-Martínez et al., 2021). of a sample of Patients Undergoing Maintenance Hemodialysis (PUMH), 77.3% reported severe to extremely severe PS (Senmar et al., 2020). Earlier research revealed that 56% of PUMH faced severe levels of PS, while 27% had extreme levels, 14% had moderate levels, and 3% had mild levels (Joseph et al., 2017). Around 56.2% of PUMH reported that their PS was related to their disease (Gemmell et al., 2016). PUMH generally experience at least one physiological and psychosocial stressor (Soponaru et al., 2016; Tchape et al., 2018). The most frequently reported physiological stress factors were exhaustion (97%) and arteriovenous fistula (88%). Regarding psychosocial stressors, hospital transportation (99.5%) and treatment costs (99.5%) were the most reported (Tchape et al., 2018). In Jordan, PUMH were found to have high scores for psychosocial stressors; "limitations on vacation time and location" (3.09±1.19) was the most commonly mentioned stressor, followed by "restrictions on consuming fluids" (2.89±1.05) and "length of dialysis sessions" (2.89±1.04) (Ahmad & Al Nazly, 2015). The mean PS level among Jordanian PUMH was reported as being mild to moderate (9.2±4.6) (Musa et al., 2018). PUMH in Jordan appear to suffer from moderate levels of psychological distress (Al-Ghabeesh et al., 2022).

Pain is one of the most prevalent complaints among PUMH (Fleishman et al., 2018; Jhamb et al., 2020), with varying estimates of 74.4% (Sadigova et al., 2020) to 82% experiencing it (Fleishman et al., 2018). Furthermore, around 75% of PUMH reported that their pain was related to ineffective pain management (Jhamb et al., 2020). The pain intensity among PUMH (7.2 ± 2.2) has been rated as mild in 6.1% of cases, moderate in 43.3%, and severe in 50.5% (Dreiher et al., 2021). A systematic review (SR) assessing the prevalence of pain in patients with CKD reported that the overall prevalence rate for pain was 60%, with 48% experiencing chronic pain and 10% neuropathic pain. Pain prevalence appears to be higher among dialysis patients (63%) than kidney transplant patients (46%) (Lambourg et al., 2021). The pain level felt among Jordanian PUMH while inserting the AVF fistula needle was reported as moderate (Abunab et al., 2021). Around 32.7% of Jordanian PUMH reported having excruciating joint and muscle pain, while extreme concerns - mostly in the pain/discomfort domain - were expressed by 19.64% (Alshogran et al., 2021).

Perceived Stress and Pain (PS&P) are connected in various ways, a relation that has been established and acknowledged (Melzack, 1999). PS&P function as warning signals to identify any potentially harmful incidents (Abdallah & Geha, 2017; Chen et al., 2021). Experiencing pain leads to the development of PS (Chen et al., 2021). An individual suffering from either PS or pain might subsequently experience both, which implies a vicious cycle and a complex relationship (Abdallah & Geha, 2017; Chen et al., 2021). The cause of PS could be the experience of pain or the consequences of ongoing pain because experiencing pain is stressful (Chen et al., 2021). Physiological stressors include pain from needle sticks and the muscle cramps due to HD treatment (Al Nazly et al., 2013). One study reported a positive association between PS&P levels among PUMH (r = 0.563) (Heidari Gorji et al., 2014).

Since PS&P are clearly endemic among PUMH, healthcare providers use diverse methods to control the associated symptoms, including pharmacological and non-pharmacological interventions. There is apparently increasing interest in the use of non-pharmacological interventions, which can often be more cost-effective, particularly compared to analgesics (Zins et al., 2018). Numerous PUMH have expressed a keenness to use therapies that do not feature pharmacology, such as the Benson's Relaxation Technique (BRT), an intervention that has proven to be effective (Akyol et al., 2011; Zins et al., 2018). BRT, one of the most useful and familiar non-pharmacological interventions, was first developed by Dr. Herbert Benson in 1975 (Benson & Klipper, 1975).

The definition of the BRT is a person's capability to stimulate the release of chemicals and brain signals in their body that slow their muscles and organs while increasing the blood flow to their brain (Benson & Klipper, 1975). It is a form of meditation that utilizes the parasympathetic nervous system to reduce the individual's reactions to stress (Benson & Klipper, 1975). BRT reduces the sympathetic nervous system's activity, thus lowering the body's oxygen consumption (Benson & Klipper, 1975). The consequent muscle relaxation results in a relaxed sensation (Benson & Klipper, 1975). Once this state has been attained, the parasympathetic system takes over, which calms the participants and helps them to eliminate common symptoms like PS&P, fatigue, anxiety, and depression (Elsayed et al., 2019). Various stress-related problems and their accompanying physical and psychological signs and symptoms may be successfully treated with BRT (Elsayed et al., 2019). Numerous Randomized Controlled Trials (RCTs) have investigated BRT in various settings, intending to reduce PS levels (Annal & Dhandapani, 2019; Borzoee et al., 2020; Jourabchi et al., 2020; Mohammadi & Parandin, 2019; Parmar & Tiwari, 2021) and pain levels (Fitri et al., 2020; Mohammadi & Parandin, 2019; Molazem et al., 2021; Parmar & Tiwari, 2021; Titi et al., 2021). However, few studies have explored this issue among PUMH. Therefore, this study aimed to bridge this research gap.

1.2 Overview of Dialysis Units in Jordan

Jordan's 87 dialysis units are located around the kingdom: 37 (43%) are in governmental hospitals run by the Ministry of Health, 12 (14%) are in Royal Medical Services hospitals, two (2%) are in university hospitals and 36 (41%) are in private hospitals (Hashemite Kingdom of Jordan Ministry of Health, 2019). There were 932 dialysis machines in total, including 435 (46.7%) in governmental hospitals, 84 (9.0%) in RMS hospitals, 34 (3.6%) in universities hospitals, and 379 (40.6%) in private hospitals (Hashemite Kingdom of Jordan Ministry of Health, 2019).

In these hospitals overall, the 2019 prevalence rate of ESRD was 6,316 Jordanian patients receiving HD or peritoneal dialysis (Hashemite Kingdom of Jordan Ministry of Health, 2019). Of these 6,316 ESRD patients, peritoneal dialysis was used to treat 151 (2.4%), while HD was used to treat 6,165 (97.6%) (Hashemite Kingdom of Jordan Ministry of Health, 2019). Of the 6,165 PUMH, 3,903 underwent HD thrice a week (63.3%), 1,988 (32.2%) underwent HD twice a week, 35 underwent HD once a week (0.6%), and 10 underwent HD four times a week (0.2%); 229 instances had missing data (3.7%) (Hashemite Kingdom of Jordan Ministry of Health, 2019). Each session lasted approximately four hours on average (Hashemite Kingdom of Jordan Ministry of Health, 2019).

Of all the 6,316 patients with prevalent ESRD, 2,871 (45.5%) received care in governmental hospitals, 1,226 (19.4%) were cared for in RMS hospitals, 162 (2.6%) received care in a university hospital, and 2,054 (32.5%) received care in a private hospital (Hashemite Kingdom of Jordan Ministry of Health, 2019). The overall prevalence rate in Jordan per million people was (864.5/1,000,000). The capital city, Amman, had the highest percentage (42.9%), followed by the Irbid (16.1%), Zarka (12.5%), Balgah (7%), and Karak governorates (4.4%) (Hashemite Kingdom of Jordan Ministry of Health, 2019). Amman, the most crowded city in Jordan, is divided into three areas: western, eastern, and southern Amman (Hashemite Kingdom of Jordan Ministry of Health, 2019). Located around 10 kilometers apart, two large government-funded hospital facilities in the city treat PUMH with dialysis (Hashemite Kingdom of Jordan Ministry of Health, 2019).

The most frequent main cause of ESRD was DM (32.2%), followed by HTN (24.7%), DM and HTN (22.7%), glomerulonephritis (4%), infection (3.3%), polycystic kidney disease (3%), and congenital causes (2.3%) (Hashemite Kingdom of Jordan Ministry of Health, 2019). In terms of the ESRD patients' prevalence of co-morbidity, 52.9% had

hypertension, 45.5% were diabetic, and 12.6% exhibited cardiovascular diseases (Hashemite Kingdom of Jordan Ministry of Health, 2019). Around 8.7% of the ESRD patients were smokers and 4% had a family history of renal diseases (Hashemite Kingdom of Jordan Ministry of Health, 2019).

In 2019, the ESRD incidence rate in patients from Jordan was 719 individuals (Hashemite Kingdom of Jordan Ministry of Health, 2019). Of these patients. 278 (38.7%) received care in governmental hospitals, 185 (25.7%) received care in RMS hospitals, 23 (3.2%) received care in university hospitals, and 233 (32.4%) received care in private hospitals (Hashemite Kingdom of Jordan Ministry of Health, 2019). Regarding dialysis type, of the 719 ESRD incident patients, peritoneal dialysis was given to 11 (1.5%), while HD was delivered to 708 (98.5%) (Hashemite Kingdom of Jordan Ministry of Health, 2019). Most patients had diabetes and HTN (32.3%) as the joint primary causes, after which came diabetes with 24.9%, HTN with 20.7%, glomerulonephritis with 6.5%, polycystic kidney disease with 4.7%, infections with 3.6%, congenital reasons with 2.8%, vesicoureteral reflux with 2.6%, drug use with 1%, and systemic lupus erythematosus with 0.3%, while 0.6% were attributed to other factors (Hashemite Kingdom of Jordan Ministry of Health, 2019).

1.3 Problem Statement

For the majority of ESRD patients worldwide, the most extensively used type of renal replacement treatment is HD (Kara, 2018). However, HD is a stressful experience for ESRD patients (Kara, 2018) and, while it boosts their survival chances, it might be a source of PS for PUMH (Morowatisharifabad et al., 2020). Once ESRD patients begin receiving HD, they often experience ongoing stress because of time limits, functional constraints, dietary constraints, and medication-linked side effects (Nikkhah et al., 2020; Özkan & Taylan, 2022; Wang & Chen, 2012). The significant changes to their daily lives mean that ESRD may bring individuals distress, chronic symptoms, and pain, in addition to the essential HD treatment (Beng et al., 2019).

HD causes psychological and physiological stressors and strains, which present difficulties for the patients (Rayyani et al., 2014). These strains can result in anxiety and depression, an increased risk of suicide, uncooperative behavior, and a poorer quality of life (Elhadad et al., 2020; Goyal et al., 2018). Various types of PS among PUMH include dependency on the HD procedure, on medical professionals, and on their medical treatment (Ghasemi Bahraseman et al., 2021; Zibaei et al., 2020). During their treatment, these forms of dependency put the patient in an unpleasant position that often causes PS (Ghasemi Bahraseman et al., 2021; Zibaei et al., 2020). Several studies have examined the stressors experienced by PUMH (Gorji et al., 2013; Rayyani et al., 2014; Tu et al., 2014). Another study reported that 51.7% of PUMH had PS (Mollahadi et al., 2020). Among PUMH, 77.3% had severe to extremely severe PS (Senmar et al., 2020).

PUMH frequently complain of pain (Sadigova et al., 2020); most experience this at moderate to severe levels, while 54% of PUMH stated that more than one part of their body was painful (Zagajewska et al., 2011). The main sources of pain are the dialysis procedure itself, musculoskeletal disorders, peripheral neuropathy, and peripheral

vascular disease (Marzouq et al., 2021). Furthermore, PUMH with chronic pain may experience varying degrees of impairment, suffering, and societal burden (Boukhira et al., 2021; Davison et al., 2021). Pain can cause physical and psychological stress for months or even years after their HD starts (Sadigova et al., 2020). Generally, chronic pain degrades one's quality of life and interferes with everyday activities (Dueñas et al., 2016). A research team reviewed 52 trials featuring around 7,000 PUMH, discovering that 82% of them recorded experiences of acute pain and up to 92% reported chronic pain. Moreover, researchers discovered that many PUMH experienced severe pain in multiple sites, which was caused by a range of conditions, including generalized pain, headaches, pain from fistula access, and musculoskeletal pain (Brkovic et al., 2016). A recent SR assessing pain prevalence in patients with CKD reported that the overall pain prevalence rate was 60%, with 48% experiencing chronic pain and 10% experiencing neuropathic pain (Lambourg et al., 2021).

Regarding Jordan, ESRD patients are required to dedicate four hours to every HD session, three times per week (Hashemite Kingdom of Jordan Ministry of Health, 2019). Consequently, the long-term HD treatment routine increases their PS&P levels. Some studies revealed that Jordanian PUMH suffer from high levels of PS&P due to the HD treatment routine (Abunab et al., 2021; Ahmad & Al Nazly, 2015; Al-Ghabeesh et al., 2022; Alshogran et al., 2021; Musa et al., 2018). This increase in PS&P can affect the PUMH quality of life (Alshogran et al., 2021; Musa et al., 2022). Shdaifat & Abdul Manaf (2012) study assessed the quality of life for both the PUMH and caregivers, results indicated that the quality of life among the PUMH and caregivers appeared to be considerably impaired.

Jordanian PUMH lack coping strategies to manage their PS&P in an appropriate way in clinical practice (Musa et al., 2022). Based on the results of Al-Ghabeesh & Suleiman (2014), the care of all PUMH must feature the early identification of individualized needs, as well as proven skills and strategies for coping. In a study conducted by Ahmad & Al Nazly (2015), the results indicated assisting Jordanian PUMH in using coping mechanisms to help them reduce their hemodialysis stressors. Jordanian PUMH appear to utilize religious and spiritual activities and beliefs to deal with their HD stressors (Musa et al., 2018). Incorporating faith and prayers was the most frequent type employed by Jordanian PUMH to overcome their HD stressors (Ahmad & Al Nazly, 2015). However, there was zero intervention utilized in HD units for reducing PS&P among Jordanian PUMH. Therefore, this gap in research and clinical settings must be filled by the current study.

Jordan, officially the Hashemite Kingdom of Jordan, is an Arab country in the Middle East, and the official religion in Jordan is Islam (Darwish & Bader, 2014). BRT origins draw from Western culture (Benson & Klipper, 1975). However, BRT was designed in a relevant way to suit all kinds of people. For instance, using the straightforward repetition of the word "one" proposed in the technique steps, Catholics and Jews could say "Hail Mary full of grace," while Protestants might find comfort in "Our Father who art in Heaven" (Benson & Klipper, 1975). Hindus might say "Om," and Muslim people might say "Isha'allah" (Benson & Klipper, 1975). Those who identify as secular or nonreligious were urged to concentrate on words, phrases, or sounds that spoke to them personally, such as the terms "love," "peace," or "calm" (Benson & Klipper, 1975). In

this approach, various kinds of people may use their own values and belief systems to elicit the BRT (Benson & Klipper, 1975). BRT is a highly effective non-pharmacological intervention (Elsayed et al., 2019) that has been found to affect a wide range of physical and psychological problems (Elsayed et al., 2019). Although BRT is originally from the western region, despite the cultural difference, it can be implemented in Jordan since it does not conflict with or go against the cultural norms and traditions of Jordanian society and can benefit the Jordanian PUMH by reducing their PS&P levels.

The effectiveness of BRT has been researched internationally over many years and in various settings, and these studies have scientifically proven its effectiveness in reducing PS&P (Annal & Dhandapani, 2019; Borzoee et al., 2020; Jourabchi et al., 2020; Mohammadi & Parandin, 2019; Parmar & Tiwari, 2021) (Fitri et al., 2020; Mohammadi & Parandin, 2019; Molazem et al., 2021; Parmar & Tiwari, 2021; Titi et al., 2021). However, the literature reveals some critical gaps in the body of knowledge. Firstly, the effects of BRT on PS&P among PUMH have been less comprehensively explored, the majority of RCTs focus on patients with other diseases or measure other factors (Barabady et al., 2020; Habibollahpour et al., 2019; Khalil et al., 2021; Muliantino et al., 2020). Secondly, since PS&P are connected, a paucity of RCTs focus on the effectiveness of BRT for both PS&P (Heidari Gorji et al., 2014).

Thirdly, most previous RCTs measured the effectiveness of BRT among PUMH preand post- after one month (Heidari Gorji et al., 2014; Mahdavi et al., 2013; Rambod, Sharif, et al., 2013), while few RCTs have explored the effectiveness of BRT among PUMH using repeated measures or over a longer period. Fourthly, too few RCTs used cluster designs and active-control groups when assessing the effectiveness of BRT for PS&P among PUMH. Fifthly, most RCTs failed to use double-blinding procedures (Heidari Gorji et al., 2014; Mahdavi et al., 2013; Otaghi et al., 2016). Last but not least, most published studies have been conducted in Western countries, and no studies have been undertaken in Arabic-speaking countries such as Jordan. To the best of the author's knowledge, no studies have investigated the effectiveness of BRT among PUMH in Jordan. Thus, this study aims to bridge the current research gaps by examining how effectively BRT can treat both PS&P among Jordanian PUMH.

1.4 Significance

Due to the typically complicated dialysis routine, dietary and liquid restrictions, and the requirement to take different drugs, HD is a stressful therapy (Arjunan et al., 2018; Lestari et al., 2021; Umeukeje et al., 2018). Many PUMH struggle to adhere to the HD regimen (Umeukeje et al., 2018). They have to attend hospital thrice weekly for no less than three to four hours, according to the treatment regimen for receiving HD (Arjunan et al., 2018).

HD causes psychological and physiological stressors that create difficulties for the PUMH (Rayyani et al., 2014). These stressors can lead to complications for them, such as stress, anxiety, depression, pain, increased risk of suicide, uncooperative behavior, and decreased quality of life (Elhadad et al., 2020; Goyal et al., 2018). PUMH exhibit high levels of PS&P, the two conditions have a clear link (Abdallah & Geha, 2017; Chen

et al., 2021). Numerous PUMH have shown an interest in the use of BRT, a non-pharmacological intervention with proven effectiveness (Akyol et al., 2011; Zins et al., 2018). Various physical and psychological signs and symptoms can benefit from being treated using BRT (Elsayed et al., 2019).

The present research was conducted for several reasons. Jordanian PUMH experience high levels of PS&P due to the HD procedure (Abunab et al., 2021; Ahmad & Al Nazly, 2015; Al-Ghabeesh et al., 2022; Alshogran et al., 2021; Musa et al., 2018). As healthcare professionals, we should pay attention to PUMH. High levels of PS&P can lead to numerous complications throughout patients' lives, which would negatively impact their quality of life. This study would decrease the PS&P levels among Jordanian PUMH and improve their quality of life. Additionally, there is a lack of using coping strategies among Jordanian PUMH to manage their PS&P in an appropriate way in clinical practice (Musa et al., 2022) and a lack of using interventional programs in HD units for reducing PS&P among Jordanian PUMH. This study offers a research-based intervention of BRT for Jordanian PUMH to reduce their PS&P and for healthcare providers and nurses striving to ease PS&P among Jordanian PUMH. Furthermore, since there have been limited studies of BRT effectiveness among Jordanian PUMH, this study is one of the first to present empirical data on the effectiveness of BRT for PS&P among Jordanian PUMH.

The researcher's interest in exploring BRT derives from the fact that it was found to be effective, simple, cost-effective, and convenient, while it is easy to follow the steps. Furthermore, BRT causes no complications and is performed once to twice a day for 10 to 20 minutes. BRT can be implemented in Jordan since it does not conflict with or go against the cultural norms and traditions of Jordanian society and can benefit the Jordanian PUMH by reducing their PS&P levels. As a non-pharmacological intervention in practice, nurses can use the BRT to decrease PS&P among Jordanian PUMH.

The results of this study offer a path and direction for policy makers and nursing leaders, based on which the existing policies and protocols could be modified and the BRT intervention could be implemented to manage PS&P among PUMH in Jordan. This would improve the health status and health functioning by relieving PS&P among Jordanian PUMH. In return, this would positively affect the quality of patient care, as well as the healthcare institutions' ranking and impact. Additionally, this study will help healthcare providers and nurses to develop sufficient skills to manage PS&P among Jordanian PUMH using a cost-effective and easy-to-use intervention. As a result, this study offers a research-based intervention for healthcare providers and nurses striving to ease PS&P among PUMH in Jordan. This study also offers a Jordanian assessment of how well PUMH recognize the role of BRT in reducing their PS&P levels. Regarding future research, this study provides baseline data for the use of researchers conducting in-depth studies of this issue in different contexts and using various designs, particularly in Eastern cultures. Lastly, this study is one of the first to present empirical data on the effectiveness of BRT for PS&P among PUMH from both an international and a national perspective.

1.5 Reasons for Selecting BRT

BRT is of the most beneficial non-pharmacological therapies (Elsayed et al., 2019). Numerous PUMH have expressed an interest in the use of BRT, a non-pharmacological intervention with supported effectiveness (Akyol et al., 2011; Zins et al., 2018). Various physical and psychological issues respond to BRT (Elsayed et al., 2019).

Several studies revealed that BRT may be effective in various settings (Abd-Elraziek et al., 2017; Barabady et al., 2020; Borzoee et al., 2020; Elsayed et al., 2019; Fitri et al., 2020; Habibollahpour et al., 2019; Heidari Gorji et al., 2014; Jourabchi et al., 2020; Khalil et al., 2021; Muliantino et al., 2020; Parmar & Tiwari, 2021; Rambod, Sharif, et al., 2013; Titi et al., 2021). Furthermore, several studies have revealed that BRT is effective among PUMH (Abd-Elraziek et al., 2017; Elsayed et al., 2019; Heidari Gorji et al., 2014; Heshmatifar et al., 2015; Kiani et al., 2017; Rambod, Sharif, et al., 2014; Heshmatifar et al., 2015; Kiani et al., 2017; Rambod, Sharif, et al., 2013; Sulistyaningsih & Melastuti, 2016). Moreover, several studies have used BRT in combination with or in comparison to other interventions, also revealing its effectiveness (Akbari et al., 2020; Bagheri et al., 2013; Mohammadi & Parandin, 2019; Seifi et al., 2018; Yekta et al., 2017).

HD is a stressful treatment (Arjunan et al., 2018; Lestari et al., 2021; Umeukeje et al., 2018) that often produces psychological and physiological stressors (Rayyani et al., 2014) and pain (Marzouq et al., 2021). Furthermore, PUMH have to attend hospital thrice weekly for no less than three to four hours (Arjunan et al., 2018). Therefore, the researcher was keen to choose the BRT for this study as it has proven to be convenient, cost-effective, easy to learn, and easily administered. It is easy to follow the steps and is practiced once or twice a day for only 10 to 20 minutes. Overall, BRT is a simple method that helps to reduce PS&P among PUMH and causes no complications or harm. In practice, nurses can implement the BRT as a non-pharmacological treatment for these patients.

1.6 Study Variables

1.6.1

Socio-demographic Variables

The following socio-demographic variables were included in this study:

- 1. Age
- 2. Gender
- 3. Marital status
- 4. Educational level
- 5. Duration of each dialysis session
- 6. Number of dialysis sessions per week

7. The length of time on hemodialysis (years)

1.6.2 Outcome Variables (Dependent Variables)

The PS&P among PUMH at the HD units of two government-funded hospital facilities in Amman, Jordan were the outcome variables for this study.

1.6.2.1 Perceived Stress (PS)

1.6.2.1.1 Conceptual Definition

PS, according to one definition, means individuals' feelings or thoughts regarding the levels of stress they are facing at given points in time or over certain time periods (Phillips, 2013).

1.6.2.1.2 Operational Definition

In this study, PS refers to a sensation of being emotionally or physically tense. It refers to the undesired angry feelings, nervousness, anxiety, and frustration that the PUMH experienced. PS was measured by the Perceived Stress Scale (PSS-10) scores.

1.6.2.2 Pain

1.6.2.2.1 Conceptual Definition

A taskforce from the International Association for the Study of Pain gave a definition of pain as unpleasant sensory and emotional experiences linked to real or possible damage to tissues, or descriptions related to such damage (International Association for the Study of Pain taskforce, 1994).

1.6.2.2.2 Operational Definition

In this study, pain refers to the unpleasant sensory feelings and discomfort that the PUMH experienced. It was measured by the Short-Form McGill Pain Questionnaire (SF-MPQ) scores.

1.6.3 Condition Variable (Independent Variable)

The BRT intervention with the PUMH in HD units at the government-funded hospital facilities in Amman, Jordan was the condition variable for this study.

1.6.3.1 Benson's Relaxation Technique (BRT)

1.6.3.1.1 Conceptual Definition

As a physical state of deep relaxation, BRT engages the parasympathetic nervous system, the other element of the nervous system. BRT is essentially the opposite reaction to the "fight or flight" response. The relaxation response can help to remove the fight or flight response and return the body to its pre-stress level (Benson & Klipper, 1975)

1.6.3.1.2 Operational Definition

In the current study, BRT means a type of mediation focusing on full, deep muscle and nervous system relaxation, followed by breathing at a set pace. The BRT intervention in this research was allocated to the intervention group from hospital A. A BRT training session was provided to the PUMH in the intervention group. Throughout the study period, the intervention group PUMH were informed to undertake the BRT twice daily for 10 minutes over a two-month period. They were instructed to perform the following:

- i. Choose a focus word or short phrase which is rooted firmly in your personal system of beliefs.
- ii. Sit comfortably and quietly.
- iii. Close your eyes.
- iv. Allow all your muscles to relax.
- v. Take slow and natural breaths; silently repeat the focus word or phrase when you exhale.
- vi. Keep a passive attitude the entire time. Don't concern yourself with your performance. Say "oh, well" whenever another thought enters your mind, then slowly resume the repetition.
- vii. Keep going for 10 minutes. If you want to check the time you can open your eyes, but avoid setting an alarm. Upon finishing, sit quietly for one minute, first with closed eyes and then with open eyes. Then perform a one-minute stand.
- viii. Perform the technique twice a day for two months.

Twice daily for 10 minutes over a two-month period, the BRT intervention was undertaken by the PUMH in the intervention group. Meanwhile, only an educational session on JPMR was delivered to the active-control group.

1.7 Research Questions

The following questions, which align with the study's objectives, served as its guiding principles:

- 1. What are the socio-demographic characteristics and the difference in the scores of socio demographic characteristics between the intervention and active-control groups among PUMH at baseline?
- 2. What are the mean scores and the difference in the mean scores of the PS&P among PUMH between the intervention and active-control groups at baseline?
- 3. What is the most reported present pain intensity and location of pain among PUMH at baseline?
- 4. What is the association between the PS&P mean scores with the sociodemographic characteristics among PUMH?
- 5. What is the effect of the BRT on PS&P among PUMH at baseline, two weeks, one month, and two months post-intervention?

1.8 Research Objectives

1.8.1 General Objective

The aim of the current study was to evaluate the effectiveness of BRT on PS&P among PUMH at governmental hospitals in Amman, Jordan.

1.8.2 Specific Objectives

- 1. To describe the socio-demographic characteristics before comparing the sociodemographic characteristics between the intervention and active-control groups among PUMH at baseline.
- 2. To ascertain the mean scores before comparing the means scores of the PS&P among PUMH between the intervention and active-control groups at baseline.
- 3. To determine the most reported present pain intensity and location of pain among PUMH at baseline.
- 4. To determine the association between the PS&P mean scores with the sociodemographic characteristics among PUMH.
- 5. To evaluate the effectiveness of the BRT on PS&P among PUMH at baseline, two weeks, one month, and two months post-intervention.

1.9 Research Hyptheses

In this experiment, two dependent variables were compared for differential changes: PS&P among PUMH after their participation in the intervention. The intervention group (Hospital A) received the BRT intervention and practiced it two times a day for ten minutes for two months. A session of education on Jacobson's Progressive Muscle Relaxation (JPMR) was delivered to the active-control group (Hospital B).

The following alternate hypotheses were proposed:

- 1. H₁: There is a significant association between the PS&P mean scores with the socio-demographic characteristics among PUMH.
- 2. H₁: There is a significant difference in the PS&P mean scores between the intervention group and active-control groups at baseline, two weeks, one month, and two months post-intervention.

The null hypotheses were tested at (P<0.05). To reject the null hypotheses, both measurements for the dependent variables PS&P would have to be statistically significant. The following null hypotheses were proposed:

- 1. H₀: There is a non-significant association between the PS&P mean scores with the socio-demographic characteristics among PUMH.
- 2. H₀: There is a non-significant difference in the PS&P mean scores between the intervention group and active-control groups at baseline, two weeks, one month, and two months post-intervention.

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