TELEPHONE-BASED MANAGEMENT FOR PATIENTS WITH OSTEOARTHRITIS AND OTHER MUSCULOSKELETAL CONDITIONS

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Thesis submitted for fulfilment of the award of Doctor of Philosophy (Behavioural Science)

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December 2018

This research was supported by an Australian Government Research Training Program (RTP) Scholarship
DECLARATIONS

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Kate O’Brien reports no conflict of interest.

Signed:
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TABLE OF CONTENTS

Declarations .................................................................................................................. ii
Table of contents ....................................................................................................... iii
Acknowledgements .................................................................................................... vii
Publications ................................................................................................................ ix
  Publications included in this thesis ................................................................. ix
  Other publications arising from work from this thesis ................................ ...... ix
  Other publications during candidature .............................................................. x
  Conference presentations during candidature ................................................. xii
Preface ......................................................................................................................... xiii
Abstract ....................................................................................................................... xiv

Chapter One: Thesis introduction ..............................................................................1
  1.1 Overview ......................................................................................................... 2
  1.2 Types of musculoskeletal conditions ............................................................. 2
  1.3 Prevalence of osteoarthritis and spinal pain ................................................ 3
  1.4 The burden of osteoarthritis and spinal pain ............................................... 4
  1.5 Risk factors for osteoarthritis and spinal pain ............................................. 6
  1.6 Management of osteoarthritis and spinal pain ............................................ 6
  1.7 Current provision of care of osteoarthritis and spinal pain ....................... 10
  1.8 Use of telehealth for care delivery .............................................................. 12
  1.9 Economic evaluation of telephone-based interventions ............................. 15
  1.10 Summary ...................................................................................................... 16
  1.11 Aims of thesis ............................................................................................... 16
  1.12 References .................................................................................................... 17
Chapter Two: Effectiveness of telephone-based interventions for managing osteoarthritis and spinal pain: a systematic review and meta-analysis

Co-author statement

Abstract

Background

Methods

Results

Discussion

Conclusions

References

Supplementary material

Chapter Three: Randomised controlled trial of referral to a telephone-based weight management and healthy lifestyle programme for patients with knee osteoarthritis who are overweight or obese: a study protocol

Co-author statement

Abstract

Background

Methods

Conclusions

References

Chapter Four: Effectiveness of a healthy lifestyle intervention for low back pain and osteoarthritis of the knee: protocol and statistical analysis plan for two randomised controlled trials

Co-author statement

Abstract

Background
ACKNOWLEDGEMENTS

Firstly, I would like to thank my supervisors for all their encouragement and support throughout my candidature. John Wiggers, thank you for providing an ongoing source of exceptional scientific knowledge and constructive suggestions. Libby Campbell, you were my first manager in research and one of the main reasons I wanted to undertake a PhD at Population Health. Thank you for your unwavering confidence in my abilities and always being there to listen when I needed you. Rebecca Hodder, I couldn’t have imagined the PhD journey without you as a supervisor – there wasn’t anything I couldn’t talk to you about (which during a PhD is a lot!) and for that I am eternally grateful. Christopher Williams, my primary supervisor, thank you for taking a chance on me back in 2014 and always believing in me. I have learnt so much from you and am so thankful for the positive PhD experience you gave me.

I would also like to thank all the co-authors on my research papers, it has been a privilege working with you and my thesis wouldn’t have been possible without you.

My thesis included a research trial, which would not have been possible without a number of individuals. I would like to acknowledge all of the people involved in the planning, implementation and evaluation of the trial. Thank you to the patients who participated in the trial and the research team at Population Health including the telephone interviewers, research assistants, the amazing statistician Christophe Lecathelinainas, the team at CReDITSS, and Hanneke van Dongen for her guidance and support in completing the trial economic evaluation.

Thank you also to my fellow PhD students and early career researchers that supported and motivated me during my thesis. Thank you to Julia Dray, Danika Tremain, Tameka Small, Jannah Jones, and Jenna Hollis for always lending an ear when I needed it and being an ongoing source of support. Special thanks to Emma Robson for always being there for me and being a constant source of optimism and positivity – I’m so glad I met you! To my partner in crime Amanda Williams – 9 years ago I sat next to you in that corridor at the University and told you we were going to be friends’ haha and you being the polite person did not run away. Well, how lucky was I that you didn’t. I don’t think I could have done this without you.

To all my friends and extended family that supported me and listened to me ramble about my PhD for the last 4 years. Without your love and unconditional support I
wouldn’t be where I am today. A special thank you to my Mum, my sister Jerrie, and my Dad and Jane – thank you for your patience and support and always encouraging me to believe in myself.

Two of my main supporters sadly passed away during my candidature – my Nanny (Maureen O’Brien) and Pop (Patrick O’Brien). One of the things my Pop was most excited about was having a ‘Dr’ in the family and couldn’t wait to be able to call me Dr O’Brien. In loving memory, I would like to dedicate this thesis to them. I hope you are both proud of me.
PUBLICATIONS

PUBLICATIONS INCLUDED IN THIS THESIS


OTHER PUBLICATIONS ARISING FROM WORK FROM THIS THESIS


OTHER PUBLICATIONS DURING CANDIDATURE


CONFERENCE PRESENTATIONS DURING CANDIDATURE


PREFACE
This thesis is presented in seven chapters, written so that each chapter can be read independently. Chapter One is an introduction to this thesis. It provides an overview of the relevant literature for osteoarthritis of the knee or hip and spinal pain (back or neck pain), with a particular focus on knee osteoarthritis and introduces the studies that form this thesis. Chapter Two is a systematic review of the evidence for the effectiveness of telephone-based interventions to support patients with osteoarthritis and spinal pain on pain intensity and disability. This chapter is presented as published in PeerJ. Chapters Three and Four detail an a priori protocol and statistical analysis plan for a pragmatic randomised controlled trial (RCT), which aimed to evaluate the effectiveness of referral to an existing non-condition specific telephone-based weight loss intervention, to reduce knee pain intensity in patients with knee osteoarthritis, who are overweight or obese. The statistical analysis plan also includes a second RCT of a healthy lifestyle intervention for patients with chronic low back pain, which the candidate contributed to, but does not form a chapter in this thesis. The two trials were conducted together as part of a cohort multiple RCT. The study protocol is presented as published in BMJ Open and the statistical analysis plan is presented as published in Brazilian Journal of Physical Therapy. Chapter Five details the results for the RCT. This chapter is presented as published in Osteoarthritis and Cartilage. Chapter Six is an economic evaluation of the aforementioned RCT. This chapter is provisionally accepted at BMC Public Health. Finally, Chapter Seven provides an overview of the key findings of this thesis and describes the implications of these findings and proposes directions for future research.

Each chapter contains its own reference list and relevant supplementary material. Ethical approval for all studies included in this thesis was obtained from the Hunter New England Human Research Ethics Committee (13/12/11/5.18) and the University of Newcastle Human Research Ethics Committee (H-2015-0043).
ABSTRACT

Musculoskeletal conditions, including osteoarthritis of the knee or hip and spinal pain, are leading causes of global disability. Despite this, evidence suggests that the vast majority of patients with osteoarthritis and spinal pain do not receive care that is consistent with evidence-based clinical practice guidelines, including encouragement to engage in physical activity and support to lose weight. Two key barriers to the provision of guideline-recommended care are concerned with the accessibility of such care, and scalability of existing clinical models of care. Telephone-based models of care are a promising option to support patients with musculoskeletal conditions. While a number of trials investigating the use of telephone-based interventions for osteoarthritis and spinal pain have been published there remains uncertainty about the effectiveness and cost-effectiveness of telephone interventions for patients in this population group.

In Chapter Two, a systematic review was conducted to assess the effectiveness of telephone-based interventions to support patients with osteoarthritis and spinal pain on pain intensity and disability. Seven electronic databases were searched for randomised controlled trials (RCTs) and non-randomised controlled trials that aimed to test the effectiveness of telephone-based interventions for patients with osteoarthritis and spinal pain. Twenty-three studies with a total of 4,994 participants were included. All included studies examined interventions focused on supporting self-management and providing education in addition to a range of intervention targets, for example, physical activity. The review found moderate-quality evidence that telephone-based interventions reduce pain intensity (n = 5 trials, n = 1,357 participants, standardised mean difference (SMD) -0.27, 95%CI: -0.53 to -0.01, Tau2 = 0.06, I2 = 74%) and disability (n = 7 trials, n = 1,537 participants, SMD -0.21, 95%CI: -0.40 to -0.02, Tau2 = 0.03, I2 = 56%) compared to usual care. There was moderate-quality evidence that telephone plus face-to-face interventions are no more effective than face-to-face interventions alone. The results highlight the potential for telephone-based services to support osteoarthritis and spinal pain patients to access better quality care.

All clinical practice guidelines for osteoarthritis recommend weight loss as a core treatment for patients with knee osteoarthritis. Despite these recommendations, few overweight patients with knee osteoarthritis receive care to support weight loss. There is evidence to support telephone-based approaches in achieving modest weight loss among overweight participants in the general population. Similarly, telephone-based interventions have been found to be effective in addressing behavioural determinants.
of weight, diet and physical activity in the general population. However, there are no previous studies primarily focused on the provision of weight loss care via telephone for patients with knee osteoarthritis. Chapters Three and Four presents an *a priori* protocol and statistical analysis plan for a high-quality pragmatic RCT testing the effectiveness of referring patients with knee osteoarthritis, who are overweight or obese, to an existing non-condition specific telephone-based weight loss intervention. Eligible patients (n=120) were randomly allocated to receive the weight loss intervention or usual care. Chapter Five presents the results of the trial and showed that there were no differences between groups for knee pain intensity over 6 months (area under the curve, mean difference 5.4, 95%CI: -13.7 to 24.5, \( p=0.58 \); equivalent to a 0.2 point difference on the pain intensity numerical rating scale 95%CI: -0.53 to 0.94) or weight change (the hypothesised mechanism to reduce pain intensity) at 6 months (self-reported weight; mean difference -0.4, 95%CI: -2.6 to 1.8, \( p=0.74 \)). These results suggest that among patients with knee osteoarthritis who are overweight, telephone-based weight loss support, provided using an existing weight loss intervention might not adequately support patients with knee osteoarthritis to reduce knee pain intensity or weight.

Given the scarce resources in healthcare, policy-makers are increasingly requiring evidence of economic value for healthcare interventions to make informed decisions about how to allocate resources. Therefore, undertaking economic evaluations of knee osteoarthritis management approaches is important. Chapter Six presents an economic evaluation of the RCT presented in Chapters Three, Four and Five. Quality-adjusted life years (QALYs) was the utility measure of effect and pain intensity, disability, weight, and BMI were the clinical measures of effect. Costs included intervention costs, healthcare utilisation costs (healthcare services and medication use) and absenteeism costs due to knee pain, collected using a patient self-reported inventory. The primary cost-effectiveness analysis was performed from the societal perspective, which accounted for a range of cost categories (intervention costs, healthcare utilisation costs and absenteeism costs due to knee pain). Mean cost differences between groups (intervention minus control) were $493 (95%CI: -3513 to 5363) for healthcare costs, $-32 (95%CI: -73 to 13) for medication costs, and $125 (95%CI: -151 to 486) for absenteeism costs. The total mean difference in societal costs was $1197 (95%CI: -2887 to 6106). For QALYs and all clinical measures of effect, the probability of the intervention being cost-effective compared with usual care was less than 0.36 at all willingness-to-pay values. These findings suggest from a societal perspective referral
to an existing non-condition specific telephone-based weight loss service was not a cost-effective relative to usual care for quality-adjusted life years (QALYs).

Whilst the studies included in this thesis have advanced the evidence-base regarding the effectiveness of telephone-based interventions for the delivery of recommended care for patients with osteoarthritis and spinal pain, there remain a number of aspects that require further investigation. Specifically, although the systematic review found that telephone-based interventions should be considered for the management of osteoarthritis and spinal pain, the referral of patients with knee osteoarthritis patients who were overweight or obese to an existing telephone weight loss service was neither effective nor cost-effective despite offering a scalable, accessible option for the delivery of weight loss care. Given the high prevalence of osteoarthritis, and that excess weight is a key driver for the onset and progression of this condition; a dedicated line of research to understand how to best deliver weight loss support at scale is warranted. This research should focus on how to best integrate and optimise scalable, effective weight loss interventions into clinical practice; such that clinicians can embed this care into routine practice and improve outcomes for patients with osteoarthritis.