

The implementation of interventions to
prevent musculoskeletal injury at work and
the stage of change approach

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Thesis abstract

Background

The targeting of injury prevention advice according to behaviour change principles has been proposed by researchers as a means for improving the effectiveness of advice. However, despite promising results, this has not been adopted by practitioners.

Aims

The aim of this thesis is to review contemporary approaches to the application of the behaviour-change approaches in the development of workplace injury prevention interventions; evaluate the implementation of stage of change based ergonomics advice; evaluate its effectiveness in musculoskeletal injury prevention; and to explore the barriers and facilitators to its adoption by practitioners.

Methods

A mixed methods approach was used, comprising a literature review/discussion paper and three inter-related studies.

Results

Literature review/Discussion paper

The structuring of injury prevention advice according to behaviour change principles has been most frequently applied using the Stage of Change (SOC) framework. However, despite favourable results there is little evidence that this has been adopted by practitioners. The translation of research findings into professional practice has been hindered by a 'research-practice gap' and the need to actively engage practitioners in the research process.

Study 1

The managers of 25 workgroups, across a range of sectors were allocated to receive either standard ergonomics advice or ergonomics advice tailored according to the workgroup SOC profile. Twelve months later managers who had received tailored advice were found to have implemented significantly more recommended changes (IRR = 1.68, 95% CI 1.07-2.63) and more "additional" changes (IRR = 1.90, 95% CI 1.12-3.20). The findings suggest that the

implementation of ergonomics recommendations may be improved by the tailoring of advice according to SOC principles.

Study 2

Injury data on 169 workers (from 21 workgroups) who had been randomly assigned to receive standard ergonomics advice or advice tailored according to the SOC approach was analysed. Workers in receipt of tailored advice were 55% (OR=0.45, 95% CI 0.19-1.08) less likely to report a compensable injury than those in receipt of standard advice. While the effect was not statistically significant at a 0.05 level ($p=0.073$) the observed outcomes support the potential value of the SOC approach when planning injury prevention programs.

Study 3

The barriers and facilitators to the adoption of the SOC approach were investigated in a series of practitioner focus groups and a subsequent survey of members of the Human Factors and Ergonomics Societies of Australia and New Zealand. A proposed SOC assessment tool was presented and its perceived utility critiqued. The results suggest the limited application of a SOC based approach is due to the absence of a suitable tool, the need for training and limited access to research findings.

Conclusion

The SOC approach has been proposed as means to improve the implementation and effectiveness of ergonomics advice. Despite some encouraging results there is little evidence that this has been adopted by practitioners. This translation of research to practice may have been hindered by a lack of engagement with practitioners, and the absence of a suitable assessment tool.

This thesis has addressed these issues in a series of inter-related studies. The outcomes are an improved evidence base for the potential effectiveness of the SOC approach, an investigation of the barriers and facilitators to its adoption by practitioners and their engagement in the development of a draft SOC assessment tool.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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Date: *January 16, 2017*

Conference presentations resulting from this thesis

1. **Rothmore P**, Aylward P, Karnon J. *Implementing ergonomics interventions – a stage of change approach*. 9th International Conference on the Prevention of Work-Related Musculoskeletal Disorders (PREMUS), Toronto, Canada, June 20-23, 2016.
2. **Rothmore P**, Aylward P, Oakman J, Tappin D, Gray J, Karnon J. *Taking the next step: operationalising a behaviour based approach for musculoskeletal injury prevention interventions*. 9th International Conference on the Prevention of Work-Related Musculoskeletal Disorders (PREMUS), Toronto, Canada, June 20-23, 2016.
3. **Rothmore P**, Aylward P, Karnon J. *Why haven't we solved the MSD problem?* Australian Physiotherapy Association Conference. Gold Coast. Queensland, Australia, October 3-6, 2015. (*Invited Speaker*).
4. **Rothmore P**, Aylward P, Karnon J. *The implementation of ergonomics advice and the stage of change approach*. 9th Triennial Congress of the International Ergonomics Association (IEA), Melbourne, Australia, August 9-14, 2015.
5. **Rothmore P**, Aylward P, Karnon J. *Implementing ergonomics interventions – a behaviour change approach*. 50th Annual Conference of the Human Factors and Ergonomics Society of Australia, Adelaide, Australia, November 17-19, 2014.
6. **Rothmore P**, Aylward P, Karnon J. *Implementation of interventions to prevent musculoskeletal injuries at work – a behaviour change approach*. Australian Physiotherapy Association National Conference, Melbourne, Australia, October 17-20, 2013. (Winner – Best Free Paper, OHS).

Peer-reviewed journal articles resulting from this thesis

1. **Rothmore P**, Karnon J, Aylward P. Implementation of interventions to prevent musculoskeletal injury at work – lost in translation? *Physical Therapy Reviews*, 2013: 18(5); 344-349.
2. **Rothmore P**, Aylward P, Karnon J. The implementation of ergonomics advice and the stage of change approach. *Applied Ergonomics*, 2015: 51; 370-376.
3. **Rothmore P**, Aylward P, Gray J, Karnon J. A long-term evaluation of the stage of change approach and compensable injury outcomes – a cluster randomised trial. *Ergonomics*, DOI 10.1080/00140139.2016.1199816.
4. **Rothmore P**, Aylward P, Oakman J, Tappin D, Gray J, Karnon J. The stage of change approach for implementing ergonomics advice – translating research into practice. *Applied Ergonomics*, 2017: 59; 225-233.

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While the completion of a PhD signifies the end of a process there is much work still be undertaken in the field of injury prevention. There are numerous strands of research from this PhD I would like to pursue – funding permitting.

List of abbreviations

HFESA	Human Factors and Ergonomics Society of Australia
HFESNZ	Human Factors and Ergonomics Society of New Zealand
MSD/s	Musculoskeletal disorder/s
MSPD	Musculoskeletal pain and discomfort
OHS	Occupational health and safety
SOC	Stage of change
TTM	Transtheoretical model
UK	United Kingdom
USA	United States of America