UNIVERSITI TEKNOLOGI MARA

IMPACT OF A MULTICOMPONENT PHYSIOTHERAPY ON BACK MUSCLE FUNCTION, PHYSICAL PERFORMANCE, PAIN AND QUALITY OF LIFE AMONG AMBULANT OLDER PERSONS WITH LOW BACK PAIN LIVING AT INSTITUTIONS

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Thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Physiotherapy)

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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.

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ABSTRACT

There is increasing prevalence of older persons (OP) with low back pain (LBP) which may lead to disability. Therefore, concern on its management is greatly needed to promote independence in physical performance and quality of life (QOL).The objectives were, in phase 1: To compare back muscle function (core control, strength and flexibility) and physical performance (hand grip (HG) strength, lower limb (LL) strength and gait speed) among OP with LBP and Non-LBP; in phase 2: To determine the effects of Z-Back program on back muscle function (core control, thickness, flexibility and strength), physical performance (HG strength, LL strength and balance), pain and QOL among OP with LBP. In phase 1, a cross-sectional study was conducted in five Rumah Seri Kenangan (RSK) in Peninsular Malaysia (N=273, age mean±SD = 70.22±7.90 years). The outcome measures used included back muscle function (push-pull dynamometer (PPD) for strength, Pressure biofeedback unit (PBU) for muscle control, digital inclinometer (DI) for lumbar flexibility), physical performance (10-MWT for gait speed, dynamometer for HG strength, sit to stand test for LL strength). The data were analyzed using the independent t-test and one-way ANOVA. In phase 2, a quasi-experimental study was conducted for 8 weeks in four RSKs (N=80, age mean±SD = 70.16±8.29 years) with four different interventions [Z-Back program (Johor Bharu), general exercise (Cheng, Melaka), postural care (Taiping) and advice do's and don'ts (Cheras)]. The outcome measures included muscle thickness (real-time ultrasound), strength (PPD), core control (PBU), lumbar flexibility (DI), balance (Time up and go (TUG)), HG strength, LL strength, pain intensity (numerical rating scale) and QOL (SF36v2). Measurements were taken at baseline, 4^{th} week and 8^{th} week of interventions. Data were analyzed using one-way ANCOVA, repeated measures ANCOVA for back muscle function, physical performance, pain and QOL. The Minimal clinical importance different (MCID) were calculated for core muscle control, strength, physical performance, pain and QOL. In phase 1, OP with LBP showed significantly lower on core control, flexibility in trunk flexion, right (Rt) and left (Lt) HG strength, and LL strength (All $p < .05$) than non-LBP. In phase 2, 64 participants completed the study [Z-Back program (n = 16), general exercise (n = 18), postural care (n = 17) and Advice do's and don'ts (n = 13)]. Z-Back program participants showed higher percentage of changes in pre-post tests than other groups on TrA and multifidus core muscle control, TrA and erector spinae thickness, flexibility in Lt side flexion and Lt rotation, Lt abdominal and Lt back extensor strength. There were also significantly higher effects of Z-Back program than Advice do's and don'ts on muscle thickness of Lt and Rt IO, flexibility in flexion, balance and LL strength [All $p < .05$ (η^2 range .13 - . 18)] . While, the effect of Z-Back program was significantly higher than general exercise on Lt side flexion ($p < .05$). MCID were small to detect clinical important difference between groups. This study suggests that OP with LBP may have poor core muscle control, trunk flexibility, muscle strength, HG strength and LL strength. The Z-Back program may be superior to improve core muscle control, muscle thickness, lumbar flexibility, physical function, pain and QOL. Future study should investigate the effects of Z-Back program among OP in other settings and using a randomized control design.

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