UNIVERSITI TEKNOLOGI MARA

RELATIONSHIP BETWEEN MUSCLE STRENGTH, PHYSICAL PEFORMANCES, QUALITY OF LIFE AND SARCOPENIA STATUS AMONG MENOPAUSAL WOMEN WITH KNEE OSTEOARTHRITIS

NOOR SYAHIDAH BINTI NOOR AZIM

Thesis submitted in partial fulfilment
of the requirements for the degree of
**Master of Health Science
(Physiotherapy)**

Faculty of Health Science

March 2023

ABSTRACT

Introduction: Postmenopausal women face a decline in physiological systems that lead to alterations in muscle mass and strength, physical performance, and osteoarthritis (OA). The impact of sarcopenia on the well-being of postmenopausal women with OA is unclear. This study aims to (1) compare muscle strength, physical performance, and quality of life (QOL) between sarcopenic and non-sarcopenic postmenopausal women with knee OA, (2) investigate the correlation between the sarcopenia status using Strength, Assistance in walking, Rise from a chair, Climb stairs and Falls (SARC-F) score, that included muscle strength, and physical performance in sarcopenic menopausal women with knee OA, and (3) determine the association of QOL with the muscle strength, physical performance, and sarcopenia status among postmenopausal women with knee OA. **Method:** A cross-sectional study recruited 110 postmenopausal women with knee OA between 50 to 75 at a selected government-funded physiotherapy clinic. Sarcopenia status was evaluated using the SARC-F questionnaire with a cut-off of 4. Meanwhile, the European quality of life (EQ5D5L) utility was used to evaluate the QOL. The assessments performed were handgrip strength (HGS), five times repeated chair stand (RCS), and handheld dynamometer for quadriceps strength. The participants were subjected to gait speed and the TUG test for physical performance.**Results:** An independent t-test showed a significantly ($p < 0.01$) higher HGS and less time to complete the timed up and go (TUG) test in the non-sarcopenic group than those with sarcopenia. There is a significant ($p < 0.001$) lower Malaysian EQ5D utility in postmenopausal women with knee OA and sarcopenia than in those without sarcopenia (0.71 and 0.82). Furthermore, significantly lower findings are observed in EQ5D5L profiles, i.e., mobility, usual activities, pain/discomfort (all $p < 0.001$), and anxiety ($p < 0.01$) in groups with sarcopenic than those without sarcopenia. Gait speed was significantly associated with the sarcopenia status measured by SARC-F score in the sarcopenic group. SARC-F score of 34.7% of the utility variation, while the SARC-F score and knee muscle strength combined accounted for 37.3% of the total variance of utility score. **Conclusion:** This sarcopenia group has lower muscle strength, poorer physical performances and poorer in QOL. Higher SARC-F score is associated with slower gait speed. Sarcopenia status and knee muscle strength are significantly associated with the QOL of postmenopausal women with knee OA. The early identification of sarcopenia status may help in preventing lower muscle strength and poorer physical performances and may improve QOL.

ACKNOWLEDGEMENT

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

1.1   Research Background

Osteoarthritis (OA) is a degenerative joint disease involving the cartilage and many surrounding tissues, primarily in older patients (Suh et al., 2016). It is also caused by damage to articular cartilage, remodelling of subarticular bone, osteophyte formation, ligamentous laxity, weakening of peri-articular muscles, and in some cases, synovial inflammation (De Ceuninck et al., 2014). OA significantly causes disability and body dysfunction (Brown, 2013), affecting the activities of daily life and quality of life (QOL) among the ageing population (Jin et al., 2017). These progressions may result in an uneven balance between the breakdown and healing of the joint tissue (De Ceuninck et al., 2014).

The risk of OA may emerge due to biomechanical or potential changes in sub-atomic factors (Suh et al., 2016). Besides nonmodifiable factors such as age, sex, ethnicity, race, and genetics (Neogi, 2013), obesity is an established risk factor for OA (Litwic et al., 2013). OA is increased by metabolic disease, nutrition, smoking, bone density, and muscle work (Neogi, 2013). Hence, it is an important health issue in the older population, affecting around 10% of men and 18% of women over 60 years of age globally (Glyn-Jones et al., 2015). It has been recognised as an important health issue in the older population, affecting around 10% of men and 18% of women over 60 years of age globally (Glyn-Jones et al., 2015). Around their fifth and sixth decade of life, women start to lose muscle strength, and between the ages of 25 and 55, they experience a 21% reduction in muscle strength (Rathnayake et al., 2021). It is critical to understand the explore regarding of sarcopenia in menopausal women to optimise their physical functions and reduce disability. Through hormonal changes, menopause is a major life event that significantly impacts women. Additionally, women are significantly more likely to develop sarcopenia than men, indicating a connection between female hormones and these musculoskeletal conditions, and in postmenopausal women, these changes result in a limited QOL (Kim et al., 2022).

Of all the 291 musculoskeletal conditions, hip and knee OA was ranked the 11th highest contributor (Litwic et al., 2013). In the study of Global Burden of Disease 2010, 251 million individuals were reported to experience knee OA worldwide (Cross et al., 2014). The prevalence of knee OA is estimated to be 10% to 20% in the Malaysian older population, and these estimates are projected to increase as the older population expands (Foo et al., 2017). With the global expansion of population ageing and obesity, medical professionals must prepare for a substantial increment in the demand for healthcare services to treat hip and knee OA (Litwic et al., 2013).

OA is related to physical and psychological sequelae and often manifests in affected individuals (De Ceuninck et al., 2014). Clinically, knee OA is determined by the history and physical examination findings (De Ceuninck et al., 2014), such as joint pain, stiffness, and mobility difficulties (Brown, 2013). Knee OA is likely to cause quadriceps weakness due to atrophy and lack of mobility (Berenbaum, 2013). Moreover, occupations associated with