Multiple Sclerosis
The Benefits of Physical Activity

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DECLARATION

This work has not been previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Nicole M. Sabapathy
This dissertation marks the end of a long and sometimes challenging journey. However this was not a journey I took alone. To all those who encouraged, supported and contributed to the completion of this thesis, I am extremely grateful.

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The following manuscripts have been published based on the data collected for this thesis:


In this article Sabapathy, N. (nee Stroud), was responsible for study design, conducting study, data collation and analysis, writing and editing manuscript. Minahan, C., assisted with study design, data analysis and editing manuscript. Sabapathy, S., assisted with data analysis and editing manuscript.


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The following abstracts have been presented at conferences:


The co-authors of these manuscripts give permission for the information in the above manuscripts to be included in the body of this thesis:

Dr Clare Minahan       Prof Simon Broadley

Dr Surendran Sabapathy       Mr Grant Turner
The overall aim of this dissertation was to examine the role of physical activity as a management and rehabilitation strategy for persons with MS. The research undertaken compared differences in fatigue, depression and quality of life measures in persons with MS who did and did not regularly participate in physical activity, assessed modifiable determinants of physical activity behaviour, as well as compared adaptations to two different exercise training modalities. To complete this research, three separate studies were conducted.

The purpose of study one was to compare fatigue, depression and quality of life scores in persons with MS who did and did not regularly participate in physical activity. This was a cross-sectional questionnaire study of one-hundred and twenty-one patients with multiple sclerosis (MS). Study participants were 25-65 years old and lived in Queensland, Australia. Physical activity level, fatigue, depression and quality of life were assessed using the International Physical Activity Questionnaire, Health Status Questionnaire Short Form-36, Beck Depression Inventory and Modified Fatigue Impact Scale. Results indicated that fifty-two participants completed at least two, 30 minute exercise sessions per week (exercising group) and sixty-nine participants did not participate in regular physical activity (non-exercising group). Individuals in the exercising group reported favourable fatigue, depression and quality of life scores when compared to participants in the non-exercising group. We also found significantly weak correlations between both leisure-time and overall reported physical activity levels and some subscales of the quality of life and fatigue impact questionnaires. The findings of study one suggest that favourable fatigue, depression and quality of life scores are reported by persons with MS who regularly participate in physical activity, when compared to persons with MS who do not.

The purpose of study two was to examine the perceived benefits and barriers to exercise participation in persons with MS. This study was a cross-sectional
postal survey comprised of ninety-three adults with MS. Participants completed the Exercise Benefits and Barriers Scale, Spinal Cord Injury Exercise Self-Efficacy Scale, Multiple Sclerosis Impact Scale, Disease Steps Scale and International Physical Activity Questionnaire. Forty-two participants reported completing at least two, 30 minute exercise sessions per week (exercising group) and participants did not participate in regular physical activity (non-exercising group). Participants in the exercising group reported significantly higher scores on the Exercise Benefits and Barriers Scale, and the Spinal Cord Injury Exercise Self-Efficacy Scale. In both the exercising and non-exercising groups, items related to physical performance and personal accomplishment were cited as the greatest perceived benefits to exercise participation, and those items related to physical exertion were cited as the greatest barriers to exercise participation. The findings of study two suggest that persons with MS have different perceived barriers to exercise participation than individuals in the general population. Furthermore, awareness of the benefits of physical activity is not sufficient to promote exercise participation in persons with MS. Perceived exercise self-efficacy was shown to play an important role in promoting exercise participation in persons with MS.

The purpose of study three was to compare adaptations in functional and quality of life measures following endurance- and resistance-exercise training in persons with MS. In this study sixteen individuals with MS completed both an eight week endurance- and a eight week resistance-exercise training program separated by an eight week washout period. The order the two exercise programs were completed was randomised. Exercise training was comprised of an individualised progressive program completed twice weekly in a supervised group setting. Functional measures assessed were grip strength, functional reach distance, time taken to complete the Four Step Square, and Timed Up and Go tests, and distanced walking during the Six Minute Walk Test. Quality of life measures included the Multiple Sclerosis Impact Scale, Modified Fatigue Impact Scale, Beck Depression Inventory and Health Status Short Form-36. Sixteen of the twenty-one participants (76%) completed the study. Participants
completed 13.2 ± 1.6 endurance- and 15.8 ± 1.9 resistance-exercise training sessions. No adverse events were reported. No significant differences (p<0.05) in any outcome measures were observed between the two exercise training programs, either at baseline or following the completion of both training programs. The findings of study three suggest that both endurance- and resistance exercise training are well tolerated and appear to provide similar effects for persons with MS, however larger studies are required to confirm these findings.
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