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# PHYSICAL ACTIVITY PROMOTION BY PHYSIOTHERAPISTS

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## **ABSTRACT**

Physical inactivity is a major public health problem worldwide and is the second highest risk factor for chronic disease such as cardiovascular disease, cancers, respiratory diseases and diabetes. Public health strategies are urgently needed to increase population levels of participation in physical activity and thereby decrease the burden of chronic disease. Such strategies include integrating and increasing the role of physical activity advice as part of chronic disease prevention in primary care services.

Physiotherapists are primary care providers who have the knowledge and skills to provide physical activity advice and tailor programs to individual needs. Their role in this important aspect of public health has been relatively untapped to date. This thesis aims to investigate the feasibility of physiotherapists providing “non treatment-related” physical activity intervention for better health, as an adjunct to their clinical treatment roles. A second aim is to establish the current level of evidence of the effectiveness of physiotherapists in providing non treatment physical activity intervention for better health.

This thesis reports two studies undertaken to address the aims. The first (Chapter 2) was a survey of practices and perceptions of physiotherapists and physiotherapy students to determine their knowledge, confidence, role perception, barriers, feasibility and counselling practices regarding the promotion of non-treatment physical activity for the primary prevention of chronic disease. Some

physiotherapists were already incorporating physical activity advice into their usual practice while most were not. Physiotherapists and physiotherapy students agreed that physical activity promotion was part of their role and felt that they had the required knowledge and skills. They also thought that provision of physical activity advice through brief counselling as part of usual consultations was the most feasible approach.

The second study (Chapter 3) was a systematic review to determine whether physiotherapists are effective in increasing physical activity behaviour and /or improving health outcomes by providing physical activity intervention/health promotion messages. Although definitive conclusions could not be drawn there is limited evidence suggesting that physiotherapists may be effective in promoting physical activity to improve health. Well conducted randomised controlled trials are needed to investigate this question further.

Physiotherapists are primary care providers that have the potential to contribute to public health strategies to increase physical activity for the prevention of chronic disease. The most obvious initial step would be through integrating physical activity advice into their usual treatment consultations; there is also scope for them to be involved in physical activity promotion in a variety of settings such as the community, workplace health and sporting environments. A definitive randomised control is needed to examine the effectiveness of physiotherapists providing physical activity intervention in primary care.

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Finally, I am extremely grateful for the encouragement, understanding and support of my son, David Shirley, and the rest of my family and friends who have ensured my sustained effort throughout this work.

## **DEDICATION**

This work is dedicated to my mother, Celia Ann Cooper, who has always inspired me to do my best, persevere and aim high.

## **NOTE ON THE AUTHOR'S CONTRIBUTION**

I hereby declare that I have not submitted this material, either in full or in part, for a degree at this or any other institution. The research was developed by the candidate with support from the research team, including Professor Adrian Bauman and Dr Hidde van der Ploeg. The research team has been listed as co-authors in publications arising from this work.

I was responsible for instigating the research questions, reviewing literature, gaining ethics approval, survey design, data collection, analysis of data, interpretation of results, overseeing the writing of peer-reviewed papers and liaising between members of the research team. Assistance with data collection for Chapter 2 was provided by the Australian Physiotherapy Association who distributed our survey to a random sample of physiotherapists registered in New South Wales.

## **PUBLICATIONS**

The work arising from these MPhil studies has resulted in the following publications.

### **Refereed Journals**

SHIRLEY, D., VAN DER PLOEG, H. P., & BAUMAN, A. E. (2010). Physical activity promotion in the physical therapy setting: perspectives from practitioners and students. *Physical Therapy*, 90(9), 1311-1322.

### **Under Review**

SHIRLEY D, VAN DER PLOEG HP, BAUMAN AE. (2013) Physical Activity promotion in Physical Therapy: A Systematic Review. Submitted to Physical Therapy August 2013.

### **Published Abstracts**

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# TABLE OF CONTENTS

<b>Abstract .....</b>	<b>ii</b>
<b>Acknowledgements .....</b>	<b>iv</b>
<b>Dedication .....</b>	<b>v</b>
<b>Note on the author's contribution .....</b>	<b>vi</b>
<b>Publications .....</b>	<b>vii</b>
<b>List of tables.....</b>	<b>xi</b>
<b>List of Figures .....</b>	<b>xiii</b>
<b>CHAPTER ONE: Introduction.....</b>	<b>1</b>
Problem of Physical Inactivity .....	2
Risk factor for chronic disease....Physical inactivity .....	2
50% of Australians are not sufficiently physically active.....	6
Physical activity promotion in primary care .....	9
Physiotherapy profession and physical activity promotion .....	19
Efficacy of physical therapists in physical activity promotion .....	22
Physiotherapy has great potential for physical activity promotion.....	24
Aims/Scope of the Thesis .....	26
References .....	28
<b>CHAPTER TWO: Physical activity promotion in the physiotherapy setting: perspectives from practitioners and students .....</b>	<b>34</b>
Abstract.....	35
Introduction .....	37
Methods .....	39
Survey Design .....	40
Data Analysis .....	41

Results .....	42
Discussion.....	51
Conclusion.....	56
Acknowledgements .....	57
References .....	58
<b>CHAPTER THREE: Physical Activity promotion in PhysioTherapy: A Systematic Review .....</b>	<b>61</b>
Abstract.....	62
Introduction .....	64
Methods .....	66
Data Sources and Searches .....	66
Study Selection .....	67
Data Extraction and Quality Assessment.....	69
Data Synthesis and Analysis .....	69
Results .....	69
Intervention studies .....	70
Studies of reported practice and perceptions of promoting physical activity by physiotherapists.....	79
Discussion.....	82
Intervention studies .....	82
Reported perceptions and practice studies .....	84
Conclusions .....	88
References .....	89
<b>CHAPTER FOUR: Concluding Remarks .....</b>	<b>93</b>
Summary of findings .....	94
Perceptions and Practices of Physiotherapists .....	95
Efficacy of PA interventions.....	96

Proposed RCT to address evidence gap in physiotherapists providing physical activity advice.....	100
Research Plan.....	101
Experimental Design.....	101
Participants.....	102
Intervention .....	104
Outcome Measurements.....	107
Statistical Analysis.....	110
Future Directions / Clinical Implications / Policy .....	112
Conclusion.....	116
References .....	117
<b>APPENDICES.....</b>	<b>120</b>
Appendix 1: Questionnaire for physiotherapists.....	121
Appendix 2: Questionnaire for physiotherapy students.....	123

## LIST OF TABLES

<b>Table 1.1</b>	Summary of recent systematic reviews of physical activity interventions in primary care	12
<b>Table 1.2</b>	Summary of recent reviews of delivery physical activity interventions by physicians in primary care	12
<b>Table 1.3</b>	Summary of recent studies of physical activity interventions in primary care	16
<b>Table 2.1</b>	Personal characteristics of the physical therapists participating in this study and of all physical therapists registered in the state of New South Wales, Australia.	43
<b>Table 2.2</b>	Physical therapists knowledge, role perception, confidence, barriers and feasibility of physical activity promotion.	46
<b>Table 2.3</b>	Comparison of physiotherapy students and practicing physiotherapists with regard to knowledge, role perception, confidence, and feasibility of physical activity promotion	49
<b>Table 3.1</b>	Methodological quality of included intervention studies rated using the PEDro scale. The first item “Eligibility Criteria Satisfied” is not included in the score. Therefore the score is out of 10.	72
<b>Table 3.2</b>	Summary of included intervention studies promoting physical activity using physical therapists	73
<b>Table 3.3</b>	Summary of studies of health promotion and physical activity promotion perceptions and practices among physiotherapists	80
<b>Table 4.1</b>	Inclusion and exclusion criteria	102

# LIST OF FIGURES

<b>Figure 3.1</b>	Flow Chart of retrieval of studies to include in the systematic review	70
<b>Figure 4.1</b>	Physical activity Promotion model (van der Ploeg HP, van der Beek AJ, van der Woude LH, & van Mechelen W, 2004)	105
<b>Figure 4.2</b>	Timing of the intervention and measurements	107
<b>Figure 4.3</b>	Actigraph GT3X-Plus accelerometer	108

# **CHAPTER ONE**

## **INTRODUCTION**

### **Problem of Physical Inactivity**

Non communicable diseases place a huge burden on society globally. Every year diseases such as cardiovascular disease, cancers, respiratory diseases and diabetes kill more than 36 million people globally (WHO, 2013). Nearly 80% deaths (29 million) from non communicable diseases occur in low to middle income countries (WHO, 2013). The 2007-08 National Health Survey indicated that the overall prevalence of chronic disease is increasing in Australia and all over the world including (Department of Health and Aging, 2012). In 2010, chronic disease was the leading cause of death in Australia led by cardiovascular disease, some cancers, chronic lower respiratory diseases and diabetes (Department of Health and Aging, 2012). Within Australia, chronic diseases are a problem across all socio economic status (SES) categories and more prevalent in low SES groups eg 23.8% of people have cardiovascular disease in low SES groups compared with 17.3% in high SES groups (AIHW, 2010).

### **Risk factor for chronic disease....Physical inactivity**

In most countries the underlying causes of chronic diseases are similar and include increased consumption of energy dense, poor nutrient foods, decreased levels of physical activity and use of tobacco (WHO, 2004). In Australia in 2003, physical inactivity was the fourth highest determinant of health behind tobacco use, high blood pressure and overweight. At that time nearly 7% of the total disease burden was attributed to physical inactivity (Australian Institute of Health and Welfare, 2008). The problem is worsening and physical inactivity is now ranked as the second highest contributor to the burden of disease in Australia, led only by tobacco

smoking (AIHW, 2010). The estimated direct cost of physical inactivity was approximately \$1.5 billion in 2006-07, largely due to coronary heart disease and falls (Econtech, 2007) both of which are substantially preventable.

Much of the burden of non communicable disease is avoidable through the implementation of public health strategies to address health and lifestyle issues such as diet and physical inactivity. Some of the public health strategies recommended to increase physical activity involve community-wide campaigns, increased access to settings where there is equitable access to physical activity in a safe environment, combined with education, enhanced physical education programs in schools and promotion of active transport (Centers for Disease Control and Prevention, 2011; Global Advocacy for Physical Activity (GAPA) the Advocacy Council of the International Society for Physical Activity and Health (ISPAH), 2012). In Australia in 2003, 37% of the total burden of disease was attributed to cancers and cardiovascular disease (Begg et al., 2007). Although the burden of cardiovascular disease in Australia has dropped from 22% in 1996 (Mathers, Vos, & Stevenson, 1999) to 18% in 2003 (Begg et al., 2007) the burden is still unacceptably high and by addressing risk factors it should be possible to decrease the burden further.

Worldwide 32% of adults are classified as physically inactive and levels of inactivity are highest in the Americas (43.3%) and East Mediterranean (43.2%) (Hallal et al., 2012). In the West pacific region, which includes Australia, 33.7% of adults are physically inactive (Hallal et al., 2012). The problem of physical inactivity is not restricted to higher income countries (Kohl et al., 2012; Rodgers et al., 2004).

Physical inactivity is fast increasing as a health concern in low to middle income countries such as China and some Latin American countries (Kohl et al., 2012), and while infectious disease and poor nutrition still dominate the disease burden, the burden due to non communicable diseases is increasing (WHO, 2004). The growing burden of physical inactivity in low – middle income countries eg China, is attributed to urbanisation and economic development in countries which results in a marked overall decrease in total physical activity and less work related physical activity (Kohl et al., 2012). Therefore strategies to incorporate appropriate levels of physical activity in lifestyle are important so the populations do not become increasingly inactive.

Strategies to address physical inactivity are a key public health priority for preventing chronic disease (A. E. Bauman, 2004; World Health Organization, 2010). Physical inactivity has been identified as the fourth leading risk factor for global mortality, accounting for 9% of global deaths or 5.3 million of deaths globally in 2008 (Lee I et al., 2012; World Health Organization, 2009). A physically inactive lifestyle increases all-cause mortality risk by 20-30% compared to sufficiently physically active people (Lee & Skerrett, 2001; Physical Activity Guidelines Advisory Committee, 2008). Most of these effects on all-cause mortality can be attributed to the positive effects of physical activity on cardiovascular disease and cancer, the leading causes of mortality and morbidity in Australia. Physical inactivity is a major risk factor for 6 of the 8 National Health Priorities: Cardiovascular disease, obesity, diabetes, cancer, mental health, and arthritis and musculoskeletal conditions (Department of Health and Aging, 2006; World Health Organization,

2009) and contributes more to the total population burden of disease in Australia than obesity or hypercholesterolemia (AIHW, 2010). Physical inactivity, in combination with poor nutrition, is also a fundamental cause of the Australian obesity epidemic.

The physical activity recommendations are that adults should be active on five days per week by accumulating at least 30 minutes per day of moderate-intensity activity (A. E. Bauman, 2004; Haskell et al., 2007; World Health Organization, 2010).

Recommended levels of physical activity for health can comprise different types of activity such as structured exercise, active commuting, incidental activity, active living, and active sport and recreation. The National Activity Guidelines for Australian adults incorporate a range of recommendations including

1. *“Think of movement as an opportunity, not an inconvenience.*
2. *Be active every day in as many ways as you can.*
3. *Put together at least 30 minutes of moderate intensity physical activity on most, preferably all, days.*
4. *If you can, also enjoy some regular, vigorous activity for extra health and fitness.” (National Physical Activity Guidelines for Adults, 1999 Reprinted 2005).*

While undertaking 30 minutes of moderate intensity activity each day results in health benefits to lower the risk of chronic disease, additional health benefits can be gained from higher volumes of activity (World Health Organization, 2010) and taking part in vigorous activity for extra health benefits (National Physical Activity Guidelines for Adults, 1999 Reprinted 2005). It is interesting to note that a study of 416, 175 people in Taiwan between 1996 and 2008 reported a benefit from modest levels of physical activity (Wen et al., 2011). Even as little as 15 minutes / day of physical activity led to a 14% reduced risk of all cause mortality and an extra 3 years

life expectancy compared with inactive people who had a 17% greater risk of mortality (Wen et al., 2011).

Overall the recommendations are clear that to gain acceptable benefits to health from physical activity, accumulating 30 minutes a day is optimal. However, as the primary aim of public health strategies to reduce the burden of chronic disease through physical activity promotion is to get people more active even some benefit can be gained from lower levels of activity. For people not accustomed to exercising starting at an appropriate level and building up to 30 minutes /day is still likely to confer health benefits before they achieve the optimal time. Similarly, while it might not be possible for people with co morbidities (eg musculoskeletal disease or injury) to manage 30 minutes a day of physical activity encouraging even a lower amount of activity is still likely to result in health benefits over inactivity.

### **50% of Australians are not sufficiently physically active**

About two thirds of Australian adults do not do sufficient physical activity to meet the physical activity guidelines (AIHW, 2010). In 2007-8 only 37% of Australian adults were sufficiently active to produce health benefits (AIHW, 2010), whereas approximately half of the adults in NSW in 2002-2005 were sufficiently active (Chau et al., 2008). These figures suggest a large percentage (50-63%) of the adult population is at increased risk of developing cardiovascular disease, diabetes, obesity, several forms of cancer, and a range of other chronic diseases. The public health challenge is to develop approaches that reach large numbers of people with cost effective, evidence-based primary prevention strategies. In 2004, the World

Health Assembly endorsed Resolution WHA57.17: Global Strategy on Diet, Physical Activity and Health and recommended that Member States develop national physical activity action plans. One avenue to implement physical activity promotion may be through primary care practitioners such as medical practitioners, physiotherapists and dieticians etc who see large numbers of people and theoretically have the potential to be an effective mechanism to expose large numbers of the population to physical activity advice as be part of a public health strategy.

Public health strategies to increase physical activity need to be multifactorial as the problem is too large to be influenced by a single pronged attack. As most aspects of modern lifestyle have low levels of activity due to mechanisation and urbanisation the approaches to increasing physical activity need to target all aspects of daily life including work, leisure and transport for adults and children. Recently the British Journal of sports Medicine published a document suggesting the seven best ways to increase physical activity at a population level to decrease the burden of non communicable disease (Global Advocacy for Physical Activity (GAPA) the Advocacy Council of the International Society for Physical Activity and Health (ISPAH), 2012). The seven 'investments' for physical activity include whole of school programs, transport policies to prioritise walking, cycling and public transport, urban design regulations and infrastructure, physical activity and non communicable disease prevention integrated into primary care health systems, public education, community programs and sports systems. To achieve the optimal benefits to health it is important that all of these 'investments' are explored and implemented. However, the focus of this thesis will be promotion of physical

activity in the primary care setting, specifically in the physiotherapy setting. To date these primary care practitioners have been relatively under utilised in physical activity promotion strategies and yet they appear to be ideally suited to this role.

The physiotherapy outpatient setting provides a unique opportunity to provide physical activity interventions. Physiotherapists see large numbers of people both in public and private settings. While people most often present to these settings for management of a musculoskeletal problem such as a sprained ankle or low back pain, they may also have other co morbidities or risk factors for chronic diseases. Physiotherapists generally see their patients on a number of occasions (eg 4-6) for musculoskeletal problems. During each treatment occasion the physiotherapist elicits information about the presenting problem as well as implementing treatment interventions. It would be feasible to add an evaluation of physical activity behaviour, eg using the International Physical Activity Questionnaire, during assessment or between sessions and incorporate brief physical activity counselling advice and instructions into the treatment sessions. In contrast, general practitioners usually see people for consultations of shorter duration and less frequently and have greater time constraints. Physiotherapy treatment frequently involves prescription of exercises so it is important to distinguish between exercises that constitute physical activity for treatment from counselling and programs to increase overall physical activity for health promotion and lifestyle behaviour change. When we refer the physical activity interventions for health promotion we are referring to non treatment physical activity and not the exercises and physical activity that forms part of usual care of a musculoskeletal problem.

### **Physical activity promotion in primary care**

Primary health care practitioners are ideally positioned to promote physical activity as a health promotion measure (ISPAH, 2010; World Health Organization, 2010), and their patients are often inactive and at higher risk for developing chronic disease. A recent review in *The Lancet* showed that physical activity interventions based in primary care can generate larger health gains than other interventions, with favourable cost effectiveness (Cecchini et al., 2010). For the past decade there have been numerous efforts to use general practitioners (GPs) as professionals to promote physical activity (Smith, van der Ploeg, Buffart, & Bauman, 2008).

Promoting a physically active lifestyle in the rehabilitation setting provided an opportunity for engaging with patients around overall disease risk reduction. A large multi-centre trial in the Netherlands showed that people with a range of health conditions (including stroke, orthopaedic conditions, and back disorders) significantly increased their physical activity after receiving a physical activity lifestyle intervention during their rehabilitation (H. van der Ploeg et al., 2007). The Active after Rehabilitation (AaR) intervention, which was provided by a physical activity counsellor, improved physical activity behaviour such that participants in the intervention group were twice as likely to meet the physical activity recommendation than the control group at 6 weeks and 12 months after the end of rehabilitation (H. van der Ploeg et al., 2007; van der Ploeg et al., 2006). This successful intervention is now being implemented in all Dutch rehabilitation centres with the help of the Netherlands Sports Organization for People with a Disability (NebasNsg). While physiotherapists were not involved in delivering the physical activity intervention in

this study they did play a major role in the recruitment of participants (H. van der Ploeg et al., 2007; van der Ploeg et al., 2006).

Interventions commonly used to investigate the efficacy of physical activity promotion include one-to-one counselling/advice or group counselling/advice; self-directed or prescribed physical activity; supervised or unsupervised physical activity; home-based or facility-based physical activity; ongoing face to-face support; telephone support; written education/motivation material; self monitoring (Foster, Hillsdon, Thorogood, Kaur, & Wedatilake, 2013). The interventions were delivered by one or more practitioners including physicians, nurses, health educators, counsellors, exercise leaders and peers (Foster et al., 2013). The results of a recent Cochrane review showed that the main outcome measures utilised by studies investigating physical activity interventions are a variety of self report measures of physical activity or measures of cardio respiratory fitness. The measures of self reported physical activity involved estimates of energy expenditure, time spent undertaking physical activity or number of times physical activity was undertaken in a four week period (Foster et al., 2013). Pooling results of these studies indicated that there was a moderate positive effect for physical activity interventions although there was considerable heterogeneity of results, thereby limiting the conclusions that can be made based on those results. Measures of cardio respiratory fitness also demonstrated a moderate positive effect with significant heterogeneity of effects. Participants in the trials included in this review were from a variety of settings including primary care, community and workplace (Foster et al., 2013).

Recent systematic reviews of physical activity promotion in primary care report mixed results (Table 1.1) ranging from weak evidence of short term increase in physical activity behaviour (Pavey et al., 2011) to significant increases in physical activity levels (Orrow, Kinmonth, Sanderson, & Sutton, 2012). Exercise referral schemes delivered to people without a medical diagnosis result in short term increases in self reported physical activity and physical fitness, however, the strength of the evidence is only weak (Pavey et al., 2011). Better results occurred with physical activity interventions delivered to sedentary adults in primary care, where small to medium positive intervention effects were reported at 12 months. The effects for cardio respiratory fitness were non significant with similar non significant results also for exercise referral (Orrow et al., 2012). Finally a narrative review also provides some evidence that physical activity interventions are effective in older people, however, they do not report specific outcome measures (Stevens et al., 2012). These reviews suggest the evidence for physical activity promotion in primary care is relatively modest with marked heterogeneity of interventions and outcome measures making direct comparisons difficult.

**Table 1.1** Summary of recent systematic reviews of physical activity interventions in primary care

Study	Design	Participants	Intervention	Outcome measures	Results
Pavey et al 2011	Systematic review and meta analysis 8 trials (13 publications)	Any individual with or without medical diagnosis n= 5190	Exercise referral scheme	Physical activity (self report), physical fitness	Weak evidence of a short term increase in physical activity
Orrow et al 2011	Systematic review and meta analysis of RCTs 15 trials	Sedentary adults in primary care n=8745	Physical activity promotion	Physical activity or fitness levels (self report) 12 months after randomisation	Significant increases physical activity levels at 12 months
Stevens et al 2012	Narrative review 6 trials	Adults aged 50+ n=1522	Structured physical activity interventions	Any	Some evidence for the effectiveness of physical activity interventions in primary care for older people

**Table 1.2.** Summary of recent reviews of delivery physical activity interventions by physicians in primary care

Study	Design	Participants	Intervention	Outcome measures	Results
Bock et al 2012	Systematic Review 18 trials	Primary care physicians or providers giving behavioural counselling n= 6,338 physicians and 1,783 other primary care providers	CVD prevention	Knowledge, attitudes, or actual delivery of behavioural counselling to reduce cardiovascular risk	2 studies focussed on physical activity frequency of behavioural counselling in primary care settings appears low, especially in the areas of nutrition and physical activity
Van Dillen et al 2012	Critical review 41 studies	General practitioners and patients overweight or obese Sample size 15- 13,859	Communication, education, counselling, preventive behaviours or strategies	GPs' nutrition guidance practices, physical activity guidance practices, or combination with the aim to prevent or treat overweight or obesity	The content of advice about nutrition and physical activity was quite general. GPs' provision of combined lifestyle advice to overweight and obese patients seems to be quite low

Evidence from recent randomised controlled trials and other trials is also modest (Table 1.3). Four randomised controlled trials from the past 2 years are presented. All were conducted in primary care and included people without health conditions that would limit ability to participate in physical activity. The study conducted by Patel A, et al (2013) consisted of 225 people involved in the Health Steps Study. All participants were aged over 65 years, could speak and write English, did not have health conditions that would contraindicate physical activity and were classified as low active. These participants were recruited from primary care practices (Patel, Keogh, Kolt, & Schofield, 2013). Gine'-Garriga M et al., 2013 recruited 362 people aged 18-85 from primary care centres in Barcelona and Catalonia. Participants were required to have at least one chronic disease eg diabetes mellitus, and be physically inactive. The study by Mutrie et al 2012, consisted of 284 participants aged 65 or over recruited from a general medical practice in Glasgow. Participants were living independently, not meeting current physical activity recommendations and did not have a medical condition that would exclude them from physical activity interventions (Mutrie et al., 2012). The fourth study by Parekh et al (2013) recruited 4678 participants from general practices in Brisbane, Australia. Participants were aged between 18 and 70, and were included if they did not have cancer, a recent cardiovascular event or other terminal illness (Parekh, Vandelanotte, King, & Boyle, 2012). The results of these studies indicate an increase in physical activity measures (Mutrie et al., 2012; Patel et al., 2013) for people over aged 65. It is interesting to note that in one study the intervention was telephone counselling (Patel et al., 2013) and in the other it was counselling a walking program and a

pedometer (Mutrie et al., 2012). Both types of intervention seem to be effective in producing an improvement in physical activity in people over 65 years of age.

Physical activity interventions also have other useful effects than just changing physical activity behaviour. A three month physical activity program with access to community resources was successful in decreasing the rate of visits to the primary care provider in inactive people with at least 1 chronic condition (Gine'-Garriga et al., 2013).

Computer tailored physical activity advice and health promotion material is able to facilitate change and improve unhealthy behaviours although changes in individual health behaviours are only modest and there was no significant change in physical activity behaviour (OR 1.06, 95% CI 0.86-1.30) (Parekh et al., 2012).

It appears that researchers are trying to address the lack of high quality evidence to determine the effectiveness of physical activity interventions in primary care through undertaking systematic reviews and randomised controlled trials. Despite the attempt to gather more evidence the results mostly show modest effects and definitive evidence is still not available. Part of the problem is the heterogeneity of participant groups, providers of interventions, interventions and outcome measures making pooling of data difficult.

General medical practitioners (GPs) are the primary care practitioners most frequently used in research to promote physical activity in primary care. GPs have been a popular choice to deliver physical activity interventions because they see large numbers of the

population, non communicable diseases are prevalent in primary care and people would believe them to be a credible source of information (Kottke, Solberg, Brekke, Cabrera, & Marquez, 1997). People expect their primary care practitioners to have integrity, be knowledgeable and competent and act with equity and honesty (WHO, 2008). Most of the studies on medical practitioners providing interventions to promote physical activity are in general medical practice.

**Table 1.3.** Summary of recent studies of physical activity interventions in primary care

Study	Design	Participants	Intervention	Outcome measures	Results
Patel et al 2013	RCT	225 65+ no health conditions that contraindicate physical activity and low active Age $\geq$ 65 years	Standard time based or modified pedometer based Green prescription with telephone counselling tailored to group	Depressive symptoms, mental health and PA. PA assessed by Auckland Heart Study Physical Activity Questionnaire (AHSPAQ)	Leisure moderate physical activity and total walking physical activity increased over time independent of group allocation
Gine-Garriga et al 2013	RCT	362 inactive patients with at least 1 chronic condition Age IG 68.3 (8.8) mean (SD) CG 67.2 (9.1) mean (SD)	3 month physical activity program with community resources compared with usual care	Rates of visits to primary health care provider	a 3-month physical activity program linked to community resources is a short duration, effective and sustainable intervention in inactive patients to decrease rates of PHC visits
Mutrie et al 2012	RCT pilot	461 aged 65+ independent and not meeting physical activity recommendations Age IG 71.6 (6.0) mean (SD) CG 70.0 (4.3) mean (SD)	Two 30 minutes physical activity consultations delivered by practice nurse, walking program and pedometer (IG), control group had usual care for 12 weeks and then the intervention (CG)	Step counts, quality of life and sedentary time	Step counts (activPAL) showed a significant increase from baseline to week 12 for the IG, while the CG showed no change. Between weeks 12 and 24, step counts were maintained in the IG, and increased for the CG after receiving the intervention. The intervention was associated with improved quality of life and reduced sedentary time
Parekh et al 2012	RCT	2306 patients Age IG 49.2 (14) mean (SD) CG 48.1 (14) mean (SD)	Intervention group computer tailored printed advice and health promotion material. Control group tailored health information not included in prudence score	Summary lifestyle score (Prudence score) and individual health behaviours	computer-tailored feedback for multiple lifestyle behaviours can facilitate change and improve unhealthy behaviours, modest individual changes in behaviour

Hardcastle et al 2012	Prospective study	207 sedentary patients who were insufficiently active with no contraindications to physical activity Age 70% > 50 years	'lifestyle change facilitation service' providing patients with one-to-one behaviour change counselling	Self report physical activity and physical activity stage of change	At 6-months there were significant improvements in physical activity, stage of change, and social support. A dose-response relationship was evident; those who attended 2 or more consultations increased their total physical activity, stage of change and family social support more than those who attended just one.
Trinh et al 2012	Trial	152 inactive patients Age range 20-80+ years	6-week PA intervention, including counselling by their physicians, provision of a pedometer and referral to a community action site (CAS) at their local recreation centre for further support.	Self report physical activity	A pedometer-based PA intervention delivered by physicians in partnership with a community PA stakeholder is feasible
French D et al 2012 (Abstract published in Psychology and Health )	Trial	315 patients Age not specified	Walking based physical activity intervention compared with information provision	Walking	No differences found Between groups in walking from immediately post-intervention to 6 months later. Practice Nurses/Health Care Assistants reporting difficulty fitting in the intervention alongside routine work
IG Intervention Group CG Control Group					

Strategies implemented by GPs have demonstrated mixed success (Eaton & Menard, 1998; Fox, Biddle, Edmunds, Bowler, & Killoran, 1997; Hillsdon, Thorogood, White, & Foster, 2002; Lawlor & Hanratty, 2001; Lawton et al., 2008; Marshall, Smith, Bauman, & Kaur, 2005; Smith, Bauman, Bull, Boot, & Harris, 2000) with most programs only showing modest effect sizes and short term effectiveness (Fox et al., 1997; Smith, Merom, Harris, & Bauman, 2002). Australian GPs see it as their role to give physical activity advice to their patients, and over the last decade, have improved their knowledge and confidence in physical activity counselling (Buffart et al., 2009; H. P. van der Ploeg et al., 2007). However, these improvements have not coincided with increases in the number of patients that receive physical activity advice. The main barriers to health promotion identified by GPs are perceived lack of training, beliefs that they are unable to change health habits, time constraints and absence of reimbursements (A. Bauman, Mant, Middleton, Mackertich, & Jane, 1989; Bull, Schipper, Jamrozik, & Blanksby, 1995; Pinto, Goldstein, DePue, & Milan, 1998). Given the reported improvements in knowledge and confidence, it appears that the main limitation for physical activity counselling in general practice is lack of time. More recent reviews also indicate the same trend (Table 1.2).

Primary care physicians have a low frequency of providing behavioural counselling on nutrition and physical activity (Bock, Diehl, Schneider, Diehm, & Litaker, 2012). Similarly provision of physical activity advice by GPs to overweight and obese patients is also low (van Dillen, van Binsbergen, Koelen, & Hiddink, 2013).

While GPs are primary care practitioners who would seem ideal to provide physical activity interventions it does not appear that there are increased numbers of patients

receiving physical activity advice and there has not been clear success at physical activity promotion in this setting. One of the investments for increasing physical activity is integration of physical activity and non communicable disease prevention into primary care settings (Global Advocacy for Physical Activity (GAPA) the Advocacy Council of the International Society for Physical Activity and Health (ISPAH), 2012). A more effective approach may be to encourage a variety of primary care practitioners to provide physical activity interventions thereby reaching greater proportions of the population.

### **Physiotherapy profession and physical activity promotion**

Physiotherapists are primary care health professionals that are ideally suited to the role of physical activity promotion. They have training in exercise physiology as well as management of non communicable diseases such as heart disease, high blood pressure etc. Physiotherapists are trained to provide exercise program for a diverse client groups which span from those that are healthy and want to keep fit and enhance their lifestyle to those with cardio-metabolic and musculoskeletal co-morbidities. Traditionally, physiotherapists have worked in the domain of tertiary and secondary prevention and their role has focused on management of existing dysfunction. Tertiary prevention is defined as “Efforts to limit the degree of disability and promote rehabilitation and restoration of function in patients/clients with chronic and irreversible diseases” and secondary prevention defined as “Efforts to decrease the duration of illness, severity of diseases, and sequelae through early diagnosis and prompt intervention” (Guide to Physical Therapist Practice, 1997). Their potential role in primary prevention of chronic disease has been relatively

untapped to date. Primary prevention is defined as “prevention of disease in a susceptible or potentially susceptible population through such specific measures as general health promotion efforts (Guide to Physical Therapist Practice, 1997).”

Approaches to health care are changing to emphasise the importance of preventive health and the importance of physical activity in preventing non communicable disease. The physiotherapy profession is evolving to embrace this increased emphasis on preventive health. National and international physiotherapy professional organisations are adapting their missions and vision statements to include health promotion and disease prevention. The World Confederation of Physical Therapy (WCPT) is the international body representing physiotherapists (also known as physical therapists) and their organisations. The WCPT position statement on description of physiotherapy states

*“Physical therapist practice is concerned with identifying and maximising quality of life and functional movement potential, within the spheres of promotion, prevention, maintenance, intervention/treatment, habilitation and rehabilitation.” (page 1)*

Furthermore , WCPT physiotherapy practice expectations are that physiotherapists:

- *“Provide physical therapy services for prevention, health promotion, fitness, and wellness to individuals, groups, and communities.*
- *Promote health, quality of life, independent living and workability by providing information on health promotion, fitness, wellness, disease, impairment, activity limitations, participation restrictions, and health risks related to age, gender, culture, and lifestyle within the scope of physical therapist practice”.*

In line with the WCPT position statement of the description of physiotherapy the Australian Physiotherapy Association (APA) in its Vision 2020 recognises health promotion and prevention of chronic disease is part of the future role for physiotherapists:

*“Physiotherapists will be recognised by governments, consumers, and other health professionals as the practitioners of choice to optimise functional mobility and quality of life, and to promote health and wellbeing. The scope of physiotherapy practice will expand. There will be an increased role in the prevention of disease and risk factors associated with disease”.*

Further, in the APA platform they contend

*“ that physiotherapists have a key role in the prevention of chronic disease and the management of complex, progressive and chronic illness which may be best managed in the community”.*

The APA platform also includes a public health section which further outlines the role of physiotherapy in prevention of a range of diseases with a focus on using exercise prescription. The APA also contends that prevention should be carried out in the most appropriate setting be that hospital home or community. While the APA supports campaigns to promote exercise they are of the view that people with a disability / disease/injury should consult a physiotherapist prior commencing an exercise program.

The physiotherapy profession clearly embraces the role of physiotherapists in health promotion and disease prevention at national and international levels. Interestingly, however, this is not completely followed through from education through to experienced practice. In the WCPT position statements there is a list of interventions that may be used in curriculum development but physical activity for chronic disease prevention is not mentioned explicitly. So even though the profession acknowledges that physiotherapists may be involved with

*“promoting the health and well being of individuals and the general public/society, emphasising the importance of physical activity and exercise” (WCPT position statements)*

it is still to make this evident in all aspects of practice and should be evident in physiotherapy curricula.

One of the barriers to providing physical activity advice identified by general practitioners was lack of time as providing physical activity counselling did not slot easily into their mode of practice. This is unlikely to be such a barrier for physiotherapists due to the nature of their practice/consultations. One of the benefits of physiotherapists providing physical activity interventions is that they see the patient over a number of visits and brief counselling and messages could be incorporated into the usual treatment sessions instead of requiring a separate session or health professional.

Physiotherapists have the potential to reach large numbers of people with health promotion/physical activity messages in the course of their usual practice in traditional settings. In the future if the profession embraces the opportunities to work in non traditional settings or in combination with other aspects of practice such as occupational health in the work place then the potential to be an effective component of an overall public health strategy to increase physical activity is enormous.

### **Efficacy of physiotherapists in physical activity promotion**

It is evident that the physiotherapy profession in theory recognises that there is an important (future) role in physical activity promotion and disease prevention. To

date there have been only a few trials that have investigated the efficacy of physiotherapists delivering physical activity interventions. Most of the attempts to evaluate the efficacy of physical activity advice/health promotion messages provided by physiotherapists have been delivered in the primary care setting. Chapter 3 reports a systematic review of the effectiveness of physiotherapists delivering physical activity interventions.

Utilising other health care practitioners provides additional settings to promote physical activity. Over 13,000 practicing physiotherapists provide care to around half a million people in Australia each fortnight (Australian Institute of Health and Welfare, 2008). The majority of these people are physically inactive and a more physically active lifestyle would improve their daily functioning as well as substantially reduce their chronic disease risk (Physical Activity Guidelines Advisory Committee, 2008). Physiotherapists are trained to prescribe exercise for specific conditions requiring rehabilitation and are mainly involved in tertiary prevention, but they are perfectly positioned to also deliver a primary prevention physical activity program during their usual treatment sessions (Verhagen & Engbers, 2009). Physiotherapists are primary care practitioners who have the potential and skills to recommend general physical activity and are amenable to prescribing physical activity to their patients for health promotion purposes (Sheedy et al., 2000). However, despite this great potential, most physiotherapists do not provide such advice in a structural way to their patients. Many people treated by physiotherapists would be classified as physically inactive. Physiotherapists are trained in prescribing physical activity, particularly in the presence of co-morbidity,

and physical activity counselling could potentially be easily integrated into usual treatment sessions. However, physiotherapists' potential for generic physical activity promotion has not been tested.

### **Physiotherapy has great potential for physical activity promotion**

This intervention strategy would lower the costs, as the physical activity advice is partly built into existing consultation time for another condition, hence making good use of clinical contact time, as well as building on the patient-physiotherapist relationship. A major potential advance over the general practice setting is that physiotherapy treatment is usually spread out over several sessions (average 6-8 times) over a number of weeks, allowing time for the provision of sequential and individualised physical activity messages.

Physiotherapists already prescribe exercise for specific conditions requiring rehabilitation and are mainly involved in tertiary prevention, but the effects of a primary prevention 'physical activity' message could be delivered through this setting. To date, only one small scale study attempted to evaluate the effects and the results were promising but inconclusive (Sheedy et al., 2000). In this study physiotherapists provided a physical activity intervention incorporating an educational brochure, brief counselling and a diary. Two hundred and twenty three people aged over 18 years, presenting for outpatient physiotherapy, were included in the study. These subjects were able to speak and understand English and did not have a physical condition that would prevent them from involvement in physical activity (Sheedy et al., 2000). The results of this study seemed to indicate that

physiotherapists were an appropriate group to deliver physical activity promotion messages to their patients. However, determination of the efficacy of physical activity promotion by physiotherapists needs further exploration (Harris & Smith, 2003). If population-wide approaches are to be effective, then a broader range of primary and secondary care consultations should include physical activity promotion (Smith et al., 2002).

Prior to commencing this thesis the perceptions and practices of physiotherapists in regard to physical activity promotion had not been documented. However, physiotherapists have the potential to fulfil this role as part of a public health strategy to increase physical activity and prevent chronic disease. Since the international and national physiotherapy bodies embrace this role as an important aspect of future practice understanding the individual physiotherapist's perspectives is necessary to inform development of strategies and plans for implementation.

## **Aims/Scope of the Thesis**

The aim of this thesis is to investigate the feasibility of physiotherapists providing non treatment physical activity intervention for better health. A secondary aim is to establish the current level of evidence of the effectiveness of physiotherapists in providing non treatment physical activity intervention for better health.

Chapter 2 investigated the perceptions and practices of physiotherapists registered in New South Wales. A survey was conducted seeking information about their knowledge, confidence, role perception, barriers, feasibility and counselling practice with regard to promoting a physically active lifestyle in their patients. Physiotherapy students at the Discipline of Physiotherapy were also surveyed about their knowledge, confidence, role perception, with regard to promoting a physically active lifestyle in their patients. The aim of this chapter was to gain insight into the understanding of physiotherapists and physiotherapy students regarding physical activity promotion and their willingness to undertake this role.

Having established that physiotherapists believe physical activity promotion is part of their role and that it is feasible to incorporate into usual practice in Chapter 2, Chapter 3 reports a systematic review conducted to determine whether physiotherapists are effective in increasing physical activity behaviour and /or improving health outcomes by providing physical activity intervention/health promotion messages. The aim of this chapter was to examine what is currently understood about whether physical activity interventions delivered by physiotherapists are effective in changing physical activity behaviour.

Finally Chapter 4 summarises the main findings from Chapters 2 and 3 and explains the implications for physical activity promotion in physiotherapy practice. A

potential randomised controlled trial is proposed to investigate the effectiveness of physical activity intervention provided by physiotherapists. Chapter 4 also includes some speculation of other possible involvement physiotherapists could have in delivering public health strategies to increase physical activity.

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## CHAPTER TWO

### PHYSICAL ACTIVITY PROMOTION IN THE PHYSIOTHERAPY SETTING: PERSPECTIVES FROM PRACTITIONERS AND STUDENTS

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## **Abstract**

**Background.** Physical inactivity is a major risk factor for chronic disease. Primary health care practitioners are well placed to promote a physically active lifestyle. The perceptions and practice of physiotherapists on their role in physical activity promotion are not well known.

**Objective.** The objective of this study was to determine the knowledge, confidence, role perception, barriers, feasibility and counselling practice of physiotherapists and physiotherapy students regarding the promotion of non-treatment physical activity for better health.

**Design.** Cross sectional survey.

**Methods.** In 2008, 321 (54%) of a random sample of all physiotherapists registered in the state of New South Wales (Australia) returned a survey on their knowledge, confidence, role perception, barriers, feasibility and counselling practice with regard to promoting a physically active lifestyle in their patients. Physiotherapy students (n=279) completed the same survey but without the barriers and counselling practice questions.

**Results.** Physiotherapists and physiotherapy students consider that it is part of their role to give their patients non-treatment physical activity advice. Overall they report to have adequate knowledge and skills to undertake this role. Incorporating advice into normal consultations is deemed the most feasible form of lifestyle physical activity promotion in physiotherapy practice.

**Limitations.** The cross sectional nature of this study makes it hard to determine cause and effect relationships. Some selection bias may have occurred as the physiotherapists that completed the questionnaires may have been those most interested in physical activity promotion.

**Conclusions.** Physiotherapy practice appears to be an excellent avenue for promoting a physically active lifestyle and could potentially play an important public health role.

## **Introduction**

Physical activity is accepted world wide as a public health priority. A physically active lifestyle has been shown to significantly reduce the risk of developing cardiovascular disease, obesity, type 2 diabetes mellitus, several forms of cancer, and depression (A. E. Bauman, 2004; Garrett, Brasure, Schmitz, Schultz, & Huber, 2004; Haskell et al., 2007; Mathers, Vos, Stevenson, & Begg, 2000). Regular physical activity decreases all-cause mortality risk by 20-30% compared to insufficiently active people (Lee & Skerrett, 2001). Most of these effects on all-cause mortality can be assigned to the positive effects of physical activity on cardiovascular disease and cancer, the leading causes of mortality and morbidity in the western world.

This epidemiological evidence has been synthesised into recommended levels of physical activity for metabolic health and cardiovascular disease prevention by the American College of Sport Medicine and the American Heart Association. The recommendation states that adults should be active on five days per week and accumulate at least 30 minutes of moderate-intensity activity daily (A. E. Bauman, 2004; Haskell et al., 2007). Recommended levels of physical activity for cardiovascular health can be comprised of all types of regular activity such as structured exercise, active commuting, incidental activity and active living, and active sport and recreation. Only half of all Australian adults meet these physical activity recommendations (Chau et al., 2008), which means the other half is at increased risk of developing cardiovascular disease, diabetes, obesity, several forms of cancer, and a range of other chronic diseases. In the US, physical inactivity is an

even wider spread public health problem with only a quarter of US adults meeting the national physical activity recommendations (Brownson, Boehmer, & Luke, 2005). The public health challenge is to develop approaches that reach large numbers of people with evidence-based primary prevention strategies.

Primary health care practitioners are ideally positioned to promote physical activity as a health promotion measure. Many patients that present to primary care have health problems that could be prevented by a physically active lifestyle (H. P. van der Ploeg et al., 2007). For the past decade there has been a focus on using primary care physicians to promote physical activity. Strategies implemented by primary care physicians have demonstrated mixed success (Eaton & Menard, 1998; Hillsdon, Thorogood, White, & Foster, 2002; Lawlor & Hanratty, 2001; Marshall, Booth, & Bauman, 2005), with most programs showing modest effect sizes and only in the short term (Smith, Merom, Harris, & Bauman, 2002). It has been suggested that a reasonable approach for primary care physicians to adopt is to undertake brief interventions with inactive patients who have health conditions which could be reduced by physical activity participation (Smith et al., 2002). However, the main barriers to health promotion identified by primary care physicians are perceived lack of training, beliefs that they are unable to change health habits, time constraints, and lack of confidence (A. Bauman, Mant, Middleton, Mackertich, & Jane, 1989; Pinto, Goldstein, & Marcus, 1998). While campaigns about the importance of physical activity have improved knowledge of primary care physicians, it has not translated into counselling more patients in physical activity (Buffart et al., 2009; H. P. van der Ploeg et al., 2007).

Physiotherapists are primary care practitioners who are thought to have great potential for physical activity promotion (Verhagen & Engbers, 2009). They prescribe exercise for a wide range of conditions (mostly musculoskeletal) requiring rehabilitation. However, currently physiotherapy is mainly a tertiary prevention discipline even though physiotherapists are equipped with the ideal skills and potential to act in a primary prevention role. In the US a survey of physiotherapists indicated that increasing physical activity was the most frequent area of focus for health promotion behaviour (Rea, Hopp Marshak, Neish, & Davis, 2004). The physiotherapists confidence in prescribing non treatment physical activity programs is the best predictor of whether physical activity is prescribed (Rea et al., 2004). Although it is believed that physiotherapists should be involved in physical activity promotion (Verhagen & Engbers, 2009), the views of individual physiotherapists about their potential role in physical activity promotion are not well known. Hence, the feasibility and acceptability of physical activity promotion in the physiotherapy setting needs to be explored (Harris & Smith, 2003). Therefore the aims of this study were to determine the knowledge, confidence, role perception, barriers, feasibility and counselling practice of physiotherapists and physiotherapy students regarding the promotion of non-treatment physical activity for better health.

## **Methods**

In June 2008, a random sample of 602 physiotherapists was mailed the study survey by regular post. The random sample was drawn from all physiotherapists in the state

of New South Wales (Australia) that were members of the Australian Physiotherapy Association. At the time of the survey there were 6585 registered physiotherapists in NSW (New South Wales Department of Health, 2009). To maximise the response rate, the original sample was sent a reminder after two months to complete the survey if they had not returned it. Three different groups of physiotherapy students from the University of Sydney were surveyed at the end of a lecture. First year (n=161) and fourth year (n=136) students enrolled in a Bachelor of Applied Science in Physiotherapy degree, and first year students (n=59) from the Masters of Physiotherapy were invited to complete the survey. All surveys were entered by the same person in a preset data entry system, and ~10% was randomly checked by one of the other researchers for entry mistakes and showed good data entry quality. The study was approved by the Human Research Ethics Committee of the University of Sydney.

### **Survey Design**

The survey was adapted from a previous survey used in primary care physicians,<sup>8</sup> that was designed based on focus groups with primary care physicians and initial pilot testing. (Mark, Miners, Bauman, & Wallner, 1999) The survey is presented in Appendix 1 and covered the following topics: knowledge about the amount of physical activity required for health benefits in adults (4 items), perception of the role of physiotherapists in physical activity promotion (2 items), confidence in promoting physical activity (3 items), barriers to physical activity promotion (6 items), and feasibility of different physical activity promotion strategies (4 items). All items were scored on a five-point Likert scale. Physiotherapists were also asked

about the number of patients they encouraged in the previous month to lead a more physically active lifestyle. Finally, general demographic data was recorded, and participants were asked how they would rate their own physical activity levels compared to other Australians of the same gender and age on a five-point scale (ranging from much more active to much less active), which has been shown to accurately determine relative proportions of active and inactive people (Slater, Green, Vernon, & Keith, 1987). The physiotherapy student survey was similar to the physiotherapist's survey but did not include the items on physical activity promotion practice and barriers.

### **Data Analysis**

The responses to the questions on knowledge, role perception, confidence, feasibility and barriers were dichotomised by combining the two 'agree' options and combining the 'neutral' with the two 'disagree' options. The question on numbers of patients counselled about physical activity each month was dichotomised at ten or more per month and less than ten per month, because this division resulted in two almost equally sized groups and hence optimised statistical power for the analysis.

Descriptive analysis was used to provide a basic quantitative description of the data set. The personal characteristics of all physiotherapists registered in the state of New South Wales were reported to give an indication of how representative our physiotherapist's sample was (New South Wales Department of Health, 2009). Inferential comparisons were made on knowledge, confidence, role perception, barriers, feasibility and counselling practice of physical activity between groups

using multiple logistic regression analyses. The logistic regression analyses were used to calculate odds ratios to compare physiotherapists that encouraged 10 or more patients per month to become more active to physiotherapists that encouraged less than 10 patients per month. Similarly, odds ratios were calculated using logistic regression to compare physiotherapists, the fourth year Bachelor, and first year Master students to the first year Bachelor students. All logistic regression analyses were checked for possible confounding between groups from gender, years in practice, hours worked per week, and number of patients treated per week. Possible confounders were added to the regression model and variables that changed the odds ratio by at least 10% were identified as confounders and were corrected for in the final analysis. The logistic regression analyses were repeated to stratify for physiotherapists working in the public and private health care sectors. All analyses were performed in SPSS version 17.

## **Results**

A total of 319 physiotherapists (54%) completed the survey and 279 (78%) students attending the scheduled lectures when the survey was administered completed the survey. The personal characteristics of the participating physiotherapists are described in Table 2.1, which also describes the personal characteristics of all physiotherapists registered in the state of New South Wales. The proportion of females was greater in the physiotherapists group (73%) compared to the student groups which had a more even distribution of females to males (58% female year 1 Bachelor students, 68% female year 4 Bachelor students, and 52% female Master

students). The majority of physiotherapists and students considered themselves more physically active in comparison to Australians of their gender and age (Table 2.2 & 2.3).

**Table 2.1:** Personal characteristics of the physical therapists participating in this study and of all physical therapists registered in the state of New South Wales, Australia.<sup>a</sup>

Variable	Study sample (n=319)	All physical therapists in New South Wales (n=6585) <sup>20</sup>
Gender female, n (%)	233 (73)	4863 (74)
Age, n (%)		
<35 yrs	133 (42)	2536 (38)
35-44 yrs	94 (29)	1821 (28)
45-54 yrs	69 (22)	1454 (22)
≥55 yrs/over	22 (7)	774 (12)
Private practice, n (%)	182 (57)	3753 (57)
Years in practice, mean (SD)	14 (11)	NA
Number of patients treated per week, mean (SD)	50 (26)	NA
Hours worked per week, mean (SD)	34 (11)	33 (NA)

<sup>a</sup>SD=standard deviation, NA=not available.

Over half of the physical therapists (54%) reported that they encouraged ten or more patients each month to lead a more physically active lifestyle (beyond therapeutic exercises). Table 2.2 presents the knowledge, role perception, confidence, barriers and feasibility of physical activity promotion for physiotherapists who encouraged 10 or more

patients per month to become more active and those that encouraged less than 10 patients per month. There were no major differences between the physiotherapists who gave physical activity advice more frequently and those who gave less advice with regard to their knowledge of the physical activity message. However, only one third of the respondents could name the national physical activity recommendation for Australian adults. In both groups, almost all physiotherapists thought it should be part of their role to give their patients physical activity advice. Physiotherapists who gave more patients physical activity advice were more likely to feel confident in suggesting specific physical activity programs. They were also less likely to identify lack of time, or the perception that it wouldn't change the patient's behaviour as barriers to promote a physically active lifestyle in their patients. Overall, physiotherapists generally did not identify many barriers to promoting physical activity to their patients. Almost all physiotherapists thought it would be feasible to incorporate brief physical activity counselling into regular treatment sessions. Separate one on one and group physical activity consultations were thought to be less feasible, although almost two thirds of the physiotherapists who gave physical activity advice more frequently still thought these were feasible avenues for physical activity promotion. Ninety percent of physiotherapists also thought it would be feasible to distribute physical activity promotion resources.

Physiotherapists working in the public and private health care sectors showed similar responses to the survey (data not shown). However, physiotherapists in private practice were less likely to report that physical activity promotion would not change the patients' behaviour (OR=0.38,  $p<0.01$ ). Compared to the public sector, private practice physiotherapists more frequently identified usual treatment consultations

(OR=3.76,  $p<0.01$ ) or separate one on one sessions (OR=1.99,  $p<0.01$ ) as feasible avenues for physical activity promotion, while group sessions were thought to be less suitable (OR=0.55,  $p=0.01$ ).

**Table 2.2:** Physical therapists knowledge, role perception, confidence, barriers and feasibility of physical activity promotion.<sup>a</sup>

Variable	Counselled <10 patients/month (n=140) n agree (%)	Counselled ≥10 patients/month (n=165) n agree (%)	Odds ratio (95%CI) for physiotherapists who counselled ≥10 patients/month compared to <10 <sup>b</sup>
<b>Knowledge of PA message</b>			
Taking the stairs at work and generally being more active each day is enough physical activity to improve health	80 (58)	83 (51)	0.70 (0.44 to 1.13)
Half an hour of walking on most days is all the exercise that is needed for good health	77 (56)	100 (61)	1.40 (0.87 to 2.26)
Exercise that is good for health must make you puff and pant	35 (25)	45 (27)	1.12 (0.66 to 1.91)
Several short walks of 10 minutes each on most days is better than one round of golf per week for good health	99 (71)	132 (80)	1.83 (1.05 to 3.17) <sup>c</sup>
<b>Physiotherapists role</b>			
Discussing the benefits of a physically active lifestyle with patients is part of the Physiotherapists role	132 (94)	160 (97)	1.69 (0.53 to 5.39)
Suggesting to patients ways to increase daily physical activity is part of the Physiotherapists role	130 (93)	161 (98)	3.07 (0.92 to 10.25)
Physiotherapists should be physically active to act as a role model for their patients	127 (91)	158 (96)	2.58 (0.97 to 6.85)
<b>Confidence in giving PA message</b>			
I would feel confident in giving general advice to patients on a physically active lifestyle	134 (96)	160 (97)	1.28 (0.37 to 4.38)
I would feel confident in suggesting specific physical activity programs for my patients	121 (87)	156 (96)	2.48 (1.03 to 5.99) <sup>c</sup>
<b>Barriers to PA promotion</b>			
Lack of time	47 (34)	25 (15)	0.32 (0.18 to 0.57) <sup>c</sup>
Lack of counselling skills	11 (8)	0 (0)	
Lack of remuneration for promoting physical activity	12 (9)	15 (9)	0.85 (0.37 to 1.96)
Lack of interest in promoting physical activity	2 (1)	1 (1)	
Feeling it would not change the patients behaviour	28 (20)	9 (6)	0.25 (0.11 to 0.56) <sup>c</sup>
Feeling it would not be beneficial for the patient	3 (2)	1 (1)	
<b>Feasibility of PA promotion strategies</b>			
Brief counselling integrated into regular consults	122 (88)	158 (97)	3.65 (1.29 to 10.31) <sup>c</sup>
Separate one on one consultations	46 (33)	102 (63)	3.25 (1.98 to 5.32) <sup>c</sup>
Group sessions	67 (48)	98 (60)	1.69 (1.05 to 2.72) <sup>c</sup>
Distribution of resources (such as brochures)	124 (89)	147 (90)	1.14 (0.53 to 2.45)
<b>Physiotherapist's PA level</b>			
How physically active do you think you are	103 (74)	137 (83)	1.67 (0.94 to 2.98)

currently compared to other Australians of your gender and age? (agree = more active)			
Are you aware of the physical activity guidelines	46 (35)	56 (34)	1.09 (0.66 to 1.79)

<sup>a</sup>CI=confidence interval, PA=physical activity.

<sup>b</sup>Adjusted for gender and years in physical therapy practice.

<sup>c</sup> $P < .05$ .

Table 2.3 shows the results of the comparison of physiotherapy students and practicing physiotherapists with regard to knowledge, role perception, confidence, and feasibility of physical activity promotion. Knowledge of the public health physical activity message showed a gradual improvement from the first year bachelor students onwards. Almost all respondents agreed that promoting a physically active lifestyle is part of the role of a physiotherapist, and as students progress towards being graduate physiotherapists their confidence in promoting physical activity grows. The most feasible method of promoting physical activity seems to be incorporating brief counselling into a normal consultation, with provision of resources as the next most feasible method.

**Table 2.3:** Comparison of physiotherapy students and practicing physiotherapists with regard to knowledge, role perception, confidence, and feasibility of physical activity promotion.<sup>a</sup>

Variable	Group (students or physio therapist)	N Agree (%)	Odds ratio (95%CI) <sup>f</sup>
<b>Knowledge of PA message</b>			
Taking the stairs at work and generally being more active each day is enough physical activity to improve health	BSc year 1 <sup>b</sup>	33 (36)	1.00
	BSc year 4 <sup>c</sup>	48 (38)	1.10 (0.63 to 1.93)
	MP year 1 <sup>d</sup>	22 (44)	1.38 (0.71 to 2.70)
	PT <sup>e</sup>	167 (53)	1.95 (1.20 to 3.16) <sup>g</sup>
Half an hour of walking on most days is all the exercise that is needed for good health	BSc year 1 <sup>b</sup>	26 (28)	1.00
	BSc year 4 <sup>c</sup>	48 (38)	1.53 (0.86 to 2.75)
	MP year 1 <sup>d</sup>	29 (48)	2.48 (1.25 to 4.92) <sup>g</sup>
	PT <sup>e</sup>	187 (59)	3.64 (2.08 to 5.77) <sup>g</sup>
Exercise that is good for health must make you puff and pant	BSc year 1 <sup>b</sup>	31 (34)	1.00
	BSc year 4 <sup>c</sup>	35 (28)	0.82 (0.45 to 1.47)
	MP year 1 <sup>d</sup>	22 (37)	1.14 (0.57 to 2.26)
	PT <sup>e</sup>	85 (27)	0.77 (0.47 to 1.27)
Several short walks of 10 minutes each on most days is better than one round of golf per week for good health	BSc year 1 <sup>b</sup>	57 (63)	1.00
	BSc year 4 <sup>c</sup>	86 (69)	1.28 (0.73 to 2.27)
	MP year 1 <sup>d</sup>	41 (67)	1.19 (0.60 to 2.37)
	PT <sup>e</sup>	244 (77)	1.96 (1.19 to 3.24) <sup>g</sup>
<b>Physiotherapists role</b>			
Discussing the benefits of a physically active lifestyle with patients is part of the physiotherapists role	BSc year 1 <sup>b</sup>	84 (91)	1.00
	BSc year 4 <sup>c</sup>	119 (94)	1.61 (0.56 to 4.63)
	MP year 1 <sup>d</sup>	57 (93)	1.80 (0.46 to 7.07)
	PT <sup>e</sup>	305 (96)	2.11 (0.85 to 5.24)
Suggesting to patients ways to increase daily physical activity is part of the physiotherapists role	BSc year 1 <sup>b</sup>	75 (82)	1.00
	BSc year 4 <sup>c</sup>	119 (94)	3.61 (1.42 to 9.23) <sup>g</sup>
	MP year 1 <sup>d</sup>	55 (90)	2.33 (0.80 to 6.74)
	PT <sup>e</sup>	305 (96)	4.73 (2.19 to 10.19) <sup>g</sup>
Physiotherapists should be physically active to act as a role model for their patients	BSc year 1 <sup>b</sup>	88 (96)	1.00
	BSc year 4 <sup>c</sup>	115 (91)	0.46 (0.14 to 1.51)
	MP year 1 <sup>d</sup>	52 (85)	0.26 (0.08 to 0.88) <sup>g</sup>
	PT <sup>e</sup>	298 (93)	0.63 (0.21 to 1.91)
I would encourage most my patients to have a physically active lifestyle if I was in physiotherapy practice	BSc year 1 <sup>b</sup>	89 (97)	1.00
	BSc year 4 <sup>c</sup>	116 (92)	0.50 (0.05 to 4.95)
	MP year 1 <sup>d</sup>	60 (98)	2.19 (0.02 to 1.56)
	PT <sup>e</sup>	NA	NA
<b>Confidence in giving PA message</b>			
I would feel confident in giving general advice to patients on a physically active lifestyle	BSc year 1 <sup>b</sup>	80 (87)	1.00
	BSc year 4 <sup>c</sup>	110 (87)	1.16 (0.51 to 2.64)
	MP year 1 <sup>d</sup>	58 (95)	4.23 (0.91 to 19.69)
	PT <sup>e</sup>	308 (97)	4.64 (1.95 to 11.01) <sup>g</sup>
I would feel confident in suggesting specific physical activity programs for my patients	BSc year 1 <sup>b</sup>	62 (67)	1.00
	BSc year 4 <sup>c</sup>	102 (81)	2.28 (1.20 to 4.30) <sup>g</sup>
	MP year 1 <sup>d</sup>	57 (93)	9.09 (2.62 to 31.51) <sup>g</sup>
	PT <sup>e</sup>	290 (91)	5.54 (3.05 to 10.06) <sup>g</sup>

<b>Feasibility of PA promotion strategies</b>			
Brief counselling integrated into regular consults	BSc year 1 <sup>b</sup>	59 (65)	1.00
	BSc year 4 <sup>c</sup>	92 (73)	1.60 (0.88 to 2.89)
	MP year 1 <sup>d</sup>	53 (87)	3.48 (1.47 to 8.24) <sup>g</sup>
	PT <sup>e</sup>	293 (93)	7.15 (3.88 to 13.17) <sup>g</sup>
Separate one on one consultations	BSc year 1 <sup>b</sup>	50 (55)	1.00
	BSc year 4 <sup>c</sup>	55 (44)	0.65 (0.37 to 1.12)
	MP year 1 <sup>d</sup>	19 (31)	0.35 (0.17 to 0.69) <sup>g</sup>
	PT <sup>e</sup>	157 (50)	0.83 (0.52 to 1.34)
Group sessions	BSc year 1 <sup>b</sup>	60 (66)	1.00
	BSc year 4 <sup>c</sup>	105 (83)	2.72 (1.43 to 5.20) <sup>g</sup>
	MP year 1 <sup>d</sup>	36 (59)	0.72 (0.37 to 1.41)
	PT <sup>e</sup>	174 (55)	0.65 (0.40 to 1.05)
Distribution of resources (such as brochures)	BSc year 1 <sup>b</sup>	62 (68)	1.00
	BSc year 4 <sup>c</sup>	108 (86)	2.74 (1.41 to 5.35) <sup>g</sup>
	MP year 1 <sup>d</sup>	49 (80)	2.09 (0.95 to 4.60)
	PT <sup>e</sup>	282 (89)	3.84 (2.17 to 6.80) <sup>g</sup>
<b>PA level</b>			
How physically active do you think you are currently compared to other Australians of your gender and age? (agree = more active)	BSc year 1 <sup>b</sup>	55 (60)	1.00
	BSc year 4 <sup>c</sup>	66 (53)	0.81 (0.46 to 1.41)
	MP year 1 <sup>d</sup>	43 (71)	1.47 (0.73 to 2.98)
	PT <sup>e</sup>	248 (77)	2.59 (1.56 to 4.30) <sup>g</sup>

<sup>a</sup>CI=confidence interval, PA=physical activity, BSc=Bachelor of Applied Science in Physiotherapy,

MP=Master of Physiotherapy, PT=Physiotherapist.

<sup>b</sup> n = 92 in BSc year 1 (= reference category).

<sup>c</sup> n = 127 in BSc year 4.

<sup>d</sup> n = 59 in MP year 1.

<sup>e</sup> n = 319 in the surveyed physiotherapists.

<sup>f</sup>Adjusted for gender

<sup>g</sup>P<.05.

## **Discussion**

The current study indicates that physiotherapists and physiotherapy students believe that physical activity prescription for health promotion should be part of their role, and they would be confident in this role. Integrating brief counselling into usual treatment sessions was thought to be the most feasible form of physical activity promotion in physiotherapy practice, followed by the distribution of resources such as brochures.

The results of our study are comparable with the attitudes of Australian primary care physicians, who completed a similar survey and indicated that 98% believed that physical activity promotion was part of the physician's role (Buffart et al., 2009). However, the surveyed physicians felt less confident in giving physical activity advice than the current sample of physiotherapists, with about 22% less physicians feeling confident in giving specific physical activity advice than the physiotherapists (Buffart et al., 2009). This gives physiotherapy practice an advantage over other primary care practitioners for successfully integrating lifestyle physical activity promotion into practice. Furthermore, our findings showed that the surveyed physiotherapists identified few barriers to promoting an active lifestyle, while a number of those same barriers are known to frequently prevent physicians from promoting physical activity, especially lack of time, absence of reimbursements, and limited counselling skills (Bull, Schipper, Jamrozik, & Blanksby, 1995; Eakin, Brown, Marshall, Mummery, & Larsen, 2004; H. P. van der Ploeg et al., 2007). In contrast, physiotherapists have extensive training in exercise prescription for treatment purposes and at present mainly operate in a tertiary prevention capacity.

Our results support the earlier notion that physiotherapists are underutilised for promoting a physically active lifestyle and appear to be well placed to play an important public health role (Sheedy et al., 2000; Verhagen & Engbers, 2009).

Although the role of physiotherapists as promoters of a physically active lifestyle has received only limited attention in the literature, they are believed to be appropriate primary care practitioners for this role (Leijon, Bendtsen, Nilsen, Ekberg, & Stahle, 2008; Rea et al., 2004; Sheedy et al., 2000). In three states in the USA when physiotherapists perceptions of health promotion behaviours were surveyed it was apparent that 54% believed physiotherapists were involved in promotion of health and fitness (Rea et al., 2004). In Sweden, an audit of the amount of physical activity prescription by various health professionals indicated that physiotherapists provided the highest number of physical activity referrals, with physicians being among the lowest (Leijon et al., 2008). The most common reasons for physical activity prescription were musculoskeletal, overweight, diabetes and high blood pressure although it was not clear how frequently physiotherapists prescribed physical activity for conditions other than musculoskeletal conditions. People receiving physical activity lifestyle advice in a physiotherapy outpatient department in Australia were more likely to increase their average weekly physical activity by sixty minutes compared to a control group (Sheedy et al., 2000). However, this was the only significant difference evident between the groups in the average weekly physical activity measures in this controlled intervention trial. The authors stated that the capacity of physiotherapists to give physical activity for non-therapeutic purposes could be further improved but that the physiotherapy setting was a feasible avenue for promoting an active lifestyle.

Physiotherapists that already gave more patients physical activity lifestyle advice also appeared to have somewhat greater knowledge on physical activity promotion. This result is similar to that for physicians, which found that those who attended relevant workshops were more likely to give physical activity advice (H. P. van der Ploeg et al., 2007). Physiotherapists who gave more patients physical activity advice also were slightly more confident and reported fewer barriers to promoting physical activity in their practice. Because of the cross sectional nature of our study, cause and effect are hard to determine. So it remains unclear if the physiotherapist's better knowledge and confidence and lower perceived barriers enabled them to integrate physical activity promotion more easily into their daily practice, or if these factors improved because they had already incorporated physical activity promotion more into their routine care. Physiotherapist's awareness of the physical activity guidelines was not correlated with the number of patients counselled on average, and was surprisingly low with just one third being aware of the national physical activity guidelines.

Physiotherapists indicate that separate one on one consultations are less feasible for physical activity promotion, while incorporating non-treatment physical activity advice into normal consultations is deemed feasible by almost all physiotherapists. Previous intervention work in the rehabilitation setting has shown that a physical activity counsellor can effectively improve patient's daily physical activity levels in a series of one on one counselling sessions (van der Ploeg et al., 2006; H. van der Ploeg et al., 2007). In light of our findings, integrating a similar intervention into physiotherapy practice might be feasible if the physiotherapist would give a brief

physical activity promotion intervention during or following the treatment session(s) that the patients receive for their initial health condition. This strategy would employ the physiotherapist's knowledge and skills on exercise prescription, while simplifying the logistics of the intervention and making the intervention more convenient for the patient. Such an intervention strategy would also lower the costs, as the physical activity advice is built into existing consultation time for another condition, and would make good use of clinical contact time, as well as build on the patient-physiotherapist relationship. As physiotherapy treatment is usually spread out over several sessions over a number of weeks, this will allow time for the provision of sequential physical activity advice that has previously been shown to be important for effective physical activity promotion (van der Ploeg et al., 2006; H. van der Ploeg et al., 2007).

Comparison between the groups of students revealed some interesting differences which may be accounted for by their different backgrounds as well as their increasing knowledge through their studies. The bachelor students are primarily high school graduates enrolled in their first degree while the master students all have a prior bachelor degree in for example exercise and sport sciences or human movement science. Many of the master students have held jobs in gymnasium environments or as personal trainers where their primary role is to assist people with exercise training. Our results showed that the further the students had advanced through their studies the more likely they are to have similar perceptions as the practicing physiotherapists. This suggests that the students are learning about the possibilities of promoting non-treatment physical activity through physiotherapy practice during their current physiotherapy curriculum. However, it has also been

suggested that the capacity of Australian physiotherapists to give their patients physical activity advice for non-treatment purposes could be improved further, and could possibly be better embedded in the physiotherapy curriculum (Sheedy et al., 2000). Furthermore, the current study only surveyed students from one university, so it is possible that students from universities with somewhat different curricula would have answered these questions differently.

The main limitations of this study are the cross sectional nature of the study that was mentioned earlier and the potential selection bias of study recruitment. Although our survey had a higher response rate (54%) than a similar survey in primary care physicians (40%) (Buffart et al., 2009), only just over half of the invited randomly sampled physiotherapists responded to the survey. Physiotherapists that chose to participate may have been those that are more interested in physical activity and health promotion in general. Hence, our results might have overestimated the perceived role, confidence and feasibility of promoting a physically active lifestyle in physiotherapy practice. However, comparison of the personal characteristics of our sample to all physiotherapists registered in New South Wales (Table 2.1) suggests that our study sample was representative for the physiotherapy workforce in New South Wales for at least these personal characteristics. Finally, the study sample size might have been insufficient to detect significant differences between groups for some of the variables that were studied.

## **Conclusion**

This study highlights the previously untapped potential for physiotherapists to give non-treatment physical activity advice during regular treatment. Physiotherapists, current and future, recognise this as one of their roles and are confident in their ability to promote lifestyle physical activity. They perceive few barriers to promoting physical activity and thought that integrating brief counselling into usual treatment sessions was the most feasible form of physical activity promotion in physiotherapy practice. The results of this study highlight the need to further explore the possibilities to integrate lifestyle physical activity promotion in physiotherapy practice to determine its potential important role in public health.

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## **CHAPTER THREE**

# **PHYSICAL ACTIVITY PROMOTION IN PHYSIOTHERAPY: A SYSTEMATIC REVIEW**

This Chapter was submitted for publication as

SHIRLEY D, VAN DER PLOEG HP, BAUMAN AE. (2013) Physical Activity promotion in Physical Therapy: A Systematic Review. Submitted to Physical Therapy August 2013

## **Abstract**

**Background:** Physical inactivity is widely recognised as a major risk factor for chronic disease. Physiotherapists are underutilised for providing interventions to promote physical activity.

**Purpose:** The purpose of this study was to determine whether physiotherapists are effective in increasing physical activity behavior and /or improving health outcomes by providing physical activity intervention/health promotion messages. A secondary aim was to determine whether physiotherapists believe they have the skills to provide physical activity advice and whether they believe it is feasible or relevant for them to provide physical activity advice.

**Data Sources:** MEDLINE, CINAHL, EMBASE and SPORTDISCUS databases were searched from inception to February 2013. In addition, reference lists of key articles were hand searched. Only full-text English-language sources were included.

**Study Selection:** Studies that evaluated physical activity interventions delivered by physiotherapists to adults were eligible for inclusion in the review. In addition studies that explored the perceptions and practice of physiotherapists in delivering physical activity interventions were included.

**Data Extraction:** The search strategy yielded 2986 titles. The titles, abstracts and complete articles were assessed by 2 reviewers independently in accordance with a registered protocol. Each reviewer rated the included articles for quality and bias using the PEDro scale.

**Data Synthesis:** The final review consisted of 5 articles evaluating interventions and 5 reporting perceptions and practices of physiotherapists. Although definitive conclusions could not be drawn the limited evidence available suggests physiotherapists may be effective in delivering physical activity interventions. Physiotherapists also perceive promoting physical activity is part of their role.

**Limitations:** Included studies used a variety of interventions and outcome measures which made direct comparison difficult. The data were not suitable for meta-analysis.

**Conclusions:** There is limited evidence suggesting that physiotherapists may be effective in promoting physical activity to improve health. Well conducted randomised controlled trials are needed to investigate this question further.

This systematic review protocol is registered in Prospero Registration Number  
CRD42013004979

[http://www.crd.york.ac.uk/PROSPERO/display\\_record.asp?ID=CRD42013004979](http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42013004979)

## **Introduction**

Physical activity is accepted world wide as a public health priority and physical inactivity is widely recognised as a major risk factor in the leading chronic diseases. Addressing physical inactivity is a key public health priority for preventing chronic disease globally (Bauman, Murphy, & Lane, 2009; Kohl et al., 2012). Physical inactivity has been identified as the fourth leading risk factor for global mortality, accounting for 9% of global deaths and accounting for as many deaths globally as tobacco smoking (Lee et al., 2012; World Health Organization, 2009). There is an inverse association between physical activity and all cause mortality ie physically active people have a 30% lower chance of dying then those that are physically inactive (Physical Activity Guidelines Advisory Committee, 2008). Mortality associated with physical inactivity is not restricted to high income countries and affects countries at all levels of development (World Health Organization, 2009).

The benefits of physical activity to health and preventing chronic diseases such as heart disease, diabetes, obesity, depression are well established (Kohl et al., 2012; Lee et al., 2012; U.S. Department of Health and Human Services, 2008). Primary care health practitioners are ideally positioned to promote physical activity as a health promotion measure (The Toronto Charter for Physical Activity, 2010; World Health Organization, 2010), and their patients are often inactive and at higher risk for developing chronic disease. A recent review in The Lancet showed that physical activity interventions based in primary care can generate larger health gains than other interventions, with favourable cost effectiveness (Cecchini et al., 2010). For the past decade there has been a focus on using general practitioners (GPs) as

professionals to promote physical activity (Smith, van der Ploeg, Buffart, & Bauman, 2008). Strategies implemented by GPs have demonstrated mixed success (Eaton & Menard, 1998; Fox, Biddle, Edmunds, Bowler, & Killoran, 1997; Hillsdon, Thorogood, White, & Foster, 2002; Lawlor & Hanratty, 2001; Lawton et al., 2008; Marshall, Smith, Bauman, & Kaur, 2005; Smith, Bauman, Bull, Boot, & Harris, 2000) with better success in the short term (Fox et al., 1997; Smith, Merom, Harris, & Bauman, 2002). The results in terms of long term change are poor (Fox et al., 1997). The main barriers to promoting physical activity reported by GPs are perceived lack of training, beliefs that they are unable to change health habits, time constraints and lack of reimbursement (Bauman, Mant, Middleton, Mackertich, & Jane, 1989; Bull, Schipper, Jamrozik, & Blanksby, 1995; Pinto, Goldstein, DePue, & Milan, 1998). These results mainly reflect attitudes in the UK and USA. Slightly different results have been observed in recent Australian studies of GPs, who believe that health promotion is part of their role and over the last decade, have improved their knowledge and confidence in physical activity counselling (Buffart et al., 2009; van der Ploeg et al., 2007).

Physiotherapists are primary care practitioners who are potentially suited to a role in prescribing physical activity for health. Physiotherapists prescribe exercise for a wide range of conditions requiring rehabilitation and are therefore mainly involved in tertiary prevention. A recent survey of Australian physiotherapists indicated that physiotherapists believe that promoting physical activity is part of their role and that they think they have the skills and knowledge to fulfil this role (Shirley, van der Ploeg, & Bauman, 2010). The physiotherapy profession (World Confederation of Physical Therapists) globally recognises that promoting physical activity and health

promotion are an integral part of the physiotherapist's role both at the present time and into the future (APA, 2005; College of Physical Therapists of Alberta, 2007; WCPT, 2011). It is therefore necessary to determine whether physiotherapists are effective in embracing this role to change physical activity behaviours.

The research questions for this study are to determine whether physiotherapists providing physical activity intervention /health promotion messages are effective in increasing physical activity behaviour and /or improving health outcomes. The secondary aims of this study are to determine whether physiotherapists believe they have the skills to provide physical activity advice and whether they believe it is feasible or relevant for them to provide physical activity advice.

## **Methods**

This systematic review was conducted in accordance with the protocol that was developed by the authors. The protocol is registered with Prospero, the International Prospective Register of Systematic Reviews (Registration Number CRD42013004979

[http://www.crd.york.ac.uk/PROSPERO/display\\_record.asp?ID=CRD42013004979](http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42013004979) )

### **Data Sources and Searches**

A systematic electronic search was conducted of the following bibliographic databases from inception to September 2011: MEDLINE, CINAHL, EMBASE and SPORTDISCUS. Search strategies for the databases included the terms 'physiotherapy' or 'physical therapy' or 'physical therapist' or 'physiotherapist' and

‘physical activity’ or ‘exercise’ or ‘walk’ and ‘health promotion’ or ‘health education’ or ‘patient education’. A restriction to retrieve only articles in English was applied.

### **Study Selection**

The search was conducted by initially selecting articles for inclusion by title, then abstract, then by reading the full text. The reference lists of included articles were scanned for any additional relevant articles. The searching and assessing of retrieved studies was conducted by one investigator (DS). A second investigator (HVP) reviewed the full text papers and rated the papers identified as suitable for inclusion. Intervention studies were included in the systematic review if they met the eligibility criteria outlined in Box 1. Studies of reported practice and perceptions of physiotherapists were included in the systematic review if they met the eligibility criteria outlined in Box 2.

## Box 1 Inclusion criteria for intervention studies

### Design

- All trials discussing strategies to get adults more physically active in the physiotherapy setting

### Participants

- adults over age 18 without medical conditions that limit physical activity

### Intervention

Must be provided by physiotherapists and include any of the following:

- One-to-one counselling/advice or group counselling/advice for physical activity;
- Self-directed or prescribed physical activity;
- Supervised or unsupervised physical activity;
- Home-based or facility-based physical activity;
- Ongoing face-to-face support for physical activity;
- Telephone support for physical activity;
- Written education/motivation support material for physical activity ;
- Self monitoring of physical activity.

### Outcome measures

- Physical activity OR cardio-respiratory fitness

## Box 2 Inclusion criteria for studies practice and perceptions of physiotherapists

### Design

All studies evaluating practice and perceptions of physiotherapists about providing physical activity messages/ advice to patients in physotherapy setting

### Participants

Physiotherapists or physiotherapy students

### Methodology

Surveys/interviews including questions of any of the following:

- Current practice of prescribing physical activity
- Attitudes to prescribing physical activity
- Understanding of physical activity recommendations
- Feasibility of prescribing physical activity
- Barriers to prescribing physical activity

### **Data Extraction and Quality Assessment**

The included studies in the intervention trials were assessed for methodological quality using the Physiotherapy Evidence Database (PEDro) rating scale by 2 of the investigators. The PEDro scale was developed as a tool to assess methodological quality of RCTs for the Physiotherapy Evidence Database and is based on a list developed by Verhagen et al (1998). It consists of 11 items (Table 3.1) which are scored 'yes' or 'no' depending on whether an item is satisfied. The maximum score is 10 for this study (the first item is not included as it relates to external validity (Maher, Sherrington, Herbert, Moseley, & Elkins, 2003). There is evidence for discriminant validity of 3 of the items and others are said to have face validity but this has not been established yet (Maher et al., 2003).

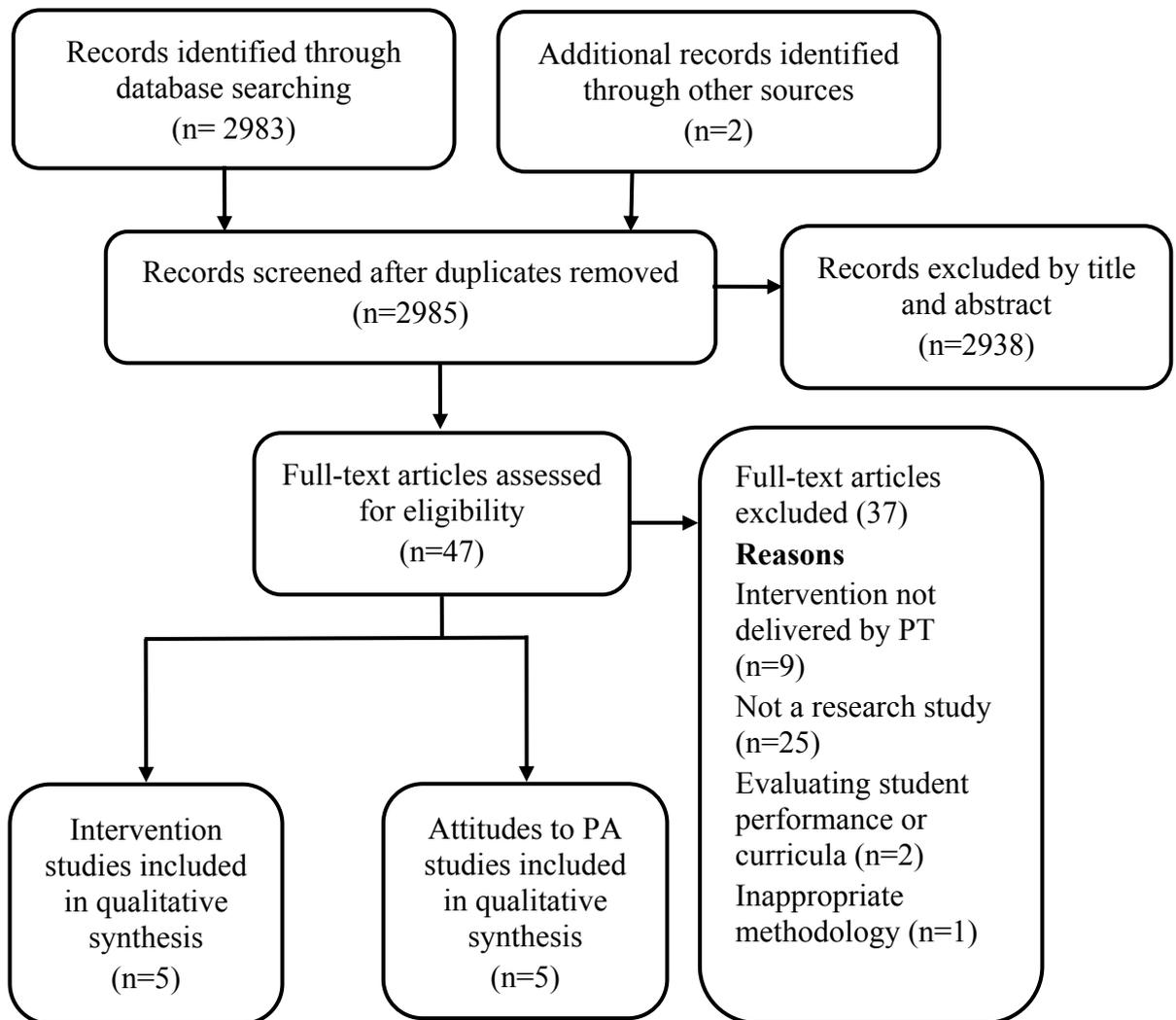
### **Data Synthesis and Analysis**

Once the studies meeting the eligibility criteria for inclusion in the review were assessed for quality more detailed data were extracted. Detailed data extraction included description of the participant groups, interventions and outcome measures as well as results of the physical activity interventions. Due to the variability of the methodology statistical pooling and analysis of the data was not appropriate so the results are presented in narrative format.

### **Results**

The search strategy returned 2985 titles and after the screening process 10 were selected for inclusion in the review (Figure 3.1). Included studies were categorised into 2 groups: intervention studies (n=5) and those investigating physiotherapists'

perceptions and reported practice regarding physical activity advice to promote a healthy lifestyle (n=5).



**Figure 3.1** Flow Chart of retrieval of studies to include in the systematic review

### **Intervention studies**

Fourteen intervention studies were identified from the title and abstract search and after reading the full text articles; 5 were deemed suitable for inclusion in the review (Table 3.2). The main reason for exclusion of the other 9 studies was that

physiotherapists were not the practitioner providing the intervention or outcome measures were not related specifically to physical activity or cardiovascular fitness.

The methodological quality of the 5 included studies varied from 2 to 6 out of 10 (Table 3.1). A consensus meeting was held and differences in scores between the two raters were resolved. The study that scored only 2 points on the quality scale (Quinn, Doody, & O'Shea, 2008), was not a randomised controlled trial. The other studies were rated between 4 and 6 and were conducted as quasi experimental studies or randomised controlled trials.

**Table 3.1** Methodological quality of included intervention studies rated using the PEDro scale. The first item “Eligibility Criteria Satisfied” is not included in the score. Therefore the score is out of 10.

<b>Parameter</b>	<b>Sheedy et al 2000</b>	<b>Quinn et al 2007</b>	<b>Shaw and Page 2008</b>	<b>Chambers et al 2000</b>	<b>Lamb et al 2002</b>
Eligibility Criteria satisfied	Yes	Yes	Yes	Yes	Yes
Random allocation	No	No	Yes	Yes	No
Randomisation concealed	No	No	Yes	No	No
Baseline comparability	No	No	No	Yes	Yes
Blinding of participants	No	No	No	No	No
Blinding of therapists	No	No	No	No	No
Blinding of assessors	No	No	No	No	Yes
Less than 15% dropouts	Yes	Yes	Yes	No	No
Intention-to-treat analysis	Yes	No	Yes	No	Yes
Between-group statistical comparisons	Yes	No	Yes	Yes	Yes
Point measures and variability data	Yes	Yes	Yes	Yes	Yes
<b>Total Score /10</b>	<b>4/10</b>	<b>2/10</b>	<b>6/10</b>	<b>4/10</b>	<b>5/10</b>

**Table 3.2** Summary of included intervention studies promoting physical activity using physical therapists

Study	Design	Participants	Intervention	Outcome measures	Results
Sheedy et al 2000	Quasi experimental controlled trial	89 intervention Age (yr) = 50 (SD 16) Gender = 60% F, 40% M 115 control Age = 52 (SD 18) Gender = 61% F, 39% M	Exp = 3 components <ul style="list-style-type: none"> <li>Brief counselling about physical activity (5 minutes delivered in a single session) tailored to subject's stage of readiness for change for physical activity delivered by physiotherapists</li> <li>Information brochure</li> <li>Diary to record physical activity goals and weekly progress for up to 4 weeks</li> </ul> Con = usual care	<ul style="list-style-type: none"> <li>Physical activity participation measured at baseline and 6 weeks post intervention by <ul style="list-style-type: none"> <li>Increase in physical activity compared to baseline</li> <li>An increase in physical activity of 60 minutes or more per week compared with baseline</li> <li>Proportion of inactive people at baseline who reached &gt;2.5 hours per week of physical activity</li> </ul> </li> </ul>	Intervention subjects were significantly more likely to report a 60 min/wk improvement in physical activity than controls
Quinn et al (2008)	Observational study (intervention group only)	n = 21 (3 failed to complete the study) Age (yr) = 38 (SD 11) Gender = 21 F	Exp = 4x1 hour group education sessions on weight, physical activity, cardiovascular fitness, quality of life and attitudes to exercise in obese females (sessions 1 month apart) delivered by a physiotherapist A handout was provided with each session	Measured at baseline and 4 months on completion of the intervention: <ul style="list-style-type: none"> <li>Cardio respiratory fitness (incremental shuttle walk test)</li> <li>Physical activity (The IPAQ short form)</li> </ul>	There were significant improvements in CRF ( $p < 0.0002$ ) and decreased barriers to exercise. No significant decrease in weight or improvement in IPAQ.
Shaw et al (2008)	RCT	n = 24 Exp (walking group) = 13 Con = 11 Age (yr) = <65 - >85 (25% 65-69 and 25% >85) Gender = not reported	Exp = daily walking-for-exercise program (increasing from 10-30minutes over 90 days) Con = usual care	Measured at baseline and at 3 months after walking for exercise program: <ul style="list-style-type: none"> <li>Total physical activity level (Yale Physical Activity Survey for Older Adults (YPASOA))</li> <li>Daily recording of distance and time walked</li> </ul>	Community-dwelling senior women participating in a walking-for-exercise program, had increased total energy expenditure and vigorous activity levels from baseline. Pre- to posttest changes were also seen in vigorous activity levels in the control group.

Chambers et al 2000	RCT	N=454 Group 1 =114 Group 2 =114 Group 3-113 Group 4=113 Age (yr) =16-24	Group 1= Con Group 2= booklet promoting benefits of exercise and letter key messages from GP Group 3= a/a + exercise assessment + individualised exercise program Group 4= as Group 3 + 4 small group exercise sessions	Measured at baseline and 1 year after entry to the trial SF36 Health Survey Questionnaire for exercise behaviour	There were encouraging trends for improved exercise behaviour and perceived health status in subjects allocated to the health promotion groups.
Lamb et al 2002	RCT	N=260 Advice group=129 Health walks Group=131 Age (yr)= 40-70 Men and women	Advice group= standardised advice session led by a physiotherapist in groups of 10-20 Health Walks group= standardised advice + information about local health walks program and encourage to consider as an option to increase physical activity	Measured at baseline and 6 and 12 months Physical activity measured with questionnaire based on 5 cities physical activity questionnaire Cardiovascular fitness by BP, cholesterol and submaximal step test Attendance at walks for Health Walks group	There were no significant between group differences in self reported physical activity at 12 month follow up with itt analysis. In people who completed the trial, health walks was more effective than giving advice only in increasing moderate intensity activity above 120 minutes/week.

Exp = experimental group, Con = control group, etc

The nature of the interventions in these studies included various forms of educational counselling (individual or in groups), booklets or brochures and exercise or walking programs. The intervention in 3 of the studies consisted of educational counselling (Lamb, Bartlett, Ashley, & Bird, 2002; Quinn et al., 2008; Sheedy et al., 2000). Sheedy et al (2000) provided a brief 5 minute counselling session, tailored to the participants readiness for physical activity, which was supported by an education brochure and a diary to record goals and weekly progress (Sheedy et al., 2000). The other two studies provided group counselling/education sessions. Shaw et al (2008) was the only study to have walking only as an intervention, ie no additional educational material, resources or advice was provided whereas Lamb et al (2002) included encouragement to join a local walks program in addition to verbal and written advice and Chambers et al (2000) included two groups with exercise in addition to education. Shaw et al (2008) required all of their participants to walk for 10 minutes a day and increase to a goal of 30 minutes a day with 90 days to reach the goal, the program was not tailored to individuals. Two of the groups in the Chambers et al (2000) study received a tailored exercise program and one of those also included group exercise sessions.

All five studies reported an improvement in their outcome measures although not all were statistically significant. Comparison between these studies is difficult as each used different outcome measures. Shaw et al (2008) used a physical activity scale (Yale Physical Activity Survey for Older Adults - YPASOA) to indicate physical activity behaviour over time. There was no significant main effect for group on YPASOA variables ( $F_{1,15}=0.417$ ,  $p>0.05$ ). There was however a statistically

significant main effect for time on YPASOA vigorous activity index ( $F_{1,15}=6.12$ ,  $p<0.05$ ) and total energy expenditure ( $F_{1,16}=4.68$ ,  $p<0.05$ ). While there was no effect seen for group, a univariate analysis to examine changes between groups over time showed increases in YPASOA vigorous activity index in the walk intervention and control groups from pre test ( $F_{1,23}=10.7$ ,  $p=0.004$ ) to post test ( $F_{1,16}=5.18$ ,  $p=0.038$ ). The results suggest that a walking program may lead to increases in vigorous activity and total energy expenditure over time with no difference between groups ( $F_{1,16}=0.899$ ,  $P>0.05$ ). The study only had twenty four participants resulting in low power potentially explaining lack of difference in the groups over time. This study was not an RCT, there was no control group and methodological quality was poor.

Sheedy et al (2000) measured physical activity with open ended questions about number of sessions and duration of; walking 10 minutes or more, moderate leisure activities and vigorous leisure activities. These were used to calculate three outcome measures; increase in physical activity from baseline, increase in physical activity of  $\geq 60$  minutes / week and proportion of people inactive at baseline who increased to adequate physical activity at follow up. The results report that the intervention group was significantly more likely to report a 60 minute/week improvement in recorded weekly physical activity compared to the control group (adjusted OR 2.97 95% CI 1.36-6.46). Subjects in the intervention group also showed an improvement in their total minutes of physical activity per day but this was marginally non significant. In addition, the proportion of inactive people in the intervention groups who increased activity to 2.5 hours per week was greater than the control group but this result was also non-significant.

Quinn et al (2008) targeted obese females with 4 education sessions of 1 hour on weight gain, energy balance, measures of exertion, prescription of exercise, benefits of exercise, motivation and resistance exercise. The main outcome measures were the Incremental Shuttle walk Test (ISWT) for cardio respiratory fitness and the International Physical Activity Questionnaire –Short Form (IPAQ-Short) for physical activity participation. At the conclusion of their study there was a significant improvement in cardiovascular fitness (change mean (SD) 1.88 (1.72) mLkg<sup>-1</sup>min<sup>-1</sup>, t=-4.614, p=0.0002) but no significant improvement in reported physical activity ( change mean median 104 MET min week<sup>-1</sup>, Z=-0.682, p=0.496). Therefore the education sessions in this study did not change physical activity behaviour.

Chambers et al (2000) had four groups ranging from “no intervention” to “education”, “education plus tailed exercise program” and “education, tailored exercise and group exercise”. The outcome measures for this study were exercise frequency and behaviour and 8 dimensions of health in SF-36 questionnaire, pre and post intervention. There was a dose-response trend for each additional intervention to show a tendency for increased exercise frequency and behaviour and perceived health status measured by SF36 but there were no significant differences between the groups (statistic for this outcome not reported).

Lamb et al (2002) included an intervention group who received advice and another group that was instructed to participate in local health walks. Physical activity was measured using a questionnaire adapted from the Stanford 5 Cities physical activity questionnaire. A submaximal step test, BMI, age, sex, resting and exercising pulse

rate were used to estimate VO<sub>2</sub> max. In the advice only group there was a 22.6% increase in proportion of active people (from 4.3% to 26.9%) over the trial and in the health walks group there was a 35.7% increase in proportion of active people (from 3.3% to 38.9%). The difference between the groups was 13% (95% CI 0.003% to 25.9%, p=0.05). There were improvements in physical activity participation and aerobic capacity in both groups but no significant difference between groups. A limitation of this study is that both the control and intervention groups received advice developed and provided by a physiotherapist but there wasn't a group with no intervention.

The strength of conclusions about the effectiveness of physiotherapists for delivering physical activity promotion in primary care is limited due to the small number of included studies (n=5) and the variation in quality (2-6/10 on Pedro Scale). There is also considerable variability in the reported results; two of the studies reported significant changes in some aspects of physical activity behaviour (Quinn et al., 2008; Sheedy et al., 2000), one reported significant increases in both intervention and control groups (Shaw & Page, 2008) and the other two report only trends to increased exercise behaviour (Chambers, Chambers, & Campbell, 2000) or no change (Lamb et al., 2002). Overall these findings indicate there are insufficient trials of adequate quality to determine whether physiotherapists are effective in promoting physical activity.

## **Studies of reported practice and perceptions of promoting physical activity by physiotherapists**

Studies on reported practice and perceptions of promoting physical activity by physiotherapists were also included in the review. The search strategy identified 5 studies which are summarised in Table 3.3. An evaluation of methodological quality was not formally undertaken for the included studies. It is difficult to assess methodological quality of qualitative studies as there are no standardised agreed criteria of quality (Spencer, Ritchie, Lewis, & Dillon, 2003). In evaluating the included studies, factors such as those suggested by the Critical Skills Appraisal Program were considered. This program recommends 10 questions relating to aims of research, methodology and the validity of the results and relationship to local issues (Critical Skills Appraisal Programme, 2013).

Two studies examined wellness beliefs and practices and health promotion in populations of pediatric physiotherapists (Goodgold, 2005; Schlessman, Martin, Ritzline, & Petrosino, 2011). Pediatric physiotherapists consider themselves to have good personal health. Most (95%) indicated that setting goals to improve participation in play or leisure was a routine part of their management. The main barriers identified to physical activity promotion were a perceived lack of interest on the part of the parent or child (Goodgold, 2005). Other barriers that were identified were lack of resources, lack of time in Physiotherapy and financial constraints of the family (Goodgold, 2005). The majority of physiotherapists thought that they were appropriate health professional to provide education on health promotion, obesity prevention and physical activity to parents and teachers (Schlessman et al., 2011).

**Table 3.3** Summary of studies of health promotion and physical activity promotion perceptions and practices among physiotherapists

Study	Design	Participants	Data Collection	Results
Goodgold 2005	Cross sectional observational	257 paediatric physical therapists	Survey	<ul style="list-style-type: none"><li>• Older age group PT more likely to include HP in PT practice</li><li>• 95% reported that they included goals to improve participation in play or leisure activities</li><li>• Goals to foster wellness improve understanding of factors to promote optimal health less frequent</li><li>• Barriers affecting wellness promotion include lack of interest by the child/family (68%), lack of resources, economic limitations of child's family, lack of community programs, lack of PT time during Treatment (all about 50%)</li></ul>
Rea et al 2004	Cross sectional observational	417 physical therapists	Survey	<ul style="list-style-type: none"><li>• Health promotion behaviour is increasing physical activity 54% of time</li><li>• Half received health promotion/education training during their training,</li><li>• High self efficacy for physical activity</li></ul>
Sassen et al 2011	Cross sectional observational	278 Nurses and physiotherapists	Survey	<ul style="list-style-type: none"><li>• Intention to encourage PA behaviour and self reported behaviour congruent in 39.7% of health care professionals and incongruent in 31.7%</li></ul>
Schlessman et al 2011	Cross sectional observational	10 paediatric physical therapists (+ other childcare workers)	Survey	<ul style="list-style-type: none"><li>• Think PTs most knowledgeable and appropriate to educate on HP/OP/PA</li><li>• Agree willing to educate teachers on HP/OP/PA</li><li>• Lack of public awareness in the role of PT's in paediatric HP</li><li>• More recently trained PTs more aware of HP role</li></ul>
Shirley et al 2010	Cross sectional observational	321 physical therapists	Survey	<ul style="list-style-type: none"><li>• Physio consider HP/PA advice is part of their role</li><li>• They have adequate knowledge and skills</li><li>• Incorporating advice into normal consultations most feasible</li><li>• Few barriers identified eg lack of time, belief it will not change patient behaviour</li></ul>

The pediatric physiotherapists perceived many more barriers to prescribing physical activity advice than other physiotherapists. The biggest barriers were lack of interest from the child or family (68%), lack of materials and resources (55%), economic limitations of the child's family (55%), lack of physiotherapy time during treatment (45%). To a lesser extent, insufficient education, lack of reimbursement and wellness promotion is not a core role of physiotherapists were also cited as barriers (Goodgold, 2005). Physiotherapists who listed lack of time as a barrier were much more likely not to include wellness promotion in their treatment.

Generally physiotherapists feel that it is part of their role to promote health and provide physical activity advice. They think they have adequate knowledge to fulfil this role (Rea, Hopp Marshak, Neish, & Davis, 2004; Sassen, Kok, & Vanhees, 2011; Shirley et al., 2010) although some are not as accurately informed as they think (Shirley et al., 2010). The most feasible method providing physical activity advice would be in a normal consultation and physiotherapists perceive few barriers to carrying out this role (Shirley et al., 2010). Interestingly, there is no difference between physiotherapists and nurses in time spent on providing health education (Sassen et al., 2011). Thirty nine percent reported encouraging physical activity in their cardiovascular patients (Sassen et al., 2011). In addition, 54% physiotherapists believe the health promotion activity most commonly practiced by physiotherapists is helping patients to increase their overall physical activity levels (Rea et al., 2004).

Half of the physiotherapists sampled received some health promotion / health education during their training (53%) whilst other had sought education in this area

since graduating (29%) (Rea et al., 2004). Shirley et al (2010) surveyed physiotherapy students undertaking both entry level Bachelor degrees and entry level Masters degrees. Physiotherapy students undertaking these degrees showed an increase in confidence in being able to promote physical activity as they progress through their course (Shirley et al., 2010).

## **Discussion**

### **Intervention studies**

There is insufficient evidence to draw definitive conclusions about the efficacy of physiotherapists in physical activity promotion. The limited evidence available suggests that physiotherapists are primary care practitioners who may be effective at promoting physical activity to improve health. However, there is a lack of good quality studies from which to draw conclusions.

The PEDro rating scale (Maher 2003) was used to gauge the quality of the studies included in this review. The studies were rated as low to moderate in quality mainly due to poor scores in research design (Chambers et al., 2000; Lamb et al., 2002; Quinn et al., 2008; Shaw & Page, 2008; Sheedy et al., 2000) and statistical analysis (Quinn et al., 2008). The low number of suitable studies to include in this review coupled with their poor methodological quality highlights the need to generate high quality research in this area to evaluate the efficacy of utilising physiotherapists for physical activity promotion.

Three out of five of the intervention studies that were included in this systematic review used health education/ counselling as their intervention and all of these resulted in small improvements in some outcomes measured but not in all relevant outcomes (Lamb et al., 2002; Quinn et al., 2008; Sheedy et al., 2000). Although the study by Quinn et al (2008) reported significant improvements in cardio-respiratory fitness it was of very low methodological quality (only a single group before-after design). Sheedy et al (2000) reported the intervention group had a 60 minutes / week improvement in physical activity over the past six months but they did not find a difference in total minutes of physical activity between intervention group and controls in the preceding week. Shaw and Page (2008) utilised a daily walking program as the intervention and all participants showed an increase in overall energy expenditure, however there was no difference between the groups. The authors conclude that a walking program could lead to increases in total energy expenditure in older women although they acknowledge that the results are inconclusive.

Verbal and written advice provided by a physiotherapist improved time spent on moderate intensity physical activity and the addition of advice to join a walking group (however, not given by a physiotherapist) resulted in even more time spent on moderately intense physical activity (Lamb et al., 2002). However, there was no statistical significance between the groups on self reported physical activity at 12 months. More importantly, the group that received written advice from a physiotherapist was designed to be the control group. The fact this group increased their physical activity is promising but it is hard to determine if this was caused by the physiotherapist advice, as a true control group was not present in this study.

Similarly, adding tailored exercise classes to education and group exercise to tailored

exercise and education results in trend towards better exercise behaviour (Chambers et al., 2000) although there is no significant difference between the interventions.

It is difficult to draw comparisons between the studies as the interventions, outcome measures and methodologies all differed. Overall the studies were of low to moderate quality and the two RCT's had low subject numbers and low statistical power (Chambers et al., 2000; Shaw & Page, 2008) making it difficult to draw meaningful conclusions. However, some of the studies showed trends that physiotherapists providing physical activity advice and/or walking/ exercise interventions may be an effective means of encouraging physical activity in primary care. The suggestion that physiotherapists providing physical activity advice may be effective in promoting physical activity is promising and signals the need for well conducted randomised controlled trials to investigate this question further.

### **Reported perceptions and practice studies**

Physiotherapy professional bodies acknowledge that physical activity promotion, health promotion and chronic disease prevention is part of the role of physiotherapists both now and into the future (American Physical Therapy Association, 2012; APA, 2005; WCPT, 2011). Individual physiotherapists also believe they have a role in physical activity promotion for health (Shirley et al., 2010). Whilst physiotherapists hold this belief, the extent to which they implement physical activity promotion in practice varies. Pediatric physiotherapists frequently (95%) include goals to increase play or leisure activities in their treatment plan (Goodgold, 2005), but this is different to adult physical activity advice. In other

studies, 54% of a large sample of physiotherapists working with a variety of patients include physical activity advice for 10 or more patients a week (Shirley et al., 2010) and 40% intended to provide physical activity advice (Sassen et al., 2011).

Two studies investigated the perceptions and attitudes of physiotherapists working in the paediatric setting (Goodgold, 2005; Schlessman et al., 2011). Goodgold et al (2005) report that 95% of participants indicate they include goals to increase participation in play and leisure activities and 54% incorporate wellness promotion in their practice. Play and leisure activities are not described so it is unclear whether these actually increase physical activity participation in this study. In contrast, Schlessman et al (2011) report that few people are aware of physiotherapists that incorporate health promotion, obesity prevention and physical activity and therefore surmise it does not happen. The possible contradiction in these two results could reflect the different settings and participants between the two studies. Even though the initial inclusion criteria for physiotherapists reported perceptions and practice studies indicated participants should be over 18, there were only a small number of studies so it was decided to include these two studies of pediatric physiotherapists as well. In addition, the Goodgold et al (2005) study was included as it discusses wellness promotion in general which has a related but broader focus.

The attitudes of dieticians, teachers, parents and physiotherapists about physiotherapists' role in health promotion have also been canvassed (Schlessman et al., 2011). Interestingly, teachers and parents were not aware of the potential role for physiotherapists in educating parents, children and teachers in health promotion, obesity prevention and physical activity. These findings suggest a need for physiotherapists to develop and market their skills in providing health promotion and

physical activity interventions to other health professionals and the wider community.

Physiotherapists think that they are appropriately skilled to provide physical activity advice (Sassen et al., 2011; Shirley et al., 2010). Although about one third of pediatric physiotherapists did not feel that they had enough education to be able to incorporate health promotion into their specialised practice (Goodgold, 2005).

However, it is interesting to note that while physiotherapists generally felt they had the appropriate skills to provide physical activity advice for their patients only one third could actually describe the recommended physical activity guidelines for adults (Shirley et al., 2010). This finding indicates there is a mismatch between physiotherapist's perception of their skills and their knowledge of physical activity recommendations. Perhaps this is because they perceive themselves to be practitioners who should provide physical activity advice and because they are used to prescribing exercise and activity as part of usual rehabilitation and treatment. This finding highlights the need to specifically educate physiotherapists on physical activity recommendations and how to provide physical activity advice for health promotion.

Most public preschool teachers, child care teachers, parents, and pediatric physiotherapists believe that pediatric physiotherapists are appropriate professionals to provide education on health promotion, obesity prevention and physical activity (Schlessman et al., 2011), and most physiotherapists surveyed across the studies in this review also held this belief. It is possible that as a result of their training that most physiotherapists assume that they are adequately educated in physical activity

promotion and methods of providing physical activity advice (Shirley et al., 2010). However not all feel adequately qualified as a result of their basic training. In the study by Rea et al (2004) about half of the physiotherapists surveyed had received health promotion education as part of their training while others had done additional training in this area since graduating. The emphasis on education in physical activity promotion may vary in different countries and the knowledge of physical activity and confidence in providing physical activity advice could vary considerably between different countries.

In an Australian study, physiotherapy students appear to gain confidence in their ability to provide physical activity advice as they progress through their course (Shirley et al., 2010). Physiotherapy training may be currently providing some education to equip physiotherapists to promote physical activity advice, but the effects of this training is not studied. There may be a need for further educational opportunities in this area, as well as testing the effects of this training on subsequent practice.

Overall, physiotherapists perceive few barriers to providing physical activity advice. The main perceived barriers include lack of time, and a feeling that it would not change patient behaviour (Shirley et al., 2010). The perception that physical activity advice was not likely to change patient behaviour was more prevalent in physiotherapists who did not provide regular physical activity advice or who worked in the public sector (Shirley et al., 2010) and some pediatric physiotherapists (Goodgold, 2005). Despite acknowledging that there are barriers, physiotherapists generally try to include physical activity advice, feel adequately skilled to do so and

perceive few barriers. Provision of brief advice or counselling as part of a usual physiotherapy session was considered the most feasible method of physical activity promotion (Shirley et al., 2010).

## **Conclusions**

Physiotherapists generally acknowledge that they are appropriate professionals to provide physical activity advice for health promotion purposes. However, it is important to ensure that physiotherapists are adequately educated in current physical activity recommendations and in how to promote physical activity. The limited evidence available suggests that physiotherapists might be effective in providing physical activity advice however to date there are only a few studies of variable quality thereby highlighting a need for more extensive randomised controlled trials to fully investigate whether physiotherapists providing physical activity advice are effective and can improve health outcomes.

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## **CHAPTER FOUR**

### **CONCLUDING REMARKS**

## **Summary of findings**

Physiotherapists are primary care practitioners with untapped potential for delivering physical activity interventions to improve health outcomes and primary prevention of chronic diseases. Traditionally physiotherapists have worked in the domain of secondary and tertiary prevention. Health care is changing with a progressive increase in attention to preventive health. Nationally and internationally the physiotherapy profession is embracing their future potential in prevention of chronic disease. The time is ripe for physiotherapists to incorporate primary prevention of chronic disease into practice.

This thesis aimed to determine the practices and perceptions of physiotherapists and physiotherapy students to promoting physical activity for the prevention of non-communicable diseases. In addition it examined the evidence for the effectiveness of physical activity promotion in this primary health care setting. This chapter will review the major findings of the studies in this thesis and their implications for the role of physiotherapists providing physical activity advice in primary care. Some directions for future research have become evident and this chapter will present a proposed randomised control trial to evaluate the efficacy of physiotherapists delivering physical activity advice in the primary care setting.

The findings arising from this thesis highlight the potential for physiotherapists to deliver physical activity advice for the prevention of chronic disease. Physical inactivity is a public health issue of epic proportions (Kohl et al., 2012) and the

problem is worsening worldwide particularly in low and middle income countries (Kohl et al., 2012; Rodgers et al., 2004). Closer to home it is also an important issue needing to be addressed with large proportions of Australians not undertaking sufficient physical activity (AIHW, 2010). The physiotherapists role in public health initiatives to prevent non communicable diseases by delivering health promotion interventions such as physical activity advice and programs also aligns with the investment in physical activity that relate to primary care and potentially others as well (Global Advocacy for Physical Activity (GAPA) the Advocacy Council of the International Society for Physical Activity and Health (ISPAH), 2012). Therefore physiotherapists should be included in a variety of public health strategies for prevention of chronic disease.

### **Perceptions and Practices of Physiotherapists**

Chapter 2 of this thesis reports a survey of the practices and perceptions of physiotherapists and physiotherapy students. The aim of this study was to determine the knowledge, confidence, role perception, barriers, feasibility and counselling practice of physiotherapists and physiotherapy students regarding the promotion of non-treatment physical activity for better health. The results indicate that physiotherapists and physiotherapy students in NSW believe that physical activity prescription for health promotion should be part of their role and that they would be confident in this role. Integrating brief counselling into usual treatment sessions was thought to be the most feasible form of physical activity promotion in physiotherapy practice, followed by the distribution of resources such as brochures.

Physiotherapy students appear to be learning about incorporating physical activity into practice as they progress through their course with students in later years of the course being more confident to prescribe physical activity. Physiotherapists on the whole feel confident to provide physical activity advice although interestingly some were not able to accurately describe the physical activity recommendations. These results suggest that continuing education for physiotherapists may be required to keep knowledge of requirements for being sufficiently active current. It is also essential that the already overcrowded university curricula ensure this important area of health promotion is adequately addressed. Both physiotherapists and students agreed that incorporating physical activity advice into their usual treatment was the most feasible approach followed by provision of health promotion resources.

This study highlights the previously untapped potential for physiotherapists to give non treatment physical activity advice during regular treatment. Physiotherapists, current and future, recognise this as one of their roles and are confident in their ability to promote lifestyle physical activity. They perceive few barriers to promoting physical activity and believe that integrating brief counselling into usual treatment sessions is the most feasible form of physical activity promotion in physiotherapist practice. The results of this study highlight the need to further explore the possibilities to integrate lifestyle physical activity promotion into physiotherapist practice to determine its potential important role in public health.

### **Efficacy of PA interventions**

While physical activity interventions have been extensively studied in the general practice setting there have only been a few studies in physiotherapy setting. Chapter

3 of this thesis is a systematic review of physical activity interventions delivered by physiotherapists. Only five intervention studies were identified as suitable to include in the review. These studies indicate that there is insufficient evidence to draw definitive conclusions about the efficacy of physiotherapists in physical activity promotion. This systematic review suggests that there is a lack of evidence on which to draw meaningful conclusions for physiotherapists. Other systematic reviews of provision of physical activity interventions in primary care indicate there is weak evidence for exercise referral schemes to increase physical activity in patients recruited in primary care (Pavey et al., 2011). However, sedentary adults undertaking physical activity promotion showed significant increases in physical activity levels at 12 months post intervention (Orrow, Kinmonth, Sanderson, & Sutton, 2012). The evidence for physical activity promotion in primary care is also somewhat limited and inconsistent and suggests this is an area where further research is required. While the available evidence for physiotherapists is limited it suggests that physiotherapists are primary care practitioners who may be effective at promoting physical activity to improve health. However, there is a lack of good quality studies from which to draw conclusions.

The second part of the systematic review details reported practice and perceptions of promoting physical activity by physiotherapists. Physiotherapy professional bodies acknowledge that physical activity promotion, health promotion and chronic disease prevention is part of the role of physiotherapists both now and into the future (American Physical Therapy Association, 2012; APA, 2005; WCPT, 2011). Individual physiotherapists also believe they have a role in physical activity promotion for health (Shirley, van der Ploeg, & Bauman, 2010). Whilst

physiotherapists hold this belief, the extent to which they implement physical activity promotion in practice varies. Paediatric physiotherapists frequently (95%) include goals to increase play or leisure activities in their treatment plan (Goodgold, 2005), but this is different to adult physical activity advice. In other studies, 54% of a large sample of physiotherapists working with a variety of patients include physical activity advice for 10 or more patients a week (Shirley et al., 2010) and 40% intended to provide physical activity advice (Sassen, Kok, & Vanhees, 2011).

Therefore, it is evident that physiotherapists generally acknowledge that they are appropriate professionals to provide physical activity advice for health promotion purposes. However, physiotherapists appear to be under utilised in this aspect of primary care and there is a need to promote awareness of their potential for promoting physical activity to policy makers. This should ideally be approached from the level of a professional body such as the Australian Physiotherapy Association who interact with departments of health and have the potential to have input to policy at a state and national levels. There is also a need to ensure that physiotherapists are adequately educated in current physical activity recommendations and in how to promote physical activity. In addition physiotherapists may need support from policy makers, physiotherapy professional organisations and educators to overcome the few potential barriers that have been identified. Examples of the type of support that could be beneficial would be recognition in workforce planning and acknowledging the primary prevention role in workload formulas and involvement in relevant health policy. To achieve this, the physiotherapy profession would need to position itself to have a voice to policy makers and heads of department lobbying the local health districts for staff to

undertake this important role. In addition, physiotherapists would need to be willing to modify practice to incorporate physical activity advice into treatment.

The limited evidence available suggests that physiotherapists might be effective in providing physical activity advice however to date there are only a few studies of variable quality thereby highlighting a need for more extensive randomised controlled trials to fully evaluate the effectiveness of physiotherapist-delivered interventions. There are a number of reasons that could account for limited evidence for physical activity interventions provided by physiotherapists such as poor quality studies and barriers to the health professionals providing physical activity advice etc. However, research to date is generally of poor quality contributing to inconclusive results and highlighting the need for future research to focus on well designed high quality studies of physiotherapist providing physical activity interventions.

## **Proposed RCT to address evidence gap in physiotherapists providing physical activity advice.**

Based on the results of this thesis it seems that there is a need for a high quality randomised controlled trial (RCT) to investigate whether physical activity advice provided by physiotherapists in a primary care setting is effective in changing physical activity behaviour and health outcomes thereby addressing the evidence gap in this area.

The results reported in Chapter 2 suggest that the majority of physiotherapists think that physical activity advice could be easily integrated into their daily practice and do not perceive lack of time and remuneration as major barriers. Thus, physiotherapy practice appears to have the potential to improve physical activity levels in the population.

The advantage of physiotherapists providing physical activity advice in the primary care setting is lower costs, as the physical activity advice is built into existing consultation time for another condition, and makes good use of clinical contact time, as well as building on the patient-physiotherapist relationship. A major potential advance over the general practice setting is that physiotherapy treatment is usually spread out over several sessions (average 6-8 times) over a number of weeks, allowing time for the provision of sequential and individualised physical activity messages.

Given only modest short term effects in other primary care settings, the proposed RCT will provide more definitive evidence on the physiotherapy setting, and in this exercise-aware group, ascertain whether physical activity promotion is effective. Thus we propose a definitive RCT as a next step and the details of such a study are presented here.

## **Research Plan**

### **Experimental Design**

The proposed RCT will recruit patients from outpatient physiotherapy departments in public hospitals and private physiotherapy practices in Sydney. The physiotherapists in the participating departments and practices will assess the eligibility of every new patient for participation in the study by checking the inclusion and exclusion criteria. Those who consent to be in the study will be contacted by the research assistant for a baseline computer assisted telephone interview and will be mailed an accelerometer with wearing instructions. After this baseline assessment, participants will be randomly allocated to either the intervention or the control group. Participants who are allocated to the intervention group will start the intervention during their next appointment with their physiotherapist. The study design has been guided by the updated CONSORT 2010 statement on guidelines for reporting parallel group randomised trials (Schulz, Altman, Moher, & for the CONSORT Group, 2010).

## Participants

The study will recruit 502 people that meet the inclusion and exclusion criteria that are presented in Table 4.1. The duration of the intervention warrants a minimum of 4 regular treatment sessions for inclusion in the study. Patients who already meet the national physical activity recommendation of 30 minutes of moderate intensity activity on at least 5 days per week will be excluded from participation. Physical activity participation will be assessed with a short validated tool, the 2Q Physical Activity Assessment tool (Smith, Marshall, & Huang, 2005). The 2Q Physical Activity Assessment tool consists of 2 questions about the frequency, intensity and duration of physical activity undertaken in a week (Smith et al., 2005).

Table 4.1: Inclusion and exclusion criteria

<b>Inclusion criteria</b>	<b>Exclusion criteria</b>
1. Age $\geq$ 18 years	1. Does not speak sufficient English
2. Expected to have $\geq$ 4 treatment sessions	2. Meets the physical activity recommendation
3. Able to walk independently for 10 minutes	3. Participates in other physical activity program
	4. Suffers a physical condition which prevents participation in a physical activity program

The study sample size calculation indicates that a sample size of 251 insufficiently active people per group would be needed to detect a 10% difference between the intervention and control group in the increase in the proportion of people that meet the physical activity recommendation (the minimal clinically relevant intervention effect). This would be achieved by a 20% increase in the intervention group with an

anticipated 10% increase in the control group based on our previous work (Merom et al., 2007; HP van der Ploeg et al., 2006), with a confidence level of 0.95 and 80% power, allowing for 20% loss to follow-up. Hence a total of 502 people need to be recruited. Further statistical power calculations also show that the proposed sample size of 502 participants will be sufficient to detect between group differences in the order of 10-15% for secondary outcome measures.

While a sample size of 502 is required to detect group differences this is a relatively large group of participants to recruit from this primary care setting. Best estimates from physiotherapists working in the public and private sectors suggest this number would be feasible however it would be necessary to recruit at least 10 patients a week. The difficulty with recruiting patients from public hospital setting is that a good proportion will be attending for physiotherapy for conditions that might contraindicate this type of physical activity intervention eg post surgery, post fracture and other conditions that would not enable the patient to participate in this type of physical activity program. This would also be true for the private practice setting where many patients attend for post surgical rehabilitation. So while the setting would appear to be rich in potential subjects many would not meet the inclusion criteria. Preliminary enquiries suggest that the required 502 subjects should be feasible with multiple sites and practices and constant efforts in recruitment.

## **Intervention**

In addition to physiotherapy usual care, the intervention group would receive a personalised tailored physical activity counselling program adapted from the successful 'Active after Rehabilitation' program previously shown to be effective (HP van der Ploeg et al., 2006; H. P. van der Ploeg et al., 2007). The intervention and evaluation would be based on the same framework as that used in 'Active after Rehabilitation' and is presented in Figure 4.1 (HP van der Ploeg, van der Beek, van der Woude, & van Mechelen, 2004). The model describes the relationship between individual functioning, physical activity and its determinants in the context of personal and environmental factors. The intervention will promote physical activity of at least a moderate-intensity level, and will be tailored to personal factors as well as social and environmental factors. The intervention will utilise well established, effective behaviour change principles, such as goal setting, planning, self-monitoring, reinforcement, overcoming barriers, and social support.

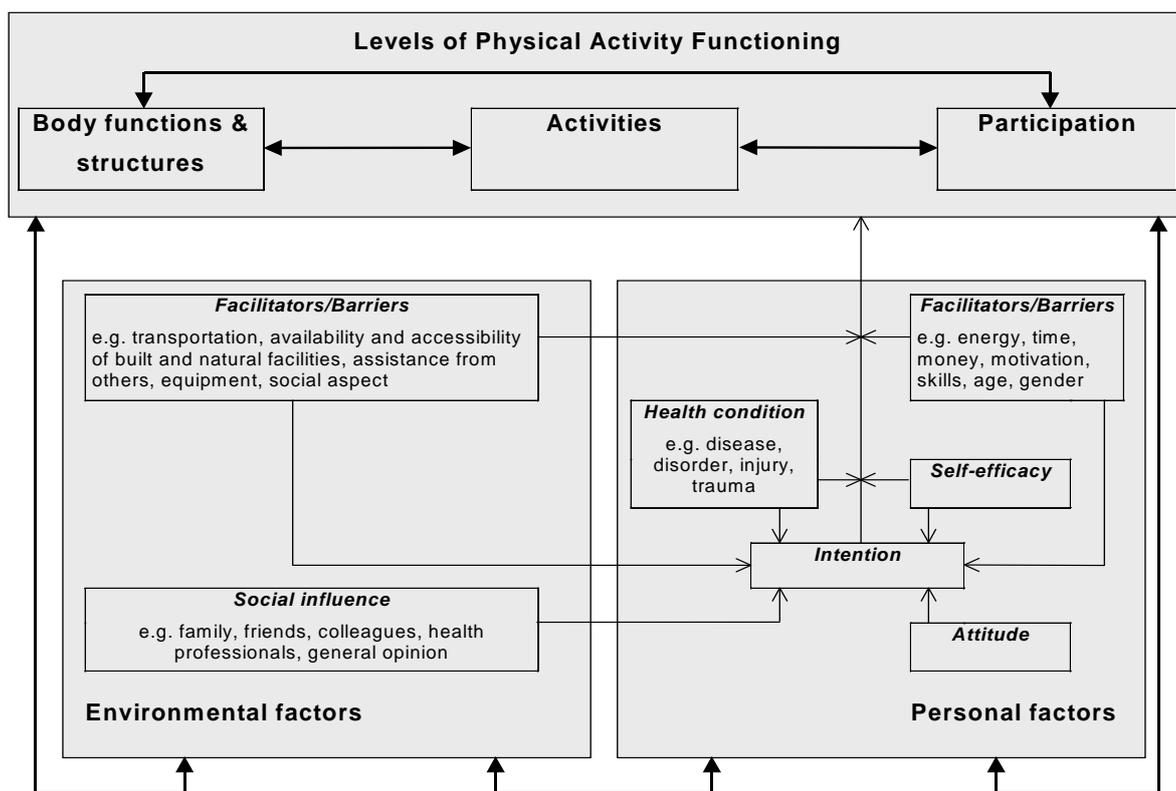


Figure 4.1 Physical activity Promotion model (HP van der Ploeg et al., 2004)

The four counselling sessions would be delivered by the participant’s physiotherapist using a standardised modular approach during the treatment period (Figure 4.2). The participating physiotherapists would receive training from the research team on how to give the intervention. The number of intervention sessions is based on a minimum number of attendances for outpatient physiotherapy as most outpatients attend at least four sessions. The first regular physiotherapy appointment would be used to inform patients and enrol interested patients in the study. The second regular physiotherapy appointment would be extended by 30 minutes in order to include the first intervention session. During this first intervention session the physiotherapist and the participant would together identify possibilities, facilitators and barriers of

daily physical activity, which would lead to a tailored specific physical activity advice. Additionally, participants would receive a self-help (take home) information package, which is based on the successful Step-by-Step program previously developed and evaluated (Merom et al., 2007). The package would include a self help booklet on walking and physical activity, a physical activity diary, and a pedometer to self-monitor their daily steps. Pedometers assess the daily steps taken, and previous work has shown that they can provide direct feedback to the participant in order to act as a behaviour reinforcement tool (Merom et al., 2009; Merom et al., 2007). The second and third intervention sessions would be integrated into the third and fourth regular physiotherapy appointments respectively (Figure 4. 2). The final intervention session would be a 15 minute telephone check up at 10 weeks after the baseline assessment. These final three intervention sessions would identify and address the participant's physical activity status, their use of intervention materials, possible barriers, and would provide new specific physical activity goals.

Participants in the control group would only receive usual care, consisting of their regular physiotherapy treatment. As participants with less than 4 treatment sessions will be excluded from the study, the clinical attention given to the participants in the control and intervention group would be quite similar, with only a 45 minute increase in clinical contact time for the intervention group.

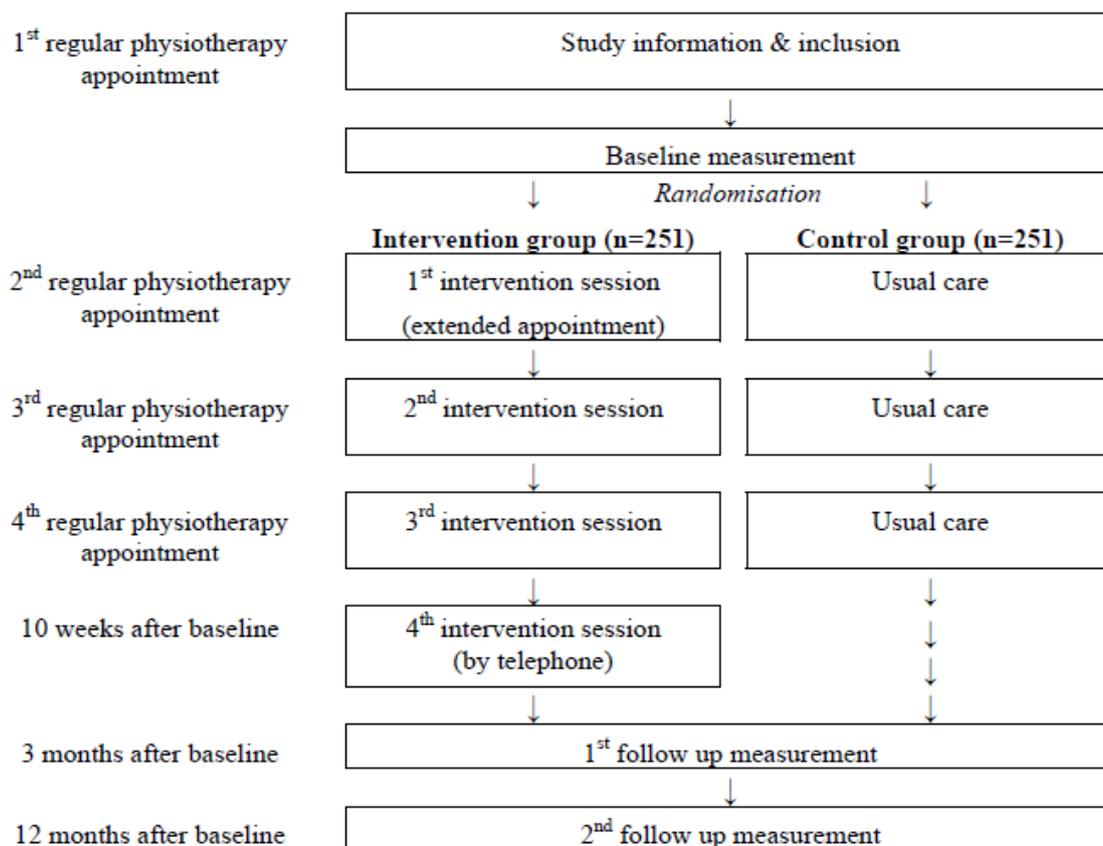


Figure 4.2: Timing of the intervention and measurements

### Outcome Measurements

In order to assess the physical activity intervention’s effectiveness, all participants will have a baseline measurement just after inclusion in the study and two follow up measurements at 3 and 12 months after baseline (Figure 4.2). To objectively assess physical activity, a research assistant will send participants an accelerometer with wearing instructions by express post, which can be returned in a reply-paid envelope after the assessment. Further questionnaires will be completed during a computer assisted telephone interview with a central research assistant, who will be blinded to group allocation. The following outcomes will be assessed at the baseline and two follow up measurements:

### ***1. Physical activity***

Physical activity is the primary outcome of the trial and would be objectively assessed with the Actigraph GT3X-Plus accelerometer (Actigraph LLC, Fort Walton Beach, FL, US). The Actigraph is a non-invasive, small, lightweight device (4.6 x 3.3 x 1.5cm, 19 grams) that is worn during waking hours for 7 consecutive days on the right hip (Figure 4.3). It records activity counts and steps taken, which are converted to time spent in sedentary, light, moderate, and vigorous physical activity. These data can be used to calculate if a participant meets the physical activity recommendation of 30 minutes of moderate to vigorous intensity physical activity on at least 5 days per week. The accelerometer data also allows a check of wearing compliance. The Actigraph is the most researched accelerometer in the physical activity and health field over the past 15 years and was shown to be the most valid (Plasqui and Westerterp, 2007).



Figure 4.3: Actigraph GT3X-Plus accelerometer

### ***2. Determinants of physical activity***

In order to determine the working mechanisms of the intervention, psychosocial and environmental determinants of physical activity will be assessed following the study's theoretical framework (Figure 4.1) with adapted versions of existing validated questionnaires such as the Neighbourhood Walkability scale (Cerin, Saelens, Sallis, & Rank, 2006), Physical Activity Scale for Individuals with Physical

Disabilities (HP van der Ploeg et al., 2008) and The Physical Activity Recall (Sallis, Calfas, Alcaraz, Gehrman, & Johnson, 1999) .

### ***3. Overweight and obesity***

Self reported height and weight would be recorded to calculate body mass index (BMI). Following the NHMRC classification system (1997), BMI of 25-30 kg/m<sup>2</sup> will be considered overweight, and BMI>30 kg/m<sup>2</sup> will be considered obese.

### ***4. General health and quality of life***

Self reported health and quality of life will be assessed with the commonly used SF12 questionnaire (Muller-Nordhorn, Roll, & Willich, 2004), which will also measure physical activity functioning at the activity and participation levels in line with the study's theoretical framework (Figure 4.1).

### ***5. Adverse health outcomes***

Even though the intervention is intended to promote low risk physical activities, it is important to record any unexpected adverse events. Injuries and falls will be recorded using questionnaires (Cumming et al., 2008; Lawton et al., 2008).

### ***6. Personal characteristics***

Age, gender, education, occupational status, household income, and clinical diagnosis and history will be recorded during the computer assisted telephone interview.

### ***7. Intervention implementation & adherence***

Program implementation will be assessed using brief standardised program checklists for the physiotherapists. Program adherence will be assessed using a brief standardised questionnaire that will be completed by intervention participants at the 3 month follow up measurement.

### **Statistical Analysis**

Multiple linear and logistic regression analyses for repeated measurements will be used to compare the intervention and control group with regard to changes in physical activity and the other outcomes between baseline and both follow up measurements (Twisk, 2003). All analyses will be checked and corrected for confounding and effect modification. In case of low compliance with the intervention, intention to treat analysis will be complemented with per protocol analysis.

### ***Cost Effectiveness Analysis***

The economic evaluation will estimate the incremental cost effectiveness of the intervention over usual care in terms of cost per quality adjusted life year (QALY) gained. The economic evaluation will take a health system perspective and will be undertaken in two stages:

1. A trial based cost effectiveness analysis in which costs and outcomes achieved within the trial will be assessed. Sensitivity analyses will be conducted initially on the usual variables such as discount rate, uncertainty in outcome estimates and assumptions made in the costings.
2. A modelled economic evaluation will be undertaken, using a state transition or Markov model, to capture lifetime costs and outcomes. This is important because if there is an advantage of the intervention over usual care in terms of long term cost offsets, survival and quality of life, these are most likely to manifest themselves beyond the study period.

Evidence from the literature in which adherence to physical activity programs and associated long term outcomes in terms of risk of death and outcomes including cardiovascular disease and musculoskeletal conditions could be used to determine

annual probabilities of transition between health states (e.g. full health to CVD event). Health sector costs and quality of life associated with each disease state could be assessed based on the trial findings and evidence review.

The benefit of the proposed RCT is that it will provide much needed evidence to inform whether physiotherapists providing physical activity advice in the primary care setting is effective in changing physical activity behaviour. The advice could be tailored to meet the needs of the patient and take into account their stage of readiness to receive physical activity advice and change behaviour. Physiotherapists see large numbers of people, many of whom have co existing health problems or risk factors for chronic disease and would benefit from physical activity advice. It is estimated that around half a million people each fortnight seek care from over 13,000 practicing physiotherapists in Australia (Australian Institute of Health and Welfare, 2008). The majority of these people are physically inactive and a more physically active lifestyle would improve their daily functioning as well as substantially reduce their chronic disease risk (Physical Activity Guidelines Advisory Committee, 2008).

The results from this study will inform the development of programs to deliver physical activity interventions in the physiotherapy setting. Physiotherapists are primary care practitioners who see large numbers of patients both healthy (other than musculoskeletal injuries) and also with chronic disease or risk factors for chronic disease. Therefore they have the opportunity to influence people about their physical activity behaviour as a primary prevention measure against chronic disease or at least secondary prevention to limit progression of chronic disease. The ‘investments’ that are effective for increasing physical activity include integration of physical activity

and non communicable disease prevention into primary care settings (Global Advocacy for Physical Activity (GAPA) the Advocacy Council of the International Society for Physical Activity and Health (ISPAH), 2012). Physiotherapists are ideal practitioners to contribute to prevention strategies in primary care and the results of this proposed study will inform the evidence of efficacy of prevention initiatives in this setting.

### **Future Directions / Clinical Implications / Policy**

The future roles of physiotherapists on health promotion/prevention of chronic disease should not be limited to practice in traditional primary care settings. To date physical activity advice provided in primary care, including by physiotherapists, has resulted in fairly modest increases in physical activity behaviours overall and inconclusive evidence on whether physiotherapists providing physical activity advice improves physical activity behaviour. This chapter has described an example of an RCT that was planned to be implemented in the physiotherapy primary care practice setting. However, this is only one platform by which physiotherapists could be used to address the public health issue of physical inactivity. The investments that work for physical activity also include other settings / strategies in which physiotherapists could contribute to prevention initiatives. In order to reach their potential to address this important public health issue physiotherapists will need to think beyond the traditional treatment clinic environment for opportunities to promote physical activity. The most relevant investments include whole of school programs, public education, community wide programs and sports systems (Global

Advocacy for Physical Activity (GAPA) the Advocacy Council of the International Society for Physical Activity and Health (ISPAH), 2012).

Another opportunity for physiotherapists to contribute to public health efforts to promote physical activity could come from establishing a greater presence in community initiatives. Physiotherapists could run community sessions on how to lead a more physically active lifestyle, including types of physical activity, screening for co morbidities and whether a consultation with a health professional is required before undertaking greater physical activity. In Chapter 3 one of the eligible studies in the systematic review utilised advice to join a community walks program as their intervention (Lamb, Bartlett, Ashley, & Bird, 2002). In that study the community walks program was not run by physiotherapists. The group that included health walks and physical activity advice were more likely to increase moderate physical activity levels than advice alone (Lamb et al., 2002). Physiotherapists could join forces with local councils to ensure such programs are available and provide advice for those wanting to undertake such walking programs. Public information evenings could also be held to get the messages about the importance of physical activity to greater numbers of the population. Physiotherapy involvement in promoting physical activity in the community also aligns with APA's Vision 2020 which describes a role as a communicator to deliver disease prevention advice to the community in a variety of settings (APA, 2005).

Other opportunities to help drive public health initiatives to promote physical activity could come from engaging with the corporate sector. Physiotherapists could be involved in activities to attempt to change culture and incorporate greater

opportunities for physical activity promotion in the work place, particularly in workplaces that are primarily sedentary. Most sedentary workplaces provide little opportunity for physical activity during the working day. People often cite lack of time, tiredness etc as reasons for not being physically active in their non work hours. The workplace is considered an important forum for health promotion to prevent non communicable diseases (World Health Organization, 2008). Workplace health promotion programs that promote physical activity are effective in promoting healthy lifestyle behaviours (Chau, 2009; World Health Organization, 2008). Proposed benefits of physical activity promotion programs in the workplace include increased physical activity levels, reduced body fat, decreases in musculoskeletal disorders and improvements of cardio respiratory fitness (Chau, 2009).

Physiotherapists would be ideal to run health promotion programs targeting physical activity in the workplace. Their role could involve screening workers for co morbidities that may indicate the need for modification of exercise. To achieve real change in physical activity behaviours through workplace interventions it is likely to need a change in culture at an organisational level. Physiotherapists could design and implement exercise / physical activity programs individually tailored to workers needs and preferences, facilitate opportunities for group exercise such as walking clubs etc during breaks, institute challenges in the workplace eg team with greatest number of steps / month, encouraging stair use etc.

Some of these activities may not need to be totally implemented by a physiotherapist and there may be a need for physiotherapists to work in a multidisciplinary team for

health promotion. Such multidisciplinary teams could consist of physiotherapists, exercise physiologists and dieticians.

Health promotion programs have been implemented in the mining and construction industries with the aim of preventing injury to workers performing their duties in awkward positions, confined spaces or spending many hours seated operating equipment. These workplaces have invested significant time, money and effort to try to ensure the health of their workers and minimise costs due to injury with a focus on back injury. Anecdotally it appears to be a worthwhile investment but these programs that have been designed and implemented by physiotherapists have not been subject to scientific evaluation. While the focus of the existing programs has been to prevent back injury there is no reason why this type of program could not involve education about general health and prevention of chronic disease by changing physical activity behaviour.

An RCT could be conducted to investigate whether a physical activity/ health promotion program in the workplace is effective in changing physical activity behaviours and health outcomes. The intervention could be a health promotion/physical activity program implemented in a corporate setting.

## **Conclusion**

This thesis has examined the role of physiotherapists in promotion physical activity for health promotion purposes to prevent non communicable diseases.

Physiotherapists consider it their role to provide physical activity advice and feel that it is possible for them to incorporate into usual care without too many barriers. To date there have only been a handful of studies investigating whether physiotherapists are effective in changing physical activity behaviours and health outcomes by providing physical activity advice in a primary care setting. The resulting evidence is inconclusive mainly because there are only a few trials of moderate to low quality. A more rigorous RCT is proposed and described in this chapter. Physiotherapists also need to consider opportunities to become involved in public health initiative to increase physical activity that are outside the usual primary care treatment settings. The time is ideal for physiotherapist to tap into their relatively underutilised potential to be key players in public health initiatives to increase physical activity and to bridge the evidence gap in this area.

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## **APPENDICES**

## Appendix 1: Questionnaire for physiotherapists

### PHYSICAL ACTIVITY IN PHYSIOTHERAPY PRACTICE

**Physical Activity:** includes any activity from a low intensity level, such as walking, to a high intensity level, such as playing a competitive sport.

1. How often did you encourage your patients to have a more physically active lifestyle (beyond therapeutic exercise) in the last month? *(please tick one)*

- Never  Often, perhaps 6-9 patients  
 Rarely, only 1 or 2 patients  More often, 10 or more patients  
 Sometimes, perhaps 3-5 patients

2. To what extent do you agree or disagree with the following statements: *(circle only one for each statement)*

	strongly agree	agree	not sure	disagree	strongly disagree
a. Taking the stairs at work and generally being more active each day is enough physical activity to improve health	1	2	3	4	5
b. Half an hour of walking on most days is all the exercise that is needed for good health	1	2	3	4	5
c. Exercise that is good for health must make you puff and pant	1	2	3	4	5
d. Several short walks of 10 minutes each on most days is better than one round of golf per week for good health	1	2	3	4	5
e. Discussing the benefits of a physically active lifestyle with patients is part of the Physiotherapists role	1	2	3	4	5
f. Suggesting to patients ways to increase daily physical activity is part of the Physiotherapists role	1	2	3	4	5
g. I feel confident in giving general advice to patients on a physically active lifestyle	1	2	3	4	5
h. I feel confident in suggesting specific physical activity programs for my patients	1	2	3	4	5
i. Physiotherapists should be physically active to act as a role model for their patients	1	2	3	4	5

3. How often does the following prevent you from promoting a physically active lifestyle in your patients (beyond therapeutic exercise)? *(circle only one for each statement)*

	never	rarely	sometimes	often	very often
a. Lack of time	1	2	3	4	5
b. Lack of counselling skills	1	2	3	4	5
c. Lack of remuneration for promoting physical activity	1	2	3	4	5
d. Lack of interest in promoting physical activity	1	2	3	4	5
e. Feeling it would not change the patients behaviour	1	2	3	4	5
f. Feeling it would not be beneficial for the patient	1	2	3	4	5
g. Other: _____	1	2	3	4	5

4. What kinds of physical activity promotion (beyond therapeutic exercise) would be feasible for you to deliver to your patients? (*circle only one for each statement*)

	highly feasible	somewhat feasible	not sure	not really feasible	totally unfeasible
a. Brief counselling integrated in your regular consults	1	2	3	4	5
b. Separate one on one consultations	1	2	3	4	5
c. Group sessions	1	2	3	4	5
d. Distribution of resources (such as brochures)	1	2	3	4	5

**5. Some general questions about your practice:**

- a. Average number of patients you see each week: \_\_\_\_\_
- b. Your number of years in practice: \_\_\_\_\_
- c. Your gender:  Female  Male
- d. Your age in years:  <35 yrs  35-44 yrs  45-54 yrs  >54 yrs
- e. Usual number of hours worked each week: \_\_\_\_\_
- f. The postcode where you work: \_\_\_\_\_
- g. What area of physiotherapy do you practice?  
(*please tick as many as are applicable*)
- Musculoskeletal  Cardiopulmonary
- Neurological  Paediatrics
- Geriatrics  OH & S
- h. What kind of practice do you work in?
- Private practice
- Community
- Public hospital

6. a. Are you aware of the National Physical Activity Recommendation for Australian Adults?

- Yes  No

b. If yes, please describe the National Physical Activity Recommendation for Australian Adults here.

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7. Finally, about your own physical activity: How physically active do you think you are currently, compared to other Australians of your gender and age? (*please tick one*)

- much more active  slightly more active  about the same  slightly less active  much less active

## Appendix 2: Questionnaire for physiotherapy students

### PHYSICAL ACTIVITY IN PHYSIOTHERAPY PRACTICE STUDENT SURVEY

Physical Activity: includes any activity from a low intensity level, such as walking, to a high intensity level, such as playing a competitive sport.

1. To what extent do you agree or disagree with the following statements: *(circle only one for each statement)*

	strongly agree	agree	not sure	disagree	strongly disagree
a. Taking the stairs at work and generally being more active each day is enough physical activity to improve health	1	2	3	4	5
b. Half an hour of walking on most days is all the exercise that is needed for good health	1	2	3	4	5
c. Exercise that is good for health must make you puff and pant	1	2	3	4	5
d. Several short walks of 10 minutes each on most days is better than one round of golf per week for good health	1	2	3	4	5
e. Discussing the benefits of a physically active lifestyle with patients is part of the Physiotherapists role	1	2	3	4	5
f. Suggesting to patients ways to increase daily physical activity is part of the Physiotherapists role	1	2	3	4	5
g. I would feel confident in giving general advice to patients on a physically active lifestyle	1	2	3	4	5
h. I would feel confident in suggesting specific physical activity programs for my patients	1	2	3	4	5
i. Physiotherapists should be physically active to act as a role model for their patients	1	2	3	4	5
j. I would encourage most my patients to have a physically active lifestyle if I was in physiotherapy practice	1	2	3	4	5

2. What kinds of physical activity promotion (beyond therapeutic exercise) would be feasible to deliver to patients?

*(circle only one for each statement)*

	highly feasible	somewhat feasible	not sure	not really feasible	totally unfeasible
a. Brief counselling integrated into regular consults	1	2	3	4	5
b. Separate one on one consultations	1	2	3	4	5
c. Group sessions	1	2	3	4	5
d. Distribution of resources (such as brochures)	1	2	3	4	5

3. Some general questions about you:

a. Your Physiotherapy student status:

Undergraduate in year:       Year 1       Year 2       Year 3       Year 4

Graduate Entry Masters in year:       Year 1       Year 2

b. Your gender:       Female       Male

c. Your age in years:      \_\_\_\_\_

d. The postcode where you live:      \_\_\_\_\_

4. Finally, about your own physical activity: How physically active do you think you are currently, compared to other Australians of your gender and age? (*please tick one*)

much more active       slightly more active       about the same       slightly less active       much less active

**Thank you for your participation. All responses are confidential.**