

Can a stress management programme reduce stress and improve quality of life in people diagnosed with multiple sclerosis?

Susan Agland , Amanda Lydon, Sally Shaw, Rodney Lea, Sheila Mortimer-Jones and Jeannette Lechner-Scott

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Abstract

Background: Despite evidence of perceived stress as a risk factor for multiple sclerosis activity, the evidence for managing stress is limited.

Objective To evaluate a stress management programme on perceived stress and quality of life, over 6 months.

Methods: One hundred people with multiple sclerosis were randomly assigned to either a stress management programme of mindfulness, meditation and progressive muscle relaxation, or wait list. Perceived stress and quality of life were assessed at three intervals across 6 months. Salivary cortisol levels were assessed at two intervals: baseline and first follow-up.

Results: The stress management programme did not significantly reduce perceived stress, when comparing mean scores. Secondary analysis using median scores found a significant improvement for quality of life, favouring the intervention group.

Conclusion: Stress management had no significant effect on the primary outcome of perceived stress but did improve quality of life in a secondary analysis of median scores.

Keywords: Multiple sclerosis, stress management, meditation, mindfulness, progressive muscle relaxation, perceived stress

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Introduction

Multiple sclerosis (MS) is a complex neurological disorder that is not yet entirely understood. The incidence and prevalence of MS are rapidly increasing¹ and people with MS are encouraged to modify lifestyle factors that may contribute to an increased risk of MS disease.² Perceived stress and emotion-related coping strategies may be indicators for poor adjustment to having MS,³ which can influence the risk of anxiety and depression. Furthermore, changes in the neuroendocrine immune network (specifically the hypo–pituitary–adrenal axis) have been postulated as a pathway that mediates MS disease progression.⁴ Salivary cortisol can be used as a measure of stress

response. Increased stress may augment the risk of MS relapse^{5,6} and negatively affect the quality of life.⁷ This project aimed to investigate the effect of a stress management programme on perceived stress and quality of life in MS.

Significance of the study

Despite considerable literature describing the role and effect of stress in MS there are few studies that have evaluated the effect of stress management programmes on perceived stress. Managing stress might positively affect MS.^{7–11} Each of these studies used small cohorts of people with MS and relied on subjective assessments to measure stress.

Correspondence to:

Susan Agland,
Susan Agland, Multiple
Sclerosis Clinic, Department
of Neurology, John Hunter
Hospital, Locked Bag 1,
Hunter Region Mail Centre
2310, Australia.
susan.agland@hnehealth.nsw.gov.au

Susan Agland,
Amanda Lydon,
Department of Neurology,
John Hunter
Hospital, Australia

Sally Shaw,
Department of Neurology,
Eastern Health, Australia

Rodney Lea,
Department of Neurology,
John Hunter
Hospital, Australia



Sheila Mortimer-Jones,
School of Health Professions,
Murdoch
University, Australia

Jeannette Lechner-Scott,
Department of Neurology,
John Hunter
Hospital, Australia

Research questions

This study will address the following research questions:

1. Can a stress management intervention reduce perceived stress in people with MS?
2. Can a stress management programme improve quality of life for people with MS?
3. Can the effect of a stress management intervention be maintained beyond the intervention programme?

Methods

Participants were randomly recruited from a MS specialist centre. Ethical approval was provided by Hunter New England local health district human research ethics committee (approval number 14/06/18/4.02) and Murdoch University human research ethics committee (approval number 2014/118). Participants were not compensated for their time. Data were collected using repeated measures, at baseline, at 1 month and 6 months post-baseline and included salivary cortisol levels and self-reported levels of perceived stress. Salivary cortisol was collected using the Salivette collection system. Samples were collected at 08.00, 14.00 and 20.00 hours on day 1 and repeated on week 4 of the study. Participants were asked to abstain from eating, drinking, taking medications, or vigorous exercise for 30 minutes before the sample was collected. The average of the three samples collected was used for analysis. Perceived stress was assessed using the depression, anxiety and stress scale (DASS21) and stress visual analogue scale (sVAS). Quality of life was assessed using the multiple sclerosis international quality of life (MusiQoL) questionnaire.

Inclusion/exclusion criteria

Included participants had a diagnosis of MS and were 18–70 years of age. Exclusion criteria comprised significant medical and/or psychological illness, MS relapse within 1 month of enrolment in the study, cognitive dysfunction, inability to read or write English, and severe muscular spasms inhibiting participation in progressive muscle relaxation (PMR) exercises.

Intervention

The intervention was delivered by the study investigator, an MS clinical nurse specialist. Formal, specific training was undertaken – mindfulness-integrated cognitive behaviour therapy. The specific programme delivered for this project was designed with input from an MS specialist psychologist, a

psychologist specialising in mindfulness and meditation and an MS specialist neurologist. Additional written resources were provided by another MS specialist psychologist (F Foley, 2012). All of the sessions were delivered by the MS clinical nurse specialist.

At the baseline visit intervention participants were provided with an informational package consisting of an educational brochure on stress in MS entitled ‘Taming Stress in MS: Staying Well’ (F. Foley, 2012), a meditation compact disc with a 20-minute guided meditation and 10-minute guided PMR and mindfulness exercises including diaphragmatic breathing and body scanning. One-on-one sessions continued weekly for another 3 weeks with the MS clinical nurse specialist. Participants were encouraged to perform meditation and PMR on a daily basis for 20 minutes per day for the study period of 6 months. Programme adherence was recorded in a daily diary. Key points for data collection were baseline and 1 month after (which coincided with the end of the face-to-face learning sessions) – surveys and salivary cortisol and baseline to 6 months post-baseline – surveys.

Results

For the first follow-up time point (i.e. 1 month post-baseline) 82% of whole datasets were available for analysis. By the second follow-up time point (i.e. 6 months post-baseline) only 42% of whole datasets were available for analysis. Complete cortisol datasets were available for 49% of participants, equally split between intervention and wait list participants. Intervention and wait list groups had a similar distribution of age, gender and MS type, see Table 1. Means (see Table 2) were compared across time points using the general linear model repeated measures analysis of variance. An alpha level of 0.05 was used as the significance threshold.

Given the presence of several outliers, a Mann–Whitney U-test was performed to compare medians between the intervention and non-intervention groups, with an alpha level of 0.05 used as the statistical significance threshold. In this secondary analysis, median score comparison did reflect a significant effect of intervention on the case group for quality of life ($P = 0.0021$), although not for sVAS ($P > 0.1$) nor DASS21 ($P > 0.1$).

Discussion

PMR, meditation and mindfulness did not significantly reduce stress in the cohort, but did improve

Table 1. Participant demographics.

Number, <i>n</i> (%)	50 (50)	50 (50)
Women, <i>n</i> (%)	44 (88)	42 (84)
Men, <i>n</i> (%)	6 (12)	8 (16)
Median age in years (range)	44 (22–67)	43 (19–72)
MS type: RRMS, <i>n</i> (%)	46 (92)	44
MS type: SPMS, <i>n</i> (%)	4 (8)	4
MS type: PPMS, <i>n</i> (%)	0 (0)	2
MS duration average in years (range)	9.8 (1–35)	9.0 (1–37)
EDSS median (range)	2.6 (0.0–6.5)	2.7 (0.0–6.5)

RRMS: relapsing–remitting multiple sclerosis; SPMS: secondary progressive multiple sclerosis; PPMS: primary progressive multiple sclerosis; EDSS: Expanded Disability Status Scale.

Table 2. Study results, primary outcome: mean scores.

Measure	Study group	Baseline	1 Month post-baseline (<i>P</i>)	6 Months post-baseline (<i>P</i>)	Reference range
Stress VAS	Intervention group	4.4	3.8 (<i>P</i> =0.8)	2.9 (<i>P</i> =0.3)	0–10
	Wait list group	3.7	4.2	3.7	
Stress of DASS21	Intervention group	14.2	12.9 (<i>P</i> =0.9)	11.9 (<i>P</i> =0.9)	Normal: 0–10 Mild: 11–18 Moderate: 19–26 Severe: 27–34 Extremely severe: 35–42
	Wait list group	14.3	13.1	10.3	
Cortisol ^a	Intervention group	7.3 nmol/L	7.6 nmol/L (<i>P</i> =0.5)	–	Normal cortisol reference ranges: 06.00 to 08.00 hours – 5.5 to 28.9 nmol/L 18.00 to 20.00 hours – 1.1 to 11.6 nmol/L midnight – <7.0 nmol/L
	Wait list group	5.1 nmol/L	7.6 nmol/L	–	
MusiQoL	Intervention group	63.9	67.2 (<i>P</i> =0.3)	73.3 (<i>P</i> =0.3)	0–100
	Wait list group	67.3	70.8	69.2	

^aSalivary cortisol measure is the average of three samples collected at 08.00, 14.00 and 20.00 hours.

quality of life. This outcome represents relative inconsistency with the existing evidence for similar stress management strategies. The small trend for improvement in perceived stress (sVAS and DASS21) over time in the intervention group is mirrored by the wait list group, further diminishing the effect of stress management exercises. The third research question focusing on the longer term effect found that any effect of the intervention initially is reduced over time, i.e. beyond the regular contact period with the study team, from month 1 to month 6.

Study strong points

The two robust features of this study are a larger study cohort and using salivary cortisol for an objective measure of intervention effect. In design, this study reflected the day-to-day realities of a largely self-managed intervention, and barriers to routinely and regularly performing stress management exercises were identified.

Study weak points

Half of the population began and finished the study with normal stress levels; 49% of cortisol sets

($n = 26$ intervention and $n = 26$ wait list) were completed for analysis. A further 11 intervention participants and nine wait list participants completed some but not all of the samples required, and so were not included for analysis. Adherence to home practice of the stress management exercises was performed as scheduled by less than half of the cohort.

Conclusions

The current study has shown that in a random cohort of people with MS (with a large range of ages and disability) performing mindfulness, meditation and PMR had no significant effect on perceived levels of stress but may influence quality of life. Future studies should focus on populations of people with MS who have at baseline objectively derived increased stress, and barriers to adherence considered.

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Conflict of Interests

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ORCID iD

Susan Agland  <http://orcid.org/0000-0003-3897-7274>

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