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MPhil Thesis

**Physical activity promotion to older adults attending out-patient
rehabilitation**

Paim, Tatiana

Paim, T. (2022). Physical activity promotion to older adults attending out-patient rehabilitation [MPhil Thesis]. Australian Catholic University.

<https://doi.org/10.26199/acu.8y44q>

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Physical activity promotion to older adults attending out-patient rehabilitation

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STATEMENT OF AUTHORSHIP

This thesis contains no material published elsewhere or extracted in whole or in part from a thesis by which I have qualified for or been awarded another degree or diploma.

No parts of this thesis have been submitted towards the award of any other degree or diploma in any other tertiary institution.

No other person's work has been used without due acknowledgment in the main text of the thesis.

All research procedures reported in the thesis received the approval of the relevant Ethics/Safety Committees (where required).

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ACKNOWLEDGEMENTS

I am ever grateful to Professor Nancy Low Choy for inspiring me to start off this research journey.

I am extremely grateful to Professor Suzanne Kuys, my principal supervisor, Professor Nancy Low Choy, my co-supervisor and Dr Simone Dorsch, my assistant supervisor, for their valuable time, expertise, guidance and support throughout the development and execution of this research program.

I am also grateful for all the participants who contributed to this research program and to the Physiotherapy Department at The Prince Charles Hospital for supporting me through this journey.

I extend my gratitude to my dear family and friends for their ongoing support and encouragement throughout the completion of this research program.

TABLE OF CONTENTS

STATEMENT OF AUTHORSHIP	ii
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES	vii
LIST OF FIGURES	vii
THESIS ABSTRACT.....	viii
PRESENTATIONS AND PUBLICATIONS.....	x
ABBREVIATIONS	xi
THESIS STRUCTURE.....	xii
Chapter 1. INTRODUCTION.....	1
Chapter 2. BACKGROUND	5
2.1 <i>Physical activity terminology</i>	5
2.2 <i>Physical activity guidelines</i>	6
2.3 <i>Physical activity measurement</i>	7
2.3.1 <i>Self-reported measurement of physical activity</i>	7
2.3.2 <i>Objective measurement of physical activity</i>	8
2.4 <i>Benefits of physical activity for older adults</i>	9
2.5 <i>Risks associated with physical activity among older adults</i>	11
2.6 <i>Promotion and prescription of physical activity to older adults attending out-patient rehabilitation .</i>	13
2.7 <i>Summary.....</i>	16
2.8 <i>Research aims</i>	17
2.8.1 <i>Overall research aim</i>	17
2.8.2 <i>Specific aim of Study 1</i>	17
2.8.3 <i>Specific aim of Study 2</i>	17
Chapter 3. METHODOLOGY	18
3.1 <i>Research paradigm.....</i>	18
3.2 <i>Research setting</i>	19
3.3 <i>Study 1 - Audit of medical records</i>	20
3.3.1 <i>Methodological considerations for audit of medical records</i>	21
3.3.1.1 <i>Well-defined research questions</i>	21

3.3.1.2. Specific inclusion and exclusion criteria	22
3.3.1.3 Sample size and sample strategy.....	22
3.3.1.4 Operationalising study variables.....	23
3.3.1.5 Data extraction form and procedure manual.....	25
3.3.1.6 Conducting a pilot test	25
3.3.1.7 Reliability of data collection.....	26
3.3.1.8 Ethical considerations.....	27
3.4 Study 2 - Focus groups.....	28
3.4.1 Open-ended research questions	30
3.4.2 Interview guide and pilot-test	30
3.4.3 Group size and composition	31
3.4.4 Suitable location and timing	32
3.4.5 Moderator and observer roles	32
3.4.6 Data analysis.....	33
3.4.7 Ethical considerations.....	35

Chapter 4. STUDY 1: An audit of physiotherapists’ documentation on physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation. 38

4.1 Abstract	39
4.2 Introduction.....	40
4.3 Methods.....	41
4.3.1 Design	41
4.3.2 Study setting.....	41
4.3.3 Participants.....	42
4.3.4 Procedures.....	42
4.3.5 Measures	43
4.3.6 Analysis	44
4.4 Results	44
4.4.1 Participant characteristics.....	44
4.4.2 Physiotherapy assessment of physical activity.....	47
4.4.3 Promotion and prescription of physical activity during physiotherapy out-patient rehabilitation.	48
4.4.4 Transition to physical activity in the community post-discharge.....	52
4.5 Discussion	52

Chapter 5. STUDY 2: Physiotherapists’ perceptions of physical activity promotion to older adults attending out-patient rehabilitation 57

5.1 Abstract	58
5.2 Introduction.....	60
5.3 Methods.....	61
5.3.1 Design	61
5.3.2 Setting	61
5.3.3 Participants and recruitment.....	62
5.3.4 Data collection	62

5.3.5 Data analysis	63
5.4 Results	63
5.4.1 Participant characteristics.....	63
5.4.2 Themes for promoting physical activity.....	64
5.4.2.1 Theme 1: Patient-centred approach	64
5.4.2.2 Theme 2: Support required	66
5.4.2.3 Theme 3: Exercise program targeting impairments versus physical activity for health.....	69
5.4.2.4 Theme 4: Inadequate community follow-up system	73
5.5 Discussion	76
Chapter 6 DISCUSSION	80
6.1 Summary of key findings.....	80
6.2 Clinical implications and future recommendations.....	82
6.2.1 Physiotherapists can and should play a key role in promoting physical activity to older adults as part of routine practice	82
6.2.2 Physical activity assessment should be incorporated into physiotherapy routine practice.....	85
6.2.3 Physiotherapists require clinical competence in knowledge and skills in behaviour change	88
6.2.3.1 Theoretical models of behaviour change	88
6.2.3.2 Behaviour change interventions.....	90
6.2.4 Physical activity programs need be provided to older adults in the community including the creation of referral schemes	92
6.2.5 An evidence-based physical activity promotion framework should be incorporated into routine physiotherapy practice	93
6.3 Limitations of the research program	96
6.4 Conclusion.....	97
7.0 REFERENCES.....	99
8.0 APPENDICES	116
8.1 APPENDIX A – AUDIT FORM	116
8.2 APPENDIX B – ETHICAL APPROVALS	119
8.3 Appendix C – INTERVIEW GUIDE	124
8.4 APPENDIX D – INVITATION EMAIL	126
8.5 APPENDIX E – STUDY 1 PUBLICATION	127

LIST OF TABLES

Table 4.1 Participant characteristics	46
Table 4.2 Description of physical activity documented in medical records	47
Table 4.3 Barriers and facilitators to physical activity documented in medical records.....	50
Table 4.4 Promotion and prescription of physical activity documented in medical records.....	51
Table 5.1 Participant characteristics	64

LIST OF FIGURES

Figure 4.1 Flow diagram showing total number of referrals and reasons for exclusion	45
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THESIS ABSTRACT

Background: Physical inactivity is identified as a leading risk factor for global mortality. Physical activity benefits have been extensively demonstrated. Being physically active is essential for healthy ageing; with regular physical activity reported as the most effective strategy to prevent and reduce disability and maintain functional independence among older adults. Nonetheless, an overwhelming majority of people aged 65 years and above do not meet physical activity recommendations. Physiotherapists in out-patient rehabilitation settings are well placed to assist older adults to achieve an active lifestyle by incorporating physical activity into care plans and transitioning patients from a therapeutic to a healthier lifestyle focus. However, it is not known whether physiotherapists actively plan for this transition and incorporate this aspect of care into out-patient rehabilitation programs for older adults. The overall aim of this research program was to investigate current physiotherapy practice of physical activity promotion to older adults attending an out-patient rehabilitation program.

Method: Pragmatism is the theoretical perspective that underpins this program of research. A multimethod approach was taken to answer the research questions for this research program. Two studies, a quantitative and a qualitative study, were undertaken to gain valuable insights in the promotion of physical activity to older adults attending out-patient rehabilitation. Study 1 comprised an audit of physiotherapists' documentation in medical records of older adults who attended an out-patient rehabilitation program at a tertiary hospital. Study 2, a qualitative study, comprised three focus groups with a total of 16 physiotherapists involved in the delivery of rehabilitation to older adults. Data were analysed using reflexive thematic analysis.

Results: In Study 1, 56 medical records were reviewed. Mean age (SD) of participants was 79 (7) years. No documentation was found on the use of validated tools to assess physical activity levels of older adults. Prescription of physical activity was documented in 55/56 (98%) medical records. Seven (12.5%) medical records included documentation on goal setting regarding physical activity participation. Advice on regular physical activity post-discharge from the rehabilitation program was documented in 28/56 (50%) medical

records. Formal referral to community-based physical activity programs was documented in 4/56 (7%) medical records. In Study 2, four themes were identified: 1. Patient-centred approach; 2. Support required; 3. Exercise program targeting impairments versus physical activity for health, and 4. Inadequate community follow-up systems. Participants described a patient-centred approach when promoting physical activity to older adults attending out-patient rehabilitation. Participants identified the importance of getting patients engaged and willing to participate in physical activity by setting patient-centred goals and finding activities that are enjoyable, meaningful and relevant. Physiotherapist support was identified as a crucial factor to facilitate engagement in physical activity. Education, therapeutic rapport, encouragement and motivation were topics often discussed by participants. Physical activity assessment was rarely reported by participants in this study. Participants acknowledged focusing on the primary goal of restoring older adults' functional capacity by treating physical impairments, and concomitantly promoting an active lifestyle for health benefits. Participants perceived that inadequate community follow-up was a major barrier to transition older adults to an active lifestyle post discharge from rehabilitation.

Conclusion: The findings from this research program suggest that physiotherapists are not widely applying evidence-based practice to the promotion of physical activity to older adults attending out-patient rehabilitation. Increasing physical activity is a global priority, with the World Health Organisation Global Action Plan on Physical Activity (GAPPA) 2018-2030, 'More active people for a healthier world', calling for a systems-wide approach to patient assessment and counselling on physical activity across all primary health care settings. Physiotherapists are ideally placed to be actioning this strategy, though there is scope for improvement in physical activity promotion to older adults attending out-patient rehabilitation. Furthermore, the establishment of tailored physical activity programmes and services to support older adults starting and maintaining regular physical activity is recommended. Implementation research providing a guiding pathway to support physiotherapists promoting physical activity to older adults is warranted. Physiotherapists working in out-patient rehabilitation settings can and should drive older adults' transition from a restorative and therapeutic context to a self-managed active lifestyle in the community, by integrating physical activity promotion into routine practice.

PRESENTATIONS AND PUBLICATIONS

Presentations

Paim, T., Low-Choy, N., Dorsch, S., & Kuys, S. Physical activity promotion to older adults attending out-patient rehabilitation. Australian Catholic University, HDR milestone presentation, Brisbane, QLD, Australia, 2021.

Paim, T., Low-Choy, N., Dorsch, S., & Kuys, S. An audit of physiotherapists' documentation on physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation. Physiotherapy department, The Prince Charles Hospital, Brisbane, Australia, 2019.

Paim, T., Low-Choy, N., Dorsch, S., & Kuys, S. Physical activity promotion to older adults attending out-patient rehabilitation. Australian Catholic University, HDR milestone presentation, Brisbane, Australia, 2019.

Paim, T., Low-Choy, N., Dorsch, S., & Kuys, S. Physical activity promotion to older adults attending out-patient rehabilitation. Australian Catholic University, HDR milestone presentation, Brisbane, Australia, 2017.

Paim, T., Low-Choy, N., Dorsch, S., & Kuys, S. Physical activity promotion to older adults attending out-patient rehabilitation. Physiotherapy department, The Prince Charles Hospital, Brisbane, Australia, 2017.

Publications

Paim, T., Low-Choy, N., Dorsch, S., & Kuys, S. (2020). An audit of physiotherapists' documentation on physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation, *Disability and Rehabilitation*, 1-7. doi: 10.1080/09638288.2020.1805644

ABBREVIATIONS

ABS	Australian Bureau of Statistics
COM-B	Capability, Opportunity, Motivation-Behaviour
GAPPA	Global Action Plan on Physical Activity
HEP	Home Exercise Program
MECC	Making Every Contact Count
METs	Metabolic Equivalents of Task
NPAP	National Physical Activity Pathway
PAVS	Physical activity Vital Sign
RAPA	Rapid Assessment of Physical Activity
RBWH	Royal Brisbane Women Hospital
RDTU	Rehabilitation Day Therapy Unit
SMART	Specific, Measurable, Attainable, Relevant and Timely
TPCH	The Prince Charles Hospital
VHI	Visual Health Information
WHO	World Health Organisation

THESIS STRUCTURE

This thesis comprises six chapters.

Chapter 1 introduces the research program.

Chapter 2 outlines the background and a review of the relevant literature that underpin the rationale for the research program.

Chapter 3 outlines the methodological approach taken for the research program.

Chapters 4 presents STUDY 1: An audit of physiotherapists' documentation on physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation.

Chapter 5 presents STUDY 2: Physiotherapists' perceptions of physical activity promotion to older adults attending out-patient rehabilitation.

Chapter 6 summarises the findings of the research program, presents the clinical implications and areas for future research. Limitations of the research program are also presented.

References are listed at the end of the thesis in the APA referencing style.

Appendices are referred to throughout the document and are presented at the end of the thesis.

Chapter 1. INTRODUCTION

One of the largest public health problems facing communities both internationally and around Australia today is the lack of regular physical activity (Blair, 2009; Gonzalez, Fuentes, & Marquez, 2017; I. M. Lee et al., 2012). Physical inactivity is identified as one of the major risk factors for non-communicable diseases, globally accounting for 6% of death (Bull et al., 2020). Physical activity levels tend to decline as people age, with 74% of older adults (people aged 65 years and above) not engaging in physical activity as per recommended levels (Australian Bureau of Statistics, 2017-18). In addition to physical inactivity, increased sedentary time, highly prevalent among older people (Harvey, Chastin, & Skelton, 2015), culminates in premature onset of illness, disability and frailty (McPhee et al., 2016).

The ageing of populations is dramatically increasing (World Health Organization, 2015). Despite life expectancy increasing (Organisation for Economic Co-operation and Development Health Statistics, 2017), older people are not experiencing a healthier life compared to prior generations (Beard, Officer, & Cassels, 2016; Crimmins & Beltran-Sanchez, 2011). Multi-morbidity, disability and frailty prevalence is highly correlated to older age (Afshar, Roderick, Kowal, Dimitrov, & Hill, 2015; Boeckxstaens et al., 2015; Crimmins & Beltran-Sanchez, 2011; Marengoni et al., 2011; Mitra & Sambamoorthi, 2014). Fortunately, many chronic diseases, disability and frailty can be prevented or ameliorated by modifying unhealthy behaviours, including the negative impact of physical inactivity (de Vries et al., 2012; Pedersen & Saltin, 2015; Tak, Kuiper, Chorus, & Hopman-Rock, 2013). Thus, physical activity has an important role in healthy ageing.

There is more to healthy ageing than the absence of diseases (World Health Organization, 2015). Healthy ageing has been defined as “the process of developing and maintaining the functional ability that enables wellbeing in older age” (World Health Organization, 2015, p. 28). Functional ability is characterised by one’s physical and mental capacities to perform daily living activities within his or her living environment (World Health Organization, 2015). Evidence suggests that having a primary focus on building and

maintaining functional ability of people 65 years and older is more effective than focussing on the management of chronic illness (World Health Organization, 2015). Reducing risk factors and encouraging healthy behaviours, including physical activity, are key targets in building, maintaining and reversing the loss of functional ability of older people (World Health Organization, 2015).

A significant body of research has demonstrated that physical activity participation can decrease overall mortality as well as specifically decrease the risk of diabetes, cancer and cardiovascular diseases (Holme & Anderssen, 2015; Long et al., 2015; Moore et al., 2012; Posadzki et al., 2020; Woodcock, Franco, Orsini, & Roberts, 2011). Furthermore, several studies suggest that regular physical activity maintains functional independence (Paterson & Warburton, 2010), improves cognition (Blondell, Hammersley-Mather, & Veerman, 2014; Sofi et al., 2011), prevents falls (J. Brown, Rosenkranz, Kolt, Berentson-Shaw, & George, 2011; Sherrington et al., 2019) and improves mental wellbeing (Park, Han, & Kang, 2014; Windle, Hughes, Linck, Russell, & Woods, 2010) and quality of life in older people (Halaweh, Willen, Grimby-Ekman, & Svantesson, 2015; Langlois et al., 2013; Phillips, Wojcicki, & McAuley, 2013). Thus, physical activity is advocated as the best non-pharmacological remedy to maintain health and functional independence among older adults (Pedersen & Saltin, 2015; Zalewski, Alt, & Arvinen-Barrow, 2014).

However, achieving physical activity levels for health in this population has been shown to be a challenging task (Zalewski et al., 2014), especially for those who are chronically ill (Chase, 2015). As older adults are vulnerable to functional decline (Ramaswamy, 2015; Stott & Quinn, 2013) especially due to illness, injury and hospitalisation; rehabilitation is often part of a geriatric care model to restore their functional independence and subsequently decrease hospital readmissions and institutionalisation (Stott & Quinn, 2013). Physiotherapists routinely prescribe exercises to older adults during rehabilitation programs to optimise their physical ability and functional independence. Evidence on the effectiveness of supervised exercise interventions to improve physical function of older people is well demonstrated, including components of mobility (Chase, Phillips, & Brown, 2017; Chou, Hwang, & Wu, 2012; de Vries et al., 2012; Gine-Garriga, Roque-Figuls, Coll-Planas, Sitja-Rabert, & Salva, 2014), strength (Steib, Schoene, & Pfeifer, 2010) and balance (Chou et al., 2012; Howe, Rochester, Neil, Skelton, & Ballinger, 2011). However,

the effects of physiotherapy exercise interventions on physical activity have received little investigation (de Vries et al., 2012). Some reports show low levels of physical activity during hospitalisation, both in acute care (Astrand et al., 2016) and during inpatient rehabilitation (Astrand et al., 2016; Lacroix et al., 2016). It is not clear if these low levels of physical activity are also seen in out-patient rehabilitation and following discharge from formal programs.

Interventions targeting achieving physical activity levels required for health and to subsequently maintain functional gains achieved during rehabilitation are paramount for adults 65 years and over, especially those with chronic ill health. Assisting older adults in the transition from hospital-based rehabilitation to the establishment and maintenance of sustainable levels of physical activity in the community is considered a good strategy. This will not only reduce healthcare utilisation; but will also encourage self-empowerment and shift the management of chronic diseases from a paradigm of healthcare rescue to self-care preventative maintenance (Desveaux, Goldstein, Mathur, & Brooks, 2016). This goal of supporting all adults, including older adults, in the achievement of required levels of physical activity is highlighted in the World Health Organisation's Global Action Plan on Physical Activity (GAPPA), titled 2018-2030 'More active people for a healthier world' (World Health Organization, 2018b). The GAPPA calls for the implementation and strengthening of patient assessment and counselling to increase physical activity and reduce sedentary behaviour as part of universal health care (World Health Organization, 2018b). The GAPPA also calls for the improvement on the provision of tailored physical activity programmes to older adults to support healthy ageing (World Health Organization, 2018b).

As experts in exercise prescription and primary healthcare providers, physiotherapists can play an important role in changing their patients' health behaviour, particularly participation in physical activity (Bezner, 2015; Dean et al., 2014). Physiotherapists working in out-patient rehabilitation settings are well placed to assist older adults to achieve an active lifestyle, incorporating physical activity into care plans and transitioning patients from a therapeutic focus to a healthier lifestyle focus. It is not known how, or if, physiotherapists actively plan for this transition and incorporate this aspect of care into out-patient rehabilitation programs for older adults.

Thus, current practices related to the prescription of physical activity to older adults undergoing out-patient rehabilitation and transition to an active lifestyle after completion of program requires investigation. Two studies were undertaken to inform this research program. The first study, an audit of medical files, aimed to investigate if physiotherapists document physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation. The second study aimed to identify and understand physiotherapists' beliefs in educating, promoting and prescribing physical activity to older adults attending out-patient rehabilitation through the use of group interviews. Investigating and understanding the current practice of physical activity promotion to older adults should assist the identification of evidence-practice gaps and relevant strategies for the implementation of evidence-based practice within the out-patient rehabilitation context.

Chapter 2. BACKGROUND

This chapter provides an overview of the literature relevant to this thesis. Physical activity terminology is discussed, along with physical activity guidelines for older adults. Tools to measure physical activity as well as benefits and risks for older adults associated with engaging in physical activity is explored. This chapter will conclude with an overview of the research aims of this thesis and each study.

2.1 Physical activity terminology

Physical activity has been defined as “any bodily movement produced by skeletal muscles that results in energy expenditure and can be categorized into occupational, sports, conditioning, household, or other activities” (Caspersen, Powell, & Christenson, 1985, p. 126). Exercise is a subcategory of physical activity that is planned, structured, and repetitive and has a goal of improving or maintaining physical fitness (Caspersen et al., 1985). Despite the age of these definitions, Caspersen’s definitions of physical activity continue to be used in health research nowadays (World Health Organization, 2020).

Physical activity is typically described according to the level of intensity. Physical activity intensity is categorised as light, moderate and vigorous intensity. Light intensity physical activity refers to any waking behaviour where the metabolic equivalent is between 1.6 and 2.9 Metabolic Equivalents of Task (METs) and includes activities such as walking slowly, washing dishes, ironing, cooking, fishing. Moderate intensity physical activity requires between 3.0 and 5.9 METs and includes activities such as walking for a duration of 10 min or greater, swimming, social tennis, or golf. Vigorous intensity physical activity requires between 6.0 to 9.0 METs and includes activities such as jogging, cycling, aerobics, and competitive tennis (Norton, Norton, & Sadgrove, 2010). A MET is a physiological measure used to express energy cost of physical activity, in which one MET is defined as 1 kcal/kg/hour which is approximately equivalent to the energy cost of sitting quietly (Ainsworth et al., 2000).

Physical inactivity and sedentary behaviour are considered distinct health behaviours and independent risk factors for chronic diseases (Sedentary Behaviour Research Network, 2012). Physical inactivity is defined as the failure to meet physical activity guidelines, while sedentary behaviour is defined as any waking behaviour characterised by an energy expenditure of ≤ 1.5 METs in a sitting or reclining posture (Sedentary Behaviour Research Network, 2012). Older adults tend to spend a great portion of their waking hours in sedentary behaviour (Harvey et al., 2015). Evidence demonstrates that sedentary behaviour is associated with adverse health outcomes and all-cause mortality independently of levels of physical activity (Patterson et al., 2018). The World Health Organisation outline the importance of increasing physical activity levels as well as the importance of reducing time spent in sedentary behaviour for all ages (WHO, 2020). Both are important considerations for promoting healthy lifestyle behaviours. This thesis will focus on physiotherapists prescription of physical activity to older adults undergoing out-patient rehabilitation. While prescribing physical activity may reduce time spent in sedentary behaviour, investigation of physiotherapists specifically addressing sedentary behaviour in older adults undergoing out-patient rehabilitation is beyond the scope of this thesis.

2.2 Physical activity guidelines

The World Health Organization recommends weekly physical activity levels for people aged 65 years and above of at least 150 minutes of moderate-intensity physical activity; or at least 75 minutes of vigorous-intensity physical activity; or an equivalent combination of moderate- and vigorous-intensity activity, for health benefits (World Health Organization, 2020). In addition, older adults should do muscle strengthening exercises at a moderate or vigorous intensity that involves major muscles on at least two days a week (World Health Organization, 2020). Older adults should include activities that focus on functional balance and strength training three or more days a week to improve functional capacity and prevent falls (World Health Organization, 2020). Physical activity guidelines remain the same for older adults with chronic conditions such as hypertension, type-2 diabetes, human immunodeficiency virus and cancer survivors (World Health Organization, 2020). When health conditions prevent older people meeting physical activity guidelines, it has been

suggested that they should be as active as possible and limit the amount of sedentary behaviour (World Health Organization, 2020).

2.3 Physical activity measurement

Measuring physical activity levels in clinical settings is important to identify whether older adults meet the recommended amounts of physical activity and accordingly inform physical activity prescription. Physical activity can be measured using self-reported tools or through objective measures, such as step counters or accelerometers. These will be discussed below.

2.3.1 Self-reported measurement of physical activity

Physical activity is commonly measured using self-report tools, such as physical activity questionnaires, interviews and activity diaries (Gorman et al., 2014; Grimm, Swartz, Hart, Miller, & Strath, 2012; Tucker, Welk, & Beyler, 2011). Questionnaires are low cost and easy to administer (Murphy, 2009) and provide information on physical activity behaviour over a specified period of time (Grimm et al., 2012). However, some limitations have been identified with self-reported measures of physical activity. Limitations highlighted include inaccurate measurement of the amount and intensity of physical activity as self-report measures are known to be affected by recall bias, socially desirable responses, mood and cognition (Murphy, 2009). Older adults may have vision or hearing impairments (Copeland & Eslinger, 2009) and difficulty recalling activities, which may also impact on the accuracy of self-reported measures (Murphy, 2009).

Older adults commonly participate in activities of short duration and /or activities of light intensity, which are activities that can be difficult to recall (Copeland & Eslinger, 2009; Pruitt et al., 2008). Older adults also may experience difficulty reporting on the intensity of physical activity they engage in. For older adults, and particularly those with chronic condition or some limitation to their functional capacity, their perception of light, moderate and vigorous intensity may vary (Copeland & Eslinger, 2009; Tucker et al.,

2011). Furthermore, a substantial number of people, including older adults, tend to overestimate their physical activity levels when using self-report measures (Tucker et al., 2011; Watkinson et al., 2010). A large study examining adults' physical activity levels with both self-reported and objective measures found a significant discrepancy between the proportion of individuals meeting physical activity guidelines (62% for self-report and 9.6% for objective measure using accelerometers) (Tucker et al., 2011). Despite the limitations of self-report, these measures can provide rich information about physical activity behaviours, such as the location and types of activity performed (Falck, McDonald, Beets, Brazendale, & Liu-Ambrose, 2016).

2.3.2 Objective measurement of physical activity

Objective measures of physical activity include devices such as pedometers and accelerometers. Pedometers or step counters measure the number of steps taken (Sylvia, Bernstein, Hubbard, Keating, & Anderson, 2014). Despite their simplicity and low cost, pedometers do not record intensity, frequency and duration of physical activity (Sylvia et al., 2014), which limits their ability to measure the exact amount of physical activity undertaken (Plasqui & Westerterp, 2007).

The use of accelerometers has been demonstrated as a valid and reliable method to assess physical activity. Accelerometers are able to measure physical activity duration, intensity and energy expenditure (Sylvia et al., 2014). Accelerometers are relatively small, portable, wireless, and have a long battery life; however, accelerometers are more expensive than pedometers, and involve significant software costs and time-consuming data analysis (Schrack et al., 2016). The most common method for classifying physical activity intensity with accelerometers is the use of cut-points of activity counts per minute (Gorman et al., 2014). Cut-points can define the range of accelerometer output corresponding to sedentary (≤ 1.5 METs), light (1.6-2.9 METS) and moderate to vigorous (≥ 3 METs) physical activity (Gorman et al., 2014). Among community-dwelling older adults, the cut-point of $\geq 1,952$ counts/min is commonly used to classify moderate-to-vigorous physical activity (Gorman et al., 2014). Validate accelerometers include brands such as Actigraph, Actiwatch and ActivPal (Schrack et al., 2016).

2.4 Benefits of physical activity for older adults

Physical activity benefits have been well demonstrated (Holme & Anderssen, 2015; Long et al., 2015; Moore et al., 2012; Pedersen & Saltin, 2015; Posadzki et al., 2020; Woodcock et al., 2011). A literature review (J. Brown et al., 2011) on physical activity benefits specifically for older adults, comprising 25 systematic reviews, 36 prospective cohort studies and 11 randomised controlled trials, revealed that physical activity benefits include the prevention of many chronic diseases (J. Brown et al., 2011). Additionally, physical activity was identified as being integral to the management of these conditions (J. Brown et al., 2011). A physically active lifestyle among older people was shown to be associated with the prevention of all-cause mortality and morbidity, various types of cancer, cardiovascular diseases, neurological conditions, hospitalisation, sarcopenia, kidney disorders, osteoporosis, diabetes, depression and disability (J. Brown et al., 2011; World Health Organization, 2020). The review concluded that the least physically active older adults present with an elevated risk of all-cause mortality compared to the more active older adults (achieving recommended levels of physical activity). Thus, physical activity is a modifiable risk factor for all-cause mortality (J. Brown et al., 2011).

Furthermore, physical activity improves and maintains mental capacities in older adults (J. Brown et al., 2011; World Health Organization, 2015), which is paramount for healthy ageing. Physical activity helps to maintain and enhance cognitive function, improve self-esteem and sleep, enhance social participation and improve mental health (reduced anxiety and depression) among older people (World Health Organization, 2015, 2020). In fact, exercise is considered an effective non-pharmacological treatment for depression in older adults (Rhyner & Watts, 2016; Schuch et al., 2016). A meta-analysis has shown a large and significant anti-depressant effect of exercise in older adults with depression, particularly mixed aerobic and strength training in a group format (Schuch et al., 2016). There is evidence demonstrating that group based physical activity for older adults not only provides the well-known health benefits of physical activity, but also contributes to improvements in social connectedness (Sebastiao & Mirda, 2021). In addition, an active lifestyle has been linked to improved quality of life and sense of wellbeing in older age (J. Brown et al., 2011; Halaweh et al., 2015; Langlois et al., 2013; Park et al., 2014; Phillips et al., 2013; Windle et al., 2010).

Another important benefit of physical activity is the prevention of falls and falls-related injuries in older adults. Falls are a leading cause of mortality and morbidity among older people (Ambrose, Paul, & Hausdorff, 2013; World Health Organization, 2020). Approximately 50% of adults over 80 years of age and up to 30-40% of adults over 65 years old fall annually (Ambrose et al., 2013; Deandrea et al., 2010). Falls and fear of falling contribute to activity restriction, which may lead to secondary functional decline, social isolation and depression, consequently further increasing the risk of falls (Landers, Oscar, Sasaoka, & Vaughn, 2016). Fear of falling and decreased balance confidence has been demonstrated to be prevalent among older people regardless of their previous falls' history (Bula, Monod, Hoskovec, & Rochat, 2011; Liu, Speed, & Beaver, 2015). It is well demonstrated that exercise can prevent falls in older adults (J. Brown et al., 2011; Gillespie et al., 2012; Sherrington et al., 2020) and is effective to improve balance confidence to perform everyday tasks (Bula et al., 2011). Sherrington et al., (2020) found that exercise as a single intervention can reduce falls among older adults, especially if programmes target balance exercises. Exercise interventions combining two or more categories of exercise (balance and strengthening for example) demonstrate a significant reduction in the risk of falling among older people (Gillespie et al., 2012; Karlsson, Vonschewelov, Karlsson, Coster, & Rosengen, 2013; Sherrington et al., 2020).

A significant body of research has demonstrated that regular physical activity improves and maintains physical functioning in older people, including components of balance, mobility and muscle strength (J. Brown et al., 2011; Chase et al., 2017; Chou et al., 2012; Paterson & Warburton, 2010). Thus, transitioning older people to an active lifestyle following rehabilitation is essential to sustain functional gains achieved during rehabilitation and to maintain their functional independence. Evidence demonstrates a positive association between regular physical activity and health-related outcomes specific to older adults (WHO, 2020). Furthermore, regular physical activity is one of the key elements for healthy aging (Daskalopoulou et al., 2017; Eckstrom, Neukam, Kalin, & Wright, 2020). Promoting regular physical activity to older adults, especially those with chronic diseases and or disabilities discharging from rehabilitation programs, will contribute positively to their physical, mental and social health, enabling healthy aging (World Health Organization, 2018b).

Despite the demonstrated health benefits resulting from physical activity participation among this population, some inherent risks and adverse events associated with physical activity need to be considered.

2.5 Risks associated with physical activity among older adults

Participating in exercise and/or leisure activities has been shown to be associated with a risk of injury (Stathokostas, Theou, Little, Vandervoort, & Raina, 2013). For older adults, age-related changes in body functions lead to a decline in physical performance and possibly increase the risk of injury during physical activity (Ganse et al., 2014; Stathokostas et al., 2013). However, evidence shows no increased risk of injury for active older adults compared to younger adults (J. Brown et al., 2011; Ganse et al., 2014; Stathokostas et al., 2013). These findings may be interpreted with some caution due to a concern raised on the possible underestimation of associated risks of physical activity as most studies mainly focus on its benefits and rarely report harms (J. Brown et al., 2011).

For sedentary older adults, including those with mobility limitations and/or chronic illness, exercise-related adverse events appear to be common during physical activity (Hinrichs et al., 2015). Exercise intervention studies among high-risk older adults most commonly report non-serious musculoskeletal problems (Hinrichs et al., 2015; McPhee et al., 2016) such as minor strains and sprains, tendonitis and exacerbation of osteoarthritis (J. Brown et al., 2011; Hinrichs et al., 2015; McPhee et al., 2016; Stathokostas et al., 2013).

Appropriate education and advice, gradual increase of activity and modifications as required may decrease the risk of injuries during physical activity (J. Brown et al., 2011; Hinrichs et al., 2015; Stathokostas et al., 2013). Tailored and individualised exercise programs are recommended for sedentary, mobility-limited or chronically ill older people engaging in physical activity (J. Brown et al., 2011; Sherrington et al., 2020).

Physiotherapists working in out-patient rehabilitation settings are well placed and well trained to transition this population from a supervised exercise program to an independent or supervised physical activity program in the community.

The risk of falling does not seem to increase during physical activity among older adults (J. Brown et al., 2011). On the contrary, physical activity is associated with the prevention of falls in the older population (J. Brown et al., 2011; Gillespie et al., 2012; Karlsson et al., 2013; Sherrington et al., 2020). However, older adults at higher risk of falling appear to be more susceptible to falls during physical activity (Sherrington, Tiedemann, Fairhall, Close, & Lord, 2011). Walking is a very popular physical activity among people over the age of 65 years (J. Brown et al., 2011; Voukelatos et al., 2015). Despite studies with walking programs demonstrating increases in physical activity in this population (Voukelatos et al., 2015), walking programs as a single intervention may increase the risk of falls in older people at high falls risk (Sherrington et al., 2011).

For the older population, physical activity programs must incorporate strength and balance training to prevent falls (Bauman, Merom, Bull, Buchner, & Fiatarone Singh, 2016; World Health Organization, 2020). Supervised and tailored exercise programs are highly recommended to prevent falls among older adults at high falls risk (Sherrington et al., 2020). Physiotherapists working in out-patient rehabilitation settings routinely assist older adults to improve their functional ability, including the prevention of falls, and are well placed and highly skilled to assist this high-risk population in the transition to a safe and active lifestyle following discharge from rehabilitation.

Cardiovascular events are very rare during physical activity and are particularly linked to extraneous or vigorous activities in older people (J. Brown et al., 2011; Goodman, Burr, Banks, & Thomas, 2016; Hinrichs et al., 2015). Some cardiovascular events that may result from physical activity participation include arrhythmias, myocardial infarction and sudden death (Goodman et al., 2016). Older people with ischemic heart disease may present an elevated risk of cardiovascular problems during physical activity (W. Brown & Blair, 2012), particularly sedentary people beginning vigorous activities rather than gradually increasing activity levels (Chen, Mears, & Hawkins, 2005). There is a consensus that the risk of cardiovascular problems is actually greater for individuals that remain sedentary than for those exercising regularly (J. Brown et al., 2011).

Fears and concerns about safety are among the main barriers preventing peoples' engagement in physical activity in older age (J. Brown et al., 2011; Stathokostas et al.,

2013). Education, advice, gradual increase in physical activity levels and tailored programs are recommended to reduce the occurrence of adverse events during physical activity in sedentary older people (J. Brown et al., 2011; Goodman et al., 2016). Overall, research findings suggest that physical activity benefits clearly counteract its associated risks (J. Brown et al., 2011; Goodman et al., 2016; Hinrichs et al., 2015).

2.6 Promotion and prescription of physical activity to older adults attending out-patient rehabilitation

Several studies have demonstrated a significant drop in functional gains shortly after discharge from out-patient rehabilitation (Crilly et al., 2005; Luk & Chan, 2011; Malone, Hill, & Smith, 2002). Non-adherence to exercise is suggested to be correlated to functional decline in older people following discharge from rehabilitation (Desveaux et al., 2016). Home exercise programs are intended to augment recovery and maintain functional improvement following discharge (Gallagher, 2016). However, sub-optimal rates of long-term adherence to prescribed home exercise programs have been reported among older people after completion of a rehabilitation program (Forkan et al., 2006; Simek, McPhate, & Haines, 2012). Physiotherapists traditionally focus on physical impairments and functional mobility when prescribing exercise to older adults, but do not specifically target higher physical activity levels for health in this population (de Vries et al., 2012). Rehabilitation is an excellent opportunity to start promoting physical activity (Rimmer & Lai, 2017; van der Ploeg et al., 2007) to older adults. Integrating physical activity behaviour change strategies in physiotherapy rehabilitation programs may be a good strategy to assist older adults to become more physically active after rehabilitation (van der Ploeg et al., 2007) and subsequently preserve the functional gains achieved during rehabilitation. Older adults, especially those with disabilities, need support to transition from being a patient in rehabilitation to becoming a participant in lifelong physical activity in the community (Rimmer & Lai, 2017).

Promoting physical activity may be particularly challenging for people over the age of 65 years after a sustained injury or an acute illness (Zalewski et al., 2014). A number of studies report on older adults' perceived barriers to physical activity (Franco et al., 2015;

Gellert et al., 2015; Justine, Azizan, Hassan, Salleh, & Manaf, 2013). A systematic review of older adults' views and experiences of physical activity participation demonstrated that many older people with chronic illness assume that physical activity is nonessential and risky, and that their health problems prevent them from exercising (Franco et al., 2015). In addition, older adults report lack of confidence to exercise independently and are reluctant to engage in physical activity without instruction and advice from a healthcare professional (Franco et al., 2015). Furthermore, motivation to have a physically active lifestyle may be diminished in this population by the belief that sedentary behaviour is expected with ageing, multi-morbidity and physical disability (McMahon et al., 2016).

Education of the benefits of physical activity and dispelling the myths of physical activity are important strategies to promote an active lifestyle in this population (Franco et al., 2015). Albeit evidence demonstrates that education alone is not enough; older adults need assistance with behaviour change (Bassett, 2015; Hay-Smith, McClurg, Frawley, & Dean, 2016; Rimmer & Lai, 2017). Physiotherapists have a great opportunity to assist older adults in the transition to an active lifestyle (Bezner, 2015) during rehabilitation, especially if physiotherapists become more aware of behaviour change strategies (Bassett, 2015). Older adults with chronic diseases perceive that physiotherapists' assistance is an important facilitator for physical activity participation after completion of a rehabilitation program (Desveaux et al., 2016). In addition, physiotherapists report having sufficient confidence to promote and prescribe physical activity in addition to usual care (Shirley, van der Ploeg, & Bauman, 2010).

Physiotherapists usually engage patients in planning or setting goals to enhance performance and to increase motivation (Schoeb, Staffoni, Parry, & Pilnick, 2014) to achieve desired rehabilitation outcomes (Kneebone et al., 2010). Setting goals is considered an effective intervention to change physical activity behaviour among diverse populations, including older adults (Chase, 2015; McEwan et al., 2016). Setting incremental goals has been shown to be essential to facilitate behaviour change (Bovend'Eerdt, Botell, & Wade, 2009). While goal setting is in general used by therapists in rehabilitation programs, there is no current information on how physiotherapists use incremental goal-setting strategies to increase physical activity levels while older adults attend rehabilitation. Nor is there evidence of how physiotherapists build towards more

independent and longer-term physical activity participation during the post-discharge period when community integration and participation is essential for health benefits.

Effective interventions have been demonstrated to improve physical activity behaviour among older adults (Chase, 2015; Grande et al., 2020). The most effective interventions included those using audio-visual media (exercise videos) and mailed materials (pictures and description of exercises and physical activity log), theory-based interventions (most commonly transtheoretical model and social cognitive theory), interventions combining cognitive (education, counselling) and behavioural strategies (self-monitoring, goal setting), and motivational-type interventions (Chase, 2015). Counselling has been shown to be an effective strategy to change physical activity behaviour (Chase, 2015). However, studies show that physiotherapists and other primary care providers do not widely practice counselling (Gagliardi, Abdallah, Faulkner, Ciliska, & Hicks, 2015; Hebert, Caughy, & Shuval, 2012).

Training and resources may be required to assist primary care providers to effectively integrate physical activity counselling to usual care (Gagliardi, Abdallah, Faulkner, Ciliska, & Hicks, 2015). A study involving young adults (mean age 47 years, SD 14) with disabilities from ten Dutch inpatient and outpatient rehabilitation centres demonstrated that individualised tailored physical activity counselling during rehabilitation can be effective in improving physical activity behaviour one year after completion of a rehabilitation program (van der Ploeg et al., 2007). Interventions included a combination of counselling sessions on sports advice, physical activity integrated into daily routine and follow-up telephone support after completion of the rehabilitation program (van der Ploeg et al., 2007).

Studies on physical activity interventions for older adults attending out-patient rehabilitation are scarce. One study on physiotherapist-led exercises, counselling and home visits for older adults attending a geriatric day hospital demonstrated positive effects on physical functioning measures, self-reported physical activity and quality of life three months following discharge from rehabilitation (Brovold, Skelton, & Bergland, 2012). It is probable that physiotherapists can successfully promote physical activity participation for

older adults attending rehabilitation when counselling and support from physiotherapists are added to usual care. The extent to which this is routinely undertaken is unknown.

2.7 Summary

Promotion of physical activity to older adults is strongly recommended for healthy ageing (World Health Organization, 2015, 2020). Physiotherapists have the potential to be key behaviour change agents when older adults present to out-patient rehabilitation settings with chronic diseases or following an acute illness. Physiotherapists are well placed to assist older adults to achieve an active lifestyle by incorporating physical activity into care plans and transitioning patients from a therapeutic focus to a healthy lifestyle focus. It is not known how, or if, physiotherapists actively plan for this transition and incorporate this aspect of care into out-patient rehabilitation programs for older adults. Thus, there is a clear need to better understand the current practices of physical activity promotion and prescription to older adults attending out-patient rehabilitation.

A research program was proposed to explore these gaps. Two studies were conducted to inform this Master of Philosophy research program. The first study, an audit of medical records, sought to identify if physiotherapists document the promotion and prescription of physical activity to older adults attending out-patient rehabilitation and assist them in the transition to a healthy lifestyle. The second study, a qualitative study using focus groups with physiotherapists working in a day therapy rehabilitation setting, sought to explore physiotherapists' attitudes, perceptions, beliefs and opinions regarding promotion and prescription of physical activity of older adults undergoing rehabilitation and transition to an active lifestyle after completion of program.

The outcomes of these studies will inform the development of additional strategies to promote beneficial physical activity behaviours among older adults attending out-patient rehabilitation.

2.8 Research aims

2.8.1 Overall research aim

The overall aim of this research program was to investigate current physiotherapy practice of physical activity promotion and prescription to older adults attending an out-patient rehabilitation program.

2.8.2 Specific aim of Study 1

Identify if physiotherapists document the promotion and prescription of physical activity to older adults attending out-patient rehabilitation and assist them in the transition to an active lifestyle.

2.8.3 Specific aim of Study 2

Identify physiotherapists' attitudes, perceptions, beliefs and opinions regarding physical activity promotion of older adults undergoing rehabilitation.

Chapter 3. METHODOLOGY

This chapter provides an overview of research methods used in this research program. The relevant research paradigm that underpins this research program will be presented, and details regarding the setting in which this research program was conducted. The methodological details and ethical considerations for this research program will be presented.

3.1 Research paradigm

Research paradigm refers to the philosophical perspectives that guides a research process and influences the research methodology and choice of methods (D. E. Gray, 2014). There are several research paradigms available with positivism and interpretivism situated at the most extreme ends of the spectrum (D. E. Gray, 2014). Positivism assumes a scientific outlook of the world, through hypotheses, formal testing and statistical analysis. A positivist approach is closely linked to an objectivism epistemological position as assumes that reality exists independently of human mind, so research is about discovering an objective truth (D. E. Gray, 2014; Moon & Blackman, 2014). Positivism is aligned with quantitative research, in which the phenomenon under investigation is independent of and unaffected by the researcher views and values. Conversely, interpretivism assumes that ‘truth’ is socially constructed, and reality and knowledge are influenced by people perspectives and experiences within the world in which they live in (D. E. Gray, 2014). An interpretivist approach is closely linked to a constructivist epistemological position as accepts reality as a construct of human mind. Interpretivism is aligned with qualitative research, which the researcher’s views and values are part of the research (D. E. Gray, 2014).

There is growing recognition that combining qualitative and quantitative approaches may offer a solution for answering complex research questions (Anguera, Blanco-Villasenor, Losada, Sanchez-Algarra, & O’nwuegbuzie, 2018). Pragmatism is a paradigm that supports plurality of methods as researchers can utilise methodological approaches that

best answer their research questions (Kaushik & Walsh, 2019). The pragmatism paradigm follows both positivism and interpretivism to seek answers to research problems.

Pragmatism is often associated with mixed-method or multimethod (or multi-method) approach (Kaushik & Walsh, 2019). Multimethod approach and mixed-method approach are terms that are often used synonymously in the literature. There are some similarities in these two methodologies but the differences between them are worth noting (Anguera et al., 2018). Both methods include both quantitative and qualitative methods. Multimethod approach tends to use the methodologies as complementary to achieve a common research goal. This might be two or more quantitative or qualitative methodologies or a combination of quantitative and qualitative methodologies; which together are driven by a common overall research goal (Anguera et al., 2018). Mixed-method approach similarly includes both quantitative and qualitative methods with the data generated needing to be integrated and synthesised to fulfill the research goal (Anguera et al., 2018).

Pragmatism is the theoretical perspective that underpins this program of research. A multimethod approach was taken to answer the research questions for this research program. An audit of medical records (quantitative) and focus groups (qualitative) studies were undertaken in order to gain valuable insights in the promotion of physical activity to older adults that could not have been gained by using either design alone. An audit of medical records was conducted to identify if physiotherapists document the promotion and prescription of physical activity to older adults attending out-patient rehabilitation and assist them in the transition to an active lifestyle. In addition, focus groups were conducted to better understand the mechanisms that shape current practices by exploring physiotherapists' attitudes, perceptions, beliefs and opinions regarding promotion and prescription of physical activity of older adults undergoing rehabilitation. More detailed descriptions of the methods used in the studies comprising this research program will be presented.

3.2 Research setting

This research program was conducted at the Day Therapy Rehabilitation Unit (RDTU) at The Prince Charles Hospital in Brisbane, Australia. The Prince Charles Hospital is a large

tertiary referral hospital within the Metro North Hospital and Health Service, comprising approximately 630 beds. The Prince Charles Hospital (TPCH) provides health services to people living in the northern suburbs of Brisbane, and also provides highly specialised cardiothoracic services to Queensland and northern New South Wales' populations. Services provided include emergency and general medicine, general surgery, cardiac and thoracic medicine and surgery, orthopaedic joint surgery, acute geriatrics and rehabilitation medicine, mental health and palliative care services.

RDTU is a hospital-based out-patient rehabilitation service that provides ambulatory rehabilitation to adults for the management of functional decline caused by an injury, illness or surgery on the background of acute or chronic neurological, orthopaedic, vestibular and cardiorespiratory conditions. RDTU rehabilitation program provides a multi-disciplinary service, including rehabilitation medicine, nursing, physiotherapy, occupational therapy, speech-therapy, dietetic, neuropsychology and social-work. The service is free of charge for Medicare card holders. Approximately 500 people are referred to physiotherapy at RDTU annually.

Older adults are commonly referred for physiotherapy at RDTU due to mobility and or balance impairments from internal or external referrals. Physiotherapy sessions are provided at RDTU by four physiotherapists (1.5 full-time equivalent) through individualised or group therapy. Therapy sessions are usually offered once a week for a median of 12 weeks depending on individual requirements.

3.3 Study 1 - Audit of medical records

A retrospective audit of medical records was used in Study 1. Audit of medical records or chart review is a common and valuable means of scientific investigation (Gearing, Mian, Barber, & Ickowicz, 2006; Siems et al., 2020). Retrospective audit of medical records, which uses pre-recorded, patient-centred data, is a frequently used methodology in many healthcare-based disciplines such as epidemiology, professional education, inpatient care, and clinical research (Panacek, 2007; Vassar & Holzmann, 2013).

Advantages of conducting a retrospective audit of medical records as a method of data collection include data being readily available, being a relatively inexpensive method of data collection and having the ability to customise data collection to meet specific research questions through large databases (Worster & Haines, 2004). However, potential limitations of medical record audits include the quality of documentation in medical records (including incomplete or missing information and handwriting interpretation), lack of impartiality and accuracy in extracting data and missing medical records (Siems et al., 2020; Worster & Haines, 2004). Thus, important methodological considerations should be taken into account when conducting an audit of medical records to ensure reliability, validity and reproducibility of audit of medical records research.

3.3.1 Methodological considerations for audit of medical records

The following section will outline important methodological considerations for an audit of medical records research based on the ‘best practices’ guide for retrospective chart review developed by Vassar & Holzmann (2013). These ‘best practices’ are explored below. Specific details about the methods used in Study 1 can be found in Chapter 4.

3.3.1.1 Well-defined research questions

Research questions form the basic structure of an audit of medical records and should direct the study design and data analysis (Vassar & Holzmann, 2013).

In order to investigate current physiotherapy practice of physical activity promotion and prescription to older adults attending an out-patient rehabilitation program, the specific research questions of Study 1 were:

1. Do physiotherapists assess physical activity levels of older adults attending out-patient rehabilitation using validated self-reported or objective measures?
2. Do physiotherapists promote and prescribe physical activity to older adults attending out-patient rehabilitation?

3. Do physiotherapists transition people who are being discharged from out-patient rehabilitation to sustainable models of physical activity within a community context?

3.3.1.2. Specific inclusion and exclusion criteria

Specific inclusion and exclusion criteria should be established prior to data collection to identify the research study population (Panacek, 2007).

Medical records of all adults aged 65 years or older who attended an initial physiotherapy assessment in the period between July 2017 and December 2017 at an out-patient rehabilitation unit at a large tertiary hospital were eligible for inclusion in Study 1. Six months of retrospective data were collected to gather relevant information related to the most current practice of physical activity promotion to older adults attending out-patient rehabilitation. Medical records were excluded if adults were younger than 65 years old or attended an initial physiotherapy assessment outside the established timeframe.

3.3.1.3 Sample size and sample strategy

Statistical power analysis may be used to help determine the number of medical records required for a particular study. Studies with larger samples have greater power (Vassar & Holzmann, 2013). Sample strategy refers to the method used to obtain the sample of medical records. The most common sample strategies in retrospective audits of medical records are convenience sampling and random sampling. Using convenience sampling, researchers access medical information over a specific time frame (Gearing et al., 2006) or for a specific condition or purpose. Convenience sampling is very convenient and practical, and is particularly useful for rarer cases and smaller sample sizes (Vassar & Holzmann, 2013). Random sampling is considered the gold standard sample strategy, as it allows researchers to obtain a representative sample of the population from which the sample was drawn (Vassar & Holzmann, 2013). When establishing the sampling strategy for a study, it is important for researchers to consider the prevalence and nature and of the

specific condition, the population availability, and pragmatics such as the resources available budget, and time constraints (Gearing et al., 2006).

A convenience sample strategy was used in Study 1. A pragmatic time period of six months was selected to ensure that the information being extracted from the audit was current, that the sample would be sufficient to answer the research question, and while not being too burdensome (time to retrieve files, availability and accessibility of medical records). All eligible medical records of adults over 65 years old attending outpatient physiotherapy during the six month data collection period were included to maximise data collection and optimise generalisability for older adults attending this facility (Vassar & Holzmann, 2013).

3.3.1.4 Operationalising study variables

Operationalising variables refers to the identification and definition of the study variables of interest (Vassar & Holzmann, 2013). Operationalisation of variables is important for accurate and consistent data extraction from medical records (Panacek, 2007). A literature review has been suggested to ascertain how other relevant studies have operationalised the study variables of interest (Gearing et al., 2006).

A literature review was conducted to assist identification and definition of variables to be used to describe the assessment, promotion and prescription of physical activity as well as the transition to engaging in physical activity in the community. Medline and CINAHL databases were searched for papers published in English up until 2016. Search terms included “physical activity” and “older adults”, “physical activity”, “physical therapy” or “physiotherapy” and “older adults”. Variables reported in the identified studies were collated and commonly reported variables recorded. Additional variables were identified from clinical experience of the research candidate.

Variables of interest for Study 1 identified and used in this study are listed below. Variables were grouped to reflect the research questions; that is physical activity

assessment, promotion of physical activity, prescription of physical activity and those relating to the supporting the transition to engaging in physical activity in the community.

Assessment of physical activity level variables included:

- level of physical activity prior to reason for referral,
- current level of physical activity (last 7 days),
- type of activity (e.g., exercise program, sport, leisure activity, housework and occupational),
- duration, frequency and intensity of activity,
- self-reported level of physical activity (use of validated measurement tool), and
- objective level of physical activity (use of accelerometer or pedometer).

Promotion of physical activity variables included:

- goal setting related to physical activity,
- provision of resource materials (e.g handout, video, photos),
- monitoring of compliance with home exercise program,
- advice and/or education on regular physical activity,
- identification of barriers/potential problems or facilitators related to engaging in physical activity,
- problem solving around barriers to physical activity,
- social support for physical activity, and
- counselling strategies on physical activity behaviour change (theoretical or cognitive- behavioural models).

Prescription of physical activity variables included:

- prescription of any exercise or physical activity such as balance exercise, sit to stand, cycling on stationary bike, walking on treadmill, and
- prescription of home exercise program.

Transition to physical activity in the community variables included:

- advice and/or education on regular physical activity post-discharge from rehabilitation program,

- referral to other agencies for regular physical activity in the community post-discharge from rehabilitation program.

3.3.1.5 Data extraction form and procedure manual

Data extraction forms help reduce error and ensure consistency in data collection (Vassar & Holzmann, 2013). Extraction forms should be designed to be easy to use, and each variable should have a simple and unambiguous response section (Gearing et al., 2006). Data collection processes must be standardized (Panacek, 2007). Data collection procedure manuals ideally should be developed and are important to ensure accuracy, reliability, and consistency amongst all auditors/reviewers (Vassar & Holzmann, 2013).

In Study 1, a purpose designed audit form was developed by the research candidate and reviewed and refined by the supervision team. Variables included in the audit form were identified from a literature review and are listed in prior Section 3.3.1.4. The research candidate and the principal supervisor held discussions prior to the commencement of data collection to define the variables, refine the audit form and establish clear steps for data extraction. The audit form was pilot tested (see Section 3.3.1.6). A final audit form (Appendix A) was then used for data extraction from the medical records.

3.3.1.6 Conducting a pilot test

A pilot test or pilot study is defined as a small version of the proposed study in any study design (Gearing et al., 2006). Pilot tests are important in audits of medical records to assess the feasibility of the study, to determine appropriacy of audit form, to clarify data collection strategies and to evaluate potential reliability issues (Vassar & Holzmann, 2013). Pilot tests should include approximately 10% of the targeted investigation sample through a randomized process (Vassar & Holzmann, 2013).

A pilot test was conducted by the research candidate and principal supervisor by reviewing 12 (10% of the targeted sample as per Section 3.3.1.3) randomly selected medical records to determine accuracy in data collection and to clarify inconsistencies and discrepancies in

data collection. Both the candidate and research supervisor independently audited the 12 medical records using the audit form. Reliability of the data extraction is reported in the next section.

Several changes were implemented to the audit form following the pilot test, including:

- inclusion of number of physiotherapists involved in care;
- inclusion of living situation (home alone or home with others);
- inclusion of mobility status (mobility level: independent, supervision or assistance; and mobility aid: nil, single point stick, four wheeled walker or other);
- physical activity assessment to include previous level (prior to hospital admission) and current level of physical activity;
- addition of detailed options for methods of assessment of physical activity (informal self-reported, formal self-reported (questionnaire) or objective (pedometer, accelerometer);
- inclusion of documented barriers and facilitators to physical activity and
- inclusion of any documented education/advice on physical activity.

An updated version of the audit form (version 2) (Appendix A) was developed following the pilot test. Reliability of data collection was established following the pilot test and is discussed in the following Section 3.3.1.7.

3.3.1.7 Reliability of data collection

Reliability of data collection is important to determine whether data collection is performed in a consistent manner (Panacek, 2007) and to determine whether data collected are accurate representations of the study variables (McHugh, 2012). Inter-rater reliability refers to the ability of two or more independent auditors to perform data extraction in a consistent manner (McHugh, 2012).

A traditional measure of inter-rater reliability is percent agreement. Percent agreement is calculated as the number of agreement scores between data collectors divided by the total

number of scores (McHugh, 2012). Although percent agreement cannot discount raters guessing the response, one benefit of percentage agreement is that it allows the identification of variables that may be more prone to errors (McHugh, 2012). In health research, 80% agreement is recommended as the minimum acceptable inter-rater agreement (McHugh, 2012).

In Study 1, inter-rater reliability was established by percent agreement. The research candidate and principal supervisor reviewed 12 randomly selected medical records to determine inter-rater reliability with a result of 93.5% agreement. Discrepancies in data collection were reviewed and clarified between the research candidate and principal supervisor following the pilot test. A final audit form was used as reported previously in Section 3.3.1.6.

3.3.1.8 Ethical considerations

All human research in Australia requires to be conducted with ethical approval (The National Health and Medical Research Council & Universities Australia, 2007 (Updated 2018)). Several ethical considerations must be addressed when conducting research involving patient health information from medical records, including confidentiality, data management and storage (The National Health and Medical Research Council & Universities Australia, 2007 (Updated 2018)). As per the National Statement (2007 (Updated 2018)), researchers must apply methods to reduce the risk of identification of participants during collection, analysis, storage of data and in any publications. A data management plan should be presented outlining information regarding generation, collection, access, use, analysis, disclosure, storage, retention, disposal, sharing and re-use of data, including any risks involved and strategies to mitigate those risks (The National Health and Medical Research Council & Universities Australia, 2007 (Updated 2018)).

Ethical approval was obtained for Study 1 from institutional Human Research Ethics Committees (The Prince Charles Hospital - HREC/17/QPCH/430 (Appendix B) and Australian Catholic University - HREC number: 2019-40R). In Study 1, details of any data collected from the medical records were kept confidential. Only the researchers had access to the data collected. De-identified information was used for research analysis and

purposes and no demographic data were reported in any dissemination of research findings. All written information collected from Study 1 and USB drive were stored on a filing cabinet kept in the research office in the physiotherapy department at the TPCCH. All electronic data were stored on a secure computer file on a secure computer.

3.4 Study 2 - Focus groups

A qualitative method using focus groups was used in Study 2 to offer additional, meaningful insights into the current physiotherapy practice of physical activity promotion to older adults attending an out-patient rehabilitation program.

Focus groups are moderated group discussions used for research purposes to gather in-depth understanding of perceptions, beliefs, attitudes and opinions of purposely selected individuals regarding a pre-defined topic (Gill & Baillie, 2018; Then, Rankin, & Ali, 2014). Focus groups are commonly used across a wide range of research disciplines, including marketing, health sciences, behavioural and social sciences (Guest, Namey, & McKenna, 2017). Focus groups have been frequently used in health care research in a range of settings over the past 20 years to explore the perspectives of patients and or health care professionals regarding a specific issue (Tausch & Menold, 2016; Then et al., 2014). In health care, understanding individuals' views and experiences regarding a specific issue might inform practice, policy and further related research (Gill & Baillie, 2018; Then et al., 2014). Focus groups offer a unique advantage of group dynamics, which allows participants to spontaneously share their experiences and points of view, which might yield deeper insights into a research topic compared to individual interviews (Tausch & Menold, 2016).

A number of advantages and disadvantages of focus groups have been identified and are outlined below as per Then, Rankin, & Ali (2014).

Advantages of focus groups include:

- Opportunity to have direct intensive contact with individuals

- Allowing collection of rich, in-depth data
- The moderator being able to encourage interaction with other participants
- Allowing for participants to express their opinions or being able to change their opinions following discussion with other members of the focus group
- Individual opinions valued
- Inclusion of people who cannot read or write
- Individuals feel listened to
- Group promotes security and a “safe” environment
- Discussion is more spontaneous and honest
- Observation of group dynamics and peer influences
- Behaviours and beliefs can be validated and clarified during the discussion
- Relatively cost effective

Disadvantages of focus groups include:

- Some groups may be lethargic and dull
- Sensitive issues may limit group disclosure
- Reluctancy to express opinions if other members of the group are not trusted
- Dominant individuals may influence the dynamics of the group
- Discussion of irrelevant issues
- Poor organisation can waste time and energy of participants
- Location and time constraints may limit size or membership of the group
- Data can be more difficult to analyse than individual interviews
- Group comments must be interpreted within the social and environmental context in which they were given

The following section will outline important methodological considerations to assure validity and reliability of focus group research. Specific details about the methods used in Study 2 are presented in Chapter 5.

3.4.1 Open-ended research questions

Open-ended questions are often used in qualitative research studies (Lauri, 2019). Open-ended questions allow participants to provide detailed insight about the research topic than would not be possible with a closed-question or forced-choice survey tool (Tausch & Menold, 2016).

In order to identify physiotherapists' attitudes, perceptions, beliefs and opinions regarding physical activity participation of older adults undergoing rehabilitation, the specific open-ended research questions of Study 2 were:

1. How do physiotherapists perceive physical activity participation of older patients attending out-patient rehabilitation?
2. How do physiotherapists prescribe and promote physical activity to older adults attending out-patient rehabilitation?
3. How do physiotherapists transition people who are being discharge from out-patient rehabilitation to sustainable models of physical activity within a community context?

3.4.2 Interview guide and pilot-test

An interview guide is commonly used in focus groups to enable researchers to ask predetermined questions while allowing participants to express their views and experiences regarding a research topic (Gill & Baillie, 2018). An interview guide contains a list of questions to assist providing a clear outline of what needs to be covered during the course of an interview (Then et al., 2014). An interview guide might include engagement questions (questions to establish the topic of discussion), exploration questions (questions to elicit detailed responses from the participants) and exit questions (questions to ensure all aspects of the topic have been discussed during the interview (Then et al., 2014). Pilot

testing the interview guide is important to ensure the interview questions are clear and relevant to answer the research questions (Gill & Baillie, 2018).

In Study 2, an interview guide was developed using broad open-ended engagement, exploration and exit questions (Appendix C). The interview guide, which was formulated by the research candidate and reviewed and refined by the supervision team, was pilot tested with two physiotherapist non-participants of Study 2 with amendments made to questions prior to focus groups interviews.

3.4.3 Group size and composition

Group size of focus group depends on the specific characteristics of the participants and the complexity of the research topic (Then et al., 2014). Group size may also be determined by the type of study, resources available and moderator experience (Gill & Baillie, 2018). The recommended size of each focus group might vary from three to 14 participants (Guest et al., 2017; Then et al., 2014). Too large groups may be difficult to manage and prevent individuals from participating, while too small groups may not provide enough diversification to generate valuable discussion (Gill & Baillie, 2018; Then et al., 2014).

The number of focus groups required depends on the complexity of the research topic, the depth of data required, the level of participation required and the need for data saturation (Gill & Baillie, 2018). The aim of a qualitative study is not to acquire a representative sample, but to yield a deeper understanding of the topic under investigation from a purposely selected group of individuals (Then et al., 2014). Guest, Namey & McKenna (2017) demonstrate that three focus groups are sufficient to establish the most prevalent themes within a data set.

The research topic and potential group interaction should inform the group composition (Then et al., 2014). Focus groups can be homogeneous, where participants share similar socio-demographic characteristics; or heterogeneous, where participants share different socio-demographic characteristics (Nyumba, Wilson, FDerrick, & Nibedita, 2018).

Homogenous groups might generate more focused findings compared to heterogenous groups (Carey, 2016; Nyumba et al., 2018). For certain research questions, varying the characteristics of participants might yield a more comprehensive understanding of the research problem (Then et al., 2014).

In Study 2, group size was informed by the number of participants eligible and available to be part of the study, and group interaction. Participants included physiotherapists working in a tertiary hospital with experience in providing physiotherapy rehabilitation to older adults attending rehabilitation within the previous two years (similar characteristics) to gather focused findings on the promotion of physical activity to older adults attending rehabilitation. Three focus groups were conducted with a total of 16 participants. Each focus group included a mix of senior, junior, male and female physiotherapists (varying characteristics) to gather a more comprehensive understanding of the promotion of physical activity to older adults attending rehabilitation.

3.4.4 Suitable location and timing

Focus group discussions should take place in a comfortable and convenient location to the participants (Gill & Baillie, 2018). The location also must be a 'safe' to allow participants to express their opinions without concerns (Then et al., 2014). Focus groups should be scheduled at convenient times for the participants and the time allocated for each focus group should take between 60 and 90 minutes (Lauri, 2019).

In Study 2, focus groups were held during working days (convenient location for participants) in a designated meeting room (safe and comfortable environment for participants) at TPCH, for a maximum duration of one hour each focus group. Focus groups were scheduled outside of busy clinical times (convenient time for participants), such as first thing in the morning, over lunch periods or in the afternoon.

3.4.5 Moderator and observer roles

Moderators and observers are recommended when conducting focus groups (Gill & Baillie, 2018). The moderator in focus group research leads the interview and plays a key

role in developing rapport with participants, creating a safe environment to allow participants to openly share their views, beliefs and experiences (Then et al., 2014). Moderators can foster rich discussions when encouraging participants to talk freely and openly by using reflective listening, directly addressing quiet participants, and handling the discussion in a flexible way (Tausch & Menold, 2016). Moderators also play an important role in redirecting the group to the purpose of the study, addressing potential conflicts and validating what participants share during group interviews (Then et al., 2014). Thus, experienced moderators are recommended (Tausch & Menold, 2016).

Observing the dynamics of the group discussion is also very important (Lauri, 2019). The observer monitors the group discussion to identify verbal and nonverbal interactions between participants and takes notes to document the specifics of the group behaviours and interactions (Then et al., 2014). When moderators and observers are the researchers, they can easily address questions relating to the research topic raised during focus group discussions (Gill & Baillie, 2018; Tausch & Menold, 2016). Moderators and observers should collate notes on thoughts and ideas emerged from focus groups, which can assist with data analysis (Gill & Baillie, 2018; Then et al., 2014).

In Study 2, focus groups were facilitated by an experienced moderator (principal supervisor). The observer (research candidate) monitored non-verbal behaviours and interactions between participants. Both the moderator and the observer took notes during focus groups. Meetings were held between the research candidate and principal supervisor following each focus group to discuss thoughts and ideas about focus groups.

3.4.6 Data analysis

In Study 2, focus group data were analysed using thematic analysis based on Braun and Clarke's approach (2006). Thematic analysis is widely used as a qualitative method to identify, analyse, and synthesise patterns within the data (Braun & Clarke, 2006). Braun & Clarke's approach has been recently labeled 'reflexive thematic analysis' to assist differentiating their approach from other forms of thematic analysis (Braun & Clarke, 2019). The researcher's role is a key consideration of reflexive thematic analysis (Braun & Clarke, 2019). Braun & Clarke (2019) encourage researchers to play an active role in

identifying themes. Themes represent meaningful information about the data and constitute some level of patterned response or meaning within the data (Braun & Clarke, 2006). However, a theme is not necessarily dependent on its prevalence in the data, but whether it captures relevant aspects about the issue under investigation (Braun & Clarke, 2006).

Themes can be identified in two ways in thematic analysis: inductive or deductive approach (Braun & Clarke, 2006). An inductive approach is data-driven, in which themes are strongly linked to the data, derived from the data and are not developed in response to the researcher's theoretical knowledge or interest in the topic (Braun & Clarke, 2006). A deductive or theoretical approach is driven by the researcher's theoretical interest in the topic (Braun & Clarke, 2006). Themes can also be identified at two levels; semantic or latent (Braun & Clarke, 2006). At a semantic or explicit level, themes are identified within the explicit meaning of the data, while underlying ideas and assumptions are identified at a latent or interpretative level (Braun & Clarke, 2006).

In Study 2, data analysis was undertaken using a deductive approach to capture important aspects of the data based on the researcher's theoretical interest in the promotion of physical activity to older adults attending rehabilitation. Data analysis was developed in six phases as outlined by (Braun & Clarke, 2006):

1. Familiarisation with the data – reading and re-reading the data
2. Coding – generating succinct labels
3. Generating initial themes – significant broad patterns of meaning
4. Reviewing themes – checking themes against the dataset
5. Defining and naming themes – developing a detailed analysis of each theme
6. Writing up – contextualising.

The analysis process of Study 2 was not linear, but rather a flexible and recursive process, moving back and forth throughout the six phases as required during data analysis (Braun & Clarke, 2006).

Focus groups were audio-recorded and initially transcribed verbatim to allow in-depth understanding of the information collected. However, the time-consuming process led the research candidate to move to data transcription using NVivo 12 software. Transcripts were checked for accuracy by the research candidate and reviewed by a supervisor. Focus group transcripts were read numerous times by the research candidate to ensure immersion and familiarity with the data. Initial coding was performed by the research candidate and principal supervisor and then independently coded by a third person (assistant supervisor). Together the research candidate and supervision team reviewed and compared their coding, which led to the development of preliminary themes. Latent themes were developed from the data. Initial themes were generated by the research candidate and reviewed and further refined by the supervision team.

3.4.7 Ethical considerations

All human research must be conducted with ethical approval (National Health and Medical Research Council, 2018). Several ethical considerations must be addressed when conducting focus group research, including participant recruitment, consent, and data collection, use and management as outlined by the National Statement on Ethical Conduct in Human Research (2007 - updated 2018).

Recruitment involves identifying potential participants, how potential participants were to be approached and sourced. Additionally, recruitment strategies outline how contact is to be made between the research team and potential participants. The recruitment process must respect potential participants' culture, traditions and beliefs while facilitating voluntary participation (National Health and Medical Research Council, 2018).

An individual's decision to participate in any research must be voluntary. Researchers must provide adequate information to enable potential participants to understand the purpose, methods, demands, risks and benefits of the research. Consent may be obtained orally, in writing or by other means; though typically written consent is considered the most desirable. Potential participants should be allowed enough time to understand the

research proposal and have their concerns addressed (National Health and Medical Research Council, 2018).

In the ethics of human research, collection, use and management of data must be in accordance with the values of respect, research merit and integrity, justice, and beneficence (National Health and Medical Research Council, 2018). It is essential that researchers adopt strategies and process aimed at reducing the risk of identifying participants during data collection, analysis, storage of data and in any publications. A data management plan is needed to outline the research team's intentions related to data collection, access, use, analysis, disclosure, storage, retention, disposal, sharing and re-use of data, including any risks involved and strategies for mitigating those risks.

Ethical approval was obtained for Study 2 from institutional Human Research Ethics Committees (The Prince Charles Hospital - HREC/17/QPCH/430 and SSA/18/QPCH/47 (Appendix B) and Australian Catholic University - HREC number: 2019-40R). Eligible participants in Study 2 included physiotherapists working at TPCCH with experience in providing physiotherapy rehabilitation to older adults attending rehabilitation within the previous two years. Twenty eligible physiotherapists were identified by the clinical leader of the physiotherapy rehabilitation program at the participating facility. All eligible physiotherapists were invited to participate in Study 2 via email (Appendix D) with a participant information sheet and consent form sent to their work email address. Eligible participants were given time to read all aspects of the proposed study and for their concerns to be addressed. Those interested in participating in the focus groups replied to the invitation email and included a signed consent form. Once informed consent was gained, participants were invited to attend a focus group at their convenience.

At the commencement of each focus group in Study 2, participants were informed of the purpose of the study, the moderator acknowledged the confidentiality of discussions between the moderator and the group and requested permission to audio record the session. The procedures were explained by the moderator and participants were provided with an opportunity to ask any questions.

During transcription of the audio files, all identifiable information was removed to ensure anonymity. Each participant was assigned to a numerical code, which was used throughout the transcript. All data were stored on a password protected computer drive.

The next two chapters of this thesis will detail the methods and results of the two studies comprising this program of research. Chapter 4 comprises the first study and Chapter 5 comprises the second study. Both chapters have been presented in manuscript format.

Chapter 4. STUDY 1: An audit of physiotherapists' documentation on physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation.

This chapter investigates if physiotherapists document the promotion and prescription of physical activity to older adults attending out-patient rehabilitation and assist them in the transition to an active lifestyle. This chapter is based on the publication (Appendix E) associated with this study. Some modifications have been made to the text included in this chapter from the publication including text formatting throughout paper and extension of design in methods.

Paim, T., Low-Choy, N., Dorsch, S., & Kuys, S. (2020). An audit of physiotherapists' documentation on physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation, *Disability and Rehabilitation*, 1-7. doi: 10.1080/09638288.2020.1805644

4.1 Abstract

Purpose: Identify if physiotherapists document the assessment, promotion and prescription of physical activity to older adults attending out-patient rehabilitation and assist them in the transition to an active lifestyle.

Methods: An audit of physiotherapists' documentation in medical records of older adults who attended an out-patient rehabilitation program at a tertiary hospital.

Results: Fifty-six medical records were reviewed. Mean age (SD) of participants was 79 (7) years. No documentation was found on the use of validated tools to assess physical activity levels of older adults. Prescription of physical activity was documented in 55/56 (98%) medical records. Seven (12.5%) medical records included documentation on goal setting regarding physical activity participation. Advice on regular physical activity post-discharge from the rehabilitation program was documented in 28/56 (50%) medical records. Formal referral to community-based physical activity programs was documented in 4/56 (7%) medical records.

Conclusions: Evidence-practice gaps were found in physiotherapists' documentation of the promotion of physical activity to older adults attending out-patient rehabilitation, indicating a lack of assistance in the transition to an active lifestyle. These gaps were evident in the lack of; physical activity assessment, implementation of behaviour change strategies and formal referral to physical activity in the community post-discharge from out-patient rehabilitation.

4.2 Introduction

The World Health Organisation (2010) has recommended weekly physical activity levels for people aged 65 years and above of “at least 150 minutes of moderate-intensity aerobic or at least 75 minutes of vigorous intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity in bouts of at least 10 minutes” (World Health Organization, 2010, p. 8). When health conditions prevent older people meeting physical activity guidelines, it has been suggested that they should be as active as possible (World Health Organization, 2010).

Regular physical activity maintains functional independence (Paterson & Warburton, 2010), improves cognition (Blondell et al., 2014; Sofi et al., 2011), prevents falls (J. Brown et al., 2011; Sherrington et al., 2019) and improves quality of life in older people (Halaweh et al., 2015; Langlois et al., 2013; Phillips et al., 2013). In fact, physical activity is advocated as the best remedy to maintain health and functional independence among older adults (Pedersen & Saltin, 2015; Zalewski et al., 2014). However, activity levels tend to decline as people age (Australian Bureau of Statistics, 2017-18; Keadle, McKinnon, Graubard, & Troiano, 2016). In addition to physical inactivity, increased sedentary time, highly prevalent among older people (Harvey et al., 2015), culminates in the premature onset of illness, disability and frailty (McPhee et al., 2016). As older adults are vulnerable to functional decline (Ramaswamy, 2015; Stott & Quinn, 2013) especially due to illness, injury and hospitalisation; rehabilitation is often part of a geriatric care model to restore their functional independence and decrease hospital readmissions and institutionalisation (Stott & Quinn, 2013).

Integrating physical activity behaviour change strategies in physiotherapy rehabilitation programs may be a good strategy to assist older adults to become more physically active after rehabilitation (Rimmer & Lai, 2017; van der Ploeg et al., 2007) and subsequently preserve the functional gains achieved during rehabilitation. Older adults, especially those with disabilities, need support to transition from being a patient in rehabilitation to being a participant in lifelong physical activity in the community (Rimmer & Lai, 2017).

Physiotherapists in out-patient rehabilitation settings are well placed to assist older adults to achieve an active lifestyle by incorporating physical activity into care plans and

transitioning patients from a therapeutic to a healthier lifestyle focus. However, it is not known whether physiotherapists actively plan for this transition and incorporate this aspect of care into out-patient rehabilitation programs for older adults. The aim of this study was to identify if physiotherapists assess, promote and prescribe physical activity to older adults attending out-patient rehabilitation and assist them in the transition to an active lifestyle.

4.3 Methods

4.3.1 Design

A retrospective audit of medical records.

4.3.2 Study setting

This study was conducted at the Day Therapy Rehabilitation Unit (RDTU) at The Prince Charles Hospital (TPCH) in Brisbane, Australia.

RDTU is a hospital-based out-patient rehabilitation service that provides ambulatory rehabilitation to adults for the management of functional decline caused by an injury, illness or surgery on the background of acute or chronic neurological, orthopaedic, vestibular and cardiorespiratory conditions.

RDTU rehabilitation program provides a multi-disciplinary service to older adults, including rehabilitation medicine, nursing, physiotherapy, occupational therapy, speech-therapy, dietetic, neuropsychology and social-work. Older adults are commonly referred for physiotherapy at RDTU due to mobility and or balance impairments.

Physiotherapy sessions are provided at RDTU by physiotherapists through individualised or group therapy. Therapy sessions are usually offered once a week for a median of 12 weeks depending on individual requirements.

4.3.3 Participants

Medical records of adults aged 65 years or older who attended an initial physiotherapy assessment in the period between July 2017 and December 2017 at an out-patient rehabilitation unit at a large tertiary hospital were eligible for inclusion in this study. Clinical and demographic information extracted from medical records included age, gender, reason for referral, admission mobility level and gait aid and living situation. Information was also extracted regarding the delivery of the physiotherapy program including number of occasions of service, number of physiotherapists involved in care and type of intervention (individual, group, individual + group).

4.3.4 Procedures

All medical records of people meeting the inclusion criteria were sourced for this study. Medical records including physiotherapy assessment forms, progress notes, and any other associated physiotherapy documentation such as discharge summaries and case conference notes of older adults attending out-patient rehabilitation were retrieved. Medical records were reviewed to identify and extract relevant documentation completed by physiotherapists regarding the assessment, promotion and prescription of physical activity to older adults during their out-patient rehabilitation program. All documentation within any part of the medical file for that outpatient rehabilitation episode was included. However, if there were multiple documentations of the same aspect in one file, it was counted as one episode of documentation.

Data were extracted using a purpose designed audit form (Appendix A). The form was developed, and pilot tested following a literature review identifying relevant variables for the assessment, promotion and prescription of physical activity. Medline and CINAHL databases were searched for papers published in English up until 2016. Search terms included “physical activity” and “older adults”, “physical activity”, “physical therapy” or “physiotherapy” and “older adults” (Bassett, 2015; Bezner, 2015; Chase, 2015; Lobelo, Stoutenberg, & Hutber, 2014; Strath et al., 2013). Two investigators reviewed 12 randomly selected medical records to determine inter-rater reliability with a result of

93.5% agreement. Ethical approval was obtained from institutional Human Research Ethics Committees (The Prince Charles Hospital HREC/17/QPCH/430 and Australian Catholic University 2019-40R).

4.3.5 Measures

All documentation by physiotherapists of; physical activity assessment, promotion and prescription and transition to physical activity in the community, was retrieved from the medical records. If there was no documentation regarding these aspects, then no activity was recorded in the audit form.

Assessment of physical activity level variables included:

- level of physical activity prior to reason for referral,
- current level of physical activity (last 7 days),
- type of activity (e.g., exercise program, sport, leisure activity, housework and occupational),
- duration, frequency and intensity of activity,
- self-reported level of physical activity (use of validated measurement tool), and
- objective level of physical activity (use of accelerometer or pedometer).

Promotion of physical activity variables included:

- goal setting related to physical activity,
- provision of resource materials (e.g. handout, video, photos),
- monitoring of compliance with home exercise program,
- advice and/or education on regular physical activity,
- identification of barriers/potential problems or facilitators related to engaging in physical activity,
- problem solving around barriers to physical activity,
- social support for physical activity, and
- counselling strategies on physical activity behaviour change (theoretical or cognitive- behavioural models).

Prescription of physical activity variables included:

- prescription of any exercise or physical activity such as balance exercise, sit to stand,
- cycling on stationary bike, walking on treadmill, and
- prescription of home exercise program.

Transition to physical activity in the community variables included:

- advice and/or education on regular physical activity post-discharge from rehabilitation program,
- referral to other agencies for regular physical activity in the community post-discharge from rehabilitation program.

4.3.6 Analysis

Descriptive analyses were used to describe participant clinical and demographic characteristics (frequencies, mean, standard deviation) using SPSS version 25. Frequencies of medical records reporting variables describing physical activity assessment, promotion and prescription prior to and current physical activity in terms of type, frequency, duration and intensity and transition to physical activity in the community post-discharge from rehabilitation were determined.

4.4 Results

4.4.1 Participant characteristics

Participants attended physiotherapy sessions once a week for a period of 60 minutes each session. A hundred and fifty-five people were referred to out-patient physiotherapy within the rehabilitation unit in the period between July 2017 and December 2017. A hundred and thirteen (73%) people were older adults. Fifty percent (n = 56) of these older adults completed their rehabilitation program and had their medical records reviewed. Reasons for exclusion are reported in the flow diagram (Figure 4.1).

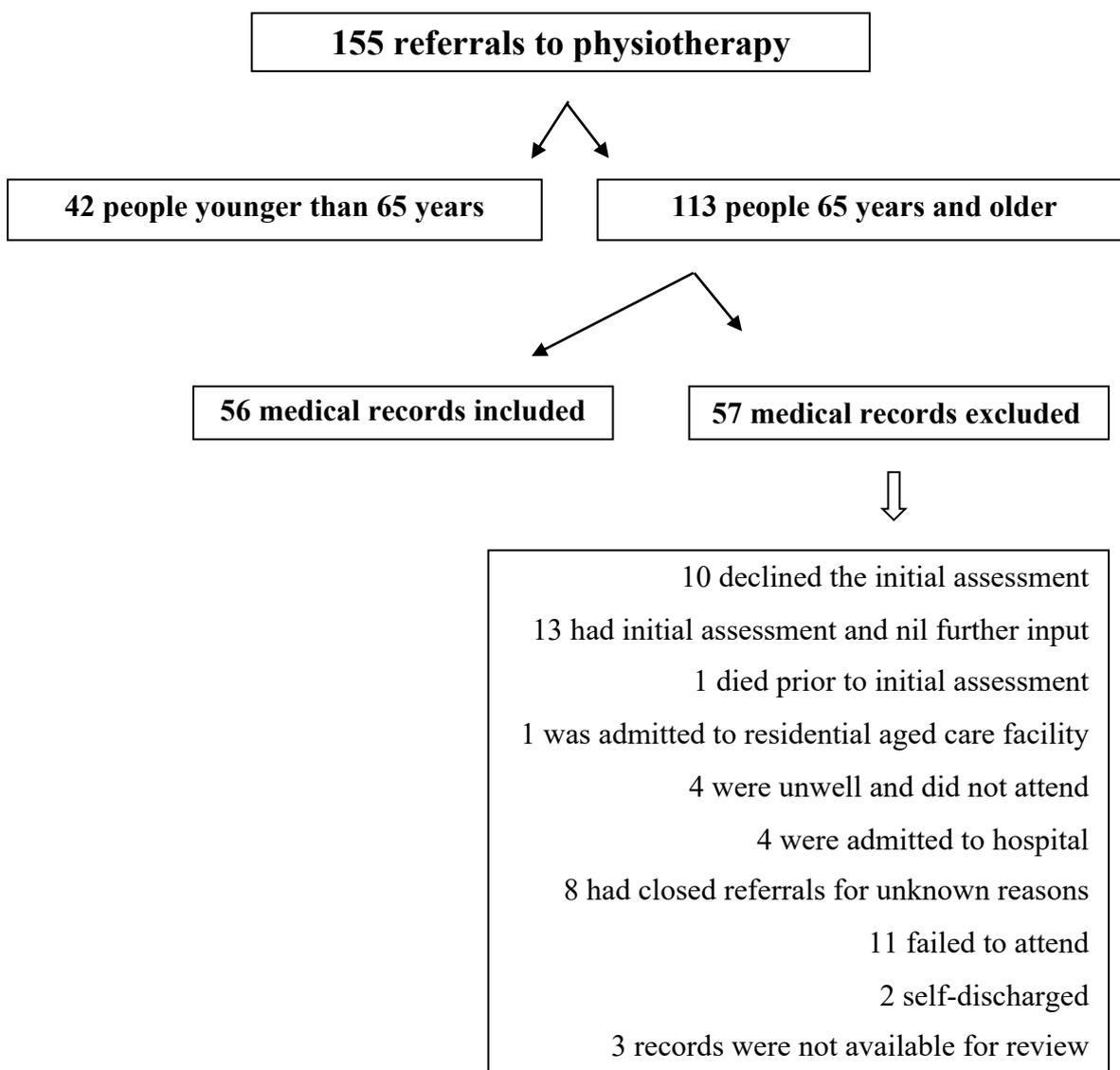


Figure 4.1 Flow diagram showing total number of referrals and reasons for exclusion

Fifty-six medical records of older adults comprising five hundred and twenty-two medical record physiotherapy entries were audited. Participant characteristics are reported in Table 4.1. Mean age (SD) of participants was 79 (7) years, 54% were female (n = 30) and most participants lived with others (n = 35). Main reasons for referrals included diagnoses of falls or decreased balance (n = 26), and neurological conditions of stroke (n=10) and Parkinson’s disease (n = 7).

Table 4.1 Participant characteristics

Participant characteristic	N = 56
Age, years, mean (SD)	79 (7)
Gender, females, n (%)	30 (54)
Living situation, n (%)	
Home alone	21 (37)
Home with others	35 (63)
Reason for referral, n (%)	
Stroke	10 (18)
Falls, decreased balance	26 (46)
Parkinson's disease	7 (13)
Others*	13 (23)
Admission mobility level, n (%)	
Independent	55 (98)
Gait aid, n (%)	
Nil	29 (52)
Stick	9 (16)
Four-wheeled walker	18 (32)
Type of intervention, n (%)	
Individual	25 (45)
Group exercise class	21 (37)
Individual combined with group exercise class	10 (18)

**Others = deconditioning (n=3), neuromuscular disorder/post-polio syndrome (n=2), cardiomyopathy (n=1), post- hip fracture (n=2), foot drop post-cardiac surgery (n=1), peripheral neuropathy (n=1), progressive supra-nuclear palsy (n=1), hydrocephalus (n=1) and functional movement disorder (n=1).*

Almost all participants (n = 55) were independently mobile at admission to out-patient physiotherapy. More than 50% (n = 29) of participants were mobilising without the use of a walking aid. Interventions were delivered as individualised therapy (45%), a group exercise class (37%) or as a combination of individualised therapy moving to a group exercise class as progress was made (18%). Mean number (SD) of occasions of service

received was 9 (4) and 2 (1) physiotherapists were involved in the rehabilitation care of participants.

4.4.2 Physiotherapy assessment of physical activity

No documentation of validated self-reported or objective measures of level of physical activity of older adults attending the out-patient rehabilitation unit was found in any of the 56 audited medical records. Physiotherapists did not document the use of any physical activity questionnaires, physical activity diaries/logs, pedometers or accelerometers to assess physical activity levels of older adults attending the out-patient rehabilitation program. Table 4.2 outlines how previous and current physical activity was described in the medical records.

Table 4.2 Description of physical activity documented in medical records

	Previous physical activity* (n = 56)	Current physical activity** (n = 56)
Documentation of physical activity, n (%)	24 (43)	24 (43)
No physical activity participation, n (%)	4 (7)	2 (4)
Type of activity, n (%)	15 (27)	14 (25)
Type and duration of activity, n (%)	2 (4)	6 (11)
Type and frequency of activity, n (%)	3 (5)	0 (0)
Type, duration and frequency of activity, n (%)	0 (0)	2 (4)
No documentation of physical activity, n (%)	32 (57)	32 (57)

*Previous physical activity = physical activity prior to reason for referral for rehabilitation;

**Current physical activity = physical activity in prior 7 days.

Types of previous activities recorded included exercise programs, such as a home-based physiotherapy program, inpatient and out-patient rehabilitation programs; single leisure activities (such as golf, walking, bike riding and hydrotherapy); or a combination of activities (such as walking and cycling, walking and exercise program). Types of current activities recorded included exercise program, single leisure activity, housework and a combination of activities, such as walking and exercise program, walking, lawn mowing and housework, walking and hydrotherapy, Pilates and housework. There was minimal documentation of duration and frequency of physical activity.

4.4.3 Promotion and prescription of physical activity during physiotherapy out-patient rehabilitation

None of the medical records audited contained documentation on goal setting towards fulfilling the physical activity guidelines. Forty-two medical records (75%) contained documentation on goal setting mainly related to the reason for referral to physiotherapy, which included mobility and balance related goals. Example of goals related to mobility and balance included: “walk without an aid”, “improve walking”, “walking on uneven ground”, “decrease falls” and “able to climb stairs without use of rails”. Seven (12.5%) medical records contained documentation on goal setting towards physical activity participation. Example of goals included “get back to bike riding”, “return to play lawn balls with a forward lunge technique”, “continue to walk dog” and “walk for 20 minutes without losing balance”. Seven (12.5%) medical records contained no documentation on goal setting. None of the medical records contained documentation on goals that meet the criteria of SMART (Specific, Measurable, Attainable, Relevant and Timely) goal setting related to physical activity. None of the medical records audited contained documentation on frequency or intensity of intended activities.

Physiotherapists documented compliance with a prescribed home exercise program in 32/56 (57%) medical records. There were no reports of the use of an activity log/diary to monitor compliance with the home exercise program. Education and or advice on regular physical activity was documented in 15/56 (27%) medical records. Two (4%) medical records included advice on duration and frequency of activities and another two (4%) medical records reported on frequency of activities. There was one (2%) medical record

with documentation on physical activity advice as per recommended guidelines (“do home exercise program daily for half an hour”). Examples of documentation on education and/or advice on physical activity included “encouragement to do home exercise program more regularly”, “walk outside with walker is a great exercise”, “education re-gradual walking program using BORG (rating of perceived exertion) scale” and “advice re-weight loss benefits”.

Barriers/potential problems related to engaging in physical activity were documented in 54/56 (96%) medical records. The most common barriers/potential problems to engaging in physical activity documented in medical records of older adults were pain, fatigue and shortness of breath on exertion. Facilitators to physical activity were documented in 11/56 (20%) medical records. Barriers/potential problems and facilitators to physical activity documented in medical records are reported in Table 4.3.

While there was documentation of barriers and facilitators to engaging in physical activity generally, none of this documentation examined the barriers and facilitators to meeting the recommended guidelines for physical activity.

Problem solving around barriers to physical activity was documented in 13/56 (23%) medical records. Examples of problem solving included “discussed strategies for community ambulation”, “to perform exercise program supervised by son for safety”, “spoke of ways to deal with stress/fear of moving” and “advice to make laminated boards to stick on walker and around house to remind patient to decrease speed and walk upright”.

Social support for physical activity was documented in 3/56 (5%) medical records. Examples of social support was “wife wrote down prompts to give to patient during home exercise program” and “continue home exercise program supervised by son”. Physical activity counselling, including theoretical or cognitive-behavioural models, was not documented in any of the audited medical records.

Table 4.3 Barriers and facilitators to physical activity documented in medical records

Barriers	Facilitators
Pain	Enjoys gardening
Fatigue	Loves travelling
Decreased memory	Enjoys cycling
Shortness of breath	Has gym and pool in living complex
Falls	Enjoys hydrotherapy
Fear of falling	Enjoys dance group for Parkinson’s Disease
Dizziness	Has trampoline at home
Decreased cognition	
Depression	
Anxiety	
Decreased motivation	
Decreased balance	
Incontinence	
Decreased vision	
Asthma	
Brain fog	
Hypotension	
Lower limb oedema	
Poor sleeping	
Dislike walking	
Decreased sensation lower limbs	

Physiotherapists documented prescription of physical activity to older adults during the rehabilitation program in 55/56 (98%) medical records. Physical activity prescription included a combination of functional activities, endurance training, strengthening and balance exercises. Some examples of documentation of prescribed physical activity to older adults included “sit-to-stand exercise for six minutes”, “exercise bike for 3.3 kilometres”, “throwing and catching ball” and “stairs practice four steps five times up and

down”. There was one (2%) medical record with documentation on prescription of physical activity for health benefits (“walking for his heart”).

A home exercise program was recorded as provided to 55/56 (98%) older adults attending out-patient rehabilitation. Information regarding provision of resources for home exercise programs was found in 44/56 (79%) medical records. Resources provided mostly comprised handouts of exercise programs (n = 43, 77%). Video was also documented as a resource provided for a home exercise program (n = 1, 2%). Data related to the promotion and prescription of physical activity to older adults is summarised in Table 4.4.

Table 4.4 Promotion and prescription of physical activity documented in medical records

Measures	N=56
Goal setting, n (%)	7 (12.5)
Advice / Education, n (%)	28 (50)
Counselling, n (%)	0 (0)
Barriers, n (%)	54 (96)
Facilitators, n (%)	11 (20)
Problem solving around barriers, n (%)	13 (23)
Social support, n (%)	3 (5)
Prescription of physical activity, n (%)	55 (98)
Prescription of HEP*, n (%)	55 (98)
Compliance with HEP*, n (%)	32 (57)
Resource provision, n (%)	44 (79)

**HEP = Home Exercise Program*

4.4.4 Transition to physical activity in the community post-discharge

Advice and/or education on regular physical activity post-discharge from rehabilitation program was documented in 28/56 (50%) medical records. One (2%) medical record documented information on the frequency of activities and no medical records documented information on duration and intensity of physical activity.

Examples of information on advice and/or education on regular physical activity post-discharge from rehabilitation program included “will continue with home exercise program, and has information re-community exercise classes”, “advice to continue walking down to local shops to maintain current level of function”, “provided with list of community exercise and balance programs”, “stressed importance of maintenance of home exercise program” and “provided with comprehensive home exercise program for balance and general strength”.

Physiotherapists documented referral to physical activity post-discharge from out-patient rehabilitation in 4/56 (7%) medical records. Referrals included supervised home-based physiotherapy 2/56 (4%) and hydrotherapy 2/56 (4%).

4.5 Discussion

Evidence-practice gaps were found in physiotherapists' documentation of assessment, prescription and promotion of physical activity to older adults attending out-patient rehabilitation. There was little documentation found of physiotherapists assisting older adults to transition to regular physical activity behaviours in line with the guidelines for physical activity. Older adults require support to achieve this transition, especially those vulnerable older adults. In this study, factors such as the mean age of older adults (79 years) and the number of medical records excluded, including reasons such as death, admission to hospital and admission to residential care facility, emphasise the vulnerability of this population. Assisting older adults in the transition from being a patient in rehabilitation to being a participant in regular physical activity in the community is a great

strategy to encourage self-management of chronic diseases and reduce healthcare utilisation.

Assessment of physical activity was not routinely documented in the medical records of older adults attending out-patient rehabilitation in this study. No validated tools, such as physical activity questionnaires or accelerometers were used to assess physical activity, and when the level of physical activity was documented the information was incomplete. As assessing physical activity is considered an essential first step to promote physical activity behaviour change (Lowe, Littlewood, McLean, & Kilner, 2017), clearly this aspect needs attention. Further, when measuring physical activity, it is essential to measure all domains (occupational, household, transportation and leisure time) and dimensions (type, frequency, duration and intensity) of physical activity to identify whether people meet the recommended amounts of physical activity (Strath et al., 2013). Our study confirms that physical activity assessment is not being effectively integrated into physiotherapy practice (Lowe et al., 2017).

It was unable to be established whether physical activity was prescribed purely to address older adults' presenting complaint or to also address health promotion towards meeting the physical activity guidelines. However, while physiotherapists routinely prescribed exercises to older adults during rehabilitation programs to optimise their physical ability and functional independence, they did not appear to focus on health promotion through changing physical activity behaviour (Bezner, 2015; Taukobong, Myezwa, Pengpid, & Van Geertruyden, 2014). As experts in exercise prescription and primary healthcare providers, physiotherapists can and should play an important role in changing older adults' health behaviour, particularly participation in physical activity (Bezner, 2015; Dean et al., 2014). Physiotherapists are uniquely qualified and well placed to promote healthy lifestyles to all patients, not only to enhance health, prevent and manage chronic diseases, but also to maximise the benefits of physiotherapy programs (Dean, 2018; Dean et al., 2014). In fact, physiotherapy professional bodies worldwide are strong advocates for the role of physiotherapists in promoting health to every patient, in particular, promoting physical activity (American Physical Therapy Association, 2019; Australian Physiotherapy Association, 2009; Canadian Physiotherapy Association, 2006).

There is evidence for the effectiveness of physiotherapist led physical activity interventions. A systematic review and meta-analysis demonstrated that physical activity interventions led by physiotherapists at private practice and outpatient settings are efficacious at increasing physical activity levels of adults up to one year after intervention (Kunstler, Cook, et al., 2018a). Studies on physical activity interventions for older adults attending out-patient rehabilitation are scarce. One randomized-controlled trial on physiotherapist-led exercises, counselling and home visits for older adults attending a geriatric day hospital demonstrated positive effects on physical activity three months following discharge from rehabilitation (Brovold et al., 2012). While counselling has been shown to be an effective strategy to change physical activity behaviour among older adults (Chase, 2015; de Vries et al., 2016), physiotherapists do not widely practice counselling to motivate patients to engage in physical activity (Aweto, Oligbo, Fapojuwo, & Olawale, 2013; Kunstler, Cook, et al., 2018b). Additional training may be required to assist physiotherapists to effectively incorporate physical activity counselling into usual care (Eisele, Schagg, & Gohner, 2020; Fishleder et al., 2018; Freene, Cools, & Bissett, 2017).

Setting goals is considered an effective strategy to change physical activity behaviour among older adults (Chase, 2015) and the use of SMART goals is recommended (American College of Sports Medicine, 2017). Our findings demonstrate that none of the medical records audited contained documentation of SMART goals related to physical activity. When goals were documented, many of the attributes considered essential to goal setting were missing, such as objective measures and time frames. Moreover, most documented goals did not target health promotion through regular participation in physical activity. Including goals related to physical activity may not only preserve the functional gains achieved during rehabilitation but may also assist older adults in the transition to an active lifestyle.

Setting goals is particularly relevant during the early stages of rehabilitation, but setting goals alone is not enough as older adults need assistance with behaviour change (Bassett, 2015). Several behaviour change techniques have been described in the literature (Michie et al., 2013). Advice and counselling, problem-solving around barriers to physical activity, social support, modelling and demonstrations of physical activity, and use of rewards were

reported as effective strategies in promoting physical activity to older adults in the 2018 physical activity guidelines advisory committee systematic review (King et al., 2019).

Physiotherapists have a great opportunity to assist older adults in the transition to an active lifestyle (Bezner, 2015) during out-patient rehabilitation, especially if physiotherapists incorporate physical activity assessment and behaviour change strategies into usual care. In addition, referral to community-based physical activity programs may assist older adults to engage in physical activity beyond physiotherapy programs (Fishleder et al., 2018). Referral to physical activity post-discharge from out-patient rehabilitation was scarce in this audit. Collaboration between the health care system and exercise programs in the community is imperative to facilitate the sustainability of an active lifestyle after discharge from rehabilitation (Fishleder et al., 2018; Geidl et al., 2019; Lowe, Littlewood, & McLean, 2018).

These findings suggest that physiotherapists are not widely applying evidence-based practice to promote physical activity to older adults attending out-patient rehabilitation or supporting them in the transition to engage in physical activity in the community post-discharge from rehabilitation. Potential reasons for the limited promotion of physical activity to older adults may include physiotherapists' perception that promoting physical activity for health benefits is not their responsibility (Dean et al., 2016), physiotherapists' lack of skills and knowledge in behavioural change techniques (Freene et al., 2017; Kunstler, Cook, et al., 2018b), time required to use validated tools to assess physical activity (Lowe et al., 2017), lack of time to incorporate promotion of physical activity into care plans (Freene et al., 2017; Lowe et al., 2018) and lack of formal referral systems to physical activity programs in the community (Fishleder et al., 2018; Lowe et al., 2017).

There is scope for improvement in physical activity promotion to older adults attending out-patient rehabilitation. Recognition is growing for the role of physiotherapists in physical activity promotion; however, there is currently no defined model to bridge the evidence-knowledge gap in physical activity promotion in usual physiotherapy practice (Geidl et al., 2019; Lowe et al., 2018). Fishleder & colleagues have recently suggested clinical-community linkages to promote older adults' adherence to physical activity after discharge from physiotherapy (Fishleder et al., 2018). They suggested four strategies to

implement clinical-community linkages: 1. Assessing patient risk (assessment of patient's specific health concerns/risk of injury before referring to community programs); 2. Brief behavioural counselling (integrating training for physiotherapists in motivational techniques); 3. Capacity and ability to make referrals (formal referral system to evidence-based physical activity programs in the community through linked electronic medical records system, or specialised referral forms); and 4. Awareness of community resources (program details and ongoing communication between physiotherapy programs and community programs) (Fishleder et al., 2018). Further work on the implementation of evidence-based practice to promote physical activity to older adults attending out-patient rehabilitation is warranted.

The results of this audit were limited to the findings of one out-patient rehabilitation setting which may be different to the clinical practice at other settings. The results were also limited by the quality of documentation in the medical records, so it is possible that older adults were provided with appropriate prescription and promotion strategies for physical activity which were not recorded. In addition, the results were also limited by the inability to differentiate between the lack of assessment of physical activity levels or the lack of documentation of physical activity levels and true lack of physical activity. It is possible that patients were reported as being sedentary when they were not due to a lack of assessment and documentation of their physical activity. Evidence suggests that medical record documentation tends to underestimate the quality of care provided by health care professionals (Soto, Kleinman, & Simon, 2002).

Investigating the experiences of physiotherapists in promoting and prescribing physical activity to older adults attending out-patient rehabilitation settings through qualitative studies would add further insight into the implementation of evidence-based practice to promote physical activity to this population. This would enable a targeted education program to help physiotherapists change behaviour of their patients. Future research should further investigate the level of physical activity of older adults attending out-patient rehabilitation using validated measures, such as accelerometers to enable the physiotherapists to have optimal insight on the promotion of physical activity.

Chapter 5. STUDY 2: Physiotherapists' perceptions of physical activity promotion to older adults attending out-patient rehabilitation

Chapter 4 identified evidence-practice gaps in physiotherapists' documentation of assessment, prescription and promotion of physical activity to older adults attending out-patient rehabilitation. Investigating the experiences of physiotherapists in promoting and prescribing physical activity to older adults attending out-patient rehabilitation settings would provide a better understanding of the mechanisms that shape current practices of promotion and prescription of physical activity of older adults undergoing rehabilitation.

Chapter 5 will explore physiotherapists' perceptions of physical activity promotion to older adults attending out-patient rehabilitation through a qualitative study using focus groups. This paper is currently being prepared for publication.

5.1 Abstract

Purpose: To investigate physiotherapists' perceptions of physical activity promotion to older adults attending out-patient rehabilitation.

Methods: A qualitative study was undertaken comprising three focus groups with a total of 16 physiotherapists involved in the delivery of rehabilitation to older adults. Data were analysed using reflexive thematic analysis.

Results: Four themes were identified: 1. Participants described a patient-centred approach when promoting physical activity to older adults attending out-patient rehabilitation. Participants identified the importance of getting patients engaged and willing to participate in physical activity by setting patient-centred goals and finding activities that are enjoyable, meaningful and relevant; 2. Physiotherapist's support was identified as a crucial factor to facilitate engagement in physical activity. Education, therapeutic rapport, encouragement and motivation were topics often discussed by participants; 3. Participants perceived that physical activity promotion is embedded into routine physiotherapy practice; however, it appeared that physiotherapists focus on the promotion and prescription of structured exercise programs to address physical impairments, with limited focus on the promotion of physical activity behaviour change for health benefits. Physical activity assessment was rarely reported by participants in this study and 4. Inadequate community follow-up systems. Participants perceived that inadequate community follow-up is a major barrier to transition older adults to an active lifestyle post discharge from rehabilitation.

Conclusions: Despite participants perceiving that physical activity promotion is embedded into routine physiotherapy practice, it appeared that the promotion of physical activity for health benefits was much less prominent in the data. In addition to inadequate physical activity assessment, the informal or infrequent use of physical activity behaviour change approaches, and inadequate community follow-up systems suggest that evidence-based physical activity promotion to older adults attending out-patient rehabilitation is not well incorporated into physiotherapy practice. There appeared to be no standard framework for

promoting physical activity to older adults attending out-patient rehabilitation in this study. Integrating effective, consistent and sustainable physical activity promotion into physiotherapy practice is warranted to assist older adults adopting and maintaining a physically active lifestyle beyond clinical settings.

5.2 Introduction

Physical inactivity is identified as a leading risk factor for global mortality (Bull et al., 2020). Physical activity benefits have been extensively demonstrated (Holme & Anderssen, 2015; Long et al., 2015; Moore et al., 2012). In older adults, a physically active lifestyle is associated with the prevention of all-cause mortality and morbidity (J. Brown et al., 2011; World Health Organization, 2020; C. Y. Wu et al., 2015). Being physically active is essential for healthy ageing (Bauman et al., 2016); with regular physical activity reported as the most effective strategy to prevent and reduce disability and maintain functional independence among older adults (Bangsbo et al., 2019; Paterson & Warburton, 2010; Tak et al., 2013). Current guidelines recommend older adults do at least 150 minutes of moderate-intensity aerobic physical activity per week (World Health Organization, 2020). Nonetheless, an overwhelming majority of people aged 65 years and above do not meet the physical activity recommendations (Australian Bureau of Statistics, 2017-18; Clarke, Colley, Janssen, & Tremblay, 2019; Keadle et al., 2016). Achieving physical activity levels for health among older adults can be a challenging task (Zalewski et al., 2014), especially for those who are chronically ill (Chase, 2015).

Physiotherapists in the rehabilitation out-patient setting are well placed and well qualified to promote physical activity to older adults to improve health, prevent and manage chronic diseases and preserve the functional gains achieved during rehabilitation (Bezner, 2015; Dean, 2018; Dean et al., 2014). Physiotherapists traditionally focus on physical impairments and mobility when prescribing exercise to older adults attending rehabilitation settings, but do not specifically target physical activity levels in this population (de Vries et al., 2012). There is a growing body of evidence on physiotherapists' experiences in promoting physical activity to the general population (Abaraogu, Edeonuh, & Frantz, 2016; Aweto et al., 2013; Eisele et al., 2020; Freene et al., 2017; Geidl et al., 2019; Kava et al., 2020; Kunstler, O'Halloran, Cook, Kemp, & Finch, 2018; Lowe et al., 2018; Shirley et al., 2010) and to older adults at various settings (Fishleder et al., 2018; Healey, Broers, Nelson, & Huber, 2012). However, there is limited evidence about physiotherapists' experiences with physical activity promotion to older adults attending out-patient rehabilitation (Healey et al., 2012).

Study 1 highlighted that physiotherapists are not widely applying evidence-based practice to promote physical activity to older adults attending out-patient rehabilitation or supporting them in the transition to engage in physical activity in the community post-discharge from rehabilitation program. In Study 1, lack of physical activity assessment, inadequate focus on health promotion through changing physical activity behaviour and scarce referral to physical activity post-discharge from out-patient rehabilitation suggested that physical activity promotion to older adults is not being effectively incorporated into physiotherapy routine practice. Investigating the experiences of physiotherapists in promoting and prescribing physical activity to older adults attending outpatient rehabilitation settings would add further insight into issues to be addressed to improve the implementation of evidence-based practice to promote physical activity to this population.

Therefore, the aim of this study was to identify physiotherapists' attitudes, perceptions, beliefs and opinions regarding promotion of physical activity to older adults undergoing out-patient rehabilitation.

5.3 Methods

5.3.1 Design

A qualitative study using focus groups was undertaken. Data were analysed using a reflexive thematic analysis approach (Braun & Clarke, 2006, 2019).

5.3.2 Setting

This study was conducted at The Prince Charles Hospital (TPCH) in Brisbane, Australia. TPCH is a large tertiary referral hospital with approximately 630 beds. TPCH provides inpatient and outpatient services, including cardiac and thoracic medicine and surgery, emergency medicine, general medicine and general surgery, orthopaedic joint surgery, acute geriatrics and rehabilitation medicine, mental health and palliative care services.

5.3.3 Participants and recruitment

Eligible participants in this study included physiotherapists working at The Prince Charles Hospital with experience in providing physiotherapy rehabilitation to older adults attending rehabilitation within the previous two years. Twenty eligible physiotherapists were identified by the clinical leader of the physiotherapy rehabilitation program at the participating facility. All eligible physiotherapists were invited to participate via email to their work email address which included a participant information sheet and consent form. Those interested in participating in the focus groups replied to the invitation email and included a signed consent form. Once informed consent was gained, participants were invited to attend a focus group at their convenience. Three focus groups were planned for this study based on the number of eligible participants. Ethical approval was obtained from institutional Human Research Ethics Committees (The Prince Charles Hospital HREC/17/QPCH/430 and Australian Catholic University 2019-40R).

5.3.4 Data collection

Focus groups were held during working days (convenient location for participants) in a designated meeting room (safe and comfortable environment for participants) at TPCCH, for a maximum duration of one hour each focus group. Focus groups were scheduled outside of busy clinical times (at a convenient time for participants).

An interview guide (Appendix C) was developed using broad open-ended engagement, exploration and exit questions and pilot tested prior to focus groups. All focus groups were facilitated by an experienced moderator and had an observer in attendance. At the commencement of each focus group, participants were informed of the purpose of the study, the moderator acknowledged the confidentiality of discussions between the moderator and the group and requested permission to audio record the session. The procedures were clearly explained by the moderator and participants were provided with an opportunity to ask any further questions. Guided by the interview guide, the moderator encouraged participants to talk freely about their points of view during the focus groups. The observer monitored non-verbal behaviours and interactions between participants. Both

the moderator and the observer took notes during group interviews and meetings were held between the moderator and observer following each focus group to discuss thoughts and ideas about focus groups. Each group interview was audio-recorded.

5.3.5 Data analysis

The data were analysed using reflexive thematic analysis based on Braun and Clarke's approach (Braun & Clarke, 2006, 2019). Data analysis was undertaken using a deductive approach and developed in six phases:

1. Familiarisation with the data – reading and re-reading the data;
2. Coding – generating succinct labels;
3. Generating initial themes – significant broader patterns of meaning;
4. Reviewing themes – checking themes against the dataset;
5. Defining and naming themes – developing a detailed analysis of each theme
6. Writing up – contextualising.

Audio files were transcribed using NVivo 12 software and transcripts were checked for accuracy by the research candidate and reviewed by a supervisor. Focus group transcripts were read multiple times by the research candidate to increase immersion and familiarisation with the data and coding commenced. Initial coding was performed by the research candidate and principal supervisor and then independently coded by a third person (assistant supervisor). Together the research candidate and supervision team reviewed and compared their coding, which led to the development of preliminary themes. Latent themes (underlying ideas and assumptions) were developed from the data. Initial themes were generated by the research candidate and reviewed and further refined by the supervision team.

5.4 Results

5.4.1 Participant characteristics

Three focus groups were conducted with a total of 16 physiotherapist participants. Participant characteristics are reported in Table 5.1. All participants were registered physiotherapists with experience in the rehabilitation of older adults within the last two years. Each focus group included a mix of senior, junior, male and female physiotherapists to gather a more comprehensive understanding of the promotion of physical activity to older adults attending rehabilitation.

Table 5.1 Participant characteristics

Characteristic	N = 16
Gender, n (%)	
Female	12 (75)
Male	4 (25)
Years of experience (%)	
0-5 years	4 (25)
6-10 years	4 (25)
11-20 years	4 (25)
20+ years	4 (25)

5.4.2 Themes for promoting physical activity

Four themes were identified when promoting physical activity to older adults undergoing out-patient rehabilitation: 1. Patient-centred approach, 2. Support required, 3. Exercise program targeting impairments versus physical activity for health and 4. Inadequate community follow-up systems.

5.4.2.1 Theme 1: Patient-centred approach

Participants described a patient-centred approach when promoting physical activity to older adults attending out-patient rehabilitation. Participants identified the importance of

getting patients engaged and willing to participate in physical activity by setting patient-centred goals and finding activities that are enjoyable, meaningful and relevant.

“We're helping the patients understand what we're trying to achieve and giving them the ownership of their goal, which is very, very important. It's powerful. I think it has to be on their terms, on their goals, yeah, making it more specific and individual.” P7

“I think relevance and prioritization for them as well. There are people that aren't motivated to do it in the first place. But people finding or seeing the relevance and the potential benefits of doing it and why it's important.” P12

“It has to be enjoyable as well. They've got to find something that they like to do and are happy to do it every day because otherwise it's not sustainable either. If they see it as exercise or a chore, then they're not gonna keep it up for more than a couple of weeks if we're lucky.” P1

Some participants discussed how they use motivational interviewing as a patient-centred approach to assist motivating older adults to achieve their goals.

“I guess my main technique is to use some motivational kind of interviewing, I guess, and bring it back to their goal and why they are here in the first place and just trying to work as a team to get what they want to achieve. It's my main goal too.” P11

“I try to use a bit of motivational interviewing, and see if they can move forward into that stage where they think about change and are ready to change. But you've got to find out their motivations and their barriers. See if you can incorporate or address those, I guess.” P16

However, when prompted about motivational interviewing, some participants appeared to have difficulty characterising the approach, suggesting a lack of understanding on the specific structure of a behaviour change approach.

“What is motivational interviewing? I just talk with them (patients) and come up with things together” P10

“I think we had one-hour training in motivational interviewing. That’s the only experience I’ve had and then I guess it’s just experience with it. Just putting a label on what we already do on a daily basis when a patient doesn’t want to do things...”
P12

Participants discussed how exploring older adults’ perceived barriers to physical activity and using problem-solving strategies around barriers are important steps to individually support older adults engaging in physical activity.

“I try to identify what are the barriers or the obstacles, so they can get around them, so that they become more compliant.” P15

“I try to find out why they're not doing it. Is it a lack of motivation? Is that timing? And then specifically address... trying to address that issue.” P12

5.4.2.2 Theme 2: Support required

Physiotherapist’s support was consistently identified as a crucial factor to facilitate engagement in physical activity among the geriatric population; a generation that highly regards the advice of health professionals. Education, therapeutic rapport, encouragement and motivation were topics often discussed by participants.

“I think that they need that clinical help, the clinician professional help to guide them, because it's a generation where they are led by others. They do rely heavily

on the recommendations of people that work in health because we know best, we know better, even though we don't always, but I think they have that faith.” P15

Social support was also identified as a key factor in promoting physical activity to older adults. Participants discussed the important and supportive role caregivers and family play in physical activity adherence and how they encourage and educate family and caregivers to assist older adults getting more active.

“Which is the other benefit of families as well, where you can get them to motivate by doing with them and or helping them keep track of it.” P3

Exercise group classes were reported as a useful tool to motivate older adults to engage in physical activity. Participants identified how group classes have a positive impact on physical activity engagement not only due to the therapist supervision, but more compellingly due to the social interaction among the older adults.

“Group classes are also really encouraging. You can see the improvement of having that other person in the same boat encouraging them in that environment. It usually speaks more than anything we can say.” P3

Provision of support material, such as exercise handouts, was raised by participants as important strategies to assist older adults to engage and maintain their exercise program.

“I give them a handout of the exercises. I use the VHI (Visual Health Information Exercise Software) and print hard copies to patients” P15

“For some patients, we've done like videos on their phones of the exercises. It's good, they can look back at that and see how they were performing the exercise specifically. And then when they go home, they can just, pull out their phone and all the exercises are there, and then they can see how they did them and usually hear me talking.” P8

Demonstration of exercise program and monitoring of progress were reported as a regular practice used by participants to assist older adults keep on track of their exercise program.

“I always get them to show me the exercises that they were doing. So, that kind of shows if they've been doing them. And then you can also use the same methods to sort of show them that they have improved with the exercises and correct what they're doing, and if it needs to be changed or anything, that makes it a lot of easier to show them.” P5

Participants also discussed strategies to assist older adults self-monitoring their physical activity participation through the use of reminders and tracking grids. There were some reports of the positive use of technology to support self-monitoring.

“Sometimes set reminders on their phone if they've got a phone and are capable of using it.” P16

“I do the tracking grid with the VHI (Visual Health Information Exercise Software), which I can print out the tracking grid where they can tick off if they've done that for that day or not.” P10

Participants recognised that education alone is not enough to get older adults more active, behaviour change is required. However, there was not a no further awareness of behaviour change models

“I get them engaged; it sounds very easy to say. ‘OK, we want you to increase your activities for all of these health reasons’... they don't really care about that, they just need to get their habits changed, their minds to switch.” P3

Participants acknowledged the challenging task of changing physical activity behaviour of the inactive and unmotivated patients; however, there was no further discussion on the use of behaviour change models to assist those patients engaging in physical activity.

“I think that's the thing for us in a way, we do only get people in a very small snapshot of time, so if they've got this well-established long-term avoidance of activity and exercise, I think it's really difficult to change their whole mental state.” P6

“If they're not motivated and you've tried everything. Sometimes you just can't do anything.” P10

“There are those patients that don't do a whole lot when they come in on their own outside of the therapy and I think if they haven't started doing that or aren't doing it well by the time they finish their therapy block, then it's not going to get any better when they go home. It'll just go down again.” P14

5.4.2.3 Theme 3: Exercise program targeting impairments versus physical activity for health

Participants discussed their perceptions regarding prescription of physical activity to older adults, including the prescription of structured exercise program targeting physical impairments versus the prescription of physical activity for health benefits. Participants discussed physical activity guidelines and the negative connotations associated with the term ‘exercise’.

Participants were aware of the physical activity guidelines and reported having discussions with patients around the current guidelines.

“I go by the World Health Organization guidelines that say 30 minutes of exercise most days of the week. So at least that's a message that has been out in the public space. So, if we just reinforce what's already there, I think we've got a better chance of them listening to us.” P1

“I tend to think about the more recent research, which is if you go from extremely low levels of activity to some level of activity that actually confers a larger health

benefit community wide than, you know, being fit to becoming fitter kind of thing.”
P2

“Most people don't do the recommended amount of physical activity that is recommended by the World Health Organization guidelines. So, they might be nowhere near the guidelines, but if you can just nudge them a bit more in that direction... and advising them what the guidelines are and then trying to work out a way that they can increase what they're doing around their day and their physical capabilities.” P16

Physical activity assessment was rarely reported by participants. When prompted those that responded identified physical activity assessment focused on understanding daily routines and usual activities.

“I usually say to people. ‘What do you do normally during the day? How do you occupy your time?’ Specially for the retired people we get through. Most of them are generally retired. People would say: ‘I watch a lot of TV’, or then they'll say, ‘I play bowls’, ‘I do golf.’ And from that I will then prescribe or advocate.” P15

“So how active they are to begin with and whether you'll get that incidental exercise as part of they are doing. So, finding out what they do currently, what their usual activities are...” P14

Incorporating physical activity into one's daily routine was consistently highlighted as a simple, yet essential strategy used by participants to foster an active lifestyle among older adults attending out-patient rehabilitation.

“If they've got a high set house and they rarely actually go up and down the stairs, get them, say, to do the stairs once a day and check the mail or something like that, that will make them do more in their normal daily routine.” P12

“If they can just do any type of activity that they can conform to their normal day to day and be compliant with that, is what I focus on in my therapy rather than pushing their activity level.” P15

“I think it's trying to fit, sort of increasing the incidental exercise into their daily routine. So, if someone goes to the shops every Wednesday with their service provider or something, get them to park 100 meters further away. Those ones that you know won't sit and do exercises, trying to get them to do something different in their daily routine that increasing their incidental exercise.” P12

Participants shared their perspectives on prescription of structured exercise programs for treating impairments and prescription of physical activity for health benefits.

“I think I probably combine them a little bit knowing if it's something for balance where you have to do specific things, I'll say: ‘These are a couple of specific exercises you need to do to help with your balance’. But then I still talk as activity as a general, you know, you need to get out. You need to move, you need to walk down to the letterbox, you can walk around the shopping centre, that's still activity. It doesn't have to be 20 minutes on a treadmill kind of thing.” P1

“Sometimes it can be both that you target the specific deficits that you want to work on, but you know, the person is not doing any activity, any general physical activity outside of that. That's the only thing that they do physical at home and they have a very sedentary lifestyle. So then, you want to prescribe some sort of physical activity that's more related to endurance or general health as well for them.” P14

Some participants emphasised their primary focus on restoring older adults' functional capacity by treating physical impairments to subsequently focus on physical activity promotion.

“And sometimes when they go through a program, they might have improved on all the measures that we use or outcomes for their strength may have increased or their balance may have improved to the point where they're now safer to do things,

and you just want them to stay active, so that all those other things don't reoccur again. So, it might then be on discharge from RDTU (Rehabilitation and Day Therapy Unit) that you're trying to get them just to maintain a more active lifestyle rather than specific exercise.” P14

Some participants reported using improvements in physiotherapy performance-based outcome measures (such as Timed Up and Go and Functional Gait Assessment) to educate patients about the importance of increasing physical activity levels in view of maintaining functional improvements gained from the rehabilitation program. Participants reported having a focus on education regarding the importance of physical activity participation rather than the prescription of physical activity for health.

“I guess it helps if you say: ‘Look at how much you've improved’. And then now is the time we have that formal conversation. ‘So, you can still keep getting better at home if you keep up what you've been doing or if you increase your exercise levels or etc, etc.’ ‘How can you fit it in? When would you fit it in? What's realistic? What can you do?’ That kind of thing at that point and then, generally if you made good improvement with them, then the more likely to be a bit chuffed with themselves and want to keep going.” P16

Different perspectives were identified in relation to the use of the terms exercise or physical activity on discussions between participants and older adults. Many participants identified the term ‘exercise’ as a ‘dirty word’, a ‘deterrent’, ‘sounds difficult’ or ‘negative connotation’. There was a lack of consistency on the use of the terms exercise and physical activity among participants.

“I usually don't use the word exercise. I usually do talk about activities, so if they're on their feet doing something at all, often that's a win. And so, I tend to avoid the dirty word.” P2

“They don't like the term exercise much of the time. If you say let's do some exercise, they say 'I haven't exercised for 30 years, I'm not going to start exercising

now.” P14

“I'd probably say exercise if I prescribe them some exercises, but if I'm just saying advice, I'll just say activity. And that could mean gardening, could mean walking. If for people that are just watching TV all day and I want them to go out and walk, I wouldn't call that exercise. I think that would be a deterrent” P16

In contrast, other participants identified the usefulness of the term ‘exercise’ as being more appropriate than the term ‘physical activity’ for the older generation.

“I don't say physical activity. I say exercise. So, with oldies I use exercise. I'd use exercise because I think physical activity is too... a higher level of thinking for the elderly population.” P15

5.4.2.4 Theme 4: Inadequate community follow-up system

Participants, particularly more experienced physiotherapists, identified the need for systemic improvement in physical activity programs in the community as paramount to facilitate older adults’ participation in physical activity after discharge from rehabilitation.

Participants identified the lack of appropriate community-based physical activity programs as a key issue for ongoing engagement of older adults in physical activity after discharge from rehabilitation.

“I think once people come in, when they go, they're doing more than what they were when they came in. But whether that is maintained after a period of time, if they're not receiving any follow up and they haven't got any follow-up and, anyone else is gonna be assisting to look at that or monitor it.” P14

“So, you've got those people where there's a void in the community services unless they're paying for it. It would be really nice if it was funded from the government

that you had exercise groups and things that were set up in the community and provides transport, because that's one of the big issues as well for people to get around. A number of them have being told they're not allowed to drive again and then they haven't got any support to be able to do it. So, they're isolated.” P14

A few available community-based physical activity programs were identified, although several barriers to access these programs were highlighted.

“So, transport and finances are an issue. But I found Burnie Brae (not-for-profit community organisation) quite good to refer because they can provide transport and it's reasonably cheap, and Wheeler Gardens (not-for-profit community organisation) is well equipped, and they've got lots going on. So, I have referred a few people to there and again, finding out what they like, if there is something near them that they like, that we can research together.” P16

Participants raised concerns about the lack of trustful community-based programs to refer older adults to.

“I think there are limitations in other services. I guess I don't feel like that they're going to get a comprehensive service to a different place other than RDTU (Rehabilitation Day Therapy Unit). Access to transport is an issue, I guess. I do refer them to hydrotherapy at the Royal Brisbane Women Hospital. It's probably the only other place that I will refer someone to from here in the geriatric population. I don't send them to other water-based (facilities) because I think it's better if they go to a hydrotherapy service and get shown what to do before just go to splash centres and work out by themselves.” P15

Participants identified the lack of domiciliary provided services as a barrier to prescribing physical activity to vulnerable older adults due to safety risks.

“And if we haven't seen their house, if they're an older person, who may be a little bit unsteady on their feet, we don't want to prescribe them very balance specific

exercises until we've seen their home environment to know where it's safe to do those exercises.” P12

“It's probably more useful to have a service that would see people at home so that they can look at what they do in the community, what their community involvement is, so that they can see what is possible for them to do and what else they might be able to be involved in.” P14

Participants discussed how well-established community-based programs are needed to facilitate physical activity engagement once older adults are discharged from hospital-based rehabilitation.

“... community-based perspective not just located in the community, but community driven as well and across organizations. So, people can be referred there from multiple sources or people can self-refer and attend it. But it needs to be coordinated. You don't know half of the programs that are out there because they all run in isolation and they're not necessarily well coordinated or promoted.” P14

In addition, limited communication between hospital-based services and community-based services was also highlighted as a deterrent to assist in the continuity of care of older adults in regarding to physical activity participation.

“Another way is having a communication between the community and the hospital because sometimes they (patients) come to us and we don't know what they do, we don't know what's been done in the community. Then we could on discharge planning know where to refer to, because they already have a relationship, they trust those people.” P7

5.5 Discussion

The purpose of this study was to identify physiotherapists' attitudes, perceptions, beliefs and opinions regarding promotion of physical activity to older adults undergoing outpatient rehabilitation. The findings indicate participants perceived that physical activity promotion was integrated into physiotherapy routine practice of older adults attending outpatient rehabilitation. As part of their approach to physical activity promotion to older adults, participants reported setting patient-centred goals by finding enjoyable, meaningful and relevant activities, identifying perceived barriers to physical activity and assisting with problem solving around these barriers. Moreover, providing therapist support through encouragement and motivation to engage in physical activity, as well as providing education on the health benefits of physical activity, encouraging social support, demonstrating exercise programs, monitoring physical activity progress and encouraging self-monitoring were strategies also reported by participants for the promotion of physical activity to older adults. Many of these strategies are in line with the current evidence-based strategies for increasing older adults' physical activity. Strategies identified by the 2018 physical activity guidelines advisory committee included advice and counselling, problem-solving around barriers to physical activity, providing social support, modelling and demonstration of physical activity, and use of rewards linked to behaviour change (King et al., 2019).

Despite participants perceiving that physical activity promotion is embedded into routine physiotherapy practice, it appeared that physiotherapists focus on the promotion and prescription of structured exercise programs to address physical impairments, with limited focus on the promotion of physical activity behaviour change for health benefits. Despite positive findings of participants' knowledge regarding the physical activity guidelines, assessment of physical activity levels was sub-optimal. Physical activity assessment appeared to be undertaken quite informally or was absent, which is consistent with the findings from Study 1. Evidence shows that physical activity assessment is not routinely undertaken as part of physiotherapy practice (Lowe et al., 2018; Lowe et al., 2017; Zhu et al., 2021). However, physical activity promotion should start with assessing baseline physical activity levels (Strath et al., 2013). In addition to inadequate physical activity assessment, the informal or infrequent use of physical activity behaviour change

approaches suggest that evidence-based physical activity promotion to older adults attending out-patient rehabilitation is not well incorporated into physiotherapy practice. The Global Action Plan on Physical Activity (GAPPA) 2018-2030 titled “More active people for a healthier world” calls for the implementation and strengthening of systems of patient assessment and for health care professionals to provide counselling to increase physical activity and reduce sedentary behaviour, as part of universal health care (World Health Organization, 2018b). Education on behaviour change models, such as the transtheoretical model (Prochaska, DiClemente, & Norcross, 1992) and training on effective behaviour change approaches and techniques, brief interventions as part of a broader Making Every Contact Count (MECC) approach (Lowe et al., 2018), would likely prepare physiotherapists to readily assist older adults to change physical activity behaviour during rehabilitation.

Physical activity referrals schemes are considered an important way for healthcare professionals to assist patients engaging in physical activity (Hanson, Oliver, Dodd-Reynolds, Pearsons, & Kelly, 2020). Participants in this study, particularly the more experienced physiotherapists, perceived that inadequate community follow-up was a major barrier to the transition of older adults to an active lifestyle post discharge from rehabilitation. The lack of physical activity programs in the community, or at least the perception of the lack of suitable programs in the community, which older adults could readily be referred to at discharge from rehabilitation was identified as a major deterrent for physiotherapists assisting older adults in the transition to physical activity participation beyond physiotherapy. The identified lack of community physical activity programs, lack of knowledge about existing programs and lack of trust on existing physical activity programs are barriers commonly experienced (Fishleder et al., 2018; Kava et al., 2020; O'Brien, Shields, Campbell, Crowell, & Fowles, 2020; West et al., 2021; Zhu et al., 2021). GAPPA 2018-2030 calls for the provision of tailored physical activity programmes to older adults to support healthy ageing across all relevant settings such as local community facilities, respite and residential or long-term care settings, supported living facilities as well as family environments (World Health Organization, 2018b). Well-established community-based physical activity programs, as well as collaboration between health care systems and physical activity programs in the community are recommended as valuable

vehicles to facilitate and sustain adherence to a physically active lifestyle among older adults (Bauman et al., 2016; Farrance, Tsofliou, & Clark, 2016).

There appeared to be no standard framework for promoting physical activity to older adults attending out-patient rehabilitation in this study. Similar evidence has been found in other qualitative studies of physiotherapists' promotion of physical activity to the general population (Eisele et al., 2020; Kava et al., 2020; Kunstler, O'Halloran, et al., 2018; Lowe et al., 2018). Integrating effective, consistent and sustainable physical activity promotion into physiotherapy practice is warranted to assist older adults adopting and maintaining a physically active lifestyle beyond clinical settings. The global health initiative, 'Exercise Is Medicine', has developed a framework to assist health care providers supporting patients to engage in physical activity within routine practice (Bowen, Mankowski, Harper, & Buford, 2019). Dissemination of the 'Exercise Is Medicine' initiative is growing in several countries, including Australia (Stoutenberg, 2021). 'Exercise Is Medicine' is a viable framework that can be utilised in physiotherapy practice to guide physiotherapists incorporating physical activity promotion into routine practice.

Several approaches have been suggested to promote physical activity specifically within physiotherapy practice. Such approaches include clinical-community linkage with older adult physical activity programs (Fishleder et al., 2018), the 'Coach2move' approach which aims to improve physical activity in community-dwelling older adults, specifically, those with mobility problems (de Vries et al., 2016) and the ComeBACK physiotherapist-led physical activity coaching for community-dwelling adults with self-reported difficulty walking (Hassett et al., 2020). However, evidence translation to real-world settings remains inadequate (S. M. Gray et al., 2021; K. Lee et al., 2021). Implementation research of evidence-based frameworks guiding physiotherapists to promote physical activity to older adults is warranted (S. M. Gray et al., 2021).

There are some limitations to this study, including the social desirability of acceptance among their peers influencing participants to say what they were expected to say instead of what they truly do in practice (Bergen & Labonte, 2020). Strategies used in this study to limit social desirability bias included explaining the purpose of the study, assuring confidentially measures, establishing rapport and asking questions during focus groups.

The results of this study were also limited to the experiences of physiotherapists at a single out-patient rehabilitation setting which may be different to other health care professionals, or rehabilitation clinical practice at other settings. Another potential limitation to this study is a lack of understanding of the different definitions between the terms exercise and physical activity by physiotherapists participants.

There is scope for improvement in the promotion of physical activity to older adults integrated to physiotherapy practice. Incorporating knowledge and skills in behaviour change into entry-level physiotherapy curriculum may be a future direction to enable physiotherapists to effectively promote physical activity to patients within routine practice. Evidence is required on the efficacy of physical activity referrals schemes to facilitate older adults' physical activity participation after discharge from rehabilitation programs. Further work on the implementation of an evidence-based framework to guide physiotherapists promoting physical activity to older adults attending out-patient rehabilitation is warranted.

Chapter 6 DISCUSSION

This chapter summarises the findings from this research program and outlines the clinical implications and areas for future research, and outlines limitations of the research program.

6.1 Summary of key findings

The overall aim of this research program was to investigate current physiotherapy practice of physical activity promotion and prescription to older adults attending an out-patient rehabilitation program. Two studies were undertaken to inform this research program. The first study, an audit of medical files, aimed to investigate if physiotherapists document physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation. The second study, a qualitative study using focus groups, aimed to identify and understand physiotherapists' beliefs in educating, promoting and prescribing physical activity to older adults attending out-patient rehabilitation.

In Study 1, a retrospective chart audit study of 56 medical records of older adults attending out-patient rehabilitation, findings suggest that physiotherapists are not widely applying evidence-based practice to promote physical activity to older adults attending out-patient rehabilitation and are not supporting them in the transition to engage in physical activity in the community post-discharge from rehabilitation. Assessment of physical activity was not routinely documented in the medical records of older adults attending out-patient rehabilitation in this study. No validated tools, such as physical activity questionnaires or accelerometers were used to assess physical activity, and when the level of physical activity was documented, the information was incomplete. While physiotherapists routinely prescribed exercises to older adults during rehabilitation programs to optimise their physical ability and functional independence, they did not appear to focus on health promotion through changing physical activity behaviour. Physical activity counselling, including theoretical or cognitive-behavioural models, was not documented in any of the audited medical records. Likewise, referral to physical activity post-discharge from out-patient rehabilitation was rarely documented in any of the audited medical records.

Findings from Study 2 added further insight to the current physiotherapy practice of physical activity promotion and prescription to older adults attending an out-patient rehabilitation program. Three focus groups were conducted with a total of 16 physiotherapist participants. Four themes were identified when promoting physical activity to older adults undergoing out-patient rehabilitation: 1. Patient-centred approach, 2. Support required, 3. Exercise program targeting impairments versus physical activity for health and 4. Inadequate community follow-up systems. Physiotherapists perceived that physical activity promotion was integrated to the routine physiotherapy practice when caring for older adults attending out-patient rehabilitation. Physiotherapists reported promoting physical activity during routine practice by setting patient-centred goals, finding enjoyable, meaningful and relevant activities, identifying barriers to physical activity and assisting with problem solving around these barriers. Furthermore, physiotherapists provided support to their patients through encouraging and motivating them for physical activity, educating them about the health benefits of physical activity, encouraging social support, demonstrating exercise programs, monitoring physical activity progress and encouraging self-monitoring. Physiotherapists perceived that physical activity promotion is embedded into routine physiotherapy practice; however, it appeared that physiotherapists focus on the promotion and prescription of structured exercise programs to address physical impairments, with limited focus on the promotion of physical activity behaviour change for health benefits. Physiotherapists demonstrated awareness of the physical activity guidelines; however, assessment of physical activity levels appeared sub-optimal. Behaviour change approaches and techniques seemed to be used informally and infrequently. Inadequate availability of appropriate and relevant physical activity community-based programs was identified as a major barrier to transition older adults to an active lifestyle post discharge from rehabilitation.

Both Study 1 and Study 2 provided evidence for the knowledge-translation gap of physical activity promotion by physiotherapists to older adults attending out-patient rehabilitation. At first, both studies demonstrated that physical activity assessment is not being effectively incorporated into physiotherapy routine practice. Furthermore, Study 1 demonstrated a lack of documentation on physical activity counselling in the audited medical records, which was also found in Study 2, where informal and infrequent behaviour change approaches and techniques were used by physiotherapists to promote

physical activity to older adults. In addition, referral to physical activity post-discharge from out-patient rehabilitation was rarely documented in the audited medical records, which was also found in Study 2, where physiotherapists identified lack of community physical activity programs, lack of knowledge about existing programs and lack of trust on existing physical activity programs as major barriers to transition older adults to an active lifestyle post discharge from rehabilitation. Finally, both studies demonstrated a lack of a standard framework for promoting physical activity to older adults attending out-patient rehabilitation. Findings from this research program present an opportunity to foster and further develop the promotion of physical activity to older adults attending physiotherapy at out-patient rehabilitation settings.

6.2 Clinical implications and future recommendations

The findings from the two studies comprising this Master of Philosophy research program suggest that evidence-based physical activity promotion to older adults is not widely integrated to physiotherapy practice in out-patient rehabilitation. This research raises a number of clinical implications and future recommendations for physiotherapy practice, which will be discussed in this section.

6.2.1 Physiotherapists can and should play a key role in promoting physical activity to older adults as part of routine practice

Physical inactivity is a long-standing global public health problem (Blair, 2009; Kohl et al., 2012; Pratt et al., 2021). Initiatives aiming to reduce physical inactivity need to be directed globally and nationally and be implemented locally. Such global and national strategic initiatives require a systems-based approach inclusive of evidence-based policies to address social, cultural, economic and environmental factors known to influence physical activity levels (World Health Organization, 2018b). A systems-based approach depends upon all relevant areas of government and the non-government sector contributing to a national response to increase physical activity levels (World Health Organization, 2018b). Although the focus of this research program was on older adults attending out-

patient rehabilitation, developing and implementing such strategic initiatives need to be targeted to increase the opportunities for people of all ages and abilities to be more physically active (World Health Organization, 2018b).

In 2018, the World Health Organisation launched the Global Action Plan on Physical Activity (GAPPA) 2018-2030, titled “More active people for a healthier world” aiming to provide a feasible framework to increase physical activity and reduce sedentary behaviour worldwide (World Health Organization, 2018b). The GAPPA sets out four strategic policy objectives (Active Societies, Active Environments, Active People, and Active Systems) and recommends 20 related policy actions to reduce physical inactivity (World Health Organization, 2018b). The WHO has prepared a technical package (ACTIVE) to assist countries adopting, tailoring and implementing the GAPPA policy actions into their local contexts (World Health Organization, 2018a). The policy ‘Active Societies’ calls for the implementation of behaviour change communication campaigns to create public and professional education, awareness and understanding of the multiple benefits of regular physical activity, associated with the provision of free access to enjoyable and affordable, socially and culturally appropriate experiences of physical activity (World Health Organization, 2018b). The policy ‘Active environments’ urges for the provision of safe, well maintained and universally accessible infrastructure, facilities and public open spaces that promote regular engagement in physical activity by people of all ages and abilities (World Health Organization, 2018b). The policy ‘Active Systems’ recommends the creation and strengthening in leadership, governance, multisectoral partnerships, workforce and research to support effective coordinated implementation of effective policy solutions aiming to increase physical activity and reduce sedentary behaviour (World Health Organization, 2018b). There has been some progress in the development of physical activity policies over the past decade; however, the implementation of those policies remains poor globally (K. Lee et al., 2021; Pratt et al., 2021).

As part of the policy actions of the ‘Active People’ objective, the GAPPA recommends the implementation of systems to support the assessment of and counselling on physical activity in primary and secondary health care and social services (World Health Organization, 2018b). Every health care professional has an important role in promoting

physical activity to individuals of all ages (Cunningham & O'Sullivan, 2021); however, evidence is lacking on primary health care professionals taking responsibility on physical activity promotion as part of routine practice (Cunningham & O'Sullivan, 2021; Persson, Brorsson, Ekvall Hansson, Troein, & Strandberg, 2013; Wheeler, Mitchell, Ghaly, & Buxton, 2017). Physiotherapists are experts in movement and exercise having extensive knowledge of pathology and risk factors for pathology and effects on body systems (World Confederation for Physical Therapy, 2019). Therefore, physiotherapists are well prepared to promote physical activity to their patients (World Confederation for Physical Therapy, 2019). In addition, physiotherapists tend to have long interactions over prolonged periods of times with their patients, which offers an opportunity to integrate physical activity behaviour change strategies as part of routine practice (Dean et al., 2014). Physiotherapists have been shown to assume a positive role in the promotion of physical activity (Kunstler, O'Halloran, et al., 2018; Lowe et al., 2018; West et al., 2021; Zhu et al., 2021), and report having sufficient confidence to promote physical activity to their patients (Freene et al., 2017; Shirley et al., 2010). Strategies to promote the role of physiotherapists in this area are required.

Physiotherapists working in rehabilitation settings routinely prescribe exercise to older adults to optimise their physical ability and functional independence (de Vries et al., 2013). The focus on function and mobility in rehabilitation settings places physiotherapists in an ideal position to promote a physically active lifestyle to older adults. Older adults need and welcome assistance from physiotherapists to improve their physical activity participation (Desveaux et al., 2016; Haynes et al., 2020). In rehabilitation settings, physiotherapists may find unique opportunities for physical activity promotion, as patients may be more likely to adopt or engage with a healthy lifestyle change following a health crisis, such as a newly acquired disability, diagnosis or injury (Rimmer & Lai, 2017). Promoting physical activity to older adults during rehabilitation may enhance health, assist in the prevention and management of chronic diseases, and maximise the benefits of physiotherapy programs on functional independence (van der Ploeg et al., 2007). Physiotherapists working in out-patient rehabilitation settings can and should drive the transition from a restorative and therapeutic context to a self-managed active lifestyle of older adults in the community, by integrating physical activity promotion into routine practice.

Despite a positive alignment between physiotherapy and physical activity promotion, implementation of evidence-based physical activity promotion into physiotherapy practice remains inconsistent and sub-optimal (Aweto et al., 2013; Eisele et al., 2020; Lowe et al., 2018). Lack of specific knowledge of the physical activity guidelines (Freene et al., 2017; Lowe et al., 2018) and infrequent and inconsistent use of approaches to physical activity promotion and behaviour change techniques (Aweto et al., 2013; Geidl et al., 2019; Kunstler, Cook, et al., 2018b; Lowe et al., 2018; Zhu et al., 2021) have been identified as important barriers to the integration of physical activity promotion into physiotherapy practice. Furthermore, lack of time to promote physical activity (Aweto et al., 2013; West et al., 2021) and lack of information regarding suitable community-based physical activity options (Fishleder et al., 2018; Kava et al., 2020; Kunstler, O'Halloran, et al., 2018; O'Brien et al., 2020; West et al., 2021; Zhu et al., 2021) have also been recognised by physiotherapists as common barriers to efficiently promote physical activity to patients.

Education on the core elements of physical activity promotion for health benefits should be better embedded in entry-level physiotherapy curriculum to enable physiotherapists to effectively incorporate evidence-based physical activity promotion into routine practice. Physiotherapists are well positioned to be promoting physical activity to older adults but are not consistently doing it. Therefore, efforts are required to support physiotherapists prioritising physical activity promotion as part of routine practice. Education is required to assist physiotherapists developing knowledge and skills in promoting physical activity. Furthermore, physiotherapists need recognition that physical activity promotion is part of their roles. The prioritisation of physical activity promotion in entry-level education in collaboration with ongoing education through physiotherapy professional bodies is warranted to enable physiotherapists promoting physical activity as part of routine practice.

6.2.2 Physical activity assessment should be incorporated into physiotherapy routine practice

Since increasing physical activity is a global priority (World Health Organization, 2018b), identifying those who are not meeting the guidelines is strongly recommended for all

primary health care assessments (Bowen et al., 2019; Lobelo et al., 2018). Assessment of physical activity needs to be comprehensive, including all domains (occupational, household, transportation and leisure time) and dimensions (type, frequency, duration and intensity) of physical activity (Bauman, Phongsavan, Schoeppe, & Owen, 2006; Strath et al., 2013). Only then can it be determined if recommended levels of physical activity are being met and promotion of physical activity should occur. The American Heart Association provided a comprehensive review of the evidence on the feasibility, validity and effectiveness of physical activity assessment tools for use in healthcare settings (Lobelo et al., 2018). Self-reports tools, such as questionnaires, and objective tools (wearable activity monitors), such as pedometers or accelerometers are recommended for the routine assessment of physical activity in healthcare settings (Lobelo et al., 2018).

Wearable activity monitors demonstrate promise for physical activity assessment in health care settings (Maher, Szeto, & Arnold, 2021). The most commonly used wearable activity monitors are accelerometers and pedometers (Strath et al., 2013). Accelerometers can be bi-axial or more commonly tri-axial, which allow them to measure acceleration and movement. Accelerometers are more accurate than pedometers and provide the data necessary to enable the distinction between light, moderate and vigorous physical activity (Sylvia et al., 2014). However, considerable measurement errors (Arvidsson, Fridolfsson, & Borjesson, 2019) and the time required to analyse the large amount of data provided by accelerometers limits its clinical feasibility (Strath et al., 2013). Pedometers are widely available and in contrast to accelerometers are often uni-axial, measure steps and can often attribute distance. However, most pedometers report physical activity data on daily step counting rather than on time spent in different physical activity intensities, which prevents health care professionals being able to assess compliance with the physical activity guidelines (Lobelo et al., 2018). In recent years smartwatches or similar wrist-based devices have grown in popularity and availability. These devices can not only count steps and record distance, but also record heart rate which can enhance estimation of the intensity of the physical activity undertaken (Strath et al., 2013). Further work is required on wearable activity monitors' software to enable generation of physical activity data in a clinically meaningful way (Lobelo et al., 2018). Nevertheless, positive effects have been demonstrated on the use of wearable activity monitors, such as pedometers and accelerometers, combined with behavioural change strategies, such as goal setting or

action planning to increase physical activity levels in physical activity interventions for adults (King et al., 2019). Despite their limitations, the use of pedometers together with self-reported tools may be a feasible way to measure physical activity levels in healthcare settings.

Self-reports tools, such as questionnaires, are low cost, easy to administer and may ascertain compliance with physical activity guidelines (Lobelo et al., 2018). Physical activity questionnaires use self-reported responses or interviews to assess dimensions and domains of physical activity behaviours over a specific period of time (Grimm et al., 2012; Strath et al., 2013). Fourteen physical activity questionnaires were identified as feasible, valid and reliable self-reported tools to assess physical activity in healthcare settings (Lobelo et al., 2018). The Rapid Assessment of Physical Activity (RAPA) (Topolski et al., 2006) and the Physical Activity Vital Sign (PAVS) (Greenwood, Joy, & Stanford, 2010) are among the 14 recommended questionnaires to assess physical activity in clinical settings (Lobelo et al., 2018). The RAPA is an easy-to-use 9-item questionnaire with 'yes' and 'no' options to questions related to amount and intensity of physical activity performed, as well as strength and flexibility (Topolski et al., 2006). The RAPA allows assessment of compliance with the physical activity guidelines and was specifically designed to assess physical activity levels of older adults (Topolski et al., 2006). The PAVS includes two self-reported questions to assess physical activity: 1. "How many days during the past week have you performed physical activity where your heart beats faster and your breathing is harder than normal for 30 minutes or more?"; 2. "How many days in a typical week do you perform activity such as this?". The responses are reported as days during the past week over days in a typical week, with scores ranging from 0 to 7 for each question (Lobelo et al., 2018).

Future research could explore strategies to support physiotherapists to change their clinical behaviour to incorporate consistent use of valid, yet simple tools to assess older adults' physical activity as part of physiotherapy routine practice. Behaviour change theories could guide the development of such interventions with review of medical chart or physiotherapy documentation, observation of clinical practice and recording of physical activity undertaken by older adults attending out-patient rehabilitation before and

following physiotherapy intervention. Research would be needed to evaluate the effectiveness of such interventions.

6.2.3 Physiotherapists require clinical competence in knowledge and skills in behaviour change

The global burden of lifestyle-related conditions is acknowledged (World Health Organization, 2018b). It is reasonable to suggest that education and training in behaviour change theories, approaches and strategies should be embedded into entry-level physiotherapy education programs to ensure health promotion content is integrated into standard physiotherapy practice (Bodner, Rhodes, Miller, & Dean, 2013; Dean et al., 2016; Sandborgh et al., 2020). Physiotherapists appear well positioned to promote physical activity to older adults attending out-patient rehabilitation; however, promoting physical activity can be quite challenging for older adults, particularly those with chronic diseases and / or disabilities (Zalewski et al., 2014). Behaviour change interventions are known to be effective for increasing physical activity in the general population, people with chronic diseases and older adults (Haynes et al., 2020; Oliveira, Sherrington, Amorim, Dario, & Tiedemann, 2017); however, physiotherapists do not appear to routinely incorporate physical activity behaviour change approaches to routine practice (Kunstler, O'Halloran, et al., 2018; Lowe et al., 2018; Zhu et al., 2021).

6.2.3.1 Theoretical models of behaviour change

Several behaviour theories and models exist to explain behaviours and how behaviour change occurs, such as self-determination theory (Deci & Ryan, 1985), social cognitive theory (Bandura, 1986), theory of planned behaviour (Schifter & Ajzen, 1985), transtheoretical model (Prochaska et al., 1992) and the COM-B (Capability, Opportunity, Motivation-Behaviour) model (Michie, van Stralen, & West, 2011). The transtheoretical model and the COM-B models are considered suitable behaviour models to be used in physical activity interventions for older adults (Jimenez-Zazo, Romero-Blanco, Castro-

Lemus, Dorado-Suarez, & Aznar, 2020; Kwok, Wong, & Remedios, 2021). A brief description of the transtheoretical and COM-B models are presented.

The transtheoretical model of behaviour change (Prochaska et al., 1992) is widely applied in behavioural interventions, including physical activity promotion (Ntoumanis, Thøgersen-Ntoumani, Quested, & Chatzisarantis, 2018). This model presents a framework for understanding five stages of behaviour change including pre-contemplation, contemplation, preparation, action, and maintenance (DiClemente & Velasquez, 2005). The pre-contemplation stage is a non-intentional stage, where the individual is unwilling to change behaviour. In the contemplation stage, the individual is starting to consider making behavioural changes but has not yet taken action. The preparation stage is a true intentional stage, where the individual has made a clear plan and has started making behaviour changes. The individual reaches the action stage when engaging in the behaviour regularly for up to six months. In the maintenance stage, the individual has been regularly performing the behaviour for 6 months or more (Ntoumanis et al., 2018). Behaviour change interventions need to target the stage of behaviour change to increase the likelihood of success.

The COM-B model of behaviour change (Michie et al., 2011) offers insights on three inter-related components, capability, opportunity, and motivation, that may play a central role in changing behaviour. Capability refers to the psychological (knowledge and reasoning) and physical (strength, skill and stamina) capacity to engage in a particular behaviour. Opportunity refers to external factors that may influence the behaviour and enable the person to carry out the behaviour. Opportunity incorporates both physical opportunities and social opportunities. Physical opportunities refer to those provided by the environment, such as time, location and resources. Social opportunities refer to opportunities that occur as a result of social factors, cultural norms and social cues. Motivation refers to the conscious and unconscious processes that influence behaviours; reflective motivation (conscious judgements, beliefs, plans and intentions), and automatic motivation (desires, impulses and inhibitions). According to this model, one or more of the three components must be changed in order to facilitate effective and long-term behaviour change.

Understanding theories and models of behaviour change is important to assist health care professionals deciding on suitable behaviour change approaches and techniques to be used in routine practice when promoting physical activity to older adults.

6.2.3.2 Behaviour change interventions

An extensive number of behaviour change approaches and techniques are available. Behaviour change techniques are known as the ‘active ingredients’ in behavioural interventions facilitating the process of behaviour change (Michie et al., 2013). Examples of behaviour change techniques include goal setting, self-regulation, self-efficacy, self-monitoring, motivation, social support, problem-solving and feedback on behaviour amongst many others (Michie et al., 2013). Behaviour change techniques can be used individually, together or in combination with other techniques, approaches or strategies. Michie and colleagues (2013) identified 93 behaviour change techniques through an international interdisciplinary consensus with the aim of establishing precise and specific report of techniques available to be used in behaviour change interventions (Michie et al., 2013). An ongoing challenge is the selection of the best techniques to promote behaviour change to achieve long-term and sustainable physical activity targets across conditions or population groups addressing the relevant factors influencing behaviour (King et al., 2019).

Goal setting is a common and effective behaviour change technique that has been used to promote physical activity behaviour change across a diverse range of populations, including older adults (Chase, 2015; McEwan et al., 2016). Self-monitoring of behaviour and intention formation are also common behaviour change techniques used in programs that have successfully led to increased physical activity levels in the general population (King et al., 2019). Among older adults, several effective behaviour change techniques have been shown to increase physical activity. These include provision of advice and counselling, problem-solving around barriers to physical activity, providing social support, modelling and demonstration of physical activity, and the use of rewards linked to positive behaviour change (King et al., 2019). French & colleagues, (2014) found that self-regulation techniques, such as setting behavioural goals, self-monitoring and providing

feedback were effective for younger adults. Further research is needed to investigate if similar outcomes can be achieved when using these techniques as part of a behaviour change interventions for older adults. Furthermore, Zubala et al., (2017) highlighted physical activity behaviour change techniques that focus on motivators, such as provision of social support, environmental factors and enjoying being physically active, as behaviour change techniques that are more appealing for the ageing population.

In addition to behaviour change techniques, motivational interviewing (Miller, 1996), a person-centred, goal-orientated communication style, has also been used for enhancing intrinsic motivation and commitment to change behaviour (Bischof, Bischof, & Rumpf, 2021). Motivational interviewing comprises evidence-based techniques developed from cognitive psychology and social psychology to encourage motivation to change behaviour and can be applied within routine practice (Bischof et al., 2021). Motivational interviewing is considered a feasible and valuable approach to promote positive health behaviour change and self-management across many areas; however, evidence is lacking on its effectiveness to change health behaviour in clinical settings (Frost et al., 2018; O'Halloran et al., 2014).

Behaviour change science is complex (Michie et al., 2013). Understanding behaviour change and developing the skills to apply patient-centred interventions to influence behaviour may enable physiotherapists to maximise the promotion of sustained healthy lifestyles to their patients (Sandborgh et al., 2020). Physiotherapists are ideally placed to incorporate behaviour change strategies into routine care to assist patients adopting health lifestyles, particularly due to the prolonged interactions providing an opportunity for meaningful discussions. Incorporating behaviour change knowledge and skills as clinical competences into physiotherapy education programs is a key future direction to enable physiotherapists to effectively promote and support physical activity behaviour change to their patients within routine practice.

6.2.4 Physical activity programs need be provided to older adults in the community including the creation of referral schemes

The Global Action Plan on Physical Activity (GAPPA) 2018-2030 recommends the establishment of tailored physical activity programs and services to support older adults to start and maintain regular physical activity (World Health Organization, 2018b). Older adults may engage in physical activity programs if counselled and referred by a health care professional (Heath et al., 2012). Physical activity referrals schemes are considered an important way for healthcare professionals to assist patients to engage in physical activity (Hanson et al., 2020). However, a shortage of well-established community-based physical activity programs, insufficient awareness of available programs and lack of trust in existing physical activity programs seem to be common issues raised by physiotherapists (Fishleder et al., 2018; Kava et al., 2020; Kunstler, O'Halloran, et al., 2018; O'Brien et al., 2020; West et al., 2021; Zhu et al., 2021) throughout the world. In order to support sustainable physical activity behaviour in older adults, national and local governments must develop and implement policies to support the provision of accessible and affordable physical activity programs tailored to older adults, including those with chronic diseases and or disability in the community (World Health Organization, 2018a). The development of accessible, easy pathways for referrals to well-established physical activity community programs is essential to assist older adults sustaining adherence to safe physical activity beyond rehabilitation. Integrating referral schemes into healthcare systems is an evidence-based approach for physical activity promotion (Etz et al., 2008; Hanson et al., 2020).

Aiming to bridge the gap between physiotherapy and community-based physical activity programs for older adults, Fishleder & colleagues (2018) have suggested the implementation of clinical-community linkages with physical activity programs. Four strategies were suggested to increase older adults' engagement in appropriate community-based physical activity programs after physiotherapy. These include:

1. Assessing patient risk (assessment of patient's specific health concerns/risk of injury before referring to community programs);
2. Brief behavioural counselling (integrating training for physiotherapists in motivational techniques);

3. Capacity and ability to make referrals (formal referral system to evidence-based physical activity programs in the community through linked electronic medical records system, or specialised referral forms); and
4. Awareness of community resources (program details and ongoing communication between physiotherapy programs and community programs).
(Fishleder et al., 2018).

The development of evidence-based physical activity programs in the community is essential to facilitate transition of older adults to physical activity beyond physiotherapy settings. Collaboration between health care systems and community-based physical activity programs is essential to facilitate the sustainability of an active lifestyle for patients after discharge from physiotherapy programs. Evidence is required on the efficacy of physical activity referrals schemes to facilitate older adults' physical activity participation after discharge from rehabilitation programs. Infrastructure support and communication systems must be developed to enable sustainable linkages between clinical practices and community-based physical activity programs. Future research could explore optimal models of community-based physical activity programs including supports required for older adults as well as systems to support the smooth transition from one service e.g. out-patient rehabilitation to another e.g. community-based program provider.

6.2.5 An evidence-based physical activity promotion framework should be incorporated into routine physiotherapy practice

Implementation of a systematic and evidence-based framework to promote physical activity to patients within physiotherapy practice is warranted (Aweto et al., 2013; Eisele et al., 2020; Lowe et al., 2018). A number of physical activity promotion frameworks exist to guide health care professionals incorporating physical activity promotion into routine practice. The '5As' approach (Estabrooks, Glasgow, & Dzewaltowski, 2003; Glasgow et al., 2002), the 'Exercise Is Medicine' global initiative (American College of Sports Medicine, 2007), the National Physical Activity Pathway (NPAP) (Public Health Scotland, 2018), and the Swedish approach on physical activity on prescription (Kallings, Leijon,

Hellenius, & Stahle, 2008) are some examples of existing physical activity frameworks. A brief description of these frameworks is presented.

The '5As' approach provides a feasible framework to promote physical activity in primary care (Carroll et al., 2016; Dosh et al., 2005; Estabrooks et al., 2003). The '5As' are:

1. ASSESS - assessing physical activity levels;
2. ADVISE - advising on physical activity benefits and recommended levels of physical activity;
3. AGREE - agreeing on an action plan to increase activity, setting patient-centred goals to increase physical activity and identifying perceived barriers to achieve goals;
4. ASSIST - assisting in developing strategies to overcome perceived barriers to achieve goals; written specific exercise prescription, and
5. ARRANGE - arranging follow-up or referral to other physical activity options (Estabrooks et al., 2003).

The '5As' (Assess, Advise, Agree, Assist, Arrange) model of behaviour change (Glasgow et al., 2002; Whitlock, Orleans, Pender, & Allan, 2002) is an evidence-based approach feasible to be incorporated into routine practice for a number of behaviours, including physical inactivity (Estabrooks et al., 2003; Glasgow, Emont, & Miller, 2006).

'Exercise Is Medicine' has been developed by the American College of Sports Medicine with the aim of ensuring physical activity promotion is standard in the prevention and management of chronic disease (Bowen et al., 2019; Thompson et al., 2020). 'Exercise Is Medicine' provides a step-by-step process to guide health care professionals integrating physical activity promotion into daily practice (American College of Sports Medicine, 2021). This framework includes three components:

1. Assessing current physical activity levels of the patient (using the Physical activity Vital Sign (PAVS));
2. Providing brief advice on trying to increase physical activity to meet the guidelines and/or writing an exercise prescription (using the Stage of Change approach), and

3. Referring the patient to physical activity resources (programs, places, professionals or self-directed resources).

Dissemination of the ‘Exercise Is Medicine’ initiative is progressing through ongoing training of healthcare providers and exercise professionals in Asia, Europe, Latin America, Africa, Middle East, North America and Australia (Stoutenberg, 2021).

The National Physical Activity Pathway (NPAP) has been developed by Public Health Scotland to assist health and social care professionals promoting physical activity to adults who are inactive or not active enough to benefit their health (Public Health Scotland, 2018). The NPAP provides a set of steps which can easily be integrated into routine practice. The pathway includes five steps:

1. Raising the issue of physical activity with patients;
2. Screening for physical activity levels using the Scottish Physical Activity Screening Questionnaire (Scot-PASQ);
3. Giving patient-centred physical activity advice including educating on physical activity benefits, exploring perceived barriers and solutions to physical activity, or adding intervention by encouraging goal setting and social support;
4. Signposting or referring the patient to support that will assist them to become more active; and
5. Follow-up review (and screen again) when possible (Public Health Scotland, 2018).

A number of interventions have been suggested to specifically promote physical activity within physiotherapy practice, such as the ‘Coach2move’ approach aimed to improve physical activity in those community-dwelling older adults with mobility problems (de Vries et al., 2016) and the ComeBACK, physiotherapist-led physical activity coaching for community-dwelling adults with difficulty walking (Hassett et al., 2020). Despite the large body of evidence of the effectiveness of physical activity interventions for older adults (Chase, 2015; Grande et al., 2020; S. M. Gray et al., 2021; Taylor et al., 2021; Zubala et al., 2017), evidence translation to real-world settings remains inadequate (S. M. Gray et al., 2021; K. Lee et al., 2021). Integrating effective, consistent and sustainable physical activity promotion into physiotherapy practice is essential to assist older adults adopting

and maintaining a physically active lifestyle beyond clinical settings. Implementation research including clearly defined indicators and providing a guiding pathway to support physical activity promotion to older adults is warranted (S. M. Gray et al., 2021). Future research should evaluate the implementation of physical activity frameworks customised to physiotherapy practice.

6.3 Limitations of the research program

While strategies were used to ensure methodological rigor of the studies included in this research program, there were some limitations.

The findings from this research program were limited to the findings of one out-patient rehabilitation setting which may be different to the clinical practice for other health care professionals, or rehabilitation clinical practice at other settings. The participating facility was a tertiary referral centre in a major capital city in Queensland, Australia. Patient throughput in the out-patient rehabilitation unit was high, with approximately 500 patients from a wide geographic and demographic area seen annually. There is no reason to suggest that findings would not be similar to other facilities of a similar size and location. Models of out-patient rehabilitation do vary; it is therefore possible that findings may not be generalisable to other health care systems and models of out-patient rehabilitation.

Several limitations are acknowledged associated with the audit methodology used in Study 1. The results may have been limited by the quality and accuracy of documentation on medical record. It is possible that older adults were provided with appropriate physical activity prescription and promotion strategies, but data was not recorded in the medical records. Evidence suggests that medical record documentation tends to underestimate the quality of care provided by health care professionals (Soto et al., 2002; L. Wu & Ashton, 1997). Additionally, findings of Study 1 may have been limited by the accuracy and validity of the extracted information. Several strategies were incorporated into the data extraction process to optimise the accuracy and validity of the data extracted from the medical records. A sample of charts were reviewed by two people, the candidate and a

supervisor. It is feasible that some extracted data may have contained errors but the high agreement between reviewers suggests this risk was minimised.

For Study 2, the social desirability of acceptance among their peers may have influenced participants to say what they perceived they were expected to say instead of what they truly do in practice (Bergen & Labonte, 2020). Strategies used in this study to limit social desirability bias included explaining the purpose of the study, assuring confidentiality measures, establishing rapport and asking questions during the focus groups. This might explain why therapists indicated they encourage and support older adults attending out-patient rehabilitation to engage in physical activity but did not use formal assessment methods or promotion strategies. The participants were transparent in the methods used or not used to assess, promote and prescribe physical activity suggesting that their responses were a true representation of their clinical practice.

This research program did not specifically explore the sedentary behaviour of older adults attending this out-patient rehabilitation service. While investigating the promoting of physical activity to older adults is a priority, investigating if and how physiotherapists assess and promote the reduction of sedentary behaviour is also very important. Sedentary behaviour appears prevalent among older adults and is regarded as an independent risk factor for negative health outcomes independent and separate to physical inactivity (Staiano, Harrington, Barreira, & Katzmarzyk, 2014). Research on the implementation of physical activity promotion to older adults should also incorporate implementation strategies to reduce sedentary behaviour.

6.4 Conclusion

The findings from this research program suggest that physiotherapists are not applying evidence-based practice to the promotion of physical activity to older adults attending out-patient rehabilitation. As increasing physical activity is a global priority, the World Health Organisation Global Action Plan on Physical Activity (GAPPA) 2018-2030, titled 'More active people for a healthier world' calls for the implementation of systems of patient assessment and counselling on physical activity in primary health care. The establishment

of tailored physical activity programmes and services to support older adults starting and maintaining regular physical activity is critical to this global initiative. This body of research shows that there is a need for improvement in physical activity promotion to older adults attending out-patient rehabilitation. Research into the effective implementation of physical activity promotion by physiotherapists working with older adults is needed. Physiotherapists working in out-patient rehabilitation settings can and should drive older adults' transition from a restorative and therapeutic focus to a self-managed active lifestyle in the community, by integrating physical activity promotion into routine practice.

7.0 REFERENCES

- Abaraogu, U. O., Edeonuh, J. C., & Frantz, J. (2016). Promoting Physical Activity and Exercise in Daily Practice: Current Practices, Barriers, and Training Needs of Physiotherapists in Eastern Nigeria. *Physiother Can*, 68(1), 37-45. doi:10.3138/ptc.2014-74
- Afshar, S., Roderick, P. J., Kowal, P., Dimitrov, B. D., & Hill, A. G. (2015). Multimorbidity and the inequalities of global ageing: a cross-sectional study of 28 countries using the World Health Surveys. *BMC Public Health*, 15, 776. doi:10.1186/s12889-015-2008-7
- Ainsworth, B. E., Haskell, W. L., Whitt, M. C., Irwin, M. L., Swartz, A. M., Strath, S. J., . . . Leon, A. S. (2000). Compendium of physical activities: an update of activity codes and MET intensities. *Med Sci Sports Exerc*, 32(9 Suppl), S498-504. doi:10.1097/00005768-200009001-00009
- Ambrose, A. F., Paul, G., & Hausdorff, J. M. (2013). Risk factors for falls among older adults: a review of the literature. *Maturitas*, 75(1), 51-61. doi:10.1016/j.maturitas.2013.02.009
- American College of Sports Medicine. (2017). *ACSM's guidelines for exercise testing and prescription*. Retrieved from London:
- American College of Sports Medicine. (2021). Health Care Providers' Action Guide. Retrieved from <https://www.exerciseismedicine.org/wp-content/uploads/2021/02/EIM-Health-Care-Providers-Action-Guide-clickable-links.pdf>
- American Physical Therapy Association. (2019). Physical Therapists' role in prevention, wellness, fitness, health promotion, and management of disease and disability. Retrieved from https://www.apta.org/uploadedFiles/APTAorg/About_Us/Policies/Practice/PTRoleAdvocacy.pdf
- Anguera, M. T., Blanco-Villasenor, A., Losada, J. L., Sanchez-Algarra, P., & O'nwuegbuzie, A. J. B., M. W. (2018). Revisiting the difference between mixed methods and multimethods: Is it all in the name? *Qual Quant*. doi:<https://doi.org/10.1007/s11135-018-0700-2>
- Arvidsson, D., Fridolfsson, J., & Borjesson, M. (2019). Measurement of physical activity in clinical practice using accelerometers. *J Intern Med*, 286(2), 137-153. doi:10.1111/joim.12908
- Astrand, A., Saxin, C., Sjolholm, A., Skarin, M., Linden, T., Stoker, A., . . . Cumming, T. (2016). Poststroke Physical Activity Levels No Higher in Rehabilitation than in the Acute Hospital. *J Stroke Cerebrovasc Dis*, 25(4), 938-945. doi:10.1016/j.jstrokecerebrovasdis.2015.12.046
- Australian Bureau of Statistics. (2017-18). National Health Survey. Retrieved from <https://www.abs.gov.au/ausstats/abs@.nsf/mf/4364.0.55.001>
- Australian Physiotherapy Association. (2009). Position Statement Chronic disease and physiotherapy. . Retrieved from https://australian.physio/sites/default/files/RESOURCES/Advocacy_Position_Chronic_Disease_2009.pdf
- Aweto, H. A., Oligbo, C. N., Fapojuwo, O. A., & Olawale, O. A. (2013). Knowledge, attitude and practice of physiotherapists towards promotion of physically active lifestyles in patient management. *BMC Health Serv Res*, 13, 21. doi:10.1186/1472-6963-13-21

- Bangsbo, J., Blackwell, J., Boraxbekk, C. J., Caserotti, P., Dela, F., Evans, A. B., . . . Vina, J. (2019). Copenhagen Consensus statement 2019: physical activity and ageing. *Br J Sports Med*, *53*(14), 856-858. doi:10.1136/bjsports-2018-100451
- Bassett, S. F. (2015). Bridging the intention-behaviour gap with behaviour change strategies for physiotherapy rehabilitation non-adherence. *N Z J Physiother*, *43*(3), 105-111. doi:10.15619/NZJP/43.3.05
- Bauman, A., Merom, D., Bull, F. C., Buchner, D. M., & Fiatarone Singh, M. A. (2016). Updating the Evidence for Physical Activity: Summative Reviews of the Epidemiological Evidence, Prevalence, and Interventions to Promote "Active Aging". *Gerontologist*, *56 Suppl 2*, S268-280. doi:10.1093/geront/gnw031
- Bauman, A., Phongsavan, P., Schoeppe, S., & Owen, N. (2006). Physical activity measurement--a primer for health promotion. *Promot Educ*, *13*(2), 92-103. doi:10.1177/10253823060130020103
- Beard, J. R., Officer, A. M., & Cassels, A. K. (2016). The World Report on Ageing and Health. *Gerontologist*, *56 Suppl 2*, S163-166. doi:10.1093/geront/gnw037
- Bergen, N., & Labonte, R. (2020). "Everything Is Perfect, and We Have No Problems": Detecting and Limiting Social Desirability Bias in Qualitative Research. *Qual Health Res*, *30*(5), 783-792. doi:10.1177/1049732319889354
- Bezner, J. R. (2015). Promoting Health and Wellness: Implications for Physical Therapist Practice. *Phys Ther*, *95*(10), 1433-1444. doi:10.2522/ptj.20140271
- Bischof, G., Bischof, A., & Rumpf, H. J. (2021). Motivational Interviewing: An Evidence-Based Approach for Use in Medical Practice. *Dtsch Arztebl Int*, *118*(7), 109-115. doi:10.3238/arztebl.m2021.0014
- Blair, S. N. (2009). Physical inactivity: the biggest public health problem of the 21st century. *Br J Sports Med*, *43*(1), 1-2. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/19136507>
- Blondell, S. J., Hammersley-Mather, R., & Veerman, J. L. (2014). Does physical activity prevent cognitive decline and dementia?: A systematic review and meta-analysis of longitudinal studies. *BMC Public Health*, *14*, 510. doi:10.1186/1471-2458-14-510
- Bodner, M. E., Rhodes, R. E., Miller, W. C., & Dean, E. (2013). Benchmarking curriculum content in entry-level health professional education with special reference to health promotion practice in physical therapy: a multi-institutional international study. *Adv Health Sci Educ Theory Pract*, *18*(4), 645-657. doi:10.1007/s10459-012-9404-x
- Boeckxstaens, P., Vaes, B., Legrand, D., Dalleur, O., De Sutter, A., & Degryse, J. M. (2015). The relationship of multimorbidity with disability and frailty in the oldest patients: a cross-sectional analysis of three measures of multimorbidity in the BELFRAIL cohort. *Eur J Gen Pract*, *21*(1), 39-44. doi:10.3109/13814788.2014.914167
- Bovend'Eerd, T. J., Botell, R. E., & Wade, D. T. (2009). Writing SMART rehabilitation goals and achieving goal attainment scaling: a practical guide. *Clin Rehabil*, *23*(4), 352-361. doi:10.1177/0269215508101741

- Bowen, P. G., Mankowski, R. T., Harper, S. A., & Buford, T. W. (2019). Exercise is Medicine as a Vital Sign: Challenges and Opportunities. *Transl J Am Coll Sports Med*, 4(1), 1-7. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/30828640>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qual Res in Psychol*, 3(2), 77-101. Retrieved from <http://dx.doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qual Res Sport Exerc Health*, 11(4), 589-597. Retrieved from <https://doi.org/10.1080/2159676X.2019.1628806>
- Brovold, T., Skelton, D. A., & Bergland, A. (2012). The efficacy of counseling and progressive resistance home-exercises on adherence, health-related quality of life and function after discharge from a geriatric day-hospital. *Arch Gerontol Geriatr*, 55(2), 453-459. doi:10.1016/j.archger.2012.01.015
- Brown, J., Rosenkranz, R., Kolt, G., Berentson-Shaw, J., & George, E. (2011). A literature review of evidence on physical activity for older people and a review of existing physical activity guidelines for older people. Retrieved from <https://www.health.govt.nz/system/files/documents/publications/literature-review-physical-activity-older-people.pdf>.
- Brown, W., & Blair, S. N. (2012). Good news, good news: occupational and household activities are important for energy expenditure, but sport and recreation remain the best buy for public health. *Br J Sports Med*, 46(10), 702-703. doi:10.1136/bjsports-2012-090992
- Bula, C. J., Monod, S., Hoskovec, C., & Rochat, S. (2011). Interventions aiming at balance confidence improvement in older adults: an updated review. *Gerontology*, 57(3), 276-286. doi:10.1159/000322241
- Bull, F. C., Al-Ansari, S. S., Biddle, S., Borodulin, K., Buman, M. P., Cardon, G., . . . Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Br J Sports Med*, 54(24), 1451-1462. doi:10.1136/bjsports-2020-102955
- Canadian Physiotherapy Association. (2006). Position Statement Primary health care. Retrieved from https://physiotherapy.ca/sites/default/files/positionstatements/primary-health-care_en.pdf
- Carey, M. A. (2016). Focus Groups--What Is the Same, What Is New, What Is Next? *Qual Health Res*, 26(6), 731-733. doi:10.1177/1049732316636848
- Carroll, J. K., Flocke, S. A., Sanders, M. R., Lowenstein, L., Fiscella, K., & Epstein, R. M. (2016). Effectiveness of a clinician intervention to improve physical activity discussions in underserved adults. *Fam Pract*, 33(5), 488-491. doi:10.1093/fampra/cmz036
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep*, 100(2), 126-131. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/3920711>
- Chase, J. D. (2015). Interventions to Increase Physical Activity Among Older Adults: A Meta-Analysis. *Gerontologist*, 55(4), 706-718. doi:10.1093/geront/gnu090

- Chase, J. D., Phillips, L. J., & Brown, M. (2017). Physical Activity Intervention Effects on Physical Function Among Community-Dwelling Older Adults: A Systematic Review and Meta-Analysis. *J Aging Phys Act*, 25(1), 149-170. doi:10.1123/japa.2016-0040
- Chen, A. L., Mears, S. C., & Hawkins, R. J. (2005). Orthopaedic care of the aging athlete. *J Am Acad Orthop Surg*, 13(6), 407-416. doi:10.5435/00124635-200510000-00005
- Chou, C. H., Hwang, C. L., & Wu, Y. T. (2012). Effect of exercise on physical function, daily living activities, and quality of life in the frail older adults: a meta-analysis. *Arch Phys Med Rehabil*, 93(2), 237-244. doi:10.1016/j.apmr.2011.08.042
- Clarke, J., Colley, R., Janssen, I., & Tremblay, M. S. (2019). Accelerometer-measured moderate-to-vigorous physical activity of Canadian adults, 2007 to 2017. *Health Rep*, 30(8), 3-10. doi:10.25318/82-003-x201900800001-eng
- Copeland, J. L., & Eslinger, D. W. (2009). Accelerometer assessment of physical activity in active, healthy older adults. *J Aging Phys Act*, 17(1), 17-30. doi:10.1123/japa.17.1.17
- Crilly, R. G., Lytwynec, S., Kloseck, M., Smith, J. M., Olsen, T., Gold, B., & Masse, S. (2005). Patient outcomes after discharge from a geriatric day hospital. *Can J Aging*, 24(3), 305-309. doi:10.1353/cja.2005.0076
- Crimmins, E. M., & Beltran-Sanchez, H. (2011). Mortality and morbidity trends: is there compression of morbidity? *J Gerontol B Psychol Sci Soc Sci*, 66(1), 75-86. doi:10.1093/geronb/gbq088
- Cunningham, C., & O'Sullivan, R. (2021). Healthcare Professionals Promotion of Physical Activity with Older Adults: A Survey of Knowledge and Routine Practice. *Int J Environ Res Public Health*, 18(11). doi:10.3390/ijerph18116064
- Daskalopoulou, C., Stubbs, B., Kralj, C., Koukounari, A., Prince, M., & Prina, A. M. (2017). Physical activity and healthy ageing: A systematic review and meta-analysis of longitudinal cohort studies. *Ageing Res Rev*, 38, 6-17. doi:10.1016/j.arr.2017.06.003
- de Vries, N. M., Staal, J. B., Teerenstra, S., Adang, E. M., Rikkert, M. G., & Nijhuis-van der Sanden, M. W. (2013). Physiotherapy to improve physical activity in community-dwelling older adults with mobility problems (Coach2Move): study protocol for a randomized controlled trial. *Trials*, 14, 434. doi:10.1186/1745-6215-14-434
- de Vries, N. M., Staal, J. B., van der Wees, P. J., Adang, E. M., Akkermans, R., Olde Rikkert, M. G., & Nijhuis-van der Sanden, M. W. (2016). Patient-centred physical therapy is (cost-) effective in increasing physical activity and reducing frailty in older adults with mobility problems: a randomized controlled trial with 6 months follow-up. *J Cachexia Sarcopenia Muscle*, 7(4), 422-435. doi:10.1002/jcsm.12091
- de Vries, N. M., van Ravensberg, C. D., Hobbelen, J. S., Olde Rikkert, M. G., Staal, J. B., & Nijhuis-van der Sanden, M. W. (2012). Effects of physical exercise therapy on mobility, physical functioning, physical activity and quality of life in community-dwelling older adults with impaired mobility, physical disability and/or multi-morbidity: a meta-analysis. *Ageing Res Rev*, 11(1), 136-149. doi:10.1016/j.arr.2011.11.002

- Dean, E. (2018). Maximizing the Functional Performance Outcomes of Patients Undergoing Rehabilitation by Maximizing Their Overall Health and Wellbeing. *J Hum Kinet*, 65, 57-68. doi:10.2478/hukin-2018-0039
- Dean, E., de Andrade, A. D., O'Donoghue, G., Skinner, M., Umereh, G., Beenen, P., . . . Wong, W. P. (2014). The Second Physical Therapy Summit on Global Health: developing an action plan to promote health in daily practice and reduce the burden of non-communicable diseases. *Physiother Theory Pract*, 30(4), 261-275. doi:10.3109/09593985.2013.856977
- Dean, E., Greig, A., Murphy, S., Roots, R., Nembhard, N., Rankin, A., . . . Garland, S. J. (2016). Raising the Priority of Lifestyle-Related Noncommunicable Diseases in Physical Therapy Curricula. *Phys Ther*, 96(7), 940-948. doi:10.2522/ptj.20150141
- Deandrea, S., Lucenteforte, E., Bravi, F., Foschi, R., La Vecchia, C., & Negri, E. (2010). Risk factors for falls in community-dwelling older people: a systematic review and meta-analysis. *Epidemiology*, 21(5), 658-668. doi:10.1097/EDE.0b013e3181e89905
- Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. *Springer Science + Business Media New York*. doi:<https://doi.org/10.1007/978-1-4899-2271-7>
- Desveaux, L., Goldstein, R., Mathur, S., & Brooks, D. (2016). Barriers to Physical Activity Following Rehabilitation: Perspectives of Older Adults with Chronic Disease. *J Aging Phys Act*, 24(2), 223-233. doi:10.1123/japa.2015-0018
- DiClemente, C. C., & Velasquez, M. M. (2005). Motivational interviewing and the stages of change. In *Motivational Interviewing* (pp. 1-20). USA: Guilford Press.
- Dosh, S. A., Holtrop, J. S., Torres, T., Arnold, A. K., Baumann, J., & White, L. L. (2005). Changing organizational constructs into functional tools: an assessment of the 5 A's in primary care practices. *Ann Fam Med*, 3 Suppl 2, S50-52. doi:10.1370/afm.357
- Eckstrom, E., Neukam, S., Kalin, L., & Wright, J. (2020). Physical Activity and Healthy Aging. *Clin Geriatr Med*, 36(4), 671-683. doi:10.1016/j.cger.2020.06.009
- Eisele, A., Schagg, D., & Gohner, W. (2020). Exercise promotion in physiotherapy: A qualitative study providing insights into German physiotherapists' practices and experiences. *Musculoskelet Sci Pract*, 45, 102104. doi:10.1016/j.msksp.2019.102104
- Estabrooks, P. A., Glasgow, R. E., & Dzewaltowski, D. A. (2003). Physical activity promotion through primary care. *JAMA*, 289(22), 2913-2916. doi:10.1001/jama.289.22.2913
- Etz, R. S., Cohen, D. J., Woolf, S. H., Holtrop, J. S., Donahue, K. E., Isaacson, N. F., . . . Olson, A. L. (2008). Bridging primary care practices and communities to promote healthy behaviors. *Am J Prev Med*, 35(5 Suppl), S390-397. doi:10.1016/j.amepre.2008.08.008
- Falck, R. S., McDonald, S. M., Beets, M. W., Brazendale, K., & Liu-Ambrose, T. (2016). Measurement of physical activity in older adult interventions: a systematic review. *Br J Sports Med*, 50(8), 464-470. doi:10.1136/bjsports-2014-094413

- Farrance, C., Tsofliou, F., & Clark, C. (2016). Adherence to community based group exercise interventions for older people: A mixed-methods systematic review. *Prev Med*, *87*, 155-166. doi:10.1016/j.ypmed.2016.02.037
- Fishleder, S., Petrescu-Prahova, M., Harris, J. R., Steinman, L., Kohn, M., Bennett, K., & Helfrich, C. D. (2018). Bridging the Gap After Physical Therapy: Clinical-Community Linkages With Older Adult Physical Activity Programs. *Innov Aging*, *2*(1), igy006. doi:10.1093/geroni/igy006
- Forkan, R., Pumper, B., Smyth, N., Wirkkala, H., Ciol, M. A., & Shumway-Cook, A. (2006). Exercise adherence following physical therapy intervention in older adults with impaired balance. *Phys Ther*, *86*(3), 401-410. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/16506876>
- Franco, M. R., Tong, A., Howard, K., Sherrington, C., Ferreira, P. H., Pinto, R. Z., & Ferreira, M. L. (2015). Older people's perspectives on participation in physical activity: a systematic review and thematic synthesis of qualitative literature. *Br J Sports Med*, *49*(19), 1268-1276. doi:10.1136/bjsports-2014-094015
- Freene, N., Cools, S., & Bissett, B. (2017). Are we missing opportunities? Physiotherapy and physical activity promotion: a cross-sectional survey. *BMC Sports Sci Med Rehabil*, *9*, 19. doi:10.1186/s13102-017-0084-y
- French, D. P., Olander, E. K., Chisholm, A., & Mc Sharry, J. (2014). Which behaviour change techniques are most effective at increasing older adults' self-efficacy and physical activity behaviour? A systematic review. *Ann Behav Med*, *48*(2), 225-234. doi:10.1007/s12160-014-9593-z
- Frost, H., Campbell, P., Maxwell, M., O'Carroll, R. E., Dombrowski, S. U., Williams, B., . . . Pollock, A. (2018). Effectiveness of Motivational Interviewing on adult behaviour change in health and social care settings: A systematic review of reviews. *PLoS One*, *13*(10), e0204890. doi:10.1371/journal.pone.0204890
- Gagliardi, A. R., Abdallah, F., Faulkner, G., Ciliska, D., & Hicks, A. (2015). Factors contributing to the effectiveness of physical activity counselling in primary care: a realist systematic review. *Patient Educ Couns*, *98*(4), 412-419. doi:10.1016/j.pec.2014.11.020
- Gallagher, K. M. (2016). Helping Older Adults Sustain Their Physical Therapy Gains: A Theory-Based Intervention to Promote Adherence to Home Exercise Following Rehabilitation. *J Geriatr Phys Ther*, *39*(1), 20-29. doi:10.1519/JPT.0000000000000040
- Ganse, B., Degens, H., Drey, M., Korhonen, M. T., McPhee, J., Muller, K., . . . Rittweger, J. (2014). Impact of age, performance and athletic event on injury rates in master athletics - first results from an ongoing prospective study. *J Musculoskelet Neuronal Interact*, *14*(2), 148-154. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24879018>
- Gearing, R. E., Mian, I. A., Barber, J., & Ickowicz, A. (2006). A methodology for conducting retrospective chart review research in child and adolescent psychiatry. *J Can Acad Child Adolesc Psychiatry*, *15*(3), 126-134. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/18392182>
- Geidl, W., Wais, J., Fangmann, C., Demisse, E., Pfeifer, K., & Sudeck, G. (2019). Physical activity promotion in daily exercise therapy: the perspectives of exercise therapists in German rehabilitation settings. *BMC Sports Sci Med Rehabil*, *11*, 28. doi:10.1186/s13102-019-0143-7

- Gellert, P., Witham, M. D., Crombie, I. K., Donnan, P. T., McMurdo, M. E., & Sniehotta, F. F. (2015). The role of perceived barriers and objectively measured physical activity in adults aged 65-100. *Age Ageing, 44*(3), 384-390. doi:10.1093/ageing/afv001
- Gill, P., & Baillie, J. (2018). Interviews and focus groups in qualitative research: an update for the digital age. *Br Dent J.* doi:10.1038/sj.bdj.2018.815
- Gillespie, L. D., Robertson, M. C., Gillespie, W. J., Sherrington, C., Gates, S., Clemson, L. M., & Lamb, S. E. (2012). Interventions for preventing falls in older people living in the community. *Cochrane Database Syst Rev*(9), CD007146. doi:10.1002/14651858.CD007146.pub3
- Gine-Garriga, M., Roque-Figuls, M., Coll-Planas, L., Sitja-Rabert, M., & Salva, A. (2014). Physical exercise interventions for improving performance-based measures of physical function in community-dwelling, frail older adults: a systematic review and meta-analysis. *Arch Phys Med Rehabil, 95*(4), 753-769 e753. doi:10.1016/j.apmr.2013.11.007
- Glasgow, R. E., Emont, S., & Miller, D. C. (2006). Assessing delivery of the five 'As' for patient-centered counseling. *Health Promot Int, 21*(3), 245-255. doi:10.1093/heapro/dal017
- Glasgow, R. E., Funnell, M. M., Bonomi, A. E., Davis, C., Beckham, V., & Wagner, E. H. (2002). Self-management aspects of the improving chronic illness care breakthrough series: implementation with diabetes and heart failure teams. *Ann Behav Med, 24*(2), 80-87. doi:10.1207/S15324796ABM2402_04
- Gonzalez, K., Fuentes, J., & Marquez, J. L. (2017). Physical Inactivity, Sedentary Behavior and Chronic Diseases. *Korean J Fam Med, 38*(3), 111-115. doi:10.4082/kjfm.2017.38.3.111
- Goodman, J. M., Burr, J. F., Banks, L., & Thomas, S. G. (2016). The Acute Risks of Exercise in Apparently Healthy Adults and Relevance for Prevention of Cardiovascular Events. *Can J Cardiol, 32*(4), 523-532. doi:10.1016/j.cjca.2016.01.019
- Gorman, E., Hanson, H. M., Yang, P. H., Khan, K. M., Liu-Ambrose, T., & Ashe, M. C. (2014). Accelerometry analysis of physical activity and sedentary behavior in older adults: a systematic review and data analysis. *Eur Rev Aging Phys Act, 11*, 35-49. doi:10.1007/s11556-013-0132-x
- Grande, G. D., Oliveira, C. B., Morelhao, P. K., Sherrington, C., Tiedemann, A., Pinto, R. Z., & Franco, M. R. (2020). Interventions Promoting Physical Activity Among Older Adults: A Systematic Review and Meta-Analysis. *Gerontologist, 60*(8), 583-599. doi:10.1093/geront/gnz167
- Gray, D. E. (2014). *Doing Research in the Real World* (Third ed.).
- Gray, S. M., McKay, H. A., Nettlefold, L., Race, D., Macdonald, H. M., Naylor, P. J., & Sims-Gould, J. (2021). Physical activity is good for older adults-but is programme implementation being overlooked? A systematic review of intervention studies that reported frameworks or measures of implementation. *Br J Sports Med, 55*(2), 84-91. doi:10.1136/bjsports-2020-102465
- Greenwood, J. L., Joy, E. A., & Stanford, J. B. (2010). The Physical Activity Vital Sign: a primary care tool to guide counseling for obesity. *J Phys Act Health, 7*(5), 571-576. doi:10.1123/jpah.7.5.571

- Grimm, E. K., Swartz, A. M., Hart, T., Miller, N. E., & Strath, S. J. (2012). Comparison of the IPAQ-Short Form and accelerometry predictions of physical activity in older adults. *J Aging Phys Act*, *20*(1), 64-79. doi:10.1123/japa.20.1.64
- Guest, G., Namey, E., & McKenna, K. (2017). How Many Focus Groups Are Enough? Building an Evidence Base for Nonprobability Sample Sizes. *Field Methods*, *29*(1), 3-22. doi:DOI: 10.1177/1525822X16639015
- Halaweh, H., Willen, C., Grimby-Ekman, A., & Svantesson, U. (2015). Physical Activity and Health-Related Quality of Life Among Community Dwelling Elderly. *J Clin Med Res*, *7*(11), 845-852. doi:10.14740/jocmr2307w
- Hanson, C. L., Oliver, E. J., Dodd-Reynolds, C. J., Pearsons, A., & Kelly, P. (2020). A modified Delphi study to gain consensus for a taxonomy to report and classify physical activity referral schemes (PARS). *Int J Behav Nutr Phys Act*, *17*(1), 158. doi:10.1186/s12966-020-01050-2
- Harvey, J. A., Chastin, S. F., & Skelton, D. A. (2015). How Sedentary are Older People? A Systematic Review of the Amount of Sedentary Behavior. *J Aging Phys Act*, *23*(3), 471-487. doi:10.1123/japa.2014-0164
- Hassett, L., Tiedemann, A., Hinman, R. S., Crotty, M., Hoffmann, T., Harvey, L., . . . Sherrington, C. (2020). Physical activity coaching for adults with mobility limitations: protocol for the ComeBACK pragmatic hybrid effectiveness-implementation type 1 randomised controlled trial. *BMJ Open*, *10*(11), e034696. doi:10.1136/bmjopen-2019-034696
- Hay-Smith, E. J., McClurg, D., Frawley, H., & Dean, S. G. (2016). Exercise adherence: integrating theory, evidence and behaviour change techniques. *Physiotherapy*, *102*(1), 7-9. doi:10.1016/j.physio.2015.08.006
- Haynes, A., Sherrington, C., Wallbank, G., Lester, D., Tong, A., Merom, D., . . . Tiedemann, A. (2020). "Someone's Got My Back": Older People's Experience of the Coaching for Healthy Ageing Program for Promoting Physical Activity and Preventing Falls. *J Aging Phys Act*, *29*(2), 296-307. doi:10.1123/japa.2020-0116
- Healey, W. E., Broers, K. B., Nelson, J., & Huber, G. (2012). Physical therapists' health promotion activities for older adults. *J Geriatr Phys Ther*, *35*(1), 35-48. doi:10.1519/JPT.0b013e318220d1f0
- Heath, G. W., Parra, D. C., Sarmiento, O. L., Andersen, L. B., Owen, N., Goenka, S., . . . Lancet Physical Activity Series Working, G. (2012). Evidence-based intervention in physical activity: lessons from around the world. *Lancet*, *380*(9838), 272-281. doi:10.1016/S0140-6736(12)60816-2
- Hinrichs, T., Bucker, B., Wilm, S., Klaassen-Mielke, R., Brach, M., Platen, P., & Moschny, A. (2015). Adverse events in mobility-limited and chronically ill elderly adults participating in an exercise intervention study supported by general practitioner practices. *J Am Geriatr Soc*, *63*(2), 258-269. doi:10.1111/jgs.13253
- Holme, I., & Anderssen, S. A. (2015). Increases in physical activity is as important as smoking cessation for reduction in total mortality in elderly men: 12 years of follow-up of the Oslo II study. *Br J Sports Med*, *49*(11), 743-748. doi:10.1136/bjsports-2014-094522
- Howe, T. E., Rochester, L., Neil, F., Skelton, D. A., & Ballinger, C. (2011). Exercise for improving balance in older people. *Cochrane Database Syst Rev*(11), CD004963. doi:10.1002/14651858.CD004963.pub3

- Jimenez-Zazo, F., Romero-Blanco, C., Castro-Lemus, N., Dorado-Suarez, A., & Aznar, S. (2020). Transtheoretical Model for Physical Activity in Older Adults: Systematic Review. *Int J Environ Res Public Health*, 17(24). doi:10.3390/ijerph17249262
- Justine, M., Azizan, A., Hassan, V., Salleh, Z., & Manaf, H. (2013). Barriers to participation in physical activity and exercise among middle-aged and elderly individuals. *Singapore Med J*, 54(10), 581-586. doi:10.11622/smedj.2013203
- Kallings, L. V., Leijon, M., Hellenius, M. L., & Stahle, A. (2008). Physical activity on prescription in primary health care: a follow-up of physical activity level and quality of life. *Scand J Med Sci Sports*, 18(2), 154-161. doi:10.1111/j.1600-0838.2007.00678.x
- Karlsson, M. K., Vonschewelov, T., Karlsson, C., Coster, M., & Rosengen, B. E. (2013). Prevention of falls in the elderly: a review. *Scand J Public Health*, 41(5), 442-454. doi:10.1177/1403494813483215
- Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a Research Paradigm and Its Implications for SocialWork Research. *Soc Sci*, 8, 255. doi:doi:10.3390/socsci8090255
- Kava, C. M., Fishleder, S., Steinman, L., Petrescu-Prahova, M., Schrodtt, L., & Harris, J. R. (2020). Provider-Patient Communication and Involvement in Physical Activity Programs Among Patients Receiving Physical Therapy Services: A Qualitative Study. *J Appl Gerontol*, 39(9), 1000-1007. doi:10.1177/0733464819847402
- Keadle, S. K., McKinnon, R., Graubard, B. I., & Troiano, R. P. (2016). Prevalence and trends in physical activity among older adults in the United States: A comparison across three national surveys. *Prev Med*, 89, 37-43. doi:10.1016/j.ypmed.2016.05.009
- King, A. C., Whitt-Glover, M. C., Marquez, D. X., Buman, M. P., Napolitano, M. A., Jakicic, J., . . . Physical Activity Guidelines Advisory, C. (2019). Physical Activity Promotion: Highlights from the 2018 Physical Activity Guidelines Advisory Committee Systematic Review. *Med Sci Sports Exerc*, 51(6), 1340-1353. doi:10.1249/MSS.0000000000001945
- Kneebone, I. I., Hurn, J. S., Raisbeck, E., Cropley, M., Khoshnaw, H., & Milton, J. E. (2010). The Validity of Goal Achievement as an Outcome Measure in Physical Rehabilitation Day Hospitals for Older People. *Int J Disabil Dev Ed*, 57(2), 145-153.
- Kohl, H. W., 3rd, Craig, C. L., Lambert, E. V., Inoue, S., Alkandari, J. R., Leetongin, G., . . . Lancet Physical Activity Series Working, G. (2012). The pandemic of physical inactivity: global action for public health. *Lancet*, 380(9838), 294-305. doi:10.1016/S0140-6736(12)60898-8
- Kunstler, B. E., Cook, J. L., Freene, N., Finch, C. F., Kemp, J. L., O'Halloran, P. D., & Gaida, J. E. (2018a). Physiotherapist-Led Physical Activity Interventions Are Efficacious at Increasing Physical Activity Levels: A Systematic Review and Meta-analysis. *Clin J Sport Med*, 28(3), 304-315. doi:10.1097/JSM.0000000000000447
- Kunstler, B. E., Cook, J. L., Freene, N., Finch, C. F., Kemp, J. L., O'Halloran, P. D., & Gaida, J. E. (2018b). Physiotherapists use a small number of behaviour change techniques when promoting physical activity: A

- systematic review comparing experimental and observational studies. *J Sci Med Sport*, 21(6), 609-615. doi:10.1016/j.jsams.2017.10.027
- Kunstler, B. E., O'Halloran, P. D., Cook, J. L., Kemp, J. L., & Finch, C. F. (2018). "...like you're pushing the snowball back up hill" - the experiences of Australian physiotherapists promoting non-treatment physical activity: A qualitative study. *AIMS Med Sci*, 5(3), 224-237. doi:10.3934/medsci.2018.3.224
- Kwok, B. C., Wong, W. P., & Remedios, L. (2021). Improving centre-based group exercise participation of older adults using the behaviour change wheel. *BMJ Open Qual*, 10(1). doi:10.1136/bmjopen-2020-001078
- Lacroix, J., Daviet, J. C., Borel, B., Kammoun, B., Salle, J. Y., & Mandigout, S. (2016). Physical Activity Level Among Stroke Patients Hospitalized in a Rehabilitation Unit. *PM R*, 8(2), 97-104. doi:10.1016/j.pmrj.2015.06.011
- Landers, M. R., Oscar, S., Sasaoka, J., & Vaughn, K. (2016). Balance Confidence and Fear of Falling Avoidance Behavior Are Most Predictive of Falling in Older Adults: Prospective Analysis. *Phys Ther*, 96(4), 433-442. doi:10.2522/ptj.20150184
- Langlois, F., Vu, T. T., Chasse, K., Dupuis, G., Kergoat, M. J., & Bherer, L. (2013). Benefits of physical exercise training on cognition and quality of life in frail older adults. *J Gerontol B Psychol Sci Soc Sci*, 68(3), 400-404. doi:10.1093/geronb/gbs069
- Lauri, M. A. (2019). WASP (Write a Scientific Paper): Collecting qualitative data using focus groups. *Early Hum Dev*, 133, 65-68. doi:10.1016/j.earlhumdev.2019.03.015
- Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., & Lancet Physical Activity Series Working, G. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet*, 380(9838), 219-229. doi:10.1016/S0140-6736(12)61031-9
- Lee, K., Ding, D., Grunseit, A., Wolfenden, L., Kumbuzi V, R., Milat, A., & Bauman, A. (2021). Many Papers but Limited Policy Impact? A Bibliometric Review of Physical Activity Research. *Transl J Am Coll Sports Med*, 6(4). doi:<https://doi.org/10.1249/tjx.000000000000167>
- Liu, Z., Speed, S., & Beaver, K. (2015). Perceptions and attitudes towards exercise among Chinese elders - the implications of culturally based self-management strategies for effective health-related help seeking and person-centred care. *Health Expect*, 18(2), 262-272. doi:10.1111/hex.12028
- Lobelo, F., Rohm Young, D., Sallis, R., Garber, M. D., Billinger, S. A., Duperly, J., . . . Stroke, C. (2018). Routine Assessment and Promotion of Physical Activity in Healthcare Settings: A Scientific Statement From the American Heart Association. *Circulation*, 137(18), e495-e522. doi:10.1161/CIR.0000000000000559
- Lobelo, F., Stoutenberg, M., & Hutber, A. (2014). The Exercise is Medicine Global Health Initiative: a 2014 update. *Br J Sports Med*, 48(22), 1627-1633. doi:10.1136/bjsports-2013-093080
- Long, G., Watkinson, C., Brage, S., Morris, J., Tuxworth, B., Fentem, P., . . . Wareham, N. (2015). Mortality benefits of population-wide adherence to

- national physical activity guidelines: a prospective cohort study. *Eur J Epidemiol*, 30(1), 71-79. doi:10.1007/s10654-014-9965-5
- Lowe, A., Littlewood, C., & McLean, S. (2018). Understanding physical activity promotion in physiotherapy practice: A qualitative study. *Musculoskelet Sci Pract*, 35, 1-7. doi:10.1016/j.msksp.2018.01.009
- Lowe, A., Littlewood, C., McLean, S., & Kilner, K. (2017). Physiotherapy and physical activity: a cross-sectional survey exploring physical activity promotion, knowledge of physical activity guidelines and the physical activity habits of UK physiotherapists. *BMJ Open Sport Exerc Med*, 3(1), e000290. doi:10.1136/bmjsem-2017-000290
- Luk, J. K., & Chan, C. F. (2011). Rehabilitation outcomes of older patients at 6 months follow-up after discharged from a geriatric day hospital (GDH). *Arch Gerontol Geriatr*, 52(3), 327-330. doi:10.1016/j.archger.2010.05.006
- Maher, C., Szeto, K., & Arnold, J. (2021). The use of accelerometer-based wearable activity monitors in clinical settings: current practice, barriers, enablers, and future opportunities. *BMC Health Serv Res*, 21(1), 1064. doi:10.1186/s12913-021-07096-7
- Malone, M., Hill, A., & Smith, G. (2002). Three-month follow up of patients discharged from a geriatric day hospital. *Age Ageing*, 31(6), 471-475. doi:10.1093/ageing/31.6.471
- Marengoni, A., Angleman, S., Melis, R., Mangialasche, F., Karp, A., Garmen, A., . . . Fratiglioni, L. (2011). Aging with multimorbidity: a systematic review of the literature. *Ageing Res Rev*, 10(4), 430-439. doi:10.1016/j.arr.2011.03.003
- McEwan, D., Harden, S. M., Zumbo, B. D., Sylvester, B. D., Kaulius, M., Ruissen, G. R., . . . Beauchamp, M. R. (2016). The effectiveness of multi-component goal setting interventions for changing physical activity behaviour: a systematic review and meta-analysis. *Health Psychol Rev*, 10(1), 67-88. doi:10.1080/17437199.2015.1104258
- McHugh, M. L. (2012). Interrater reliability: the kappa statistic. *Biochem Med (Zagreb)*, 22(3), 276-282. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/23092060>
- McMahon, S. K., Wyman, J. F., Belyea, M. J., Shearer, N., Hekler, E. B., & Fleury, J. (2016). Combining Motivational and Physical Intervention Components to Promote Fall-Reducing Physical Activity Among Community-Dwelling Older Adults: A Feasibility Study. *Am J Health Promot*, 30(8), 638-644. doi:10.4278/ajhp.130522-ARB-265
- McPhee, J. S., French, D. P., Jackson, D., Nazroo, J., Pendleton, N., & Degens, H. (2016). Physical activity in older age: perspectives for healthy ageing and frailty. *Biogerontology*, 17(3), 567-580. doi:10.1007/s10522-016-9641-0
- Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., . . . Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. *Ann Behav Med*, 46(1), 81-95. doi:10.1007/s12160-013-9486-6
- Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci*, 6, 42. doi:10.1186/1748-5908-6-42

- Miller, W. R. (1996). Motivational interviewing: research, practice, and puzzles. *Addict Behav*, 21(6), 835-842. doi:10.1016/0306-4603(96)00044-5
- Mitra, S., & Sambamoorthi, U. (2014). Disability prevalence among adults: estimates for 54 countries and progress toward a global estimate. *Disabil Rehabil*, 36(11), 940-947. doi:10.3109/09638288.2013.825333
- Moon, K., & Blackman, D. (2014). A guide to understanding social science research for natural scientists. *Conserv Biol*, 28(5), 1167-1177. doi:10.1111/cobi.12326
- Moore, S. C., Patel, A. V., Matthews, C. E., Berrington de Gonzalez, A., Park, Y., Katki, H. A., . . . Lee, I. M. (2012). Leisure time physical activity of moderate to vigorous intensity and mortality: a large pooled cohort analysis. *PLoS Med*, 9(11), e1001335. doi:10.1371/journal.pmed.1001335
- Murphy, S. L. (2009). Review of physical activity measurement using accelerometers in older adults: considerations for research design and conduct. *Prev Med*, 48(2), 108-114. doi:10.1016/j.ypmed.2008.12.001
- Norton, K., Norton, L., & Sadgrove, D. (2010). Position statement on physical activity and exercise intensity terminology. *J Sci Med Sport*, 13(5), 496-502. doi:10.1016/j.jsams.2009.09.008
- Ntoumanis, N., Thøgersen-Ntoumani, C., Quested, E., & Chatzisarantis, N. (2018). Theoretical approaches to physical activity promotion. In *Oxford Research Encyclopaedia of Psychology*. Oxford University Press.
- Nyumba, T., Wilson, K., FDerrick, C., & Nibedita, M. (2018). The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods Eco Evol*(9), 20-32. doi:DOI: 10.1111/2041-210X.12860
- O'Brien, M. W., Shields, C. A., Campbell, K. L., Crowell, S. J., & Fowles, J. R. (2020). Perceptions and Practices of Providing Physical Activity Counselling and Exercise Prescriptions among Physiotherapists in Nova Scotia. *Physiother Can*, 72(3), 230-238. doi:10.3138/ptc-2018-0098
- O'Halloran, P. D., Blackstock, F., Shields, N., Holland, A., Iles, R., Kingsley, M., . . . Taylor, N. F. (2014). Motivational interviewing to increase physical activity in people with chronic health conditions: a systematic review and meta-analysis. *Clin Rehabil*, 28(12), 1159-1171. doi:10.1177/0269215514536210
- Oliveira, J. S., Sherrington, C., Amorim, A. B., Dario, A. B., & Tiedemann, A. (2017). What is the effect of health coaching on physical activity participation in people aged 60 years and over? A systematic review of randomised controlled trials. *Br J Sports Med*, 51(19), 1425-1432. doi:10.1136/bjsports-2016-096943
- Organisation for Economic Co-operation and Development Health Statistics. (2017). Health at a Glance Australia. Retrieved from <https://www.oecd.org/social/health-at-a-glance-19991312.htm>
- Panacek, E. A. (2007). Performing chart review studies. *Air Med J*, 26(5), 206-210. doi:10.1016/j.amj.2007.06.007
- Park, S. H., Han, K. S., & Kang, C. B. (2014). Effects of exercise programs on depressive symptoms, quality of life, and self-esteem in older people: a systematic review of randomized controlled trials. *Appl Nurs Res*, 27(4), 219-226. doi:10.1016/j.apnr.2014.01.004
- Paterson, D. H., & Warburton, D. E. (2010). Physical activity and functional limitations in older adults: a systematic review related to Canada's Physical

- Activity Guidelines. *Int J Behav Nutr Phys Act*, 7, 38. doi:10.1186/1479-5868-7-38
- Patterson, R., McNamara, E., Tainio, M., de Sa, T. H., Smith, A. D., Sharp, S. J., . . . Wijndaele, K. (2018). Sedentary behaviour and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: a systematic review and dose response meta-analysis. *Eur J Epidemiol*, 33(9), 811-829. doi:10.1007/s10654-018-0380-1
- Pedersen, B. K., & Saltin, B. (2015). Exercise as medicine - evidence for prescribing exercise as therapy in 26 different chronic diseases. *Scand J Med Sci Sports*, 25 Suppl 3, 1-72. doi:10.1111/sms.12581
- Persson, G., Brorsson, A., Ekvall Hansson, E., Troein, M., & Strandberg, E. L. (2013). Physical activity on prescription (PAP) from the general practitioner's perspective - a qualitative study. *BMC Fam Pract*, 14, 128. doi:10.1186/1471-2296-14-128
- Phillips, S. M., Wojcicki, T. R., & McAuley, E. (2013). Physical activity and quality of life in older adults: an 18-month panel analysis. *Qual Life Res*, 22(7), 1647-1654. doi:10.1007/s11136-012-0319-z
- Plasqui, G., & Westerterp, K. R. (2007). Physical activity assessment with accelerometers: an evaluation against doubly labeled water. *Obesity (Silver Spring)*, 15(10), 2371-2379. doi:10.1038/oby.2007.281
- Posadzki, P., Pieper, D., Bajpai, R., Makaruk, H., Konsgen, N., Neuhaus, A. L., & Semwal, M. (2020). Exercise/physical activity and health outcomes: an overview of Cochrane systematic reviews. *BMC Public Health*, 20(1), 1724. doi:10.1186/s12889-020-09855-3
- Pratt, M., Ramirez Varela, A., Kohl, H. W. B., Klepac Pogrmilovic, B., Pedisic, Z., & Sallis, J. F. (2021). Plan Globally and Act Locally for Physical Activity? *J Phys Act Health*, 18(10), 1157-1158. doi:10.1123/jpah.2021-0471
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change. Applications to addictive behaviors. *Am Psychol*, 47(9), 1102-1114. doi:10.1037//0003-066x.47.9.1102
- Pruitt, L. A., Glynn, N. W., King, A. C., Guralnik, J. M., Aiken, E. K., Miller, G., & Haskell, W. L. (2008). Use of accelerometry to measure physical activity in older adults at risk for mobility disability. *J Aging Phys Act*, 16(4), 416-434. doi:10.1123/japa.16.4.416
- Public Health Scotland. (2018). National Physical Activity Pathway. Retrieved from <http://www.healthscotland.scot/health-topics/physical-activity/national-physical-activity-pathway>
- Ramaswamy, R. (2015). Functional Status in the Older Adult: The Sixth Vital Sign. *NY FAM MED NEWS*, 4(2), 28-31.
- Rhyner, K. T., & Watts, A. (2016). Exercise and Depressive Symptoms in Older Adults: A Systematic Meta-Analytic Review. *J Aging Phys Act*, 24(2), 234-246. doi:10.1123/japa.2015-0146
- Rimmer, J., & Lai, B. (2017). Framing new pathways in transformative exercise for individuals with existing and newly acquired disability. *Disabil Rehabil*, 39(2), 173-180. doi:10.3109/09638288.2015.1047967
- Sandborgh, M., Dean, E., Denison, E., Elven, M., Fritz, J., Wagert, P. V. H., . . . Soderlund, A. (2020). Integration of behavioral medicine competencies into physiotherapy curriculum in an exemplary Swedish program: rationale,

- process, and review. *Physiother Theory Pract*, 36(3), 365-377.
doi:10.1080/09593985.2018.1488192
- Schifter, D. E., & Ajzen, I. (1985). Intention, perceived control, and weight loss: an application of the theory of planned behavior. *J Pers Soc Psychol*, 49(3), 843-851. doi:10.1037//0022-3514.49.3.843
- Schoeb, V., Staffoni, L., Parry, R., & Pilnick, A. (2014). "What do you expect from physiotherapy?": a detailed analysis of goal setting in physiotherapy. *Disabil Rehabil*, 36(20), 1679-1686. doi:10.3109/09638288.2013.867369
- Schrack, J. A., Cooper, R., Koster, A., Shiroma, E. J., Murabito, J. M., Rejeski, W. J., . . . Harris, T. B. (2016). Assessing Daily Physical Activity in Older Adults: Unraveling the Complexity of Monitors, Measures, and Methods. *J Gerontol A Biol Sci Med Sci*, 71(8), 1039-1048. doi:10.1093/gerona/glw026
- Schuch, F. B., Vancampfort, D., Rosenbaum, S., Richards, J., Ward, P. B., Veronese, N., . . . Stubbs, B. (2016). Exercise for depression in older adults: a meta-analysis of randomized controlled trials adjusting for publication bias. *Braz J Psychiatry*, 38(3), 247-254. doi:10.1590/1516-4446-2016-1915
- Sebastiao, E., & Mirda, D. (2021). Group-based physical activity as a means to reduce social isolation and loneliness among older adults. *Aging Clin Exp Res*, 33(7), 2003-2006. doi:10.1007/s40520-020-01722-w
- Sedentary Behaviour Research Network. (2012). Letter to the editor: standardized use of the terms "sedentary" and "sedentary behaviours". *Appl Physiol Nutr Metab*, 37(3), 540-542. doi:10.1139/h2012-024
- Sherrington, C., Fairhall, N., Kwok, W., Wallbank, G., Tiedemann, A., Michaleff, Z. A., . . . Bauman, A. (2020). Evidence on physical activity and falls prevention for people aged 65+ years: systematic review to inform the WHO guidelines on physical activity and sedentary behaviour. *Int J Behav Nutr Phys Act*, 17(1), 144. doi:10.1186/s12966-020-01041-3
- Sherrington, C., Fairhall, N. J., Wallbank, G. K., Tiedemann, A., Michaleff, Z. A., Howard, K., . . . Lamb, S. E. (2019). Exercise for preventing falls in older people living in the community. *Cochrane Database Syst Rev*, 1, CD012424. doi:10.1002/14651858.CD012424.pub2
- Sherrington, C., Tiedemann, A., Fairhall, N., Close, J. C., & Lord, S. R. (2011). Exercise to prevent falls in older adults: an updated meta-analysis and best practice recommendations. *N S W Public Health Bull*, 22(3-4), 78-83. doi:10.1071/NB10056
- Shirley, D., van der Ploeg, H. P., & Bauman, A. E. (2010). Physical activity promotion in the physical therapy setting: perspectives from practitioners and students. *Phys Ther*, 90(9), 1311-1322. doi:10.2522/ptj.20090383
- Siems, A., Banks, R., Holubkov, R., Meert, K. L., Bauerfeld, C., Beyda, D., . . . Pollack, M. M. (2020). Structured Chart Review: Assessment of a Structured Chart Review Methodology. *Hosp Pediatr*, 10(1), 61-69. doi:10.1542/hpeds.2019-0225
- Simek, E. M., McPhate, L., & Haines, T. P. (2012). Adherence to and efficacy of home exercise programs to prevent falls: a systematic review and meta-analysis of the impact of exercise program characteristics. *Prev Med*, 55(4), 262-275. doi:10.1016/j.ypmed.2012.07.007
- Sofi, F., Valecchi, D., Bacci, D., Abbate, R., Gensini, G. F., Casini, A., & Macchi, C. (2011). Physical activity and risk of cognitive decline: a meta-analysis of

- prospective studies. *J Intern Med*, 269(1), 107-117. doi:10.1111/j.1365-2796.2010.02281.x
- Soto, C. M., Kleinman, K. P., & Simon, S. R. (2002). Quality and correlates of medical record documentation in the ambulatory care setting. *BMC Health Serv Res*, 2(1), 22. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/12473161>
- Staiano, A. E., Harrington, D. M., Barreira, T. V., & Katzmarzyk, P. T. (2014). Sitting time and cardiometabolic risk in US adults: associations by sex, race, socioeconomic status and activity level. *Br J Sports Med*, 48(3), 213-219. doi:10.1136/bjsports-2012-091896
- Stathokostas, L., Theou, O., Little, R. M., Vandervoort, A. A., & Raina, P. (2013). Physical activity-related injuries in older adults: a scoping review. *Sports Med*, 43(10), 955-963. doi:10.1007/s40279-013-0076-3
- Steib, S., Schoene, D., & Pfeifer, K. (2010). Dose-response relationship of resistance training in older adults: a meta-analysis. *Med Sci Sports Exerc*, 42(5), 902-914. doi:10.1249/MSS.0b013e3181c34465
- Stott, D. J., & Quinn, T. J. (2013). Principles of rehabilitation of older people. *Medicine*, 41(1), 1-4.
- Stoutenberg, M. (2021). Update on the EIM Global Health Network. Retrieved from <https://www.exerciseismedicine.org/update-on-the-eim-global-health-network/>
- Strath, S. J., Kaminsky, L. A., Ainsworth, B. E., Ekelund, U., Freedson, P. S., Gary, R. A., . . . Council. (2013). Guide to the assessment of physical activity: Clinical and research applications: a scientific statement from the American Heart Association. *Circulation*, 128(20), 2259-2279. doi:10.1161/01.cir.0000435708.67487.da
- Sylvia, L. G., Bernstein, E. E., Hubbard, J. L., Keating, L., & Anderson, E. J. (2014). Practical guide to measuring physical activity. *J Acad Nutr Diet*, 14(2), 199-208. doi:10.1016/j.jand.2013.09.018
- Tak, E., Kuiper, R., Chorus, A., & Hopman-Rock, M. (2013). Prevention of onset and progression of basic ADL disability by physical activity in community dwelling older adults: a meta-analysis. *Ageing Res Rev*, 12(1), 329-338. doi:10.1016/j.arr.2012.10.001
- Taukobong, N. P., Myezwa, H., Pengpid, S., & Van Geertruyden, J. P. (2014). The degree to which physiotherapy literature includes physical activity as a component of health promotion in practice and entry level education: a scoping systematic review. *Physiother Theory Pract*, 30(1), 12-19. doi:10.3109/09593985.2013.783896
- Tausch, A. P., & Menold, N. (2016). Methodological Aspects of Focus Groups in Health Research: Results of Qualitative Interviews With Focus Group Moderators. *Glob Qual Nurs Res*, 3, 2333393616630466. doi:10.1177/2333393616630466
- Taylor, J., Walsh, S., Kwok, W., Pinheiro, M. B., de Oliveira, J. S., Hassett, L., . . . Sherrington, C. (2021). A scoping review of physical activity interventions for older adults. *Int J Behav Nutr Phys Act*, 18(1), 82. doi:10.1186/s12966-021-01140-9
- The National Health and Medical Research Council, t. A. R. C. a., & Universities Australia. (2007 (Updated 2018)). National Statement on Ethical Conduct in Human Research. In: National Health and Medical Research Council.

- Then, K. L., Rankin, J. A., & Ali, E. (2014). Focus group research: what is it and how can it be used? *Can J Cardiovasc Nurs*, 24(1), 16-22. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24660275>
- Thompson, W. R., Sallis, R., Joy, E., Jaworski, C. A., Stuhr, R. M., & Trilk, J. L. (2020). Exercise Is Medicine. *Am J Lifestyle Med*, 14(5), 511-523. doi:10.1177/1559827620912192
- Topolski, T. D., LoGerfo, J., Patrick, D. L., Williams, B., Walwick, J., & Patrick, M. B. (2006). The Rapid Assessment of Physical Activity (RAPA) among older adults. *Prev Chronic Dis*, 3(4), A118. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/16978493>
- Tucker, J. M., Welk, G. J., & Beyler, N. K. (2011). Physical activity in U.S.: adults compliance with the Physical Activity Guidelines for Americans. *Am J Prev Med*, 40(4), 454-461. doi:10.1016/j.amepre.2010.12.016
- van der Ploeg, H. P., Streppel, K. R., van der Beek, A. J., van der Woude, L. H., Vollenbroek-Hutten, M. M., van Harten, W. H., & van Mechelen, W. (2007). Successfully improving physical activity behavior after rehabilitation. *Am J Health Promot*, 21(3), 153-159. doi:10.4278/0890-1171-21.3.153
- Vassar, M., & Holzmann, M. (2013). The retrospective chart review: important methodological considerations. *J Educ Eval Health Prof*, 10, 12. doi:10.3352/jeehp.2013.10.12
- Voukelatos, A., Merom, D., Sherrington, C., Rissel, C., Cumming, R. G., & Lord, S. R. (2015). The impact of a home-based walking programme on falls in older people: the Easy Steps randomised controlled trial. *Age Ageing*, 44(3), 377-383. doi:10.1093/ageing/afu186
- Watkinson, C., van Sluijs, E. M., Sutton, S., Hardeman, W., Corder, K., & Griffin, S. J. (2010). Overestimation of physical activity level is associated with lower BMI: a cross-sectional analysis. *Int J Behav Nutr Phys Act*, 7, 68. doi:10.1186/1479-5868-7-68
- West, K., Purcell, K., Haynes, A., Taylor, J., Hassett, L., & Sherrington, C. (2021). "People Associate Us with Movement so It's an Awesome Opportunity": Perspectives from Physiotherapists on Promoting Physical Activity, Exercise and Sport. *Int J Environ Res Public Health*, 18(6). doi:10.3390/ijerph18062963
- Wheeler, P. C., Mitchell, R., Ghaly, M., & Buxton, K. (2017). Primary care knowledge and beliefs about physical activity and health: a survey of primary healthcare team members. *BJGP Open*, 1(2), bjgpopen17X100809. doi:10.3399/bjgpopen17X100809
- Whitlock, E. P., Orleans, C. T., Pender, N., & Allan, J. (2002). Evaluating primary care behavioral counseling interventions: an evidence-based approach. *Am J Prev Med*, 22(4), 267-284. doi:10.1016/s0749-3797(02)00415-4
- WHO. (2020). WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO.
- Windle, G., Hughes, D., Linck, P., Russell, I., & Woods, B. (2010). Is exercise effective in promoting mental well-being in older age? A systematic review. *Aging Ment Health*, 14(6), 652-669. doi:10.1080/13607861003713232
- Woodcock, J., Franco, O. H., Orsini, N., & Roberts, I. (2011). Non-vigorous physical activity and all-cause mortality: systematic review and meta-

- analysis of cohort studies. *Int J Epidemiol*, 40(1), 121-138.
doi:10.1093/ije/dyq104
- World Confederation for Physical Therapy. (2019). Physical therapists as exercise and physical activity experts across the life span. Retrieved from <https://world.physio/policy/ps-exercise-experts>
- World Health Organization. (2010). Global recommendations on physical activity for health. Retrieved from <https://www.who.int/publications/i/item/9789241599979>
- World Health Organization. (2015). *World Report on Ageing and Health*. Retrieved from <https://www.who.int/publications/i/item/9789241565042>
- World Health Organization. (2018a). ACTIVE: a technical package for increasing physical activity. Retrieved from <https://apps.who.int/iris/handle/10665/275415>
- World Health Organization. (2018b). GLOBAL ACTION PLAN ON PHYSICAL ACTIVITY 2018-2030 More Active People For a Healthier World. Retrieved from <https://www.who.int/news-room/initiatives/gappa/action-plan>
- World Health Organization. (2020). World Health Organization Guidelines on Physical Activity and Sedentary Behaviour Retrieved from <https://www.who.int/publications/i/item/9789240015128>
- Worster, A., & Haines, T. (2004). Advanced statistics: understanding medical record review (MRR) studies. *Acad Emerg Med*, 11(2), 187-192. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/14759964>
- Wu, C. Y., Hu, H. Y., Chou, Y. C., Huang, N., Chou, Y. J., & Li, C. P. (2015). The association of physical activity with all-cause, cardiovascular, and cancer mortalities among older adults. *Prev Med*, 72, 23-29.
doi:10.1016/j.ypmed.2014.12.023
- Wu, L., & Ashton, C. M. (1997). Chart review. A need for reappraisal. *Eval Health Prof*, 20(2), 146-163. doi:10.1177/016327879702000203
- Zalewski, K., Alt, C., & Arvinen-Barrow, M. (2014). Identifying barriers to remaining physically active after rehabilitation: differences in perception between physical therapists and older adult patients. *J Orthop Sports Phys Ther*, 44(6), 415-424. doi:10.2519/jospt.2014.5171
- Zhu, S., Sherrington, C., Jennings, M., Brady, B., Pinheiro, M., Dennis, S., . . . Hassett, L. (2021). Current Practice of Physical Activity Counselling within Physiotherapy Usual Care and Influences on Its Use: A Cross-Sectional Survey. *Int J Environ Res Public Health*, 18(9). doi:10.3390/ijerph18094762
- Zubala, A., MacGillivray, S., Frost, H., Kroll, T., Skelton, D. A., Gavine, A., . . . Morris, J. (2017). Promotion of physical activity interventions for community dwelling older adults: A systematic review of reviews. *PLoS One*, 12(7), e0180902. doi:10.1371/journal.pone.0180902

8.0 APPENDICES

8.1 APPENDIX A – AUDIT FORM



The Prince Charles Hospital
Metro North Hospital and Health Service



Chart audit form

Coded number: _____ Patient name: _____ UR: _____ DOB: _____ Gender: _____

Type of intervention: 1:1, Group, 1:1+ Group. Number of occasions: _____ Numbers of physiotherapists involved in care: _____

Reason For referral: _____

Co-morbidities: _____

Living situation: Home alone, Home with others

Admission Mobility level: Unable, Independent, Sup, Assistance; Admission Mobility Aid: Nil, SPS, 4ww; Other _____

Discharge Mobility level: Unable, Independent, Sup, Assistance; Discharge Mobility Aid: Nil, SPS, 4ww; Other _____

Documentation	Initial Assessment Date: _____	Progress Notes	Discharge Ax Date: _____	Discharge Summary	Any other documentation
Assessment (Ax) of previous level of physical activity (PA): yes or no. If yes, add details.					
Method of Ax of PA: informal self-reported; formal self-reported (questionnaire); Objective (Pedometer; Accelerometer). Add details.					
Ax of current level of PA: yes or no. If yes, add details.					
Method of Ax of PA: informal self-reported; formal self-reported (questionnaire). Objective (Pedometer; Accelerometer). Add details.					



The Prince Charles Hospital
Metro North Hospital and Health Service



Documentation	Initial Assessment	Progress Notes	Discharge Ax	Discharge Summary	Any other documentation
Prescription of Home Exercise Program: yes or no.					
Home Exercise Program handout: yes or no.					
Education/advice on long-term participation of PA: yes or no. If yes, add details.					
Referral for PA program in the community: yes or no. If yes, add details.					
Any other information related to PA.					

Any additional notes:



The Prince Charles Hospital
Metro North Hospital and Health Service



Documentation	Initial Assessment	Progress Notes	Discharge Ax	Discharge Summary	Any other documentation
List of outcome measures completed.					
Ax of barriers to PA: yes or no. If yes, add details.					
Ax of facilitators to PA: yes or no. If yes, add details.					
Goal-setting related to PA: yes or no. If yes, add details.					
Counselling strategies for PA: yes or no. If yes, add details.					
Prescription of PA: yes or no. If yes, add details (exercises/PA).					
Education/advice on how to become more active at present: yes or no. If yes, add details.					

8.2 APPENDIX B – ETHICAL APPROVALS

TPCH ETHICAL/GOVERNANCE APPROVAL - STUDY 1 AND STUDY 2

Enquiries to: Office ResearchTPCH@health.qld.gov.au (07)
Ph: 3139 4198
(07) 3139 4500
Our Ref: Low Risk Final Approval



Queensland
Government

6 December 2017

**The Prince Charles Hospital Human
Research Ethics Committee**
The Prince Charles Hospital
Building 14 Rode Road, Chermside QLD 4032

Ms Tatiana Paim Physiotherapy
Department
The Prince Charles Hospital

Dear Ms Paim,

Re: HREC/17/QPCH/430: Physical activity of older adults attending out-patient rehabilitation

Thank you for submitting your Low Risk project for ethical and scientific review. I am pleased to advise that The Prince Charles Hospital Human Research Ethics Committee reviewed your submission and upon recommendation, the Chair has granted final approval for your low risk project.

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007), NHMRC and Universities Australia Australian Code for the Responsible Conduct of Research (2007) and the CPMP/ICH Note for Guidance on Good Clinical Practice.

I am pleased to advise that The Prince Charles Hospital Human Research Ethics Committee has granted approval of this research project. The documents reviewed and approved on 5 December 2017 include:

Document	Version	Date
Low Risk Application	(AU/10/D832317)	
Protocol	1	6 November 2017
Participant Information Sheet & Consent Form	2	5 December 2017
Email to potential participants	2	5 December 2017
Interview guide	1	6 November 2017
Chart audit form	1	6 November 2017

The Ethics Committee would like to acknowledge the following:

Australian Catholic University – Candidate letter dated 26 October 2017
CV – Dr Suzanne Kuys
CV – Professor Nancy Lowchoy

This information will be tabled at the next HREC meeting held 25 January 2018 for noting.

Please note the following conditions of approval:

A **waiver of consent** has been approved. Please consider permissions under the *Hospital and Health Boards Act 2011* or *Public Health Act 2005* to enable access to confidential information for the purposes of research without consent.

The Principal Investigator will immediately report anything which might warrant review of ethical approval of the project in the specified format, including any unforeseen events that might affect continued ethical acceptability of the project.

Amendments to the research project which may affect the ongoing ethical acceptability of a project must be submitted to the TPCH HREC for review. Major amendments should be reflected in a cover letter from the principal investigator, providing a description of the changes, the rationale for the changes, and their implications for the ongoing conduct of the study. Hard copies of the revised amendments, the cover letter and all relevant updated documents with tracked changes must also be submitted to the TPCH HREC coordinator as per standard HREC SOP. Further advice on submitting amendments is available from http://www.health.qld.gov.au/ohmr/documents/researcher_userguide.pdf

Proposed amendments to the research project which may affect both the ethical acceptability and site suitability of the project must be submitted firstly to the TPCH HREC for review and, once TPCH HREC approval has been granted, submitted to the RGO.

Amendments which do not affect either the ethical acceptability or site acceptability of the project (e.g. typographical errors) should be submitted in hard copy to the TPCH HREC coordinator. These should include a cover letter from the principal investigator providing a brief description of the changes and the rationale for the changes, and accompanied by all relevant updated documents with tracked changes.

In accordance with Section 3.3.22 (b) of the National Statement the Principal Investigator will report to the TPCH HREC annually in the specified format and a final report is to be submitted on completion of the study. <https://www.health.qld.gov.au/metronorth/research/ethics-governance/post-approval-reporting/default.asp>

The Principal Investigator will notify the TPCH HREC if the project is discontinued at the participating site before the expected completion date, with reasons provided. Any plan to extend the duration of the project past the approved period, the Principal Investigator will submit any associated required documentation for TPCH HREC approval **before** expiry of the project, listed below.

The Hospital & Health Service Administration and the Human Research Ethics Committee may inquire into the conduct of any research or purported research, whether approved or not and regardless of the source of funding, being conducted on hospital premises or claiming any association with the Hospital; or which the Committee has approved if conducted outside The Prince Charles Hospital & Health Services.

HREC approval is valid until **6 December 2020**.

Please advise The Prince Charles Hospital Human Research Ethics Committee of the date you commence the research project for the approved site(s) using the Notification of Commencement Form: <https://www.health.qld.gov.au/metronorth/research/ethics-governance/post-approval-reporting/default.asp>

If the research does not commence within 3 months of this letter, please inform the committee in

formal correspondence of any delays occurring with your project.

Should you have any queries about the HREC's consideration of your project please contact the Manager of Research, Ethics & Governance Unit on 3139 4500. The HREC terms of Reference, Standard Operating Procedures, membership and standard forms are available from http://www.health.qld.gov.au/ohmr/html/regu/regu_home.asp.

You are reminded that this letter constitutes ethical approval only. *You must not commence this research project at a site until separate authorisation from the Hospital and Health Service CEO or Delegate of that site has been obtained.*

A copy of this approval must be submitted to the relevant Hospital & Health Services Research Governance Officer/s or Delegated Personnel with a completed Site Specific Assessment (SSA) Form for authorisation from the CEO or Delegate to conduct this research at the site/s listed below.

The HREC wishes you every success in your research.

Yours faithfully



Dr Russell Denman

Chair

The Prince Charles Hospital Human Research Ethics Committee

List of approved Sites:

No.	Site:
1	The Prince Charles Hospital



Enquiries to: Research Governance Officer
Telephone: (07) 3139 4407
Our Ref: 38535
mail: RGOTPCH@health.qld.gov.au

Ms Tatiana Paim
Physiotherapy Department
The Prince Charles Hospital

Dear Ms Paim,

Project ID: 38535

HREC reference number: HREC/17/QPCH/430 SSA reference number: SSA/18/QPCH/47

Project title: Promotion and prescription of physical activity to older adults attending out- patient rehabilitation

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to take place at the following site/s:

The Prince Charles Hospital

The following conditions apply to this research proposal. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval.

The study must be conducted in accordance with the Australian Code for the Responsible Conduct of Research (2018) and ICH Good Clinical Practice (GCP).

Amendments to the research are to be submitted to the HREC for review. A copy of the HREC approval/rejection letter together with the documents must be submitted to the Research Governance Officer (RGO) at each site for acknowledgment/approval.

An annual report acknowledged by the HREC must be submitted to the RGO for site records.

A final report acknowledged by the HREC must be submitted to the RGO on completion or early termination of the study.

All local Serious Adverse Events (SAE) or Suspected Unexpected Serious Adverse Reaction (SUSAR) must be reported to the relevant RGO. Furthermore, the relevant safety reporting requirements of the approving HREC must be adhered to.

The documents reviewed and approved include:

Document	Version	Date
Letter to RGO	-	22 January 2018
Site Specific Application	(AU/11/8843312)	

Furthermore, I acknowledge receipt of the following documents submitted with the SSA application:

Document	Version	Date
PHA Approval Letter	RD007213	19 January 2018
PHA Application Form		9 January 2018
Research Agreement		3 September 2018
HREC approval letter	-	6 December 2017
Low Risk Application	AU/10/D832317	
Protocol	1	6 December 2017

Participant Information Sheet and Consent Form	2	5 December 2017
Email to potential participants	2	5 December 2017
Interview guide	1	6 December 2017
Chart audit form	1	6 December 2017

Please complete the Notification of Commencement Form once commencement of this protocol has occurred at this site and return to the RGO and the approving HREC.

In relation to:

Promotion and prescription of physical activity to older adults attending out-patient rehabilitation

I wish you every success in your research project.

Yours sincerely



Ascar Yu

**RESEARCH GOVERNANCE OFFICER
THE PRINCE CHARLES HOSPITAL
METRO NORTH HOSPITAL AND HEALTH SE**

8.3 Appendix C – INTERVIEW GUIDE

Pre-discussion

Thank you for joining us today. We really appreciate your participation in this study about physical activity of older adults attending out-patient rehabilitation.

Overall, we aim to gather greater understanding of your perspectives of promoting and prescribing physical activity to older people attending Rehabilitation Day Therapy Unit at The Prince Charles Hospital.

Recording checks & confidentiality

1. Check participants are comfortable and can hear the interviewer clearly.
2. Ensure audio recorder is working.
3. Go through confidentiality issues:

Main confidentiality concepts:

Your views and opinions will be treated in confidence among the researchers for the purpose and dissemination of this study.

One of the research team will need to listen to the audio recording as part of the analysis process to check accuracy of transcription. No other researcher outside our team will be listening to the recording. No names will be recorded when we transcribe the recording; it won't be possible to identify you from the transcription of your recording.

I encourage you to talk freely about your points of view. Your views and experiences are very important. Once the discussion has commenced it will not be possible to withdraw data from the study at a later time, because we do not record your name.

Are there any objections to use of the audio-recorder? Then switch it on. (Participants who object will need to withdraw from the study before it is turned on).

Discussion/Interview

Initial open-ended question:

Could you tell me about the process of prescribing physical activity to older adults attending out-patient rehabilitation?

Probe questions:

How do you normally prescribe physical activity to older adults attending RDTU?

When do you usually prescribe physical activity to these patients?

Why do you or don't prescribe physical activity?

What do you consider important in prescribing physical activity?

What factors do you consider in prescribing physical activity?

What strategies do you use in prescribing physical activity?

How do you monitor physical activity adherence?

Intermediate questions:

Could you tell me how do you monitor if an out-patient rehabilitation program has an effect of physical activity levels of older adults?

Probe questions:

What measurement do you use?

Could you tell me how do you monitor if older adults attending out-patient rehabilitation are achieving recommended levels of physical activity as per guidelines?

Ending question:

Do you have any idea or comment that would help us to understand better the prescription of physical activity to older adults attending out-patient rehabilitation?

D. Finishing up

I have no more questions to ask. Do you have any other comment or questions?

Thank you for your time. Our discussion has been most valuable.

8.4 APPENDIX D – INVITATION EMAIL

Email to potential participants

Date

Dear _____,

I am Tatiana Paim, one of physiotherapists working at TPCH. I am interested in the physical activity level of older adults attending out-patient rehabilitation as part of my Master of Philosophy degree at Australian Catholic University.

You are being invited to take part in a group discussion on the promotion and prescription of physical activity to older adults attending out-patient rehabilitation.

Your participation in this research is entirely voluntary. You are under no obligation to participate and there will be no negative consequences if you do not agree to participate.

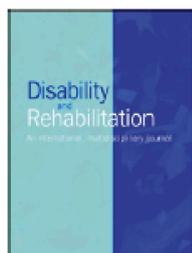
Please find attached a participant information sheet and consent form. Please take a moment to read and ask any question or concern you may have about this study.

Please reply to this email if you are interested in participating in this study. You may sign the consent form now and send it back to me by email or later in person at the time of the group discussion.

Best regards,

Tatiana Paim

8.5 APPENDIX E – STUDY 1 PUBLICATION



Disability and Rehabilitation



ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/idre20>

An audit of physiotherapists' documentation on physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation

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To cite this article: Tatiana Paim , Nancy Low-Choy , Simone Dorsch & Suzanne Kuys (2020): An audit of physiotherapists' documentation on physical activity assessment, promotion and prescription to older adults attending out-patient rehabilitation, Disability and Rehabilitation, DOI: [10.1080/09638288.2020.1805644](https://doi.org/10.1080/09638288.2020.1805644)

To link to this article: <https://doi.org/10.1080/09638288.2020.1805644>

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