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ENHANCING PHYSICAL ACTIVITY: EXPLORING REFERRAL
PATHWAYS BETWEEN GENERAL PRACTITIONERS AND EXERCISE
PHYSIOLOGISTS

Francis Ali Albert

BSc Human Physiology (Hons), MSc Exercise and Sports Science

Submitted in fulfilment of the requirement for the degree of

Doctor of Philosophy

At the College of Medicine and Dentistry

Division of Tropical Health and Medicine

James Cook University

March 2022

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I declare that the research included in this thesis was ethically conducted with approval received for each component of the research from James Cook University's Human Research Ethics Committee (HREC). The ethics approval code for the research relevant to this thesis is H7661.

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Abstract

Introduction: Physical activity referral schemes (PARS) are commonly used physical activity (PA) interventions for insufficiently active individuals who are at risk of developing or have existing chronic health conditions. PARS originated from, and are more widely used in the UK compared to Australia. To help manage the growing burden of chronic diseases, the Australian Government in 2006, included referrals from frontline healthcare professionals (HCPs) such as general practitioners (GPs) to accredited exercise physiologists (EPs) under the Medicare health programme. Despite this healthcare reform, current findings have highlighted that the effectiveness of the GP-EP referral pathway is hampered by low GP to EP referrals and low EP consultation rates. The literature revealed the following five knowledge gaps: The scarcity of PARS; poor knowledge about PARS and the roles of EPs; lack of a structural framework for PARS; and limited PARS studies, particularly mixed methods studies. Furthermore, there is a scarcity of studies exploring the referral pathways between GPs and EPs from the Australian context. Hence, this research aimed to bridge the identified literature gaps by exploring the global and Australian physical activity referral scheme (PARS) stakeholder views on the promotion of PA and PARS for insights into the programme's functionality and how to enhance its effectiveness. To address this aim, the following five research questions (RQs) were developed: 1) What is the global patient perspective on the functionality of PARS?; 2) What are global HCPs' perceptions about PA and PARS promotion?; 3) What are Australian patients' perception of the efficacy of PARS?; 4) How do Australian health professionals (GPs and EPs) perceive the coordination of care for PARS users?; and 5) What are Australian PARS stakeholders' (GPs, EPs, and patients) recommendations for improving PARS?

Methods: This thesis encompassed three research stages: The first stage involved two systematic reviews that investigated the global views of patients (RQ1) and HCPs (RQ2) regarding the promotion of PA and PARS. The findings from this stage informed the need for

the second (mixed methods studies) and third (qualitative study) stages of the research, which involved in-depth investigations of the perspectives of PARS stakeholders on their experiences of the functionality of PARS within an Australian context. For these two stages of the research, participants included Australian GPs, EPs and patients with chronic disease(s), aged 18 years and above. A sequential explanatory mixed methods research design that included quantitative online surveys and qualitative telephone interviews was adopted for the two mixed methods studies conducted in stage two. The first mixed methods study explored patients' views on the efficacy of PARS programmes and provided answers to RQ3. The second mixed methods study investigated the perspectives of HCPs (GPs and EPs) on the coordination of care for PARS users and provided answers to RQ4. Descriptive and suitable inferential statistics were used to analyse data from the quantitative studies, while framework analysis was used for the qualitative studies in stage two. Stage three answered RQ5 by utilising a qualitative pluralistic evaluation approach to explore and synthesise the recommendations of all stakeholders (GPs, EPs and patients) on how to enhance the effectiveness of the PARS programme.

Results: Findings from the reviews revealed that PARS is crucial to uptake and adherence to PA intervention goals, but obstacles, including scarcity of the programme's information and paucity of studies from settings other than the UK, limit the programme's effectiveness. The review findings also showed that increasing workload and time constraints might hinder the ability of GPs to promote PA and PARS, which potentially leads to underutilisation of the services of PA specialists such as EPs. The findings from the mixed-methods studies highlighted that patients could boost PARS effectiveness if they are adequately informed and supported. Empowering patients through efficient patient-HCP collaboration can drive self-initiated referrals into PARS and is crucial to reducing the burden of work for GPs and driving the success of the PARS programme. Furthermore, fostering quality GP-EP relationships and information sharing can improve insights about the services of EPs, stimulate referrals, and

enhance the programme's effectiveness. A synthesis of all stakeholders' recommendations for enhancing PARS effectiveness in the qualitative study informed the development of the 'PRICE' (promote, relate, incentivise, communicate, and educate) model. It was evident from this study that the success of PARS depends on continued interdisciplinary and HCP-patient collaborations and designating other healthcare team members such as nurses, to organise PARS referrals. Also, improving incentivising strategies for patients and healthcare gatekeepers like GPs, can boost PARS referrals, uptake, and effectiveness.

Conclusion: Ultimately, the findings from this research uncovered that despite the increasing complexity and heterogeneity of the healthcare coordination and service delivery systems, PA and PARS strategies could be potent therapeutic tools for enhancing people's health and wellness outcomes. Ongoing promotion of PA and PARS initiatives, interprofessional and HCP-patient rapport could enhance the visibility of the roles of EPs, services that they render and improve the effectiveness of the PARS programme. Additionally, prospective HCPs could benefit from learning more about PA and PARS during undergraduate training. This could better prepare HCPs to provide holistic care to patients and potentially inform a functional and sustainable PARS process. Finally, the developed 'PRICE' (promote, relate, incentivise, communicate, and educate) model could be used to inform policies and enhance PARS functionality.

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List of Abbreviations

| | |
|---------|--|
| AEOM-A: | Aduli EO Malau-Aduli |
| AHPs: | Allied Health Professionals |
| AIHW: | Australian Institute of Health and Welfare |
| BSM-A: | Bunmi Sherifat Malau-Aduli |
| BP: | Blood pressure |
| CDM: | Chronic Disease Management |
| CMD: | College of Medicine and Dentistry |
| COREQ: | Consolidated criteria for reporting qualitative research |
| EPs: | Exercise Physiologists |
| ERS: | Exercise Referral Scheme |
| EPC: | Enhanced Primary Care |
| FAA: | Francis Ali Albert |
| GPs: | General practitioner |
| HCPs: | Health Care Professionals |
| HREC: | Human Research Ethics Committee |
| JCU: | James Cook University |
| MC: | Melissa Crowe |
| MET: | Metabolic Equivalent |
| MRC: | Medical Research Council |
| NCDs: | Non-communicable Diseases |
| PA: | Physical Activity |
| PAP: | Physical Activity on Prescription |
| PARS: | Physical Activity Referral Scheme |
| PI: | Physical Inactivity |
| PRISMA: | Preferred Reporting Items for Systematic Reviews and Meta-Analyses |
| RCTs: | Randomised Control Trials |

| | |
|------|------------------------------|
| RQs: | Research Questions |
| SB: | Sedentary Behaviour |
| SRQ | Sub-Research Question |
| TDF: | Theoretical Domain Framework |
| UK: | United Kingdom |
| USA: | United States of America |
| WHO: | World Health Organisation |

Researcher's Motivation and Personal Background

I am a goal-driven Exercise Scientist with a mission to alleviate the suffering of vulnerable members of our society through physical activity (PA). I have always had an interest in the sciences and my passion for PA evolved from the death of my older brother due to physical inactivity (PI) related chronic condition. My brother was a lovely husband and a father of two beautiful kids. He was full of life until 20th March 2012, when he came down with a cardiovascular disease and unfortunately died on 6th April 2013. His demise left me devastated because he was my role model and an integral part of my formative years. His death prompted me to pursue a Masters degree in Exercise and Sports Science following my Bachelor's degree with Honours in Human Physiology. I started my career in Nigeria (West Africa) as a recreational therapist and worked my way up to a senior recreational officer, after which an opportunity for my services emerged in Australia. I relocated to Australia and continued to pursue my passion by volunteering as a PA promoter and working as a personal trainer. Working in the fitness industry was a rewarding and transformative experience for me as I witnessed first-hand, the invaluable impacts of PA on the health and wellness of my clients. I also noticed the PA referral pathway dilemmas that my clients encounter. Linking the dilemmas to my brother's demise moved me to act. These issues motivated me to pursue a PhD to enhance my knowledge and contribute to the possible solutions to the PI pandemic and inefficient PA referral process between General Practitioners (GPs) and Exercise Physiologists (EPs).

Chapter ONE: General Introduction

1.1 Chapter Overview

This introductory chapter provides a background for the research and contextualizes the research questions guiding this study. The chapter commences with the definition and implications of physical inactivity (PI). It also provides an outline of the global burden of PI and its impact as a risk factor for chronic diseases. The importance of physical activity (PA), its potential benefits, and an overview of PA interventions are highlighted. Furthermore, the importance of PA referral pathways and the factors that limit their effectiveness are elucidated. The theoretical and methodological frameworks as well as the analytical approaches that underpin the current research are also discussed. Finally, a synopsis of the thesis chapters and how they each address the research questions is presented.

1.2 The Global Burden of Physical Inactivity

Physical inactivity (PI) is the term used to identify people who are not achieving specified physical activity (PA) requirements (Tremblay et al., 2017), while PA is defined by the World Health Organisation (WHO) as any bodily movement produced by contraction of skeletal muscles that require energy expenditure (WHO, 2018a). WHO's global recommendations on physical activity for health state that "*Adults aged 18–64 years should do at least 150 min of moderate-intensity aerobic physical activity throughout the week, or do at least 75 min of vigorous-intensity aerobic physical activity throughout the week, or an equivalent combination of moderate- and vigorous-intensity activity*" (WHO, 2020). However, an estimated 31% of the world's population does not fulfil PA recommendations (Guthold et al., 2018), with the burden of PI accruing an annual cost of \$53.8 billion in direct healthcare cost globally (Ding et al., 2017). Furthermore, the impact of the COVID-19 pandemic has led to social isolation, negative emotions and stress, and these problems could exacerbate PI behaviours and impact wellbeing, quality of life and global health (Puccinelli et al., 2021; Ricci et al., 2020).

PI has been characterised as a global pandemic (Pratt et al., 2020) and it has significant implications for the prevalence of various non-communicable diseases (NCDs), and chronic disorders (Roth et al., 2018). Studies have indicated that PI poses an enormous set of clinical, economic, and public health problems, including functional decline, disability, and increased healthcare costs (Ding et al., 2017; WHO, 2018b). Current statistics on PI show that men are more active than women, with the lowest percentages of PI recorded in men from Oceania (12.3%), East and South-East Asia (17.6%), and sub-Saharan Africa (17.9%) (Figure 1.1a). As portrayed in Figure 1.1b, PI is most prevalent among women from Latin America and the Caribbean (43.7%), South Asia (43%), and high-income western countries (42.3%). The prevalence of PI has increased in high-income countries (from 31.1% in 2001 to 36.8% in 2016), which is double the numbers in low-income countries (16.2%) (Guthold et al., 2018).

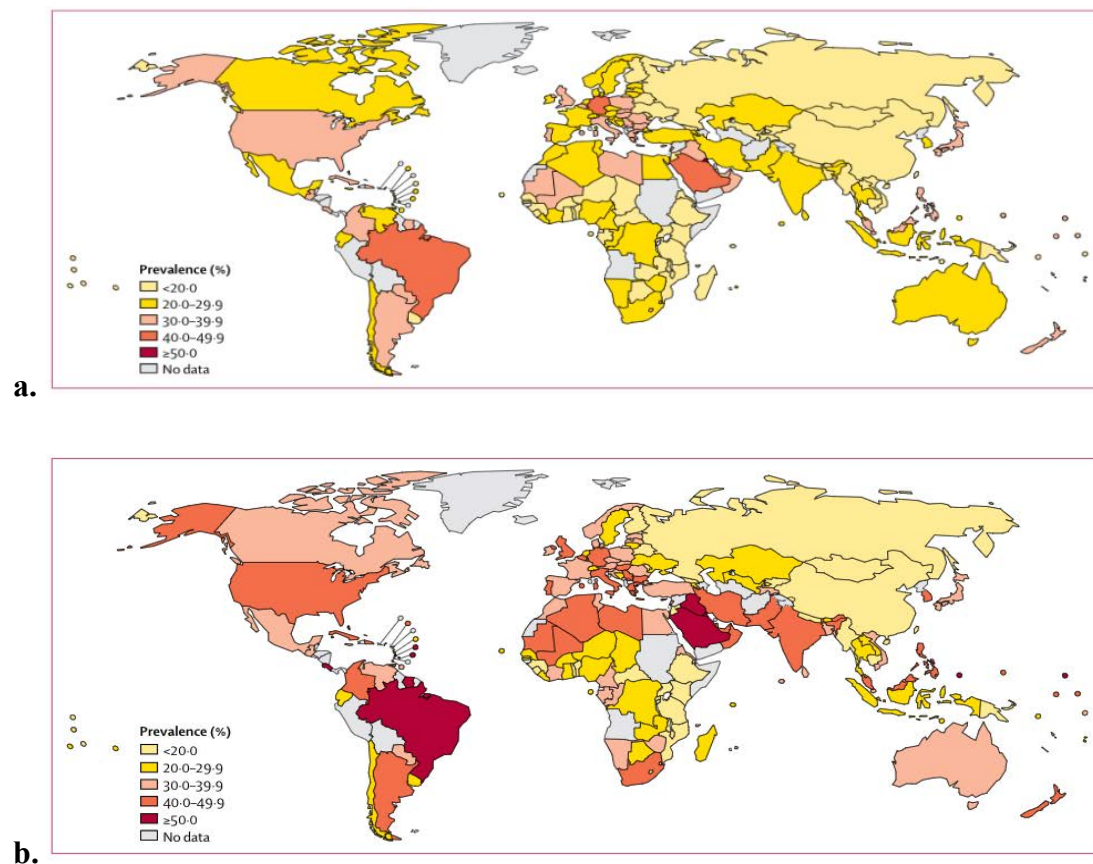


Figure 1.1: Global prevalence of insufficient physical activity in (a) men and (b) women in 2016 (Guthold et al., 2018)

The current PI trends put 20% of the world's population at risk of developing or worsening inactivity-linked diseases and hinder the achievement of WHO's goal of a 10% reduction in PI by 2025 (Guthold et al., 2018). A multinational study reported that PI is a significant health burden accounting for 7.2% of all-cause mortality, 7.6% of cardiovascular diseases and 8% of non-communicable diseases globally (Katzmarzyk et al., 2021). Interestingly, current global estimates reveal that one in four adults do not sufficiently engage in PA, suggesting a worsening of inactivity from 2018 to 2020 (WHO, 2020). In Australia, 55% of adults have been reported by the Australian Institute of Health and Welfare (AIHW) to be insufficiently active (AIHW, 2020). PI was linked to 10% to 20% disease burden and was the main predisposing factor for 19% of diabetes, 16% each of bowel and uterine cancers, 14% of dementia, 11% of breast cancer, 11% of coronary heart diseases and 10% of stroke (AIHW, 2017).

1.2.1 Impact of Physical Inactivity on Health and Wellbeing

The growing prevalence of PI-related risk factors is alarming. Several chronic diseases, including non-communicable diseases (NCDs) like type 2 diabetes, cardiovascular diseases (CVDs) and some cancers have been linked to inadequate PA (Lee et al., 2020) and sedentary behaviour (SB) (Engelen et al., 2017). SB is defined as any conscious behaviour characterized by an energy expenditure ≤ 1.5 metabolic equivalent (MET) while in a sitting, reclining or lying posture (Tremblay et al., 2017). The relationship between SB and PI and their role in the development of chronic health conditions is an ongoing topic of research. However, PI and SB have been established as different constructs and independent risk factors for chronic NCDs (Thivel et al., 2018). Generally, people with chronic conditions are less active and prone to SB (Vancampfort et al., 2017). Furthermore, there are major concerns about the significant increasing levels of chronic conditions such as mental health (Arora et al., 2016). In Australia, data from a 2017/2018 self-reported survey highlighted that one in two Australians (47%) have

at least one of the ten common chronic conditions, which accounted for approximately nine out of ten fatalities in 2018 (AIHW, 2021). Also, chronic diseases accounted for three out of four of Australia's non-fatal disease burdens in 2015 (AIHW, 2019). The growing incidence of chronic diseases calls for urgent action such as optimising current PA interventions (Guthold et al., 2018). Considering the prevalence of PI, the WHO has outlined strategies to achieve 10% and 15% reduction in PI by the years 2025 and 2030, respectively, in the global plan of action for PA 2018 – 2030 (WHO, 2018a).

1.3 Physical Activity

Regular PA interventions, particularly those of moderate to vigorous intensity, can prevent and help manage a myriad of chronic conditions (Pedersen & Saltin, 2015; WHO, 2017) and promote other health benefits (Piercy et al., 2018). Furthermore, increased PA can facilitate reduced working-age mortality and morbidity among populations, leading to strengthened global economy (Hafner et al., 2019). Exercise is a type of PA designed to develop or maintain one or more aspects of physical fitness (Caspersen et al., 1985; Dasso, 2019; WHO, 2018b). There is overwhelming evidence that supports the effectiveness of PA as a therapeutic strategy for preventing and managing NCDs and chronic conditions (Lee et al., 2012; Pedersen & Saltin, 2015) and maintaining physical and mental health (McKinney et al., 2016). Warburton and Bredin (2016) reported a significant decrease (over 30%) in the risk of all-cause mortality, CVDs, stroke, hypertension, colon cancer, and type 2 diabetes for active individuals in comparison to their inactive counterparts.

PA is performed in the following three main ways: 1) During sporting and leisure activities like cycling, tennis, jogging and hiking; 2) Incidental activities such as those done at work, during transportation and house chores; and 3) Muscle-strengthening activities such as climbing stairs or hills, squats, push-ups and weight training (AIHW, 2020; Lear et al., 2017; McGuire & Ross, 2011). To maximise the benefits of PA, the WHO guidelines (2020)

recommend that adults (18 – 64 years) are required to engage in at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity activity per week (Figure 1.2).

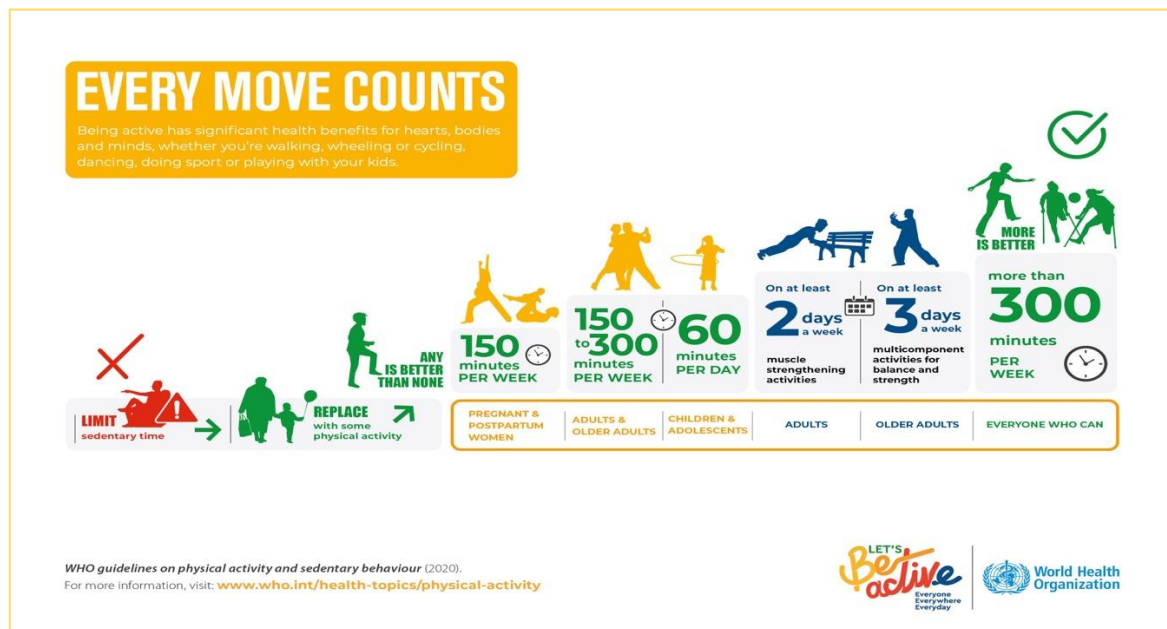


Figure 1.2: Physical activity recommendations (WHO, 2020).

Adults can combine moderate and vigorous-intensity activities, employing the rule of thumb that one minute of vigorous-intensity activity equals two minutes of moderate-intensity activity (Piercy et al., 2018). Adults are encouraged to engage in activities that strengthen the major muscle groups of the body (including shoulders, arms, trunk/abdomen, back, hips, and legs) at least twice a week and minimise SB by taking part in bouts of light activities (Figure 1.2) (WHO, 2020).

The PA guidelines for Australians recommend that older Australians (65 years and above and 55 years and above for Aboriginal and Torres Strait Islander peoples) should participate daily in different forms of PA that integrate fitness, strength, balance, and flexibility (AIHW, 2018). The guidelines further urge these populations to engage in moderate-intensity PA such as walking, jogging or hiking for at least 30 minutes daily, regardless of age, weight, abilities and

health concerns (AIHW, 2018). Interspersing prolonged periods of sitting or inactivity with modest amounts of PA can have greater health benefits for individuals with high sedentary habits/tendencies (Duvivier et al., 2013). Six in ten (60%) Australians (aged 18 - 64 years) within the highest socioeconomic group met the current PA guidelines, compared to only 37% in the lowest socioeconomic group. Indigenous Australian men (aged 18 - 64 years) and women (65 years and above) were less likely to fulfil the PA guidelines. Only 38% of Indigenous Australian adults met the PA guidelines compared to 46% of their non-indigenous counterparts. Also, 38% of non-indigenous women were twice as likely to meet the PA guidelines than 16% of their indigenous counterparts (AIHW, 2018).

1.3.1 Benefits of Physical Activity

Consistent participation in PA interventions could be beneficial for the prevention, treatment and management of numerous chronic metabolic, cardiovascular, psychological and musculoskeletal conditions (Bennell et al., 2014; Cascaes da Silva et al., 2016; Fransen et al., 2015; Sui et al., 2008). About half of PI related mortalities could be averted by achieving, enhancing and sustaining essential PA requirements (Mok et al., 2019).

PA could confer numerous benefits ranging from improved health and wellness to reduced mortality (Ekelund et al., 2019a). For instance, a systematic review and meta-analysis by Ekelund et al. (2019b) indicated that the risk of premature death could be substantially reduced by taking part in increased PA at any intensity and reducing sedentary time. A 2017 study by the AIHW disclosed that individuals, particularly those who are 65 years and above, could reduce the disease burden of PI by 13% if they perform a moderate to vigorous-intensity activity like brisk walking for 15 minutes, five days a week. The percentage reduction in disease burden in these individuals could be doubled (26%) if the time increased to 30 minutes (AIHW, 2017). Lowering PI by 10% could save Australia 0.19% of the yearly cost of healthcare (Cadilhac et al., 2011).

1.4 Physical Activity Interventions

PA intervention is critical to preventing and treating chronic diseases, the risk of diseases and premature death which are exacerbated by PI and sedentary lifestyles (Ekelund, et al., 2019b; Ku et al., 2018; Patterson et al., 2018). It is also significant to increasing health outcomes for patients (Lion et al., 2019). Promoting PA requires a multi-faceted approach that includes individual behaviour and lifestyle adjustment techniques, as well as environmental and policy interventions. Environmental and policy interventions to promote PA include developing new buildings, walking and biking routes (Forberger et al., 2019). This approach could provide equal access and enhance the PA of dwellers and visitors in and around public facilities. However, there is the need to implement and enforce safety measures to protect pedestrians and vulnerable road users (WHO, 2018b).

Several interventions have been used to promote PA in primary healthcare settings (Orrow et al., 2012). Common strategies for promoting PA in primary healthcare settings could be categorised into individualised and community-based strategies (Draper & Stratton, 2018). Individual approaches for promoting PA predominantly include face to face education and fitness classes such as recreational activities and referral to PA specialists for structured exercises (Cushing et al., 2014). Studies have highlighted that individualised PA promoting strategies including counselling and advice could be effective among youths (Cushing et al., 2014) and the elderly (French et al., 2014). However, this intervention is fraught with difficulties such as lack of time and adequate PA knowledge on the part of HCPs (Glowacki et al., 2019). Work burden and time barriers make it difficult for frontline HCPs such as GPs to effectively support positive PA behavioural changes in patients (Patel et al., 2011).

Community or population-based strategies aim to promote PA to many people in different settings such as primary healthcare, worksites, and faith-based locations. They use mass media, environmental and policy initiatives to promote and implement PA interventions to change

health behaviours in the community (Gielen & Green, 2015; Golden & Earp, 2012). Compared to individualised approaches, community-based PA is affordable and the strategies employed enhance knowledge, build skills, and foster health behavioural change (Heath et al., 2012). Also, it has a broader reach than other strategies and can deliver optimum health outcomes to the population (Golden & Earp, 2012). Examples of valuable strategies used in the community to improve PA include house-to-house dissemination of PA information, instructing and supporting community members who are at risk of developing chronic diseases (Kamada et al., 2018). Despite the utilisation of these strategies, the effectiveness of community-based strategies are inconclusive (Craike et al., 2018; Everson-Hock et al., 2013) and undermined by very low uptake and adherence (Jefferis et al., 2014; Baker et al., 2015).

Common barriers to the uptake and adherence to individualised and community-based PA include the lack of facilities, motivation and time, illness, disability, cost, perceived lack of benefit, transport barriers, safety concerns, poor attitude to PA, and fear of racial or religious discrimination (Chinn et al., 1999; Kjaer et al., 2019; Koshoedo et al., 2015; Linder et al., 2021; Macintyre, 2000). Integrating strategies such as goal setting, support and self-monitoring could foster effective PA and behavioural change interventions (Bird et al., 2013; Greaves et al., 2011; Nyman et al., 2018; Samdal et al., 2017). Therefore, studies have recommended that general PA intervention strategies including behavioural change approaches, should be integrated with efficient adherence strategies in promoting PA, particularly in primary healthcare settings (Bassett, 2015; Rhodes, 2014). Primary healthcare practice environments provide HCPs with opportunities for improved access to promote PA to individuals within the community (Lion et al., 2019).

However, studies have reported that when individuals involved in both the delivery and receipt of an intervention; lack knowledge, perceive involvement as highly demanding or place low sense of value on the intervention, these can serve as barriers for successful implementation

(Darlington et al., 2017; Powell et al., 2017). Thus, it is evident that the effectiveness of PA interventions is influenced by diverse individual characteristics (Murray et al., 2017). This highlights the need to address PI issues at the individual level. Assessing the factors that influence implementation processes, which include the characteristics and preferences of individuals involved in both the delivery and receipt of PA intervention, may facilitate better engagement and improved health outcomes for patients.

1.5 Physical Activity Referral Schemes (PARS)

The National Institute for Health and Care Excellence (NICE) describes PARS as interventions for prescribing and delivering structured exercise programmes to improve people's physical and mental wellbeing (NICE, 2014). It involves the referral of patients with one or more chronic disease risk factors or conditions by frontline HCPs such as GPs to PA specialists like EPs. PARS started in the UK in the early 1990s before proliferating to other parts of the world (NICE, 2014; Pavey et al., 2011b). The structure, implementation process and terminology for PARS varies depending on the country where the programme is delivered. Common terminologies for PARS include exercise referral schemes (ERS) (NICE, 2014) and physical activity on prescription (Lundqvist et al., 2017). In Australia, it is referred to as chronic disease management (CDM) plan (Billot et al., 2016). The programme's duration is mostly between eight and twelve weeks, and payments are largely discounted or rebatable (Williams et al., 2007). Participants in PARS interventions usually have an average age of 55 years and above with one or more chronic conditions (Hanson et al., 2013; Wade et al., 2020). Structured and supervised gym-based activities are commonly delivered in PARS interventions and various settings have set criteria for the length, content, and eligibility for PARS intervention uptake (Morgan, et al., 2016).

Studies have highlighted that the strategies employed in PA and PARS interventions could foster the achievement of PA goals for participants and promote positive PA attitudes (Bell et

al., 2021; Hanson et al., 2021). Furthermore, a meta-analysis by Love et al. (2018) showed that PARS interventions in controlled settings could positively influence participants' behaviour. Although different PARS variants have been adopted in various settings, evidence supporting the programmes' effectiveness are inconclusive (Campbell et al., 2015; Pavey, et al., 2011b). For example, Hanson et al. (2019) concluded that the programme was beneficial for people with NCDs; however, strategies to optimise behaviour change for PARS users with complex health and social needs are required. With the complexity, heterogeneity and growing demands of healthcare systems, this issue needs to be re-evaluated to adequately tackle the challenges and improve the quality of PARS delivery (Wade et al., 2020).

1.5.1 Factors that Influence Uptake and Adherence to PARS

Uptake and adherence are determinants of PARS success (Pavey et al., 2012). While uptake represents the enrolment and agreement to partake in a PA intervention, adherence is defined as the degree to which a person's conduct fits the agreed-upon plan of the prescribed exercise intervention (Hawley-Hague et al., 2016; Slade et al., 2016). Despite the manifold benefits of PA, studies have indicated low uptake of interventions that foster the promotion of PARS (Hardcastle et al., 2018; Leijon et al., 2011). Identifying the factors that cause low uptake and poor adherence to PARS could optimise the programme's effectiveness (Pavey et al., 2012)

According to Pavey et al. (2012), variables including participant demographics (e.g. sex, age and location), medical diagnosis, programme and psychosocial factors influence uptake and adherence to PARS interventions. For instance, older adults (40 – 69 years) are more likely to take up PARS interventions than younger adults (below 40 years) (Gidlow et al., 2007). People in deprived and rural settings are less likely to take up PARS interventions (Hanson et al., 2013; Pavey et al., 2012). On programme factors, the time between referral and first session, exercise leader attributes, exercise possibilities and the type of HCP referring a participant into PARS, influence user uptake and adherence to PARS intervention goals (Morgan et al., 2016).

Arsenijevic and Groot (2017) explored PARS effects on adherence and self-reported PA. Their study highlighted that PARS was impacted by characteristics such as the referrer, programme duration, reason for referral and payments. Psychosocial predictors such as self-determination were positively correlated with adherence to PARS interventions (Morton et al., 2007). Yang et al. (2017) showed that lack of motivation to engage in PA and PARS interventions is a considerable barrier to adherence and uptake. Educating HCPs could help them to be better informed, more successful, and better prepared when advocating for PA and PARS programmes (Jones et al., 2021).

1.5.2 HCPs and their Roles in Promoting PA and PARS

General practice is the bedrock of the healthcare system and could be a viable setting for promoting PA and PARS (Britt et al., 2016; Jones et al., 2021). HCPs such as GPs are important for promoting individualised or one-on-one PA interventions because of their access to the general population (Britt et al., 2016; Craike et al., 2019). The GP integrates biomedical, psychological, and sociological skills to provide preventive, diagnostic, curative, and palliative care to the patient (Olesen et al., 2000). Every contact with a patient should be considered an opportunity to promote lifestyle interventions and help patients increase their health and wellness (Gates, 2016).

A major strategy that has been used to explore PA in general practice is the “ask-assess-advice” framework developed by NICE and NHS Health (NICE, 2006; Silverman & Deuster, 2014). The “ask-assess-advice” technique is initiated with a validated question that examines the patient’s involvement in PA the previous week (Milton et al., 2013; Silsbury et al., 2015), followed by an assessment of the patient’s readiness to improve PA habits and finally aids the setting of achievable health goals (Haseler et al., 2019). Despite this recommendation, many doctors are under-equipped to provide tailored PA prescriptions to patients throughout the health and disease spectrum (Blair, 2009). While GPs may provide quality PA advice to

patients, they are less likely to provide individualised exercise or continuing support due to time constraints, lack of knowledge of the physiological and metabolic reactions to exercise, or awareness of patients' readiness to change habits. Furthermore, training on lifestyle intervention and interprofessional collaboration are underemphasised in the undergraduate programmes of HCPs including GPs (Davies et al., 2009; Derman et al., 2008; Radenkovic et al., 2019). This creates a significant practice gap for the delivery of ongoing support and follow-up of clients who have received lifestyle prescriptions including PA (Matheson et al., 2011; Matheson et al., 2013).

1.6 Research Gaps within the Australian Context

In the Australian healthcare system, GPs are usually the first port of call, and are therefore, well-positioned to promote PA and PARS to patients because studies have shown that over 83% of Australians see a GP at least once a year (Britt, et al., 2016). However, the ability of GPs to coordinate quality care for patients is constrained by numerous difficulties such as lack of information on available referral services, work burdens and time constraints (Huijg et al., 2015). In the light of this, integrated care through referrals to PA specialists such as EPs, can support the efforts of doctors to improve patient care (Soan et al., 2014). Integrated care has been demonstrated to improve patient self-management, limit chronic disease development, and minimise the number of acute conditions needing hospitalisation, hence, reducing costs and burden on healthcare systems (Casas et al., 2006; Wu et al., 2018).

EPs are university qualified PA specialists who have the skills and time to conduct tailored exercise programmes that consider the individual's functional and disease-related limitations and use effective behaviour change techniques to promote PA uptake and adherence (Cheema et al., 2014; Gillam, 2015). In Australia, accredited EPs are required to meet the rigorous accreditation standards set by Exercise and Sports Science Australia (ESSA) (Franklin et al., 2009; Zimmermann & Barnett, 2018).

The Australian government in 2006 granted EPs eligibility for a Medicare provider number as part of the government's Medicare system. To qualify for Medicare rebate, a patient must have had chronic disease(s) for at least six months and requires a formal referral from a GP (Cant and Foster, 2011). In Australia, PARS interventions are delivered mainly by allied health professionals (AHPs), including EPs and physiotherapists. However, in places like the UK, this intervention could be provided by fitness professionals who are not AHPs (Cheema et al., 2014). Like the UK, the Australian scheme varies in length (between 8 – 12 weeks) and scope (Cheema et al., 2014). Generally, Australian patients could get partial or complete rebates for EPs' services through Australia's universal health scheme (Medicare) or private health insurance (Ewald et al., 2018). Medicare rebates require a CDM plan to be developed, which grants patients eligibility for five rebatable sessions per year, and this could be used to access the services of a range of AHPs, including EPs (Foster & Mitchell, 2015). If patients need more than five sessions within a year, they would be required to pay out of pocket or jointly with healthcare insurance to continue accessing PARS services. Medicare rebates are set at \$52.95 per session for AHP services; however, some facilities include extra charges for their services called the gap fee (Ewald et al., 2018). Australian PARS interventions are primarily supervised and could be delivered via teleconference or face to face within indoor settings (e.g. in gyms and studios) or outdoors (e.g. parks). Australian patients can seek PARS services for themselves (self-initiated referrals) (Bleyer et al., 2020) but are required to provide a formal GP referral to access the Medicare rebates. A GP can also prepare a team care arrangement (GP-initiated referrals) with relevant allied health professionals (AHPs) such as EPs, including a CDM plan that specifies their client's health goals.

Despite the Australian government's inclusion of referral to EPs into the Medicare scheme in 2006, no study has evaluated the effectiveness of the GP to EP referral pathway. Moreover, current estimates show that only 1% of the patients seen by GPs are referred onwards to EPs,

and the national consultation rates for EPs occurs at 2.6 consultations per 1000 patients (Craike et al., 2019). These results question the functionality of the PARS programme and signify that there are bottlenecks in the referral process. To adequately address this issue, it is important to assess both global and national stakeholders' perspectives to obtain an in-depth understanding of the current PARS process and the best possible ways of optimising its functionality. These identified gaps in the literature informed the research conducted and reported in this thesis.

1.7 Research Aims and Questions

The overarching aim of this thesis was to explore from both global and national contexts, the views of PARS stakeholders on their experiences of PARS for insights into the programme's functionality and how to enhance its effectiveness. To adequately address this overarching aim, five specific aims were posited. Table 1.1 presents these specific aims, their corresponding research questions (RQs) and sub-research questions (SRQs) as well as the related thesis chapter.

Table 1.1 Thesis Aims and Research Questions

| Aim | Research Question (RQ) | Sub-Research Question (SRQ) | Thesis Chapter |
|---|--|--|-----------------------|
| Aim 1: To examine the functionality of PARS by investigating the influence of type of disease and intervention on uptake and health outcomes as well as patients' perceptions of motivators and barriers to effective PARS processes. | RQ1: What is the global patient perspective on the functionality of PARS? | SRQ1.1: How does type of disease and intervention influence adherence and health outcomes? SRQ1.2: What are participants' views on the facilitators and barriers to attaining intervention goals? | Chapter 2A |
| Aim 2: To synthesize from the global perspective of HCPs, the research evidence on PA promotion and the key determinants impacting on the optimum achievement of PA promotional goals in healthcare systems. | RQ2: What are the global HCPs' perspectives about PA and PARS promotion? | SRQ2.1: What are HCPs' perceptions regarding key determinants of PA promotion? SRQ2.2: What are HCPs' perceptions about the barriers and facilitators to the achievement of PA promotional goals? | Chapter 2B |
| Aim 3: To investigate Australian patients' knowledge, beliefs, attitudes and perceptions of PA and PARS | RQ3: What are Australian patients' perceptions of the efficacy of PARS? | SRQ3.1: What are Australian patients' knowledge, beliefs and attitudes towards PA and PARS? SRQ3.2: What are Australian patients' perceptions of the effectiveness of PARS? | Chapter 3 |
| Aim 4: To investigate the perceptions of Australian GPs and EPs regarding the efficacy of PARS in relation to the coordination of care for PARS patients | RQ4: How do Australian HCPs (GPs and EPs) perceive the coordination of care for PARS users? | SRQ4.1: What are GPs and EPs' knowledge, beliefs, and attitudes towards PA and PARS? SRQ4.2: What are GPs' and EPs' views regarding the coordination and optimisation of PARS care for users? | Chapter 4 |
| Aim 5: To explore the views of Australian PARS stakeholders on recommendations for improving PARS | RQ5: What are Australian PARS stakeholders' (GPs, EPs, and patients) recommendations for improving PARS? | SRQ5.1: What are participants' (GPs, EPs, and patients) views on how to optimise the quality of care in PARS to enhance PA and patient health outcomes? | Chapter 5 |

1.8 Underpinning Theoretical Frameworks

To adequately test the stated research aims, it is important to hinge the study on appropriate theoretical frameworks that provide deeper insights into the phenomenon under investigation (Eccles et al., 2012; NICE, 2014). Relevant frameworks from diverse fields including biomedical and health communication, underpinned this research. Studies have accentuated the need for the explicit use of theory to identify impacts on behaviour change (i.e., facilitators and barriers to change) (Eccles et al., 2012), to comprehend how change occurs (Dixon-Woods et al., 2011; Eccles et al., 2012; Michie, 2008) and provide insights on how to implement interventions (Baker et al., 2015; Davies et al., 2010; Foy et al., 2011). The theoretical frameworks employed in this research were chosen on the basis of diversity, applicability to the research context and relevance to individual studies.

Behavioural change frameworks/ models that are often used in healthcare include the Transtheoretical Model of Behaviour Change (Prochaska & DiClemente, 1982), the Theory Planned Behaviour (Ajzen, 1991), Health Belief Model (Champion and Skinner, 2008), Social Cognitive Theory (Bandura, 2002), Theory of Reasoned Action (Terry et al., 1993), Theoretical Domain Framework (TDF) (Atkins et al., 2017), Donabedian Framework for Healthcare Quality (Donabedian, 1988), and the Emerging Care Coordination Framework (Van Houdt et al., 2014). These theoretical models have unique principles, can influence behavioural change in an individual or population and have been applied to understand people's behaviour. In this research, the TDF, Donabedian and Emerging Care Coordination Frameworks were utilised to inform evidenced-based solutions for fostering the effectiveness of the PARS programme.

1.8.1 The Theoretical Domain Framework

The Theoretical Domains Framework (TDF) was originally developed for implementation research. It provides a theoretical lens through which the cognitive, affective, social and environmental influences on behaviour can be investigated (Atkins et al., 2017). It has been used to identify influences on health professionals' behaviour related to implementation of evidence-based recommendations (Atkins et al., 2017) and changing patient behaviours (Honigh-de Vlaming et al., 2013).

The TDF has been utilised in PA and PARS studies. For example, TDF was used to understand the factors that impact PA referral, uptake, and completion of pulmonary rehabilitation in patients with chronic obstructive pulmonary diseases (Cox et al., 2017) and to explore HCPs' promotion of PA to patients (Sissons et al., 2020). The TDF provided answers to RQ2 and was employed in this research to synthesise the global perspective of HCPs regarding the barriers to, and facilitators of, promoting PA and PARS. Dyson et al. (2011) highlighted that using a psychological theory such as TDF to assess barriers and facilitators to clinical practice, could provide a broad spectrum of feedback and insights.

1.8.2 The Donabedian Framework for Healthcare Quality Assessment

The Donabedian framework describes the synergistic interactions between structure, process, and outcome metrics, each critical for evaluating healthcare quality (Donabedian, 1988). Structural measures pertain to the physical settings in which care is provided, such as facility, staff, and equipment availability. Process measures include delivering care to patients and the accompanying workflows and outcome measures describing how healthcare affects populations (Donabedian, 2005). Studies that have used the Donabedian framework to explore the quality of PA and PARS interventions are scarce.

The Donabedian framework was employed in this research to address RQ3 which involved the exploration of Australian patients' views on the interactions between the structural and process factors that either obstruct or facilitate PA and PARS outcomes. As a result, utilising this framework helped in identifying and understanding the characteristics that influence the success of PA and PARS programmes.

1.8.3 Emerging Care Coordination Framework

There is a need to shift the focus of healthcare coordination away from a mainly reactive individual disease care approach to a proactive and holistic approach with competent strategies for promoting health and wellness to the populace (Loewenson & Simpson, 2017). Due to the complex and heterogeneous nature of care coordination, building an effective strategy in daily practice requires more clarity about care coordination and its underlying principles (McDonald et al., 2007).

The emerging care coordination framework highlights that the factors that encompass the (inter)organisational mechanism domain are related to those of the relational coordination domain which influences patient, team or (inter) organisational outcomes. (Van Houdt et al., 2014). Integrated care could be enhanced by utilising care coordination frameworks to assess the quality of teamwork and information-sharing among healthcare stakeholders (Baxter et al., 2018). Utilisation of the emerging care coordination framework facilitates an in-depth understanding of the experiences and views of HCPs who are involved in the coordination of care for PARS patients (McDonald et al., 2007; Rotter et al., 2010; Rotter et al., 2008). It also helps to identify what works and what does not, in order to facilitate improved integrated care among GPs and EPs. The care coordination framework was used to address RQ4.

1.9 Overview of Research Methods

As depicted in Figure 1.3, multiple methods including systematic reviews, mixed methods and qualitative research designs were employed in this thesis. The research was conducted in three stages. Stage one involved two systematic reviews that investigated studies with a global audience of patients and HCPs respectively. Stage two utilised two mixed methods studies to investigate the views of Australian PARS stakeholders including patients and HCPs (GPs and EPs) respectively, about the promotion of PA and PARS in the Australian setting. Stage 3 utilised a qualitative study to explore and synthesize the recommendations of Australian PARS stakeholders (GPs, EPs and patients) regarding the PARS initiative and how to foster the programme's effectiveness.

The research conducted in Stages 2 and 3 focused on Australia because of the scarcity of PARS studies from this setting and the lack of assessment of the efficacy of CDM referrals from GPs to EPs, since its formation in 2006. Furthermore, studies on patient referral to EPs who are PA experts, indicated that EPs' services might be underutilised (Craike et al., 2019), necessitating further research into the issues to understand how the pathway may be improved for quality PA delivery and better patient health outcomes.

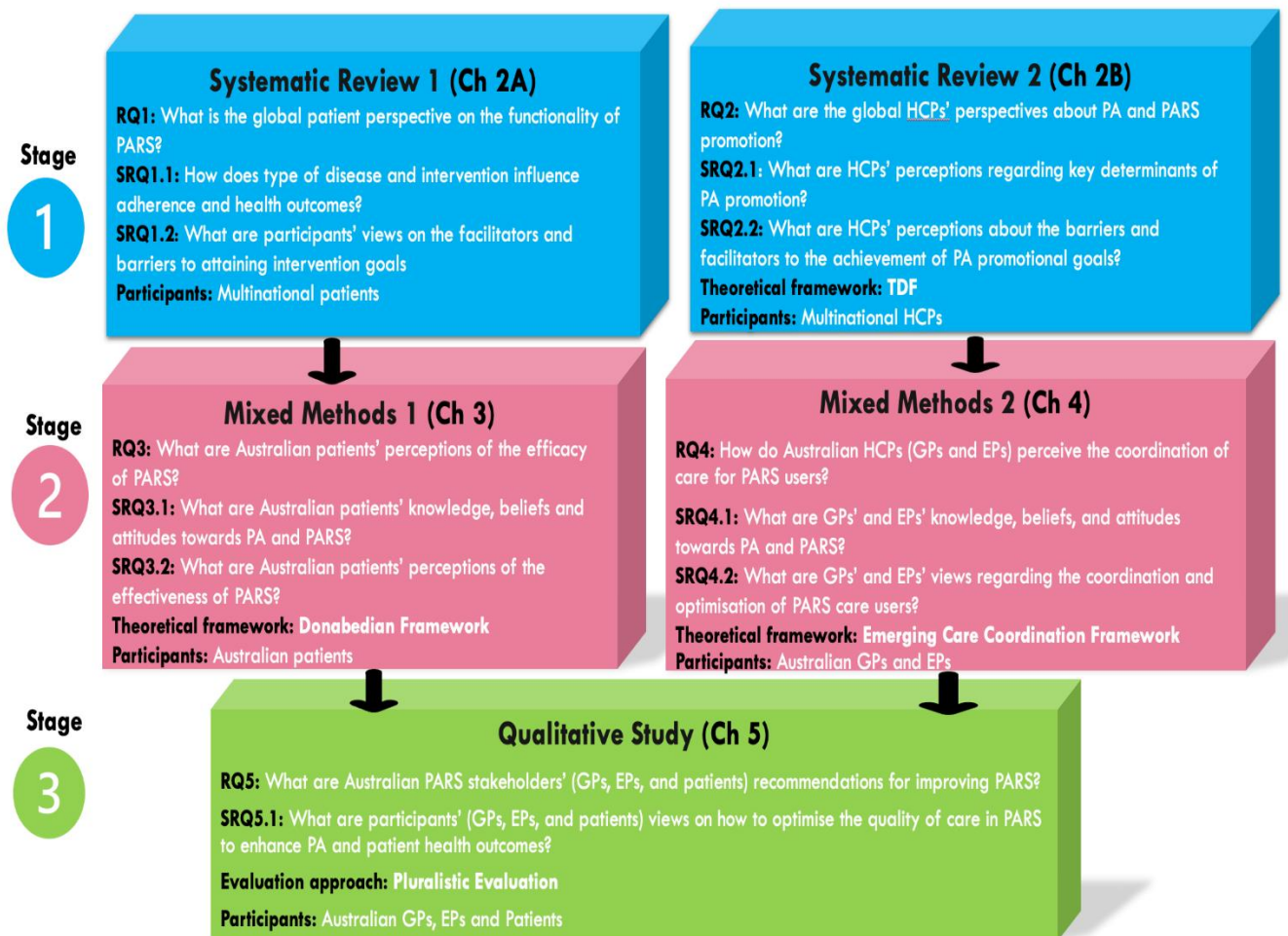


Figure 1.3: Overview of the methodological approach

1.9.1 Stage 1: Systematic Reviews – Addressing RQ1 and RQ2.

RQ1: What is the global patient perspective on the functionality of PARS?

RQ2: What are global HCPs' perceptions about PA and PARS promotion?

Research Method: Stage 1 addressed RQ1 and RQ2 and involved multinational systematic reviews. Systematic review is useful for undertaking thorough, replicable and trustworthy synthesis of available evidence in a particular study area (Crocetti, 2016). A systematic review of multinational peer-reviewed studies that explored patients' views regarding the functionality of PARS interventions was conducted to answer RQ1 and its two sub-questions (SRQ1.1 and SRQ1.2). Another systematic review of peer-reviewed literature that explored the perceptions of multinational HCPs regarding the promotion of PA and PARS was conducted to answer

RQ2 and its two sub questions (SRQ2.1 and SRQ2.2). See Table 1.1 for details of the research questions.

The systematic reviews followed the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines for transparent and accurate search strategy documentation (Moher et al., 2009). The methodological quality of the included studies was assessed using the modified quality assessment tool for studies with diverse designs (QATSDD) critical appraisal tool (Sirriyeh et al., 2012).

1.9.2 Study Participants for Stages 2 and 3

The participants for stages 2 and 3 of this research included Australian GPs, EPs and patients with chronic diseases. An *a-priori* power analysis was computed using G-Power software (Faul et al., 2007) to determine the effective sample size for the quantitative phase of the study. The power analysis indicated that 192 (64 of each participant group – GPs, EPs and patients) participants were needed to have 80% power for detecting a medium sized effect with a statistical significance criterion level of 0.05. The James Cook University (JCU) Human Research Ethics Committee (HREC) granted approval for the research presented in this thesis (Appendix A). Participants were provided with the relevant information sheet, their privacy rights, and the possible benefits of the study. While keeping confidentiality and anonymity, electronic and verbal consents were sought from participants before the commencement of both phases of the study.

1.9.3 Stage 2: Mixed Methods Research – Addressing RQ3 and RQ4

RQ3: What are Australian patients' perceptions of the efficacy of PARS?

RQ4: How do Australian HCPs (GPs and EPs) perceive the coordination of care for PARS users?

Research Method: Considering the complexity of coordination of care among stakeholder groups involved in PARS initiatives, a sequential explanatory mixed methods approach was deemed appropriate for this part of the research (see Figure 1.4). Mixed methods research design involves the integration of findings from quantitative and qualitative strands in a single study through the triangulation of results of both strands to address specific research questions (Creswell & Clark, 2017). Sequential explanatory mixed methods research was conducted in two phases and commenced with the collection and analysis of quantitative data (via online surveys) in the first phase to examine participants' experiences (knowledge, beliefs, and attitude) regarding PARS; followed by qualitative data (via semi-structured telephone interviews) in the second phase to explore participants' perceptions about the efficacy of PARS initiatives. See Appendix B for all the survey instruments and interview protocols utilised.

A quantitative study is a systematic research approach that uses statistics to analyse data and minimise bias through objectivity. Although they are inadequate in their ability to explore and provide in-depth meanings to research findings, quantitative studies have the potential to produce empirical and statistically significant outcomes (O'Leary, 2014). The findings from the quantitative phase informed the development of interview protocol and participant selection for the qualitative phase. Qualitative studies can potentially augment the weaknesses of quantitative studies because they are context-specific and provide meaning to the lived experiences of humans (O'Leary, 2014). This could aid researchers in understanding processes, particularly those that emerge over time (Creswell & Clark, 2017). Combining both methodologies in a single study and triangulating findings fostered a thorough and critical investigation of respondents' accounts of the complexity and challenges surrounding the functionality of PARS (Creswell & Clark, 2017).

Analytical Techniques: Quantitative data were managed and analysed in IBM's SPSS statistics software version 26. Descriptive statistics including frequencies, percentages, means and

standard deviations were used to analyse the demographic characteristics of participants. Shapiro Wilk's test, an inspection of histograms and q-q plots were used to test for normality. Non-parametric statistical tests including Mann Whitney U and Kruskal Wallis tests were used to compare the relationships between variables to meet the specific objectives of RQ3 and RQ4. The data were presented as frequencies and means \pm SD, with an alpha value of 0.05.

Qualitative data were managed and analysed in NVivo software version 12 (QSR International Pty Ltd., Victoria, Australia: 2018). Framework analysis was employed for the synthesis of the qualitative data. The approach involved five major steps namely: 1) familiarisation with the data, 2) identifying a thematic framework (key themes or sub-themes), 3) indexing or coding the data, 4) charting and summarising the fragments, and 5) mapping and interpretation (describing cases, creating typologies and categories, mapping linkages to develop explanations) (Ritchie & Spencer, 2002).

The Donabedian framework for healthcare quality was used to synthesise the findings from RQ3 while the emerging care coordination framework was used to synthesise the findings from RQ4. Framework analysis approach was used to help identify crucial factors that inform PA and PARS' promotion. Member verification, evaluation and resolution of disconfirming evidence, and researcher verification were all employed to foster the trustworthiness of the findings (Creswell, 2015; Shaw, 2010). The checklist for consolidated criteria for reporting qualitative research (COREQ) was utilised to guide the qualitative phase procedures (Tong et al., 2007).

Triangulation of Results: To increase the credibility and validity of the findings in stage two, the results from both strands of each of the two mixed methods studies were triangulated. Integrating quantitative and qualitative data through triangulation minimises the flaws and optimises the strengths in each data type (Creswell & Clark, 2017). The integration occurred at two different points. First, when the findings from the quantitative phase of the study were

used to inform the interview protocol of the qualitative phase and second, when the findings from the qualitative phase were leveraged to make meaning of the findings from the quantitative phase of the study (Creswell & Clark, 2017).

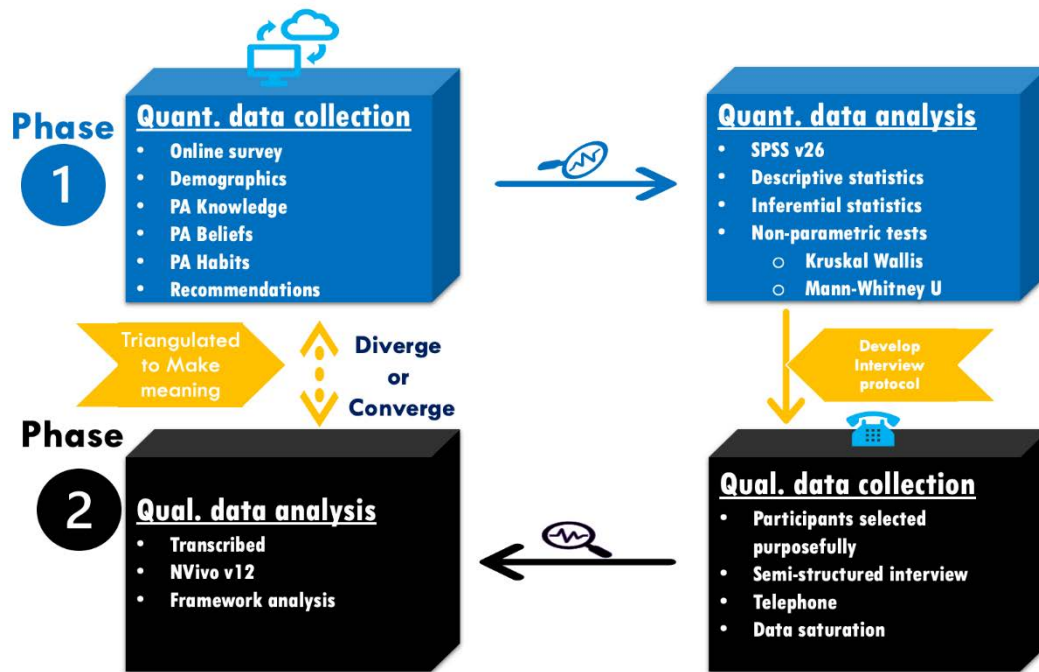


Figure 1.4 An illustration of the sequential explanatory mixed methods design utilised

1.9.4 Stage 3: Qualitative Research – Addressing RQ5

RQ5: What are Australian PARS stakeholders’ (GPs, EPs, and patients) recommendations for improving PARS?

Research Method: Qualitative research is a methodological approach exploring participants’ lived experiences, activities, attitudes, goals, and stories and their perceived significance (Yin, 2016). Qualitative research was considered appropriate to explore the recommendations made by PARS stakeholders regarding the PARS initiative and how to foster the programme’s effectiveness. The qualitative study was guided by an interpretive phenomenological paradigm. This approach focuses on the engagement and interpretation of lived experiences of participants regarding a phenomenon and helped to analyse the recommendations of GPs, EPs

and patients regarding the way forward for the PARS programme (Rodriguez & Smith, 2018). Data were collected using the same protocols used for the qualitative strand in section 1.9.3 (mixed methods studies) above.

A pluralistic evaluation approach was used to harmonise participants' PARS recommendations. Smith and Cantley developed the pluralistic evaluation approach to promote involvement and representation of end-users' perspectives in healthcare practice (Smith & Cantley, 1985a; 1985b). Pluralistic evaluation approach promotes the holistic understanding of stakeholders' views, behaviours, and experiences to inform policy changes within a particular context (Frost & Bailey-Rodriguez, 2020). Pluralistic evaluation encompasses three key domains including stakeholders, processes, and values. It involves brainstorming or thinking about categories or groups of stakeholders, the types of processes or systems that a policy might target and the values those stakeholders might hold concerning those systems or processes (Hall, 2004).

The approach acknowledges that stakeholder groups have different ideas of success that influence measurement of health service performance and that the diverse viewpoints from participants can inform successful delivery of healthcare services. This approach is beneficial because it helps to make the evaluation process situational, and therefore real and meaningful (Hall, 2004).

1.9.5 Philosophical Assumptions

A set of beliefs or philosophical assumptions that guide a researcher when conducting a study is a paradigm (Dina, 2012). Paradigms emerged from two opposing world views (positivism and interpretivism) about the role of researcher values, the nature of reality and human engagement, how knowledge about reality is acquired and the methodology used within the context of a particular research paradigm (Creswell, 2014). The overall methodological

technique used in this thesis is anchored in the pragmatism philosophical paradigm. Pragmatism primarily is an “alternative epistemological paradigm” (Hall, 2013) that is centred on the cyclical interplay of beliefs and actions (Morgan, 2014). Quantitative research is grounded in positivism or post-positivism which is a probabilistic interpretation of reality. A tenet of (post-)positivism is the belief in the existence of an objective world that may be studied and discovered (Díaz, 2014). Therefore, the scientific method minimises the researcher's effect on the data sources to prevent subjectivity from contaminating the conclusions (Díaz, 2014). Qualitative research is however grounded in the principles of constructivism or interpretivism (Petty et al., 2012). This paradigm acknowledges the possibility of many perspectives on reality, the fact that knowledge is not value-free, and subjectivity is a necessary component of enquiry (Petty et al., 2012).

The divergent beliefs and assumptions behind constructivism and positivism have resulted in heated debates between its proponents, dubbed the paradigm wars (Denzin & Lincoln, 2000; Teddlie & Tashakkori, 2009). Consequently, Lincoln 1990 (p 81) (Lincoln, 1990) expressed that the impossibility of accommodating paradigms is immediately apparent. Nevertheless, mixed methods research, which combines quantitative and qualitative methodologies, has grown in popularity within the field of health research (Tariq & Woodman, 2013). The Medical Research Council (MRC) recommends using mixed methods research to aid evaluation of complex interventions (Skivington et al, 2021). The use of mixed methods research is typically driven by the need to integrate quantitative and qualitative methodologies (Morgan, 2014). As a researcher, I place myself in the middle of this debate. I acknowledge that both quantitative and qualitative approaches are valuable to research and therefore combined both methods in this research.

1.9.6 Researcher's Reflexivity

A researcher's reflexivity is significant for understanding the researcher's stance regarding data collection, analysis, and participant recruitment (Strauss & Corbin, 1998). It is therefore critical that I establish my relationship with this research. As a patient relative and an exercise scientist, I witnessed the detrimental effects of PI. I saw the sufferings of numerous loved ones including clients, friends, and relatives due to PI related chronic conditions. This informed and spurred my zeal to understand and synthesise the perspectives of key Australian PARS stakeholders involved in promoting PA and PARS about the current form of PA promotion initiatives and how they could be enhanced. Consequently, my experiences and knowledge as a researcher could undermine the credibility of this research if not addressed. I explored, examined, and reflected on my relationship to the data throughout the research process to counterbalance this potential bias (Enosh & Ben-Ari, 2016).

I developed rapport and engaged with all participants in self-reflection. All through the research process, from pre-recruitment to post data collection, my engagement with participants was non-judgemental and characterised by respect, fairness, and shared understanding (Shaw, 2010). Reflecting on the analytical process aided me in navigating through the participants' experiences and my responses to them. I frequently revisited the data and kept a reflective journal throughout the analysis process to clarify my assumptions and the methods by which they were constructed. Considering the factors that informed my judgment allowed me to see through them and better understand my interviewees. To minimise anxiety and promote quality rapport with interviewees, I sometimes empathised with them by sharing my personal experiences while maintaining a professional stance. This approach fostered quality data collection and informed theories that enhanced in-depth understanding of the experiences of PARS stakeholders. Furthermore, the trustworthiness and credibility of the findings from this

research were enhanced through information triangulation, member checking and supervisor confirmations.

1.9.7 Expected Outcomes

This research could help PARS service providers design interventions that might facilitate uptake and reflect end users' perspectives. In addition, the results could inform insights into ways to improve interprofessional and HCP-patient relationship building and better shared-decision making and enhanced health outcomes for patients. The research could enhance insights into the roles and functions of EPs. Easily accessible information about EPs could promote the need for their services and boost referrals from GPs and other healthcare specialists. The mixed methods studies conducted in this research will substantiate the evidence base for PA and PARS and fill the knowledge gap on the need for more mixed methods studies. The findings could also inform policy for the promotion of PA and PARS and proffer ways to reduce the undervaluing of PA and PARS services.

1.10 Thesis Structure and Organisation

As shown in Table 1.2, there are eight chapters in this thesis, all of which are aimed at addressing the research aims and questions previously stated.

- Chapter 1 provides general introduction of the research topic. It outlines the influence of PI and the need for public health focused PA interventions, provides background on PARS and defines the overarching goals and structure of the thesis.
- Chapter 2 is the systematic literature review chapter which encompasses two parts (2A and 2B) and provides an in-depth synthesis of the knowledge and promotion of PA and PARS interventions across the globe. It also emphasises critical concerns and enablers to the programme's effectiveness. The findings from Part 2A informed the development

of RQ3 in Chapter 3 while the evidence from Part 2B informed RQ4 and its associated SRQs in Chapter 4.

- Chapter 3 is the first of three primary research chapters that explored Australian patients' views on the quality of care in PARS interventions. This chapter addressed RQ3 and its associated SRQs.
- Chapter 4 is the second primary research chapter and it explored HCPs' (GPs and EPs) opinions regarding the coordination of care for PARS participants. This chapter addressed RQ4 and its associated SRQs.
- Chapter 5 is the last of the primary research chapters and it offered an in-depth qualitative exploration and synthesis of the recommendations of all stakeholders on how to foster the effectiveness of the PARS programme. The findings from this chapter led to the development of the 'PRICE' framework for the delivery of quality care in PARS intervention. This chapter provided answers to RQ5.
- Chapter 6 delivers a general discussion of the research findings by drawing on the results from the empirical studies to provide a detailed synthesis of the research outcomes and their implications.
- Chapter 7 presents the conclusions and recommendations for practice as well as future research to inform the development or reformation of PARS for enhanced public health outcomes.

Table 1.2 Thesis Outline - Chapter Details and Publication Status*

| Chapter Titles | Chapter Details and Publication Status | Author Contributions |
|---|--|--|
| <p>Chapter 1: General Introduction</p> | <p>This chapter provided background information about the research. It gave an overview of the problems of PI and how PA and PARS interventions can be beneficial. It also outlined the aims, research questions, research design and the methodology employed in the thesis.</p> <p style="text-align: center;"><i>Not published</i></p> | <p>FAA wrote the introductory chapter with AEOM-A, MC and BSM-A reviewing each draft before approving the final version</p> |
| <p>Chapter 2A: Functionality of Physical Activity Referral Schemes (PARS): A Systematic Review</p> <p>Chapter 2B: Physical Activity Promotion: A Systematic Review of the Perceptions of Healthcare Professionals</p> | <p>Chapter 2A reviewed available literature and provided a general overview of PA and PARS from a global patients' perspective. It also captured patients' views on the functionality of the PARS initiative. Several constructs critical to the functionality of PARS including patient's disease conditions, intervention use, adherence and uptake, facilitators and barriers to PARS were explored. Gaps including the scarcity of PARS studies and few mixed methods studies, emerged from this review. Insights from this study's findings informed the study design and methodological approach utilized in chapters 3 and 5.</p> <p style="text-align: center;"><i>Published in Frontiers in Public Health., 25 June 2020 https://doi.org/10.3389/fpubh.2020.00257</i></p> <p>Chapter 2B explored the views of a global audience of healthcare professionals regarding critical constructs that influence the effective promotion of PA and PARS. The critical constructs explored included the knowledge of PA, confidence in promoting PA, perceived importance of PA, role in PA promotion, PA assessment, how PA was promoted and its effectiveness. Barriers and facilitators to PA promotion were explored with the theoretical domain framework (TDF). The review revealed three gaps including, poor PARS knowledge, the poor insights on the roles of PA specialists such as EPs and the lack of a structural framework for PARS. The findings from this study informed the study design and methodological techniques employed in chapters 4 and 5.</p> <p style="text-align: center;"><i>Published in Int J Environ Res Public Health 18 June 2020 https://doi.org/10.3390/ijerph17124358</i></p> | <p>FAA and BSM-A extracted the data. BSM-A, MC, AEOM-A thoroughly evaluated and validated the findings from the study. The draft of the manuscript was written by FAA which was reviewed with final version approved by AEOM-A, MC and BSM-A..</p> |
| <p>Chapter 3: Australian patients' perception of the</p> | <p>This is the first of the three primary research chapters and it employed a sequential explanatory mixed methods approach. The study explored Australian patients' perceptions and experiences of PARS using the Donabedian quality of care framework to gain an in-</p> | <p>FAA designed the survey tool and semi-structured interview questions which were reviewed by BSM-A, AEOM-A and MC.</p> |

| | | |
|--|---|--|
| <p>efficacy of physical activity referral scheme (PARS)</p> | <p>depth understanding of their views of the quality of care in PARS initiatives and the efficacy of the programme. The study highlighted that empowering patients to seek PARS referrals and efficient patient-HCP collaboration is key to the success and effectiveness of PARS.</p> <p><i>Patient Educ & Couns November 2021, https://doi.org/10.1016/j.pec.2021.04.001</i></p> | <p>FAA collected and analysed the data from both phases of the study, then BSM-A reviewed and confirmed the data. The draft of the manuscript was written by FAA which was reviewed with final version approved by AEOM-A, MC and BSM-A.</p> |
| <p>Chapter 4: Optimising care coordination strategies for Physical Activity Referral Scheme patients by Australian health professionals</p> | <p>This is the second of the two mixed methods studies and the second primary research chapter in this thesis. The study utilised the emerging care coordination framework to explore the perspectives of Australian HCPs (GPs and EPs) regarding the coordination and optimisation of care for PARS users. The study revealed that fostering interprofessional relationships and information sharing between GPs and EPs and incentivising PARS initiatives could potentially enhance the programme's effectiveness</p> <p><i>Submitted to PLoS ONE</i></p> | <p>FAA developed the survey tool and semi-structure interview questions which were reviewed by BSM-A, AEOM-A and MC. FAA collected and analysed the data from both phases of the study then BSM-A reviewed and confirmed the data. The draft of the manuscript was written by FAA which was reviewed with final version approved by AEOM-A, MC, and BSM-A.</p> |
| <p>Chapter 5: The 'PRICE' of Physical Activity Referral Schemes (PARS): Stakeholders' Recommendations for Delivering Quality Care to Patients</p> | <p>This is a qualitative study and the last of the three primary research chapters. The recommendations of all PARS participants were synthesised using a pluralistic evaluation approach to inform the development of a model for promoting quality care in PARS. The study unearths that five factors ("promote", "relate", "incentivise", "communicate" and "educate") are crucial to the effective promotion of quality care in PARS interventions.</p> <p><i>Published in Int J Environ Res Public Health 15 August 2021 https://doi.org/10.3390/ijerph18168627</i></p> | <p>FAA developed the semi-structured interview questions which were reviewed by BSM-A, AEOM-A and MC. FAA and BSM-A evaluated and coded the data. The draft of the manuscript was written by FAA which was reviewed with final version approved by AEOM-A, MC, and BSM-A.</p> |
| <p>Chapter 6: General Discussion</p> | <p>This chapter discusses the overall findings from all the thesis chapters and their implications for policymakers, patients, HCPs, providers, and the government.</p> <p><i>Not Published</i></p> | <p>FAA developed the general discussion chapter with AEOM-A, MC and BSM-A reviewing the developed draft before final approval.</p> |
| <p>Chapter 7: Conclusions and Recommendations</p> | <p>This chapter discusses the thesis's overall conclusion, recommendations, and techniques for delivering quality care to PARS users, coordinating patients' care, improving PARS effectiveness and future research directions.</p> <p><i>Not Published</i></p> | <p>FAA developed the conclusion and recommendations chapters with AEOM-A, MC and BSM-A reviewing the developed draft prior to final approval.</p> |

*Chapters 2 – 5 are publication-based chapters in this thesis

Chapter TWO: Literature Review

2.1 Chapter Overview

This chapter details the findings from two systematic reviews grouped into Parts 2A and 2B. The systematic review in Part 2A examined the global perspectives of patients on the functionality of PARS. The review details how factors such as the reason for referral, type of intervention, facilitators (e.g., support during and after the scheme and participants' goals and motivation) and barriers (e.g. time constraints and psychological/perceived negative feelings) to PARS influence participants' adherence and the achievement of intervention goals and health outcomes. The systematic review in Part 2B examined the global perspectives of HCPs on the promotion of PA and PARS interventions. The study presents the critical determinants of PA promotion, including the barriers and facilitators to achieving PA intervention goals. The reviews are presented in the form accepted for publication with minor formatting updates to the figures, table numbering and referencing styles.

2.2 Part 2A: Functionality of Physical Activity Referral Schemes (PARS): A Systematic Review

2.2.1 Abstract

Physical activity (PA) is vital to maintaining good health. However, WHO estimates that 60% of the world's population are inadequately active. To enhance PA, Physical Activity Referral Schemes (PARS) have been established by some countries. This study examined the functionality of the PARS process across different countries. This systematic review was performed and reported in accordance with the PRISMA guidelines. Sixteen electronic databases were searched from January 1990 to May 2020. PARS studies, published in English language and in peer-reviewed journals, that reported adherence, outcomes, disease conditions, interventions, facilitators, and barriers, were included in this review. Twenty-seven studies conducted across eight countries met the inclusion criteria. Most patients were referred for sedentary/inactivity reasons and supervised group-based activities was the most used intervention. Participants' average adherence rate was 77.5%. Adherence was either facilitated or hindered by type of support provided during and after intervention period. Inclusion of PA allied health specialist in the intervention enhanced positive health outcomes. PARS is a key driver and motivator for individuals to undertake and adhere to PA interventions. Utilization of guidelines on evidence-based interventional PA for different types of diseases, effective use of common group supervised activities and the involvement of PA specialists may aid PA adherence and foster positive health outcomes.

2.2.2 Introduction

Physical activity (PA) is vital to maintaining good health (WHO, 2009; 2014). Furthermore, PA contributes to the prevention, management and treatment of non-communicable diseases including cardiovascular diseases, diabetes, stroke, colon and breast cancers, osteoarthritis, osteoporosis, obesity, and mental and psychological illnesses (Biddle et al., 2000; 2003; Stathopoulou et al., 2006; Williams et al., 2007). Despite these benefits, WHO estimates that 60% of the world's population fail to meet the recommended levels of PA (150 minutes of moderate-intensity PA per week or 10,000 steps per day) to confer relevant health benefits. Physical inactivity has been identified as a major problem in breast and colon cancer (20-25%), diabetes (27%) and ischemic heart (30%) diseases worldwide (WHO, 2009).

Primary healthcare settings provide accessibility to healthcare for the majority of the population (Bully et al., 2015) and have therefore been utilised by various countries in the development of interventions that promote PA (NICE, 2006). Advice from primary healthcare professionals has been reported to significantly increase levels of PA (15 – 45% increase in self-reported PA) among patients (Orrow et al., 2012). To sustain this increase, more than 360 minutes of patient contact time is required (U.S. Preventive Services Task Force, 2002). Furthermore, estimated figures from past studies show that primary healthcare physicians would need an extra 444 minutes per day to implement effective PA interventions (Yarnall et al., 2003). Considering the existing work load and time constraints on primary healthcare physicians, effective PA counselling seems impractical (Smith et al., 2008). Consequently, there are divergent views regarding the effectiveness of PA counselling provided by General Practitioners (GPs) (Britt, et al., 2016b; Moyer, 2012; U.S. Preventive Services Task Force, 2002).

Referral of physically inactive patients to allied health professionals such as: exercise physiologists (EP), physiotherapists, nutritionists and other PA specialists for individualised PA programmes could help fill this gap (Buchan & O'May, 2011; James et al., 2017). The intervention usually commences with referral of an eligible patient (who is mostly sedentary, at risk of developing or has a non-communicable disease) by health professionals like GPs and nurses to allied health professionals or community PA advisors for individualised PA programmes which include PA counselling and advice with prescriptions of moderate to vigorous aerobic exercises (Aittasalo et al., 2006; Grandes et al., 2009). PA referral programmes typically last 10 – 12 weeks and have been established in primary healthcare settings in various countries. However, the name, structural and implementation processes vary, depending on the country where the programme is delivered (Gademan et al., 2012; Karjalainen et al., 2012; Pavey, et al., 2011b; Romé et al., 2009).

Referral schemes were first introduced in the United Kingdom during the 1990s, and now have well-established guidelines published by the National Institute for Health and Care Excellence (NICE) (Morgan, et al., 2016; Pavey, et al., 2011b; Romé et al., 2009). Subsequently, similar referral programmes were introduced in other European countries as well as in Canada, New Zealand and USA; and are often known as exercise referral schemes (ERS), physical activity on prescription (PAP) or physical activity referral scheme (PARS) (Lundqvist et al., 2017; Sørensen et al., 2011; Vinson & Parker, 2012). In Australia, they are predominantly called chronic disease management (CDM) and were introduced into the Medicare system in 2006 (Foster & Mitchell, 2015). Nonetheless, for the purpose of this review paper, the referral schemes will be addressed as Physical Activity Referral Schemes (PARS).

Previous studies have expressed doubts over the effectiveness of PARS (Lawlor & Hanratty, 2001; Williams et al., 2007) due to reported limited uptake of the interventional programmes

and non-sustainability of PA gains (Ackermann et al., 2005; James et al., 2008; Moore et al., 2013). For instance, a low national CDM consultation rate of 0.26% (Cant & Foster, 2011) and only 1% of consultations by GPs were reported in Australia (Britt, et al., 2016). Systematic reviews on the effectiveness of referral schemes have shown that the programmes fostered increased PA levels in overweight, non-sedentary and elderly individuals, but the gains were not sustained after 1 year (Dugdill et al., 2005; Pavey, et al., 2011b; Shore et al., 2019). Williams et al (Williams et al., 2007) assessed the effectiveness of primary healthcare-initiated PARS in improving long-term participation of sedentary adults. The study concluded that PARS has a small effect in increasing PA in sedentary adults and suggested that future PARS should concentrate on how to improve uptake and adherence. Pavey et al. (2011b) assessed the impact of PARS on PA and health outcomes and concluded with doubts on the effectiveness of PARS for improving PA, fitness or health indicators. Most of the reviews to date have been limited in scope, majorly focusing on quantitative studies, particularly randomised control trials (RCTs) (Duda et al., 2014; Edwards et al., 2013; James et al., 2008; Romé et al., 2014), and only few reviews have evaluated qualitative studies (Morgan, Battersby, et al., 2016). Of great consequence is the fact that majority of the reviews have been focused on single countries. Given that PARS have been established in many developed countries, it will be beneficial to obtain a multinational and generalisable perspective on their effectiveness. Thus, systematic evaluation of the functionality of PARS, within a wider context, is significant to understanding their benefits and participants' responses to the intervention, particularly in relation to the referral process, barriers to adherence; support mechanisms utilised to foster adherence and health outcomes. This multinational review therefore aimed to examine the functionality of PARS by investigating the influence of type of disease and intervention on uptake and health

outcomes as well as patients' perceptions of motivators and barriers to effective PARS processes. This review addressed the following research questions:

1. How does type of disease and intervention influence adherence and health outcomes?
2. What are participants' views on the facilitators and barriers to attaining intervention goals?

2.2.3 Methods

The systematic review was conducted and reported in accordance with the PRISMA Statement (Moher et al., 2009).

2.2.3.1 Inclusion and exclusion criteria

There was no restriction on study design. Studies where participants were advised/counselled on PA in a single contact or referred by a health professional (e.g. a GP or nurse) to an allied health professional (e.g. physiotherapist or EP) were included. Studies were included if they were written in English, published in peer-reviewed journals between 1990 and 2020 - considering that referral schemes were first introduced in the 1990s, included adult study participants who were older than 18 years, examined the PARS process. Also, the study must have reported the following outcome measures: Disease conditions (reason for referral/disease characteristics of referred of participants), type of intervention, health/PA related outcome of intervention, adherence rate, and facilitators and barriers to effective intervention programmes. Studies were excluded if they did not report the above characteristics or were literature reviews, used to check the psychometric characteristics of instruments, opinion papers, national guidelines, reports, used to examine the PARS process from the perspective of the physician and if data from other studies were used to model cost-effectiveness.

2.2.3.2 Search strategy

Electronic databases comprising Medline Ovid, Medline (Pubmed), Cinahl, Informit, Scopus, SportDiscus, Academic Search Complete, SpringerLink, ArticleFirst, Taylor & Francis, Wiley Online, SAGE, ScienceDirect, ProQuest, Embase and The Cochrane Library were searched from January 1990 to May 2020. Text words and indexed terms included “exercise, physical activity, sport, walk, run, physical fitness, exertion, general practitioner, family physician, refer, secondary care and exercise physiology”. The search strategy used is presented in Appendix C. Reference lists from previous systematic reviews and included studies were also screened for relevant additional inclusions.

2.2.3.3 Study selection process

The articles identified from all the databases were imported into Endnote X9.3 software, then titles and abstracts were screened. FAA and BSM-A independently screened the titles and abstracts of the retrieved articles and excluded irrelevant ones. Subsequently, full-text articles categorised as potentially eligible for inclusion were screened in a consensus meeting and disagreements were resolved in real time until consensus was reached. Figure 2.1 portrays a detailed PRISMA flow diagram.

2.2.3.4 Data extraction and analysis

Due to the heterogeneous nature of the included articles, meta-analysis was not possible (Moher et al., 2010). Study characteristics included study aims and country where study was conducted, study design, venue of the activity, who led the intervention and study participants. To further explore the functionality of the PARS programme, the following characteristics were extracted: Disease conditions (reason for referral/disease characteristics), referrer, intervention and follow-up period, adherence rate/uptake, health outcomes, facilitators and barriers.

2.2.3.5 Content Analysis

Inductive content analysis was employed for the eight qualitative studies included in this review to determine reoccurring themes (Vaismoradi et al., 2013). This analysis was carried out in three stages of coding, creating categories and abstraction. In Stage 1, FAA extracted data, listed all descriptions and developed coding frames for the following: disease conditions, intervention used and follow-up, health outcome, adherence, facilitators and barriers to the PARS process. In Stage 2, FAA and BSM-A developed and discussed preliminary categories. In Stage 3, final categories were created and labelled by FAA and BSM-A. All discrepancies were evaluated and resolved in a consensus meeting. Validation and potential extension of the coding frame was made possible by replication test (reoccurring themes).

2.2.3.6 Risk of bias assessment

The methodological quality of the included studies were assessed using the Quality Assessment Tool for Studies with Diverse Designs (QATSDD) (Sirriyeh et al., 2012). This tool contains 16 items and is used for examining studies with different research designs. The QATSDD tool was modified by excluding two criteria, “evidence of user involvement in design” and “statistical assessment of reliability and validity of measurement tool(s),” as they were not relevant to the included studies. The grading system used assessed each reviewed study on a scale of 0 to 3 for each criterion, with 0 = not at all, 1 = very slightly, 2 = moderately and 3 = complete. The criteria scores were summed and expressed as a percentage of the maximum possible score to assess the methodological quality of included studies. For ease of interpretation, the percentage scores were classified into low (<50%), medium (50-80%) or high (>80%) quality evidence. The criteria included were 1) theoretical framework; (2) aims/objectives; (3) description of research setting; (4) sample size; (5) representative sample of target group, (6) procedure for data collection; (7) rationale for choice of data collection

tool(s); (8) detailed recruitment data; (9) fit between research question and method of data collection (Quantitative only) (10) fit between research question and data collection method (Qualitative only) (11) fit between research question and method of analysis; (12) good justification for analytical method selected; (13) reliability of analytical process (Qualitative only); (14) strengths and limitations. An interpretation of the scores then allowed for classification into low (<50%), medium (50-80%) or high (>80%) quality evidence.

2.2.4 Results

2.2.4.1 Study selection

After screening 1, 331 titles and abstracts and reviewing 61 full texts; 27 studies were selected for inclusion in the review (Figure 2.1).

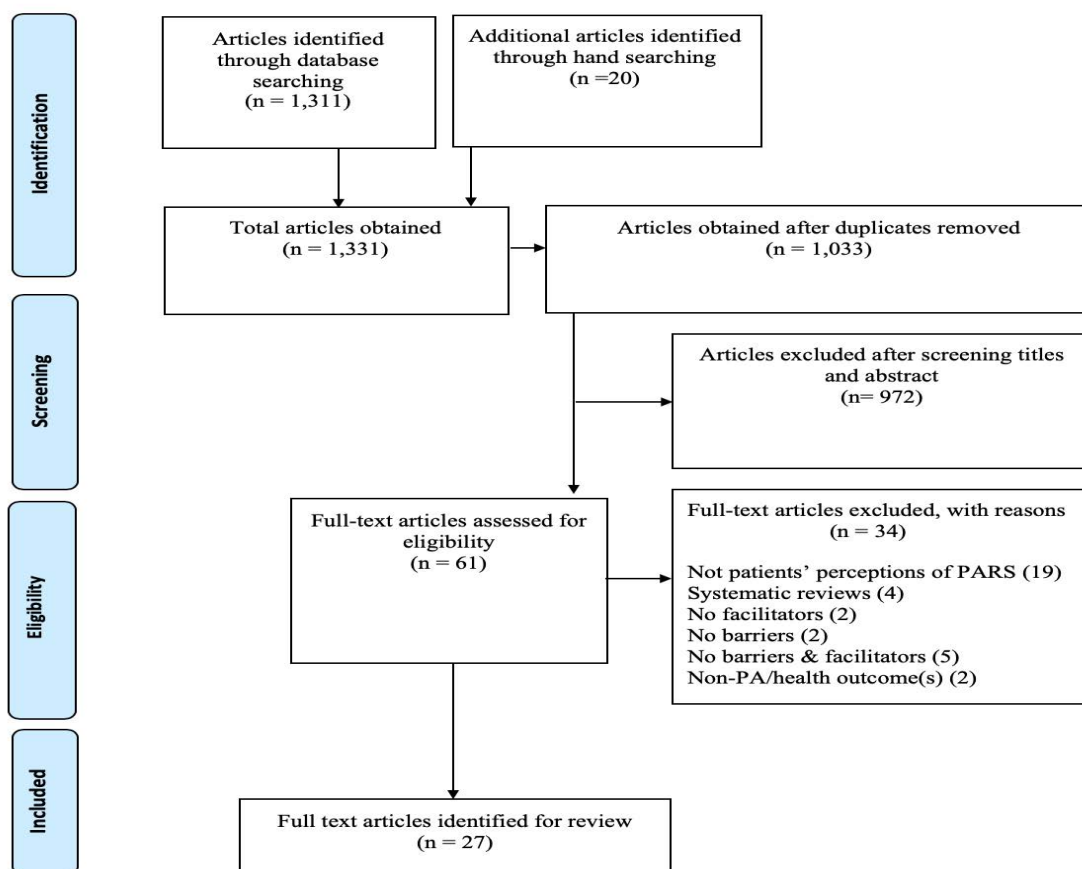


Figure 2.1 PRISMA flow chart of the systematic review selection process for 2A

2.2.4.2 Characteristics of the included studies

Table 2.1 presents the summary characteristics of participants in the included studies. PA interventions were administered at primary healthcare centres in about half (48%) of the studies. Participant numbers ranged from 9 – 4, 317 and their mean ages ranged from 44.5±15.7 to 82.0±4.6 years. More females (65%) than males (35%) were referred for PA interventions. Table 2.2 presents information on reported disease conditions, interventions, adherence rates, health outcomes, facilitators, and barriers for each reviewed study. The included studies originated from eight countries: UK (n = 13), Spain (n = 4), Sweden (n = 3), Denmark (n = 2), Australia (n = 2), Netherlands (n = 1), New Zealand (n = 1) and USA (n = 1). The study designs included RCTs (44.4%, n = 12), qualitative (29.6%, n = 8), longitudinal (7.4%, n = 2), case study (3.7%, n = 1), cohort study (3.7%, n = 1), mixed methods (3.7%, n = 1), cross sectional studies (3.7%, n = 1) and prospective (3.7%, n = 1).

2.2.4.3 Disease conditions, referral reason and disease characteristics of referred participants

Table 2.2 provides information on frequency of occurrence of key findings. More studies were conducted in the UK (48.1%) compared to other countries and were mostly RCTs. Disease conditions (reason for referral/disease characteristics of participants) were clustered into nine categories. Sedentary/inactive reasons recorded the highest number of referral with sixteen (N = 16, 59.2%) of the 27 included studies referring participants to PA programmes for sedentary/inactive behavioural reasons. Referral for cardiovascular disease related reasons was recorded in thirteen (N = 13, 48.1%) studies, other reasons for referral were overweight/obesity (N = 11, 40.7%), musculoskeletal/ageing reasons (N = 8, 29.6%), diabetes related reasons (N = 6, 22.2%), psychological illness (N = 6, 22.2%), at-risk smokers (N= 5, 18.5%), people with diagnosis of cancer (N = 1, 3.7%) and stroke (N = 1, 3.7%). The major (80%) referrers were GPs, however, few studies reported other health care professionals (dietitians, nurses and physiotherapists) as the referrer.

Table 2.1: Characteristics of reviewed studies for Part 2A

| Author & Year | Aim of study | Country of study | Study design | Setting (Venue & PA specialist) | Participants (No., Gender, Mean Age (yrs.)) |
|------------------------|---|------------------|----------------------------|--|---|
| Ackermann et al (2005) | Using clinic-based PA exercise to increase motivations. | USA | RCT | Clinic Intervention conducted by physicians, nurse practitioners and physician assistants | N = 336, Male (99%, n = 332), Age: (66.0±4) |
| Dinan et al (2006) | Feasibility and effectiveness of referral programmes for frail elderly patients | UK | Prospective cohort studies | Varied (Clinic, Leisure centre & primary healthcare) Specialist exercise instructors led intervention | N = 242 Gender* Age: (82.0±4.6) |
| Dugdill et al (2005) | Leisure time PA levels | UK | 2 Case evaluation studies | Leisure centre Exercise referral officer (ERO) led intervention | N = 958 Males (n = 344) Age: (44.0±15.7) |
| Eynon et al (2018) | To uncover the key psychological factors associated with adherence to the scheme based on adherers' subjective experiences, with a particular focus on motivational experiences while also taking into account any other pertinent factors driven by the participants | UK | Qualitative | Leisure centre Intervention led by exercise specialists | N = 9 Males (44.4%, n = 4) Age: (49.9±8.6) |
| Gademan et al (2012) | To evaluate the effect of EoP in physical inactive women living in multi-ethnic neighbourhoods in the Netherlands | Netherlands | RCT | Leisure centre Sports instructor led intervention | N = 514 All females Age: (45.0±10) |
| Grandes et al (2011) | Evaluate the effectiveness of a PA promotion programme | Spain | RCT | Primary healthcare GP led intervention | N = 3,691 Male (35.4%, n=1,307) Age: (50.3±14.66) |

| | | | | | |
|-----------------------|--|-----------|-------------------|--|---|
| Grandes et al (2009) | Assess the effectiveness of a PA on prescription | Spain | RCT | Primary healthcare Physician led intervention | N = 4,317 Male (34.3%, n = 1,484) Age: (49.5±14.88) |
| Gusi et al (2008) | Assesses the cost utility of the adding a supervised walking programme to the standard | Spain | RCT | Varied (Clinic, Leisure centre & primary healthcare) Qualified exercise leader led intervention | N = 127 All female Age: (72.6±1.5) |
| Hanson et al (2019) | To gain an insight into differential engagement through understanding participants experiences of patients referred for ERS | UK | Qualitative | Leisure centres | N = 15 Males (27%, n = 4) Age* |
| Isaacs et al (2007) | To evaluate and compare the effectiveness and cost-effectiveness of a leisure centre-based exercise programme, walking programme and advice-only | UK | RCT | Leisure centre Fitness instructor led intervention | N = 943 Males (32.7% n=308) Age: (57.0±8.73) |
| James et al (2017) | Determine the efficacy of primary care physicians' referral | Australia | RCT | Primary healthcare Accredited exercise physiologist (AEPs) led intervention | N = 203 Males (29.5% n =60) Age: (57.0±13.0) |
| Joyce et al (2010) | Explore patients' experiences of condition management programmes | UK | Qualitative | Primary healthcare Intervention led by intervention leaders | N = 25; Males (40%, n = 10); Age: (= >50 years) |
| Kallings et al (2009) | Examine self-reported adherence to individualized prescribed PA | Sweden | Prospective study | Primary care centre Self-reported physical activity by participants | N = 240 Males (25% n = 60) Age: (51.0±13.0) |

| | | | | | |
|----------------------------|--|-------------|---|---|---|
| Law et al (2019) | To explore views and experiences of lifestyle management programme (LMP) among patients and professionals | UK | Qualitative | Home-based/telephone interviews Physiotherapist, exercise professionals and dietitians | N = 9 Males (22% n = 2) Age: (58.0±13.0) |
| Livingstone et al (2015) | To determine the efficacy of a clinician referral and exercise programmed in improving exercise levels and quality of life for men with prostate cancer | Australia | RCT | Local community gym Exercise physiologist | N = 147 All males Age: (65.6±8.5) |
| Lundqvist et al (2017) | Explore the association between PA on prescription treatment and the PA level of patients with metabolic risk | Sweden | Prospective/longitudinal observational study. | Healthcare centres A nurse led intervention | N = 368 Males (42.6% n = 170) Age: (57.4±13.0) |
| Martin-Borras et al (2018) | To assess the effectiveness and sustainability of a primary healthcare-based ERS | Spain | RCT | Leisure centre PA specialist led intervention | N = 422; Males (39.1%, n = 165) Age: (68.8±8.65) |
| Moore et al (2013) | Mixed-method process evaluation exploring how outcomes were achieved | UK | Mixed methods | Leisure centre Exercise specialist led intervention | N = 1080 Males (34.5%, n = 373) Age: (50. 3) |
| Patel et al (2013) | To examine whether perceived barriers, benefits, and motives for physical activity differed based on allocation to 2 different types of primary-care activity- prescription programs (pedometer-based vs. time-based Green Prescription) | New Zealand | Quantitative (Cross sectional studies) | Primary HealthCare Physician led intervention | N = 80 Males (40%, n = 32) Age:* |

| | | | | | |
|-------------------------|--|---------|----------------------------------|--|---|
| Roessler & Ibsen (2009) | Analyse recruitment, motivation, barriers and adherence to increasing PA | Denmark | Longitudinal observational study | Primary healthcare Physiotherapist and dietician led intervention | N = 1156 Male (33%, n = 382), Age: (50.5±12.3) |
| Romé et al (2014) | Analyse 1-year follow up, of cost offset and outcomes of changing the PA behaviour | Sweden | RCT | Primary healthcare Physiotherapist led intervention | N = 528 Males 23% (n = 123). Age: (53.2±12.7) |
| Sharma et al (2012) | To explore stroke survivors experience of undertaking ERS | UK | Qualitative | Varied Physiotherapist led intervention | N = 9 Males (55.5%, n = 5) Age: (51.0±9.0) |
| Shaw et al (2012) | To explore patients' attitudes towards, and experiences of a lifestyle intervention | UK | Qualitative | Varied Health coach led intervention | N = 84 Males (48.8%, n = 41). Age: (66.9±10.4) |
| Sorensen et al (2008) | To compare short and long-term effects of high-intensive exercise on prescription and low intensive intervention in primary care | Denmark | RCT | Primary healthcare Physiotherapist led intervention | N = 52 Gender* Age: (53.4) |
| Taylor et al (1998) | Examine the effects of a GP exercise referral programme | UK | RCT | Health and leisure centre Trained assessor led intervention | N = 142 Males (57%, n = 82) Age: (54.5± 0.46) |
| Wormald & Ingle (2004) | To explore participant's experiences of ERS | UK | Qualitative | Leisure centre Leisure centre staff led intervention | N = 30 Males (33.3%, n = 10) Age: (54.5±18.0) |
| Wormald et al (2006) | Explore participants' perceptions of the operation and effectiveness of the active lifestyle (AL) service | UK | Qualitative | Leisure centre Intervention led by active lifestyle (AL) advisor | N = 16 Male (31.25%, n = 5) Age: (53±12) |

Table 2.2: Key findings and frequency of occurrence

| Country of study & study references | Study design & study references | Disease conditions (reason for referral/disease characteristics of referred patients) & study references | Intervention used and study references | Adherence/uptake | Facilitators, study references & sample comment | Barriers, study references & sample comment |
|--|---|--|---|--|--|--|
| <p>UK (48.1%, n = 13)</p> <p>(Dinan et al., 2006; Dugdill et al., 2005; Eynon et al., 2018; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019; Moore et al., 2013; Sharma et al., 2012; Shaw et al., 2012; Taylor et al., 1998; Wormald & Ingle, 2004; Wormald et al., 2006)</p> | <p>RCTs (n = 12)</p> <p>(Ackermann et al., 2005; Gademan et al., 2012; Grandes et al., 2011; Grandes et al., 2009; Gusi et al., 2008; Isaacs et al., 2007; James et al., 2017; Livingston et al., 2015; Martin-Borràs et al., 2018; Romé et al., 2014; Sørensen et al., 2008; Taylor et al., 1998)</p> | <p>Sedentary behaviour/inadequately active (n = 16)</p> <p>(Ackermann et al., 2005; Eynon et al., 2018; Gademan et al., 2012; Grandes et al., 2011; Grandes et al., 2009; Isaacs et al., 2007; James et al., 2017; Joyce et al., 2010; Kallings et al., 2009; Lundqvist et al., 2017b; Martin-Borràs et al., 2018; Moore et al., 2013; Patel, Schofield, Kolt, & Keogh 2013; Roessler & Ibsen, 2009; Romé et al., 2014; Wormald et al., 2006)</p> | <p>Common group supervised activities (n = 12)</p> <p>(Gusi et al., 2008; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019; Martín-Borràs et al., 2018; Moore et al., 2013; Roessler & Ibsen, 2009; Romé et al., 2014; Sørensen et al., 2008; Wormald & Ingle, 2004; Wormald et al., 2006)</p> | <p>High adherence = (n = 17, 63%)</p> <p>(Ackermann et al., 2005; Eynon et al., 2018; Gademan et al., 2012; Grandes et al., 2011; Grandes et al., 2009; Gusi et al., 2008; Joyce et al., 2010; Kallings et al., 2009; Law et al., 2019; Livingston et al., 2015; Lundqvist et al., 2017b; Patel, Schofield, Kolt, & Keogh 2013; Sharma et al., 2012; Shaw et al., 2012; Sørensen et al., 2008; Wormald & Ingle, 2004; Wormald et al., 2006)</p> | <p>Support during and after the scheme (n = 20)</p> <p>(Ackermann et al., 2005; Dinan et al., 2006; Dugdill et al., 2005; Eynon et al., 2018; Gademan et al., 2012; Grandes et al., 2011; Grandes et al., 2009; Gusi et al., 2008; Hanson et al., 2019; James et al., 2017; Joyce et al., 2010; Kallings et al., 2009; Lundqvist et al., 2017b; Moore et al., 2013; Roessler & Ibsen, 2009; Romé et al., 2014; Sharma et al., 2012; Shaw et al., 2012; Sørensen et al., 2008; Wormald et al., 2006)</p> <p>“If I could go with my husband, I would find the time”</p> | <p>Time constraints (n = 17)</p> <p>(Dinan et al., 2006; Dugdill et al., 2005; Grandes et al., 2011; Gusi et al., 2008; Hanson et al., 2019; Isaacs et al., 2007; James et al., 2017; Joyce et al., 2010; Kallings et al., 2009; Law et al., 2019; Livingston et al., 2015; Moore et al., 2013; Patel, Schofield, Kolt, & Keogh, 2013; Roessler & Ibsen, 2009; Taylor et al., 1998; Wormald & Ingle, 2004; Wormald et al., 2006)</p> <p>“I need different times, you know, that’s what I do need”</p> |
| <p>Spain (14.8%, n = 4)</p> <p>(Grandes et al., 2011; Grandes et al., 2009; Gusi et al., 2008; Martín-Borràs et al., 2018)</p> | <p>Qualitative (n = 8)</p> <p>(Eynon et al., 2018; Hanson et al., 2019; Joyce et al., 2010; Law et al., 2019; Sharma et al., 2012; Shaw et al., 2012; Wormald & Ingle, 2004; Wormald et al., 2006)</p> | <p>Cardiovascular diseases (n = 13)</p> <p>(Dugdill et al., 2005; Gademan et al., 2012; Gusi et al., 2008; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Kallings et al., 2009; Lundqvist et al., 2017b; Roessler & Ibsen, 2009; Shaw et al., 2012; Sørensen et al., 2008; Taylor et al., 1998; Wormald et al., 2006)</p> | <p>PA counselling and advice (n = 10)</p> <p>(Ackermann et al., 2005; Grandes et al., 2011; Grandes et al., 2009; Isaacs et al., 2007; James et al., 2017; Kallings et al., 2009; Lundqvist et al., 2017b; Sharma et al., 2012; Sørensen et al., 2008; Taylor et al., 1998)</p> | <p>Medium adherence = (n = 6, 22.2%)</p> <p>(Dinan et al., 2006; Hanson et al., 2019; Isaacs et al., 2007; James et al., 2017; Martín-Borràs et al., 2018; Roessler & Ibsen, 2009)</p> | <p>Participant’s goals and motivation (n = 14)</p> <p>(Ackermann et al., 2005; Eynon et al., 2018; Grandes et al., 2011; Grandes et al., 2009; Gusi et al., 2008; James et al., 2017; Joyce et al., 2010; Kallings et al., 2009; Law et al., 2019; Patel, Schofield, Kolt, & Keogh 2013; Roessler & Ibsen, 2009; Romé et al., 2014; Sharma et al., 2012; Sørensen et al., 2008)</p> | <p>Psychological/perceived negative feelings (n = 13)</p> <p>(Dinan et al., 2006; Eynon et al., 2018; Gusi et al., 2008; Hanson et al., 2019; Isaacs et al., 2007; Kallings et al., 2009; Law et al., 2019; Martín-Borràs et al., 2018; Moore et al., 2013; Patel, Schofield, Kolt, & Keogh, 2013; Shaw et al., 2012; Sørensen et al., 2008; Taylor et al., 1998)</p> <p>“Anxious, scared, it was due to seeing young fit</p> |

| | | | | | | |
|--|---|--|--|--|---|---|
| | | | | | “My main aim is to stay fit, and active, and mobile” | and healthy males showing off and felt intimidated” |
| Sweden (11.1%, n = 3) (Kallings et al., 2009; Lundqvist et al., 2017b; Romé et al., 2014) | Longitudinal (n = 2) (Lundqvist et al., 2017b; Roessler & Ibsen, 2009) | Overweight/obesity (n = 11) (Dugdill et al., 2005; Eynon et al., 2018; Gademan et al., 2012; Gusi et al., 2008; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019; Lundqvist et al., 2017b; Roessler & Ibsen, 2009; Taylor et al., 1998) | Individualised and supervised activities (n = 9) (Ackermann et al., 2005; Eynon et al., 2018; Gademan et al., 2012; Hanson et al., 2019; Kallings et al., 2009; Livingston et al., 2015; Lundqvist et al., 2017b; Sharma et al., 2012; Shaw et al., 2012) | Low adherence = (n = 4, 14.8%) (Dugdill et al., 2005; Moore et al., 2013; Romé et al., 2014; Taylor et al., 1998) | Professional advice and supervision (n = 10) (Ackermann et al., 2005; Gademan et al., 2012; Grandes et al., 2011; Grandes et al., 2009; Gusi et al., 2008; Kallings et al., 2009; Livingston et al., 2015; Roessler & Ibsen, 2009; Romé et al., 2014; Wormald & Ingle, 2004) “The thought that there would be somebody who could actually advise me on what to do, so I didn’t knacker myself I wouldn’t dare try it by myself” | Unwell (n = 11) (Ackermann et al., 2005; Gademan et al., 2012; Grandes et al., 2009; Hanson et al., 2019; Isaacs et al., 2007; James et al., 2017; Joyce et al., 2010; Kallings et al., 2009; Livingston et al., 2015; Lundqvist et al., 2017b; Roessler & Ibsen, 2009) “... caught virus, affected my heart and lungs and went to hospital.” |
| Australia (7.4%, n = 2) (James et al., 2017; Livingston et al., 2015) | Case evaluation (n = 1) (Dugdill et al., 2005) | Musculoskeletal/ Ageing reasons (n = 8) (Dinan et al., 2006; Dugdill et al., 2005; Gademan et al., 2012; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019; Lundqvist et al., 2017b) | Referred to other health professionals (n = 8) (Ackermann et al., 2005; Dinan et al., 2006; Dugdill et al., 2005; James et al., 2017; Joyce et al., 2010; Kallings et al., 2009; Roessler & Ibsen, 2009; Taylor et al., 1998) | | | |
| Denmark (7.4%, n = 2) (Roessler & Ibsen, 2009; Sørensen et al., 2008) | Cohort (n = 1) (Dinan et al., 2006) | Diabetes (n = 6) (Gademan et al., 2012; Gusi et al., 2008; Hanson et al., 2019; Lundqvist et al., 2017b; Roessler & Ibsen, 2009; Sørensen et al., 2008) | Self-administered PA (n = 4) (Gademan et al., 2012; Grandes et al., 2011; James et al., 2017; Taylor et al., 1998) | | | Inaccessibility - Transport/venue location (n = 11) (Gademan et al., 2012; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Kallings et al., 2009; Lundqvist et al., 2017b; Moore et al., 2013; Sharma et al., 2012; Taylor et al., 1998; Wormald & Ingle, 2004; Wormald et al., 2006) “There’s no direct bus” |
| USA (3.7%, n = 1) (Ackermann et al., 2005) | Mixed methods (n = 1) (Moore et al., 2013) | Psychological illness (n = 6) (Dugdill et al., 2005; Gademan et al., 2012; Hanson et al., 2019; Isaacs et al., 2007; Kallings et al., 2009; Wormald & Ingle, 2004) | Individualised PA prescription without supervision (n = 4) (Dinan et al., 2006; Lundqvist et al., 2017b; Patel, Schofield, Kolt, & Keogh 2013; Romé et al., 2014) | | Incentives (n = 8) (Hanson et al., 2019; Isaacs et al., 2007; Romé et al., 2014; Shaw et al., 2012; Sørensen et al., 2008; Taylor et al., 1998; Wormald & Ingle, 2004; Wormald et al., 2006) e.g. giving 10 pounds gift vouchers | |
| Netherlands (3.7%, n = 1) | Prospective (n = 1) (Roessler & Ibsen, 2009) | At-risk smoker (n = 5) (Ackermann et al., 2005; Gusi et al., 2008; Joyce et al., 2010; Roessler & Ibsen, 2009; Taylor et al., 1998) | | | Social engagement with other participants (n = 5) | Inadequate support (n = 10) |

| | | | | | | |
|--|---|--|--|--|--|--|
| (Gademan et al., 2012) | | | | | (Dinan et al., 2006; Isaacs et al., 2007; Kallings et al., 2009; Law et al., 2019; Martín-Borràs et al., 2018) | (Dugdill et al., 2005; Hanson et al., 2019; Isaacs et al., 2007; James et al., 2017; Joyce et al., 2010; Kallings et al., 2009; Moore et al., 2013; Shaw et al., 2012; Sørensen et al., 2008; Taylor et al., 1998) |
| New Zealand (3.7%, n =1) (Patel, Schofield, Kolt, & Keogh, 2013) | Cross Sectional Study (n = 1) (Patel, Schofield, Kolt, & Keogh 2013) | Cancer (n = 1) (Livingston et al., 2015) | | | “And I found the whole process valuable, particularly going along with other people who had similar problems and sharing their problems with them” | “After quite a few weeks of not seeing him the counsellor, that I slipped back a bit” |
| | | Stroke (n = 1) (Sharma et al., 2012) | | | | Financial constraints (n = 4) (Kallings et al., 2009; Law et al., 2019; Moore et al., 2013; Romé et al., 2014) “They charge money and its expensive” |

2.2.4.4 Intervention, adherence and health outcomes

Criteria for measuring the success of the PARS process in this review included the intervention used, adherence/uptake by the participants and the reported health/PA related outcomes. As shown in Table 2.2, the interventions reportedly used in the management of chronic diseases across different countries included: common group supervised activities which was reported in twelve studies (n = 12, 44.4%), PA counselling and advice (n = 10, 37%), individualised and supervised activities (n = 9, 33.3%), referral to other health professionals (n = 8, 29.6%), self-administered PA (n = 4, 14.8%) and individualised PA prescription without supervision (n = 4, 14.8%).

Table 2.3. Relationship between disease conditions, intervention used and outcome of intervention

| Disease condition (reason for referral/characteristics of referred patients) | General intervention used and study reference number | | | | | | Outcome(s) recorded after intervention | | | | | |
|---|--|---|---|---|--|--|--|--|--|---|---|---|
| | C/A | SAPA | IPAWS | ROHP | CGSA | IS | | SAPA | IPAWS | ROHP | CGSA | IS |
| Sedentary behaviour (insufficiently active) N = 16 (Ackermann et al., 2005; Eynon et al., 2018; Gademan et al., 2012; Grandes et al., 2011; Grandes et al., 2009; Isaacs et al., 2007; James et al., 2017; Joyce et al., 2010; Kallings et al., 2009; Lundqvist et al., 2017b; Martín-Borràs et al., 2018; Moore et al., 2013; Patel, Schofield, Kolt, & Keogh, 2013; Roessler & Ibsen, 2009; Romé et al., 2014; Wormald et al., 2006) | (Ackermann et al., 2005; Grandes et al., 2011; Grandes et al., 2009; Isaacs et al., 2007; James et al., 2017; Lundqvist et al., 2017b) | (Gademan et al., 2012; James et al., 2017) | (Dinan et al., 2006; Romé et al., 2014) | (James et al., 2017; Joyce et al., 2010) | (Isaacs et al., 2007; Martín-Borràs et al., 2018; Moore et al., 2013; Roessler & Ibsen, 2009; Romé et al., 2014; Wormald et al., 2006) | (Eynon et al., 2018; Gademan et al., 2012; Kallings et al., 2009; Lundqvist et al., 2017b) | Positive outcome | (Ackermann et al., 2005; Grandes et al., 2011; Grandes et al., 2009; Isaacs et al., 2007; James et al., 2017; Lundqvist et al., 2017b) | (Patel, Schofield, Kolt, & Keogh, 2013; Romé et al., 2014) | (Ackermann et al., 2005; James et al., 2017; Joyce et al., 2010) | (Gusi et al., 2008; Isaacs et al., 2007; Moore et al., 2013; Roessler & Ibsen, 2009; Romé et al., 2014; Wormald et al., 2006) | (Ackermann et al., 2005; Eynon et al., 2018; Gademan et al., 2012; Lundqvist et al., 2017b) |
| | | | | | | | No effect | Nil | | | | |
| Cardiovascular diseases N = 13 (Dugdill et al., 2005; Gademan et al., 2012; Gusi et al., 2008; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Kallings et al., 2009; Lundqvist et al., 2017b; Roessler & Ibsen, 2009; Shaw et al., 2012; Sørensen et al., 2008; Taylor et al., 1998; Wormald et al., 2006) | (Grandes et al., 2011; Hanson et al., 2019; Lundqvist et al., 2017b; Sørensen et al., 2008; Taylor et al., 1998) | (Gademan et al., 2012; Taylor et al., 1998) | | (Dugdill et al., 2005; Taylor et al., 1998) | (Gusi et al., 2008; Isaacs et al., 2007; Joyce et al., 2010; Roessler & Ibsen, 2009; Sørensen et al., 2008) | (Gademan et al., 2012; Shaw et al., 1998; Wormald et al., 2006) | Positive outcome | (Gademan et al., 2012; Grandes et al., 2011; Isaacs et al., 2007; Lundqvist et al., 2017b; Sørensen et al., 2008; Taylor et al., 1998) | (Lundqvist et al., 2017b; Taylor et al., 1998) | (Gusi et al., 2008; Isaacs et al., 2007; Joyce et al., 2010; Roessler & Ibsen, 2009; Sørensen et al., 2008) | (Gusi et al., 2008; Isaacs et al., 2007; Joyce et al., 2010; Roessler & Ibsen, 2009; Sørensen et al., 2008) | (Gademan et al., 2012; Shaw et al., 2012; Taylor et al., 1998; Wormald et al., 2006) |
| | | | | | | | No effect | Nil | | | | |
| Overweight/obesity N = 11 (Dugdill et al., 2005; Eynon et al., 2018; Gademan et al., 2012; Gusi et al., 2008; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019; Lundqvist et al., 2017b; Roessler & Ibsen, 2009; Taylor et al., 1998) | (Gusi et al., 2008; Isaacs et al., 2007; Lundqvist et al., 2017b) | (Gademan et al., 2012; Taylor et al., 1998) | | (Dugdill et al., 2005; Taylor et al., 1998) | (Gusi et al., 2008; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019; Roessler & Ibsen, 2009) | (Gademan et al., 2012; Hanson et al., 2019; Lundqvist et al., 2017b) | Positive outcome | (Gademan et al., 2012; Gusi et al., 2008; Isaacs et al., 2007; Lundqvist et al., 2017b; Taylor et al., 1998) | | (Grandes et al., 2011; Taylor et al., 1998) | (Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019; Roessler & Ibsen, 2009) | (Eynon et al., 2018; Gademan et al., 2012; Hanson et al., 2019; Lundqvist et al., 2017b) |
| | | | | | | | No effect | Nil | | | | |

| | | | | | | | | | | | | |
|--|--|------------------------|---|---|---|---|-------------------------|--|--|--|---|--|
| Musculoskeletal/ageing reasons N = 8 (Dinan et al., 2006; Dugdill et al., 2005; Gademan et al., 2012; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019; Lundqvist et al., 2017b) | (Isaacs et al., 2007; Lundqvist et al., 2017b) | (Gademan et al., 2012) | (Dinan et al., 2006; Lundqvist et al., 2017b) | (Dugdill et al., 2005; Gademan et al., 2012) | (Joyce et al., 2010; Law et al., 2019) | (Dinan et al., 2006; Gademan et al., 2012; Hanson et al., 2019) | Positive outcome | (Gademan et al., 2012; Gusi et al., 2008; Lundqvist et al., 2017b) | (Gusi et al., 2008; Lundqvist et al., 2017b) | (Gademan et al., 2012) | (Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019) | (Gademan et al., 2012; Gusi et al., 2008; Hanson et al., 2019) |
| | | | | | | | No effect | | | (Dugdill et al., 2005) | | |
| Diabetes N = 6 (Gademan et al., 2012; Gusi et al., 2008; Hanson et al., 2019; Lundqvist et al., 2017b; Roessler & Ibsen, 2009; Sørensen et al., 2008) | (Lundqvist et al., 2017b; Sørensen et al., 2008) | (Gademan et al., 2012) | (Lundqvist et al., 2017b) | | (Gusi et al., 2008; Hanson et al., 2019; Roessler & Ibsen, 2009; Sørensen et al., 2008) | (Hanson et al., 2019) | Positive outcome | (Lundqvist et al., 2017b; Sørensen et al., 2008) | (Lundqvist et al., 2017b) | | (Gusi et al., 2008; Hanson et al., 2019; Roessler & Ibsen, 2009; Sørensen et al., 2008) | (Gademan et al., 2012; Hanson et al., 2019) |
| | | | | | | | No effect | Nil | | | | |
| Psychological illness N = 6 (Dugdill et al., 2005; Gademan et al., 2012; Hanson et al., 2019; Isaacs et al., 2007; Kallings et al., 2009; Wormald & Ingle, 2004) | (Dugdill et al., 2005; Hanson et al., 2019) | (Gademan et al., 2012) | | (Dugdill et al., 2005; Kallings et al., 2009) | (Isaacs et al., 2007; Wormald & Ingle, 2004) | (Gademan et al., 2012; Hanson et al., 2019) | Positive outcome | (Dugdill et al., 2005; Hanson et al., 2019) | | (Ackermann et al., 2005) | (Isaacs et al., 2007; Wormald & Ingle, 2004) | (Ackermann et al., 2005; Kallings et al., 2009) |
| | | | | | | | No effect | (Gademan et al., 2012) | | (Dugdill et al., 2005) | | |
| At-risk smoker N = 5 (Ackermann et al., 2005; Gusi et al., 2008; Joyce et al., 2010; Roessler & Ibsen, 2009; Taylor et al., 1998) | (Ackermann et al., 2005) | (Taylor et al., 1998) | | (Ackermann et al., 2005; Roessler & Ibsen, 2009; Taylor et al., 1998) | (Gusi et al., 2008; Joyce et al., 2010) | | Positive outcome | (Taylor et al., 1998) | | (Ackermann et al., 2005; Roessler & Ibsen, 2009) | (Gusi et al., 2008; Joyce et al., 2010) | |
| | | | | | | | No effect | (Ackermann et al., 2005) | | (Kallings et al., 2009) | | |
| Cancer N = 1 (Livingston et al., 2015) | | | | (Livingston et al., 2015) | | | Positive outcome | | | (Livingston et al., 2015) | | |
| | | | | | | | No effect | Nil | | | | |
| Stroke N = 1 (Sharma et al., 2012) | | | | | | (Sharma et al., 2012) | Positive outcome | | | | | (Sharma et al., 2012) |
| | | | | | | | No effect | Nil | | | | |

Abbreviations: Counselling/advise (C/A); Self-administered PA (SAPA); Individualised PA prescription without supervision (IPAWS); Referred to other health professionals (ROHP); Common group supervised activities (CGSA); Individualised and supervised activities (IS)

Table 2.3 shows the disease conditions patients were referred for, the interventions reportedly used in the management of these diseases and the outcome(s) recorded for each intervention. For sedentary/inactivity behavioural reasons, counselling/advice and common group supervised activities were the most reported interventions (n = 6 for each activity); while individualised PA prescription without supervision was the least reported intervention (n = 1). All the interventions reportedly recorded positive outcomes for the participants. A positive outcome from any of the studies is an indication that the goal of a particular PA intervention led to a positive result for participants. This outcome could be PA related (e.g. an increase in PA level) or enhancement of the health and wellness of participants (e.g. a decrease in blood glucose level). Among the studies which reported the referral of participants for cardiovascular disease related reasons, counselling/advice and common group supervised activities were the most reported (n = 5 each) interventions, while no study reported the use of individualised PA prescription without supervision. There were positive outcomes for all the interventions.

For overweight/obese referrals, common group supervised activities was the most reported intervention (n = 6), counselling/advice (n = 3) and individualised and supervised activities (n = 3) were reported by three studies each. Two studies each reported the use of self-administered PA and referral to other health professionals. For musculoskeletal/ageing reasons, individualised and supervised activities was the most reported intervention (n = 3); while other interventions were reported by two studies each except self-administered PA which was reported by only one study (n = 1). All the interventions reported positive outcomes except one which reported the referral of participants to other health professionals.

Six studies (n = 6) each reported the referral of participants for diabetes and psychological illness related reasons. Common group supervised activities was the most reported (n = 4) intervention for the diabetic patients, while no study reported the use of referral to other health

professionals. For psychological illness related referrals, one study ($n = 1$) reported the use of self-administered PA, none for individualised PA prescription without supervision; while all other interventions were reported by two studies ($n = 2$) each. All the studies reported positive outcomes for the diabetes related referrals. For psychological illness, three ($n = 3$) of the five interventions used reported positive outcomes while self-administered PA and one ($n = 1$) study which reported the referral of participants to other health professionals had no effect. However, when self-administered PA was combined with individualised and supervised activities in the same study, a positive outcome was reported. Referral to other health professionals was the most reported ($n = 3$) intervention for at-risk smoking reasons ($n = 5$). Common group supervised intervention was reported by two studies ($n = 2$), one each ($n = 1$) for counselling/advice and self-administered PA and none for the remaining interventions. No effect was reported for participants who self-administered PA and also for one ($n = 1$) of the studies which referred participants to other health professionals. However, two studies ($n = 2$) each reportedly had positive effects from common group supervised activities and those referred to other professionals. Furthermore, when counselling/advice was combined with referral to other health professionals in the same study, a positive outcome was reported.

The study on cancer ($n = 1$) reported the referral of participants to other health professionals while the study on stroke ($n = 1$) reported the use of individualised and supervised activities as interventions. Both studies recorded positive outcomes for participants.

Adherence (Table 2.2) was defined as the proportion of participants who started and ended the PA referral programme. Studies with 75 – 100% adherence were categorised as having high adherence ($n = 17$, 63%), 50 -75% as having medium adherence ($n = 6$, 22.2%), and below 50%, were categorised as low adherence ($n = 4$, 14.8%). Table 2.2 depicts that overall, there was a positive adherence of 85.2% (high + mid adherence), while Table 2.3 shows that over

90% of the studies recorded positive health outcomes (examples include: enhanced PA, improved physical and mental health). Majority of the participants recorded notable health or PA outcome in the referral process except those referred for smoking reasons and some participants with musculoskeletal conditions who were referred to other professionals (n = 3). In addition, two studies which examined the effects of PARS on cancer and stroke, designed individualised programmes for participants and were supervised by other healthcare professionals (EPs and physiotherapist respectively). These studies reported positive health outcomes with high adherence by the participants (n = 1).

2.2.4.5 Facilitators and barriers

Facilitators and barriers to effective PARS process were categorised into five and six broad themes, respectively (Table 2.2). Five factors (n = 5) were identified as facilitators: perceived support (n = 20), defined goals and motivation (n = 14), professional advice and supervision during and after PARS programme (n = 10), incentives (n = 8) and social engagement with other participants (n = 5). About half of the reviewed studies in which the participants reported perceived presence of support, development of personal goals and motivation, also recorded high or medium adherence and notable outcomes (n = 15). Some studies that provided professional counselling/advice as an intervention also had positive adherence and notable outcomes (n = 7). Six (6) major factors were reported by participants as barriers. These included time constraints (n = 17), psychological/perceived negative feelings (n = 13), inaccessibility (transport/venue problems) (n = 11), unwell (n = 11), inadequate support (n = 10) and financial constraints (n = 4). Participants' views on the PA referral setting and accessibility were broadly categorised as scheme settings (leisure centre or intervention environment) and accessibility (transport and distance to venue). Eleven out of the twenty-seven (40.7%) included studies

considered this a barrier and two ($n = 2$) out of these eleven studies recorded low adherence rates.

2.2.4.6 Assessment of methodological quality

Based on the individual QATSDD assessment, results indicated that the scores ranged from 31 to 83% (Table 2.4). There were twenty ($n = 20$) medium quality studies compared to four ($n = 4$) high and three low quality studies. The low-quality studies had lower scores because they lacked a theoretical framework, had small sample sizes, poor reliability of analytical process, and poor description of strengths and limitations of the study. The studies with higher scores were RCTs and they were judged to be appropriate in their statistical analyses and trial designs.

Table 2.4: Quality assessment of the reviewed studies

| QATSDD criteria | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Total score | Maximum possible score (%) |
|-----------------------------|---|---|---|---|---|---|---|---|-----|-----|----|----|-----|----|-------------|----------------------------|
| Author & Year | | | | | | | | | | | | | | | | |
| James et al. (2017) | 2 | 3 | 3 | 1 | 2 | 3 | 3 | 3 | 2 | n/a | 2 | 3 | n/a | 3 | 30/36 | 83% |
| Grandes et al. (2009) | 0 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | n/a | 0 | 3 | n/a | 1 | 23/36 | 64% |
| Gademan et al. (2012) | 0 | 3 | 1 | 0 | 1 | 3 | 3 | 3 | 2 | n/a | 0 | 3 | n/a | 3 | 22/36 | 61% |
| Lundqvist et al. (2017) | 0 | 3 | 3 | 1 | 1 | 3 | 2 | 3 | 0 | n/a | 3 | 3 | n/a | 3 | 25/36 | 69% |
| Ackermann et al. (2005) | 0 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | n/a | 2 | 3 | n/a | 1 | 29/36 | 81% |
| Moore et al. (2013) | 0 | 3 | 1 | 3 | 3 | 2 | 3 | 3 | 0 | 2 | 3 | 2 | 1 | 3 | 29/42 | 69% |
| Dugdill et al. (2005) | 3 | 1 | 1 | 0 | 0 | 2 | 0 | 2 | n/a | 1 | 1 | 0 | 1 | 0 | 12/39 | 31% |
| Romé et al. (2014) | 1 | 3 | 1 | 2 | 2 | 3 | 2 | 3 | 2 | n/a | 2 | 2 | n/a | 3 | 25/36 | 72% |
| Grandes et al. (2011) | 0 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 0 | n/a | 0 | 3 | n/a | 3 | 25/36 | 69% |
| Isaacs et al. (2007) | 0 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | n/a | 0 | 3 | n/a | 3 | 29/36 | 81% |
| Joyce et al. (2010) | 0 | 2 | 1 | 3 | 1 | 3 | 3 | 1 | n/a | 0 | 3 | 2 | 0 | 3 | 22/39 | 56% |
| Kallings et al. (2009) | 0 | 3 | 1 | 3 | 3 | 3 | 2 | 3 | n/a | n/a | 2 | 2 | n/a | 2 | 24/33 | 73% |
| Martin-Borras et al. (2018) | 0 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | n/a | 0 | 3 | n/a | 3 | 26/36 | 72% |
| Roessler & Ibsen. (2009) | 1 | 0 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 0 | 2 | 2 | n/a | 0 | 27/39 | 69% |
| Wormald et al. (2006) | 0 | 3 | 3 | 0 | 2 | 2 | 3 | 2 | n/a | 0 | 2 | 3 | 0 | 0 | 20/39 | 51% |
| Patel et al. (2013) | 1 | 3 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | n/a | 2 | 2 | n/a | 3 | 25/36 | 69% |
| Eynon et al. (2018) | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | n/a | 3 | 2 | 3 | 3 | 1 | 29/39 | 74% |
| Gusi et al. (2008) | 0 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 0 | n/a | 0 | 3 | n/a | 3 | 25/36 | 69% |
| Hanson et al. (2019) | 1 | 3 | 3 | 1 | 1 | 3 | 3 | 3 | n/a | 0 | 3 | 3 | 1 | 3 | 28/39 | 72% |
| Shaw et al. (2012) | 1 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | n/a | 0 | 2 | 2 | 0 | 2 | 26/39 | 67% |
| Sorenson et al. (2008) | 0 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | n/a | 3 | 2 | n/a | 2 | 29/36 | 81% |
| Taylor et al. (1998) | 0 | 1 | 3 | 0 | 3 | 3 | 3 | 3 | 2 | n/a | 2 | 2 | n/a | 2 | 24/36 | 67% |
| Law et al. (2019) | 1 | 3 | 3 | 1 | 1 | 3 | 3 | 1 | n/a | 0 | 0 | 3 | 2 | 1 | 22/39 | 56% |
| Dinan et al. (2006) | 0 | 2 | 3 | 0 | 3 | 1 | 0 | 2 | n/a | n/a | 2 | 0 | n/a | 0 | 13/33 | 39% |
| Wormald & Ingle. (2004) | 0 | 2 | 3 | 0 | 1 | 2 | 3 | 2 | n/a | 0 | 2 | 3 | 0 | 0 | 17/39 | 44% |
| Livingston et al. (2015) | 0 | 3 | 3 | 0 | 0 | 2 | 3 | 3 | 3 | n/a | 0 | 3 | n/a | 2 | 22/36 | 61% |
| harma et al. (2012) | 1 | 1 | 3 | 2 | 3 | 3 | 2 | 3 | n/a | 0 | 2 | 2 | 0 | 2 | 24/39 | 62% |

QATSDD criteria: This row shows a list of all the Quality Assessment Tool for Studies with Diverse Designs (QATSDD) item employed in this review. The QATSDD item were numbered from one to fourteen. The interpretation of the numbers includes: (1) theoretical framework; (2) aims/objectives; (3) description of research setting; (4) sample size; (5) representative sample of target group, (6) procedure for data collection; (7) rationale for choice of data collection tool(s); (8) detailed recruitment data; (9) fit between research question and method of data collection (Quantitative only) (10) fit between research question and format and content of data collection method (Qualitative only) (11) fit between research question and method of analysis; (12) good justification for analytical method selected; (13) reliability of analytical process (Qualitative only); (14) strengths and limitations. The grading system used assessed each reviewed study on a scale of 0–3 for each criterion, with 0 = not at all; 1 = very slightly; 2 = moderately; 3 = complete; and n/a, not applicable as portrayed in the table. References: This column shows all the reviewed studies and their year of publication listed according to their order in the references; n/a: not applicable.

2.2.5 Discussion

This systematic review investigated the functionality of PARS process by exploring participants' disease conditions, interventions used, health outcomes and the facilitators and barriers to achieving intervention goals.

2.2.5.1 Referral process, study designs and settings

Most of the studies in this review originated from the UK. This could be a result of the rapid expansion of PA programmes in the UK, its inclusion into the national policy and communities being allowed to operate various designs of the PARS programme (Dugdill, 2005). The low number of studies reported from the other countries indicate that there is paucity of research on the functionality of PARS in these countries and that further research is needed in this area. In terms of study design, quantitative research methods, particularly RCT dominated, while only one study employed the use of mixed methods design. This could be because the duration of PARS tend to be between 10 – 12 weeks (Pavey et al., 2011b; Rowley et al., 2018). Also, the 'gold standard' in the evaluation of health pathway interventions is RCTs, however, they were limited by a short follow-up period. The average reported follow-up period in this review was 12 weeks (approximately three months). Previous studies have highlighted the importance of considering studies with longer follow-up periods for the evaluation of the effectiveness of health pathway programmes that aim to change participants' behaviour (Pavey et al., 2011b). More studies employing the use of mixed methods are required to examine the functionality of PARS (Moore et al., 2013). This approach allows for triangulation between quantitative and qualitative research methods to uncover the best possible explanations for the observed phenomenon (Wisdom et al., 2012). Furthermore, mixed methods approach balances the flaws in either qualitative or quantitative research, is pragmatic and allows for triangulation of data

which in turn fosters in-depth understanding and interpretation of convergent and divergent findings (Creswell & Plano Clark, 2017).

2.2.5.2 Disease conditions, interventions used and outcomes

The current review found that sedentary/inactive participants were the most referred. This could be because, being ‘sedentary/inactive’ is the frequent rationale offered by referrers for referring participants into PARS (Leijon et al., 2008). Not all studies in this review that used PA counselling/ advice as an intervention had positive outcomes, confirming the results of the systematic review by Pavey et al. (2011a), who showed that there was no difference in the proportion of individuals achieving improved PA outcomes after being advised by their GPs in comparison to other PA interventions. Most of the studies indicated short-term improvement in PA related outcomes like increased PA during leisure time but no effect was observed for other health related outcomes like overweight, cardiovascular disease and mental health (Grandes et al., 2011; Grandes et al., 2009). This could be an indication that counselling and advice alone would not suffice to motivate participants to adhere to PA interventions and more supportive measures such as professional supervision and engagement with other participants are required (Grandes et al., 2011; Hanson et al., 2019). In a study where counselling and advice were combined with group-based supervised activities, there was an improvement in level of PA, cardiorespiratory, physical and mental health (Isaacs et al., 2007).

A comparison of reasons for referral in different countries showed that more patients with cardiovascular disease were referred into the PARS programme in the UK and that these participants were highly likely to participate and adhere to the PA referral programme when compared to other reasons for referral. This could be as a result of the prevalence of this disease and the popularity of the referral scheme as an alternative in the management of cardiovascular disease in the UK (Dugdill et al., 2005; Shaw et al., 2012). In addition, research has shown that

PARS is effective in cardiac rehabilitation (Hanson et al., 2017). However, some of the cardiovascular disease participants recorded low adherence rates and no outcome (Dugdill et al., 2005; Taylor et al., 1998). These participants were either referred to other professionals (Dugdill et al., 2005) or only counselled/advised (Taylor et al., 1998) to participate in PA. A possible reason for the no outcome could be because adherence to the intervention dropped due to poor follow up (inefficient or lack of clinical reinforcements and support for participants) (Grandes et al., 2011) implying that PA counselling and advice as the only intervention may not adequately motivate adherence to PA interventions.

Overweight/obese participants preferred common group activities and found it to be effective. These participants recorded positive outcomes and good adherence to study intervention goals (Eynon, 2018; Gusi et al., 2008; Isaacs et al., 2007; Joyce et al., 2010; Law et al., 2019; Roessler & Ibsen, 2009). Participants who were counselled/advised (Gademan et al., 2012; Gusi et al., 2008; Isaacs et al., 2007; Livingston, et al., 2015; Lundqvist et al., 2017) recorded improved PA related outcomes after self-administered PA. However, there was low adherence for some of the participants (Dugdill et al., 2005; Taylor et al., 1998) hence, another disadvantage of this intervention. Participants who were referred to other health professionals recorded positive health outcomes but low adherence to interventions goals (Dugdill et al., 2005; Taylor et al., 1998). This could be because the overweight participants tend not to adhere to programme intervention goals because they believe that PARS is not appropriate for them (James et al., 2008).

All of the interventions used for participants referred for musculoskeletal/ageing reasons (Dinan et al., 2006; Dugdill et al., 2005; Gademan et al., 2012; Gusi et al., 2008; Hanson et al., 2019; Isaacs et al., 2007; Joyce et al., 2010; Lundqvist et al., 2017) resulted in positive outcomes and good adherence rates except for one study for which the outcome was not

recorded (Dugdill et al., 2005). Participants who were advised/counselled to increase their PA adhered to the advice and recorded positive PA related outcomes (Isaacs et al., 2007; Lundqvist et al., 2017). Participants referred for diabetes related reasons (Gademan et al., 2012; Gusi et al., 2008; Hanson et al., 2019; Lundqvist et al., 2017; Roessler & Ibsen, 2009; Sørensen et al., 2008) recorded positive outcomes and good adherence rates. There was no difference in terms of outcome between the interventions used. Possible reason could be because participants' goal or disease conditions could act as a motivator towards achieving positive outcome for their disease conditions regardless of the intervention used (Gusi et al., 2008; Roessler & Ibsen, 2009; Sørensen et al., 2008). For participants with psychological illness (Dugdill et al., 2005; Gademan et al., 2012; Hanson et al., 2019; Isaacs et al., 2007; Kallings et al., 2009; Wormald & Ingle, 2004), most of the studies (Hanson et al., 2019; Isaacs et al., 2007; Kallings et al., 2009) reported positive outcomes except those studies in which participants reportedly self-administered PA (Gademan et al., 2012) and one in which participants were referred to other health care professionals (Dugdill et al., 2005). Possible reason for poor health outcome could be the difficulty of adhering to intervention goals by participants with mental health conditions (James et al., 2008).

Some of the interventions used for participants with at risk smoking behaviours recorded positive outcomes and good adherence (Ackermann et al., 2005; Gusi et al., 2008; Joyce et al., 2010; Roessler & Ibsen, 2009; Taylor et al., 1998). The possible reason for this could be because more than one of the above interventions (referral to other health professionals and common group supervised activities) were combined and thus encouraged participants to improve the outcome of their disease (Gusi et al., 2008; Joyce et al., 2010). Some other interventions used in these studies reportedly had no outcome (Ackermann et al., 2005; Taylor et al., 1998) and low adherence (Taylor et al., 1998). Possible reason could be because of the

type of intervention used coupled with the challenges of changing smoking habits (Ackermann et al., 2005; Taylor et al., 1998). Only one study each out of the 27 reviewed studies indicated the referral of cancer (et al., 2015) and stroke patients (Sharma et al., 2012) despite the positive effects of PA on stroke (Saunders et al., 2014) and cancer (Spence et al., 2010). One possible reason could be the paucity of PA specialists (e.g. physiotherapists and EPs) in the management of such diseases which require highly skilled personnel. However, the study on cancer (prostate cancer) had positive outcome and mentioned the involvement of EPs in the management of the intervention. This further strengthened the reason for the positive outcome recorded by the participants. Hence, the need for more PA experts/specialists to manage PA interventions, especially for chronic and delicate diseases (James et al., 2017).

2.2.5.3 Facilitators and barriers to referral process

Support from providers, peers, family and friends were identified as facilitators of participation, adherence and enhanced positive health outcomes for the participants; while the lack of these support networks was perceived as a barrier (Grandes et al., 2011; Martin & Woolf-May, 1999; Taylor et al., 1998). Adequate supervision and follow-up support programmes by professionals reduced participants' anxiety and fostered motivation, while lack of on-going support was perceived as a barrier to uptake, adherence and sustained PA improvements (Joyce et al., 2010). These findings have been previously reported by other studies (Beers, 2006; Wiles et al., 2008). Group activities and interactions with other participants also aided enjoyment of the PA referral programme (Joyce et al., 2010; Sharma et al., 2012; Shaw et al., 2012). Involvement of EPs also facilitated better health outcomes for participants. Possible reason for this could be the professional advice and supervision provided by EPs (James et al., 2017). PARS that engage individuals in PA with practical, professional,

supportive and follow-up measures are therefore required to obtain sustainable long-term gains (Wormald & Ingle, 2004).

Participants felt either intimidated or uncomfortable in unfamiliar environments (James et al., 2017; James et al., 2008; Joyce et al., 2010; Martin & Woolf-May, 1999; Moore et al., 2013; Taylor et al., 1998; Wormald & Ingle, 2004; Wormald et al., 2006). This may be related to a perceived image of other PA participants being fitter, younger, slimmer or more beautiful (Martin & Woolf-May, 1999; Wormald & Ingle, 2004) and/or to the PA referral participants' own low self-esteem and body image (Joyce et al., 2010; Taylor et al., 1998; Wormald & Ingle, 2004). On scheme accessibility, participants expressed the following factors as barriers to adherence to the PARS programmes: Difficulty getting to programme sessions by public transport (James et al., 2008; Martin & Woolf-May, 1999; Moore et al., 2013; Wormald & Ingle, 2004), the time it takes to get to intervention venues (James et al., 2008), cost implications (Shaw et al., 2012) and the perception of feeling unsafe (Martin & Woolf-May, 1999). During the implementation of PARS, it is important that the administrators ensure that intervention venues are accessible and conducive for participants so as to optimize adherence to intervention and improved outcomes for participants.

Finally, timing and programme content were considered as major barriers. The timing for sessions was reported by some participants as unsuitable because they often coincided with work or childcare commitments, and as such, served as a barrier to attendance (Dinan et al., 2006; Dugdill et al., 2005; James et al., 2008; Shaw et al., 2012; Sørensen et al., 2008; Taylor et al., 1998). Off-peak gym time programmes allowed attendance only when the environment was 'less intimidating' but again, not suitable for day-time workers (Taylor et al., 1998). Administrators of PARS should avoid 'rigid' programme schedules as this could impact on uptake and attendance (Shaw et al., 2012; Taylor et al., 1998).

In summary, the majority of the patients in the reviewed studies were referred for sedentary/inactivity related diseases and common group supervised activities was the most predominantly used intervention. Overall, the participants in the reviewed studies had a high adherence rate. This adherence was either facilitated or hindered by the type of support provided during and after the intervention period.

2.2.5.4 Strengths and limitations

To the knowledge of the researcher, this is the first multinational study on PARS, to examine six useful programme characteristics (disease conditions, intervention used, adherence/uptake, outcomes, facilitators and barriers) in order to explore the functionality of the PARS process holistically. Also, this review is the first to explore the outcome of PARS interventions, by categorising diseases into similar groups. The findings of this review will aid healthcare providers in healthcare planning, enhancement of guidelines and advance insight into the most effective interventions for different chronic diseases. However, the findings of this review may have been limited by the search criteria. Predefined inclusion criteria were applied and although this ensured focus on the functionality of PARS, it resulted in the exclusion of several PA intervention studies. Also, the search criteria employed might have limited the total number of studies included in this review. The heterogeneity of the included studies and lack of methodological details in some of the studies could have potentially biased the review findings. Other limitations of this review are the selection of studies written in English language only and the fact that all the reviewed studies were from only developed countries. Nonetheless, the QATSDD assessment tool facilitated the assessment of studies with varying methodologies. This further strengthens the evidence from this review and showed that more medium based studies were assessed. The strengths of the analysed studies depended on their aims/objectives, description of their research settings, how data was collected, the tools used,

recruitment of participants and how the results were analysed. Further improvements are required in describing theoretical frameworks, sample size, research question and data collection methods.

2.2.6 Conclusion

Findings from this review have highlighted that PARS process is, in itself, a key motivator and driver for individuals to take up and adhere to PA interventions. PARS should be considered for preventive medicine with early identification and referral of sedentary people to the PARS thereby curbing the proliferation of lifestyle diseases and their associated complications. Utilisation of guidelines on evidence-based interventional PA for different types of diseases, effective use of common group supervised activities and the involvement of PA specialists may aid PA adherence and foster positive health outcomes. Finally, during the implementation of PARS process, administrators should be encouraged to focus on the professional and social on-going support available to participants, accessibility and conducive nature of the intervention venue/setting, as well as the timing and content of programme activities. Consideration of these factors could enhance the functionality of the PARS process and facilitate improved health outcomes for patients.

This systematic review has highlighted that PARS could support the uptake, adherence and achievement of PA intervention goals. The shortage of studies and information about PARS however, limits the viability of the programme. Patients have indicated an interest in ongoing PARS support. Patients have noted that ongoing support from providers, family and friends is crucial to the effectiveness of the PARS programme. Given that the information in this review is mainly from the UK (13 studies) compared to Australia's two, there is a need to understand the perspective of the Australian context. It will be valuable to conduct another study that will help identify the bottlenecks within the Australian context. This could help provide recommendations to support the gaps in current literature about very few referrals from GPs to EPs. These findings informed the study in **Chapter 3**.

2.3 Part 2B: Physical Activity Promotion: A Systematic Review of The Perceptions of Healthcare Professionals

2.3.1 Abstract

Physical Activity (PA) is a cost-effective and non-pharmacological foundation for the prevention and management of chronic and complex diseases. Healthcare professionals could be viable conduits for PA promotion. However, the evidence regarding the effectiveness and benefits of the current forms of PA promotion are inconclusive. Healthcare professionals' perceptions on key determinants impacting on the optimum promotion of PA were explored in this review. Thirty-four (34) studies were identified after systematically searching seven databases for peer-reviewed articles published within the last decade. PA advice or counselling was the most recorded form of PA promotion, limited counselling time was the most reported obstacle while providing incentives was viewed as a key facilitator. There is a prevalent consensus on few aspects of PA promotion among HCPs. Utilisation of all PA promotional pathways to their full potential could be an essential turning point towards the optimal success of PA promotional goals. Hence, strategies are required to broaden chronic disease treatment methods to include preventive and integrative PA promotion approaches particularly, between frontline HCPs (e.g. GPs) and PA specialists (e.g. EPs). Future studies could explore the functionality of GP to EP referral pathways to determining what currently works and areas requiring further development.

2.3.2 Introduction

Physical Activity (PA) has been described as a wonder drug (McNally, 2020); owing to its positive impacts on physical and mental wellbeing (Haskell et al., 2007; WHO, 2010c) and its ability to prevent disability (Pahor et al., 2014) and myriads of chronic diseases (Pedersen & Saltin, 2015). WHO defines PA as any bodily movement produced by the skeletal muscles that requires an outlay of energy and involves competitive and recreational exercises such as hiking, housework and formal labour (WHO, 2019). Despite growing emphasis on the promotion of PA (Berra et al., 2015; Kohl et al., 2012), the burden of physical inactivity (PI) continues to increase as over 35% of the global population fail to meet the recommended PA guidelines (Hallal et al., 2012) and 5.3 million premature deaths are now directly linked to PI (Wen & Wu, 2012). A 25% reduction in PI could prevent over 1.3 million deaths each year (Lee et al., 2012).

PA promotional programmes have been developed worldwide since the 1990s and are still utilised in various settings (Blair et al., 2012; Lobelo et al., 2014; Miura et al., 2004; Sallis, 2011; van Sluijs et al., 2004). These programmes are typically, structured in the form of PA advice, counselling and advice with a behavioural change focus and referral to PA specialists for an individualised PA programme within the context of an healthcare system (Petrella & Lattanzio, 2002). Public health policies are being used to motivate healthcare professionals (HCPs) towards the delivery of behavioural change activities like the promotion of PA to patients (Carroll et al., 2011). Also, measures advocating for the inclusion of PA into patients' treatment plans have been initiated by several schemes and some notable examples include: Healthy People 2020 (HP, 2020) and Exercise is Medicine (Cowan, 2016; Joy et al., 2013).

Various studies have reported PA promotion as an effective intervention in diverse healthcare settings (Orrow, et al., 2012; Varney et al., 2014; Webb et al., 2016) and that HCPs can be very

useful conduits for promoting PA (Webb et al., 2016). Successful intervention is attributed to the different levels of one-to-one contact a patient might have with different HCPs during treatment and the significant PA behavioural change that could ensue if PA was promoted at each contact thereby, making every contact count (Fisher et al., 2015; Keyworth et al., 2018). WHO and other agencies have reiterated that HCPs are pivotal to promoting PA and healthcare systems could be key avenues for reducing chronic diseases and PI (Foster et al., 2018; Kohl, et al., 2012; WHO, 2013). Nonetheless, it's been argued that combined support of the academic and scientific communities would be required in synergy with the efforts of HCPs and policy makers to ultimately achieve the 2013 – 2020 WHO's global action plan designed to achieve a 10% reduction in PI by 2025 (Bull, 2018).

However, the evidence regarding the key determinant factors that impact on the promotion of PA among HCPs are inconclusive (Smith-Turchyn et al., 2016; Spellman et al., 2014). Studies have claimed that several barriers hinder the effective promotion of PA in primary healthcare settings (Huijg et al., 2015; Keogh et al., 2017; Lowson et al., 2015) and that, several HCPs miss the opportunities to promote PA to their patients (Nelson et al., 2016; Noordman et al., 2010; Park et al., 2015; Spellman et al., 2014; Van Dillen et al., 2014; Williams et al., 2015). Further claims indicated that these opportunities could have been missed because of the brief and non-specificity of HCPs' advice (Bardach & Schoenberg, 2014), lack of knowledge and confidence on the effective strategies for promoting PA (Delgado & Johansen, 2010; Persson et al., 2013), lack of skills, limited time, reimbursements, current workload and practice barriers (AuYoung et al., 2016; Elwell et al., 2013). Other notable barriers include lack of training (Keyworth et al., 2014; Weiler et al., 2012) and HCPs' beliefs about a patient's readiness to change PA habits (Bonner et al., 2015; Jansen et al., 2017). If these barriers and the growing prevalence of chronic diseases and PI are not urgently addressed, there could be

worsening cases of premature deaths, long-term disabilities, hospitalisation, rehabilitation costs (Raghupathi & Raghupathi, 2018) and burden on the healthcare systems (McPhail, 2016). Studies on the key determinants of the effectiveness and long-term sustainability of PA promotional goals from the perspective of HCPs are required (Huijg et al., 2015). The pressing need for the opinions of key PA stakeholders about key determinants of PA promotion and a sustainable integrated health solution to the growing burden of PI and chronic diseases, highlights the need for a systematic assessment and synthesis of current research on this topic (Barnes et al., 2019; Din et al., 2015; Haussmann, et al., 2018a). This will help identify gaps in the literature and give direction for future research. A thorough review of literature would provide the information that could enhance PA promotional practices, optimise utilization of public health resources and ultimately, improve health outcomes for patients. Consequently, the primary objective of this review was to examine relevant primary peer-reviewed articles in order to synthesize the research evidence on PA promotion from the perspective of HCPs. The secondary objective was to explore the key determinants impacting on the optimum achievement of PA promotional goals in healthcare systems.

Considering these objectives and the need to explicitly appraise and synthesize current evidence on the key determinants of effective PA promotion, a systematic review was deemed the most suitable approach for reviewing the literature (Barnes et al., 2019; Din et al., 2015; Haussmann, et al., 2018). Systematic reviews are studies often conducted for the purpose of identifying, appraising and integrating the evidence pertinent to specific question(s) in order to inform practice, policy and further research (Aromataris & Pearson, 2014; Liberati et al., 2009).

The following questions were addressed by this review:

1. What are HCPs' perceptions regarding key determinants of PA promotion?

2. What are HCPs' perceptions about the barriers and facilitators to the achievement of PA promotional goals?

2.3.3 Methods

The systematic review was conducted and reported in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Statement (Liberati et al., 2009).

2.3.3.1 Inclusion and exclusion criteria

The study population consisted of all HCPs (e.g. General Practitioners (GPs), Physicians, Nurses, Physiotherapists, Exercise Physiologists (EPs), Dietitians, Diabetes Health Educators, Pharmacists, Surgeons, Podiatrists, Oncologists, Occupational and Physical Therapists and Healthcare Assistants). Regarding study designs, only interventional studies (randomised control design and quasi-experimental designs) were excluded given that the aim of this review was to examine the perceptions of HCPs independent of any intervention. Other requirements for inclusion were that studies must have:

- Included adult participants aged 18 years and above.
- Considered HCPs' attitudes or perceptions to PA promotion

Articles were excluded if they did not meet the inclusion criteria and/or they:

- Considered opinions other than those of HCPs (e.g. patients)
- Were review papers and
- Perceptions of HCPs about PA promotion was not specifically discussed.

2.3.3.2 Search strategy

Seven electronic databases comprising, Cinahl, Informit, Medline Ovid, Medline (Pubmed), Scopus, SportDiscus and The Cochrane Library were searched. Peer reviewed primary articles, written in English and published between February 2010 and February 2020 (a decade of

literature) were included in this review. The search was limited to a decade in order to facilitate the evaluation of HCPs' PA promotional practices after the publication of WHO's 2010 global recommendations on PA for health (WHO, 2010b). Text words and indexed terms like "healthcare practitioner, healthcare professionals, healthcare personnel, primary healthcare personnel, physical activity promotion, health promotion, perceptions, views, perspectives, knowledge, believe, attitude, inactivity, physical inactivity and chronic diseases" were included in the search terms. The comprehensive search strategy used for this review is presented in Appendix C. Reference lists from previous reviews and included studies were also screened for additional inclusions.

2.3.3.3 Study selection

All the identified articles were imported into Endnote X9 software, then titles and abstracts were screened. FAA and BSM-A independently screened the titles and abstracts of the retrieved articles and excluded those articles which did not meet the inclusion criteria. Subsequently, full-text articles categorised as potentially eligible for inclusion were screened in a consensus meeting and disagreements were resolved in real time until consensus was reached.

2.3.3.4 Data synthesis and analysis

Meta-analysis was not possible, due to the heterogeneous nature of the included articles (Liberati et al., 2009). A data extraction form was developed and used to collect relevant information from all the included studies. Descriptive data including author, study year, country of study, study design, type of healthcare professional and participant population, gender and mean age were extracted from each of the selected studies. To explore participants' perceptions regarding PA promotion, the following key determinant factors to PA promotion were extracted: HCPs' knowledge of PA, confidence in promoting PA, importance of PA

promotion, role in PA promotion, PA assessment, how HCPs currently promote PA, perceived effectiveness of PA promotion, and perceived barriers and facilitators to PA promotion. These factors were adapted from the classifications reported in Fleuren et al., (Fleuren et al., 2004) and Chaudoir et al., (Chaudoir et al., 2013) studies on the factors influencing innovations in healthcare.

To categorise the extracted facilitators and barriers from this review, the refined Theoretical Domain Framework (TDF) was adopted (Cane et al., 2012). This framework contains 14 domains which are used for coding in behavioural change and implementation research. The TDF domains included: knowledge, skill, social/professional role and identity, beliefs about capabilities, optimism, beliefs about consequences, reinforcement, intentions, goals, memory, attention, decision process, environmental context and resources, social influences, emotion and behavioural regulation (Atkins et al., 2017). FAA and BSM-A independently extracted and categorised facilitators and barriers from each of the studies. After extracting and categorising each of these determinants, FAA and BSM-A met to harmonize the extracted factors as determined by the TDF domain classification. All discrepancies were resolved through discussion and re-examining referenced materials. Identical TDF factors were categorised into sub-themes and domains with multiple themes were deemed crucial TDF domains (Michie et al., 2005). Table 2.6 contains a detailed description of these domains.

For qualitative studies, inductive content analysis was employed (Vaismoradi et al., 2013). The analysis included three stages of coding, creating categories and abstraction. FAA extracted data, defined and developed coding frames for all the key determinant variables in the first stage. FAA and BSM-A designed preliminary categories in the second stage. In the third stage, final categories were developed and labelled by FAA and BSM-A while, all differences were

resolved in a consensus meeting. A replication test was used to validate and determine possible extensions to coding frames.

2.3.3.5 Risk of bias assessment

Quality Assessment Tool for Studies with Diverse Designs (QATSDDD) was used to assess the methodological consistency of the included studies (Sirriyeh et al., 2012). This tool contains 16 items and is used for examining studies with different research designs. Each of the included studies was graded on a scale of 0 to 3 for each criterion, with 0 = not at all, 1 = very slightly, 2 = moderately and 3 = complete. To assess the methodological quality of the each of the included studies, the criteria scores were summed and expressed as a percentage of the maximum possible score. The percentage scores were classified into low (<50%), medium (50-80%) or high (>80%) quality evidence for easy identification. The QATSDDD criteria included: 1) theoretical framework; (2) aims/objectives; (3) description of research setting; (4) sample size; (5) representative sample of target group; (6) procedure for data collection; (7) rationale for choice of data collection tool(s); (8) detailed recruitment data; (2009) assessment of reliability and validity of measurement tool(s) (Quantitative only); (10) fit between research question and method of data collection (Quantitative only); (11) fit between research question and data collection method (Qualitative only); (12) fit between research question and method of analysis; (13) good justification for analytical method selected; (14) reliability of analytical process (Qualitative only); (15) evidence of user involvement in design; (16) strengths and limitations.

2.3.4. Results

2.3.4.1 Included studies

One thousand one hundred (1,100) articles were identified from all searched databases and imported into Endnote. After screening the titles and abstracts of the articles identified and reviewing 68 full texts, 34 studies met the inclusion criteria for this review (Figure 2.2).

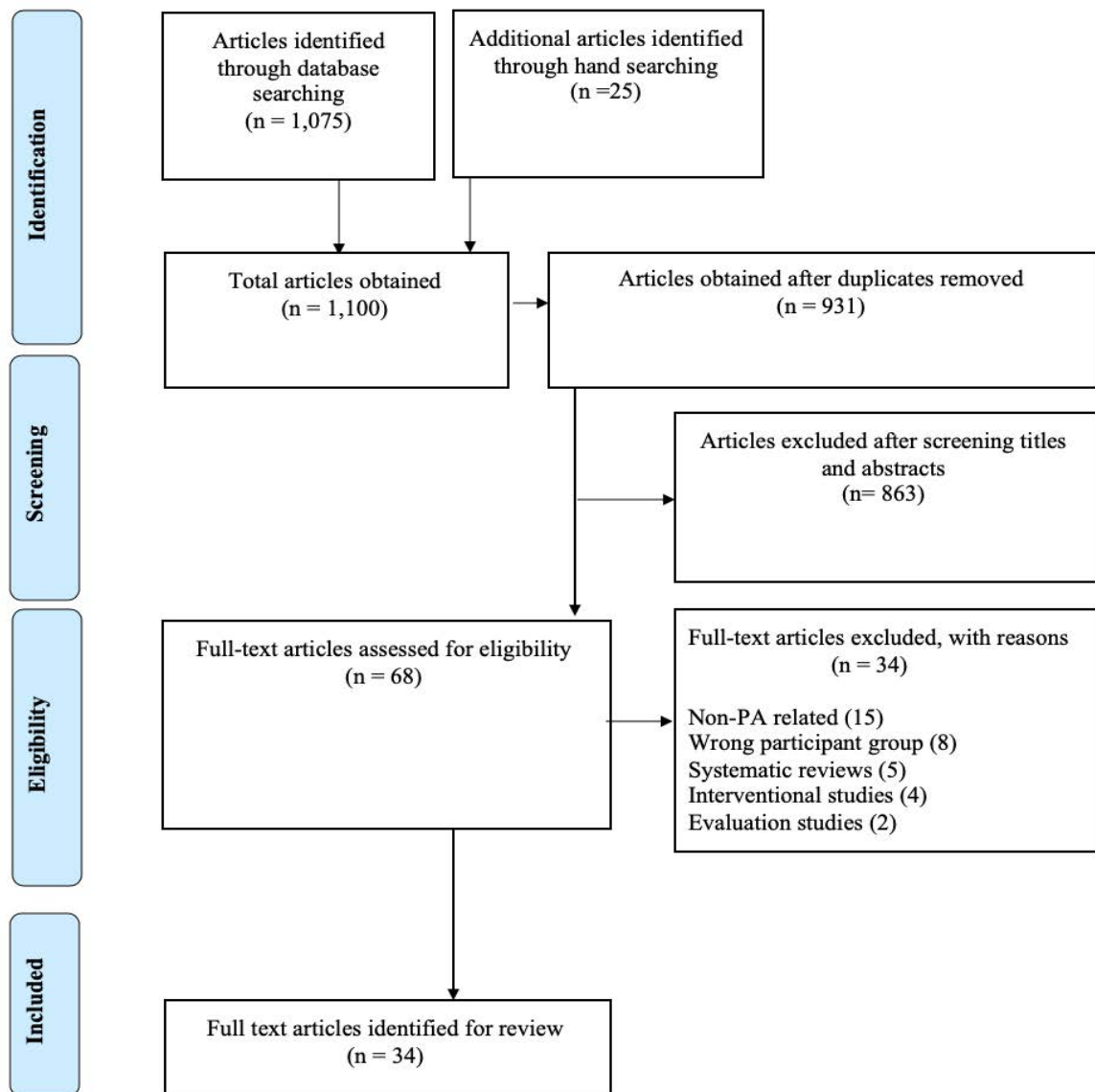


Figure 2.2: PRISMA flow chart of the systematic review selection process for 2B

Table 2.5: Characteristics of reviewed studies for Part 2B

| Author & Study year | Country of study | Study design | Type of Healthcare Professional(s) (HCPs) | Participants (No., Gender, Mean Age (yrs)) |
|---------------------------|------------------|-------------------------------|---|---|
| Abaraogu et al. 2016 | Nigeria | Cross-sectional study | Physiotherapists | N = 103; Females (30%, n =31); Age: (34.5±9.5) |
| Barnes et al. 2019 | Australia | Longitudinal study | GPs | N = 2846; Females (20%, n =570); Age: (49.8±4.08) |
| Barrett et al. 2013 | Ireland | Cross-sectional study | GPs and Physiotherapists | N = 431; Females (43.4%, n =187); Age: * |
| Burton et al. 2010 | Australia | Cross-sectional study | Psychologists | N =236; Females (84.7%, n =200); Age: (42.12±11.03) |
| Cantwell et al. 2018 | Ireland | Multi-methods (Delphi method) | HCPs (Nurses – 48%; Oncologists – 27%; GPs – 8%; Surgeons – 19.5%; Physiotherapists – 2% & Radiation therapists – 0.5%) | N = 91; Females (67%, n =61); Age: (44.02±15.6) |
| Courtney-Long et al. 2017 | USA | Cross-sectional study | HCPs (Family/GPs – 44.1%; Internists – 37.1% & Nurse practitioners – 18.9%) | N = 1760; Females (38.5%, n =678); Age: (59.9±5.7) |
| Din et al. 2015 | UK | Qualitative study | HCPs (GPs – 67.3 %, Nurses – 19.5% & Practice Managers – 13.0%) | N = 46; Females (56.5%, n =26) Age: * |
| Eisele et al. 2020 | Germany | Qualitative study | Physiotherapists | N = 9; Females (66.6%, n =6); Age: (39±12.0) |
| Frantz & Ngambare 2013 | Rwanda | Mixed Methods | Physiotherapists | N = 92; Females (30%, n =28); Age: (32.49±6.56) |
| Freene et al. 2019 | Australia | Cross Sectional Study | HCPs (Physiotherapists – 59%; Nurses – 16%; Exercise Physiologists – 13%; Occupational therapists – 6%; Dietitians – 3% & Pharmacists – 2%) | N = 433; Females (79%, n =340); Age: (41.7±15.3) |

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|------------------------|----------------------|-----------------------|---|---|
| Freene et al. 2017 | Australia | Cross Sectional Study | Physiotherapists | N = 257; Females (77.8%, n =200); Age: (43.2±15.4) |
| Hausmann et al. 2018a | Germany | Qualitative study | HCPs (GPs – 33.3%; Physicians – 33.3% & Nurses – 33.3%) | N = 30; Females (63%, n = 19); Age: (45.0±11.5) |
| Hausmann et al. 2018b | Germany | Cross Sectional Study | HCPs (GPs – 17.2%; Physicians – 40.5% & Nurses – 42.3%) | N = 917; Females (61.3%, n = 563); Age: (30.2±9.8) |
| Hurkmans et al. 2011 | The Netherlands | Cross Sectional Study | HCPs (Rheumatologists – 34.2%; Nurse – 35.6% & Physical Therapist – 30.2%) | N = 370; Females (66.7%, n = 247); Age: (46±6.0) |
| Jorgensen et al. 2012 | Denmark | Cross Sectional Study | GPs | N = 223; Females (50.7%, n = 113); Age: (53.4±8.0) |
| Kinnafick et al. 2018 | UK | Qualitative study | Healthcare Assistants | N = 11; Females (54.5%, n = 6); Age: (30.27±7.75) |
| Leemrijse et al. 2015 | The Netherlands | Cross Sectional Study | GPs | N = 340; Females (41.1%, n = 140); Age* |
| Litchfield et al. 2019 | UK | Qualitative study | HCPs (Dietitians – 33.3%; Specialist; Doctors – 16.6%; Nurses – 50%) | N = 6; Females*; Age* |
| Lowe et al. 2018 | UK | Qualitative study | Physiotherapists | N = 12; Females (58%, n = 7); Age* |
| Mulligan et al. 2010 | New Zealand & Sweden | Qualitative study | Physiotherapists | N = 9; Females (88.8%, n =8); Age** |
| O'Brien et al. 2019 | Ireland | Cross Sectional Study | Physicians | N = 595; Females (56.3%, n =335); Age: (42.6±12.1) |
| Omura et al. 2018 | USA | Cross Sectional Study | HCPs (Physicians – 57.1%; Paediatricians – 14.2%; Obstetrician & Gynaecologists – 14.2% & Nurses – 14.3%) | N = 1751; Females (14.5%, n = 254); Age: (51.5 ±11.5) |
| Patel et al. 2011 | New Zealand | Qualitative study | GPs | N = 15; Females (66.6%, n = 10); Age: (50.8±7.1) |
| Patel et al. 2012 | New Zealand | Qualitative study | GPs | N = 15; Females (66.6%, n = 10); Age: (50.8±7.1) |
| Patra et al. 2013 | India | Cross sectional study | HCPs (GPs– 32.8% & Physicians – 67.2%) | N = 146; Females (41%, n = 60); Age: (43±11.3) |
| Pearson et al. 2018 | USA | Cross sectional study | Nurses | N = 111; Females (78.3%, n = 87); Age: (36.8±11.9) |

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|----------------------|-----------------|-----------------------|---|--|
| Pojednic et al. 2017 | USA | Cross sectional study | Sport Medicine Physicians | N = 412; Females (47%, n = 194); Age: (47.1±2) |
| Sassen et al. 2011 | The Netherlands | Cross sectional study | HCPs (Nurses– 40% & Physiotherapists – 60%) | N = 278; Females (73.7%, n= 205); Age: (36.2±10.1) |
| Shirley et al. 2010 | Australia | Cross sectional study | Physical Therapy practitioners | N = 318; Females (73%, n= 233); Age: (41.8±9.4) |
| Speake et al. 2019 | Australia | Qualitative study | HCPs (Clinical specialists in pain management*; Occupational therapists*; Nurses* (Continence and diabetes), Consultants in diabetes* and Orthopaedics*; Specialist diabetes dieticians*; Physiotherapists* (continence and MSK), specialist and advanced* Podiatrists) | N = 22; Females (68.1%, n= 15); Age* |
| Spellman et al. 2014 | Australia | Cross sectional study | HCPs (Clinicians i.e. Urologists*; Medical Oncologists*; Radiation Oncologists* and Nurses*) | N = 31; Females (29%, n= 9); Age: (43.5±16.2) |
| Suija et al. 2010 | Estonia | Cross sectional study | Physicians** | N = 198; All Females; Age: (47.1±9.4) |
| Tucker et al. 2017 | USA | Cross sectional study | Physicians** | N = 25; Females (64%, n= 16); Age** |
| Williams et al. 2018 | UK | Qualitative | Physiotherapists | N = 18; Females (72.2%, n= 13); Age** |

*= Item not indicated; ** = Values/categories not specified

2.3.4.2 Study characteristics

A summary of the characteristics of the included studies is presented in Table 2.5. Twelve (12) of the 34 studies in this review, explored the perceptions of HCPs practising in Europe, 10 were conducted in Australia and New Zealand, five each from the UK and USA, two from Africa and one from India. The study designs were varied with 20 of the 34 included studies employing a cross sectional design, the majority of which sampled the opinions of HCPs about PA promotion using questionnaires, 11 studies were qualitative (using semi-structured interviews and focus groups), while longitudinal (Barnes et al., 2019), mixed (Frantz & Ngambare, 2013) and multi methods (Cantwell et al., 2018) designs were employed in one study each. Across the 34 included studies, 20 explored the perceptions of a homogenous group of HCPs, including seven physiotherapists studies (Abaraogu et al., 2016; Eisele et al., 2020; Frantz & Ngambare, 2013; Freene et al., 2017; Lowe et al., 2018; Mulligan et al., 2011; Williams et al., 2018), five GPs studies (Barnes et al., 2019; Jorgensen et al., 2012; Leemrijse et al., 2015; Patel et al., 2012; Patel et al., 2011), three physician studies (Mulligan et al., 2011; Suija et al.; Tucker et al., 2017) and one each for psychologists (Burton et al., 2010), nurses (Pearson et al., 2018), sport medicine physicians (Pojednic et al., 2017), physical therapists (Shirley et al., 2010), and healthcare assistants (Kinnafick et al., 2018). The other 14 studies explored the perceptions of heterogeneous groups of HCPs. The HCPs included in these heterogeneous groups included nurses (Cantwell et al., 2018; Courtney-Long et al., 2017; Din et al., 2015; Freene et al., 2019; Haussmann, , et al., 2018a; Haussmann, et al., 2018b; Hurkmans et al., 2011; Litchfield et al., 2019; Omura et al., 2018; Sassen et al., 2011; Speake et al., 2019; Spellman et al., 2014), GPs (Barrett et al., 2013; Cantwell et al., 2018; Courtney-Long et al., 2017; Din et al., 2015; Haussmann, et al., 2018a; Haussmann, et al., 2018b; Patra et al., 2015), physicians (Haussmann, et al., 2018a; Haussmann, et al., 2018b; Litchfield et al., 2019; Omura et al., 2018; Patra et al., 2015), physiotherapists (Barrett et al., 2013; Cantwell et

al., 2018; Freene et al., 2019; Sassen et al., 2011; Speake et al., 2019), dietitians (Freene et al., 2019; Litchfield et al., 2019; Speake et al., 2019), surgeons (Cantwell et al., 2018; Omura et al., 2018; Speake et al., 2019), oncologist (Cantwell et al., 2018; Spellman et al., 2014), radiation therapists (Cantwell et al., 2018; Spellman et al., 2014), occupational therapists (Freene et al., 2019; Speake et al., 2019), and only one study explored the perceptions of exercise physiologists (Freene et al., 2019), pharmacists (Freene et al., 2019), internists (Courtney-Long et al., 2017), rheumatologists (Hurkmans et al., 2011) and physical therapists (Hurkmans et al., 2011).

The total number of participants included in the studies in this review was 11, 862. More males (7,033; 59.3%) compared to females (4, 829; 40.7%) were included in the studies. Participants' mean age ranged from 30.2+9.8 to 59.9+5.7 years while the number of participants per study ranged from six (6) to 2,846. HCPs' perceptions about key determinants of effective PA promotion including: PA knowledge, confidence in PA promotion, PA importance, role in promoting PA, PA assessment, how they promoted PA and the barriers and facilitators to effective PA promotion were extracted from all the 34 studies. The majority of studies (n = 27), recorded the perceptions of HCPs on how PA was promoted; 26 on barriers to PA promotion; 20 on HCPs' role in PA promotion; 15 on HCPs' knowledge of PA; 12 on the importance of promoting PA; 11 on HCPs' confidence in promoting PA; nine on facilitators to promoting PA; eight on their assessment of PA and three on the effectiveness of promoting PA. Each of these key determining factors to PA promotion are described in more detail below.

2.3.4.3 HCPs' perceived knowledge of PA

HCPs' perceptions of their knowledge of PA was explored in 44.1% (n = 15) of the included studies (Table 2.6) (Barrett et al., 2013; Burton et al., 2010; Courtney-Long et al., 2017; Freene et al., 2017; Freene et al., 2019; Haussmann, et al., 2018a; Haussmann, et al., 2018b; Hurkmans et al., 2011; Mulligan et al., 2011; O'Brien et al., 2019; Patra et al., 2015; Pearson et al., 2018;

Pojednic et al., 2017; Shirley et al., 2010; Williams et al., 2018). In 85.7% (n = 12) of these 15 studies, varying percentages of HCPs indicated that they had some form of PA knowledge (12 – 64.1%). However, GPs, physicians, nurses and rheumatologists from three group studies indicated the need for more training on PA (Hausmann, et al., 2018a; Hausmann, et al., 2018b; Hurkmans et al., 2011). Two studies indicated that participants had some university education on PA (Burton et al., 2010; Patra et al., 2015)

2.3.4.4 HCPs' perceived confidence in promoting PA

HCPs expressed their confidence in promoting PA in 32.3% (n = 11) of the 34 included studies (Table 2.6) (Abaraogu et al., 2016; Burton et al., 2010; Freene et al., 2017; Freene et al., 2019; Litchfield et al., 2019; Mulligan et al., 2011; Shirley et al., 2010; Speake et al., 2019; Spellman et al., 2014; Tucker et al., 2017). In over half of the studies (n = 6), 68 to 95.3% of participants indicated that they were confident in promoting PA (Abaraogu et al., 2016; Barrett et al., 2013; Burton et al., 2010; Freene et al., 2017; Spellman et al., 2014; Tucker et al., 2017). Across the other five studies, EPs and physiotherapists were judged to be more confident than other HCPs in providing general and specific PA advice to patients in one (Freene et al., 2019). Another study indicated that confidence was key to PA promotion and equally, found significant associations between confidence and HCPs' PA enquiry and advice habits (O'Brien et al., 2019). Lastly, dietitians indicated that their own personal interest in a particular sport and PA habits enhanced their confidence in promoting PA (Litchfield et al., 2019).

Table 2.6: Participants’ perceptions about PA knowledge, confidence, importance, role assessment, recommendation and effectiveness

| Author, Study year | Knowledge of PA | Confidence in Promoting PA | Importance of PA and its Promotion | Role in PA Promotion | PA Assessment | How PA was promoted | Perceived Effectiveness of PA Promotion |
|---------------------------|------------------------|---|---|--|--|--|---|
| Abaraogu et al. 2016 | NA | Over 90% (n = 93) of participants rated themselves confident in assessing physical inactivity | Counselling patients on PA was considered very important by 87%; (n = 90) of participants | Addressing physical inactivity was considered high priority and a normal clinical role by 82% (n = 84) of participants | 56%; (n = 58) of participants “always” or “usually” assess their client’s PA profile | PA was promoted by providing advice; written materials; referral; and managing risk factors. Over 78% regularly advised clients on PA while about 24% gave written PA advice | 66% (n = 68) of participants believed that their counselling is effective |
| Barnes et al. 2019 | NA | | | | | GPs provided Physical Activity Management (PAM) for 58, (2.0%) prostate cancer survivors. The PAM provided was physical activity counselling on 39 and a physical activity referral on 19 occasions. | NA |

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|---------------------|--|--|--|--|--|---|--|
| Barrett et al. 2013 | Below 1/3 of GPs and 1/2 of PTs reported the correct PA guidelines. More PTs compared to GPs significantly recalled the PA guidelines (PTs - 50.5%, n = 45; GPs - 28%, n = 97; $p < 0.005$; $\chi^2 = 16.56$; $df = 1$) while 58% (n = 197) of GPs and 37% (n = 33) of PTs were unsure about the frequency of PA. | Seventy two percent (72%, n = 247) and 92% (n = 82) of PTs noted that they were confident in providing PA advice to their patients | NA | Ninety five percent (95%) of both GPs (325) and PTs (85) perceived PA promotion to be part of their role | About 41%, (n = 139) of GPs reported opportunistic screening of patients, 37% (n = 126) screened patients for PA if relevant to patients' presentations and 8% (n = 28) routinely screened all their patients for PA. For PTs, 34% (n = 30) screened all patients for PA, 28% (n = 25) screened patients if related to presentations and 24% (n = 21) reported opportunistic screening | Education and advice (GPs = 76%, n = 258 and PTs 97%, n = 86); referrals to other services by GPs (practice nurse = 16%, n = 56; exercise specialist = 14%; n = 49; exercise prescription schemes = 11%; n = 37, gyms = 44%; n = 150). PTs utilised written materials (73 %; n = 65), exercise diaries (57%; n = 51), follow up appointments (53%; n = 47) and behavioural modification (GP = 50%, n = 172; PT = 53%, n = 47) | NA |
| Burton et al. 2010 | 12% (n=29) of respondents said they had received PA advice or counselling during instructions during undergraduate, 31% (n=61) during postgraduate training and 18% (n = 41) during a workshop/seminar | Over 80% of respondents were confident to provide general activity advice, discuss options, identify and manage barriers to activity | 12% (n = 29) strongly agreed/agreed that PA was important for preventing chronic health problems | NA | 61% (n = 142) of respondents reported always asking about PA in the past month | 59% (n = 139) always discussed PA, 53% (n=22) recommended PA, 33% (n = 77) always gave PA advice | 93% (n = 220) strongly agreed/agreed that PA advice and counselling could be a useful component of psychological treatment |

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|---------------------------|---|--|---|----|---|----|
| Cantwell et al. 2018 | NA | Over 86% of HCPs agreed or strongly agreed that PA has so many health benefits and can improve quality of life | Almost 88% of participants either agreed or strongly agreed that discussing physical activity with cancer patients was part of their role | NA | PA was frequently recommended to myriads of cancer patients depending on the stage of cancer. PA promotion was given verbally or by a referral to a physiotherapist or exercise specialist (40%) or referral to a community-based programme (28%) | NA |
| Courtney-Long et al. 2017 | 53.7% of participants knew the guideline on aerobic activity applied to adults with disabilities with the percentage being highest among those who strongly agreed they felt prepared (62.0%) | NA | About 79% of participants or somewhat agreed they felt prepared to recommend physical activity to their patients with disabilities | NA | About 50.6% of participants reported recommending PA to patients with disabilities at most clinic visits | NA |
| Din et al. 2015 | NA | Most HCPs acknowledged the importance of promoting physical activity in order to improve public health | Health professionals commonly saw their role as giving advice when asked for, rather than 'coercing' patients into changing their behaviour | NA | HCP's selectively provided PA advice to patients. The advice was targeted at individuals they felt would be motivated to change. Such judgements were sometimes based on patients' physical appearance, conditions, age and/or gender | NA |
| Eisele et al. 2020 | NA | NA | Participants indicated that they felt responsible to instruct PA. Some also regarded it as their role to advice and motivate | NA | Some participants design home-based PA for their clients (goal setting behaviour). Participant's choice of activities are considered by some | NA |

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|------------------------|--|---|---------------------------------------|--|--|---|
| | | | patients on routine PA implementation | | participants while others do not | |
| Frantz & Ngambare 2013 | NA | | | | PA counselling was the predominant health promotions strategy used participants (98%) while 9% used written materials. | |
| Freene et al. 2019 | All disciplines felt they had the skills to promote PA | PTs and EPs were more confident giving general (P < 0.001) and specific (P < 0.001) PA advice to patients | NA | All disciplines agreed that providing PA advice was part of their role, although nurses were less likely to agree | NA | Brief counselling (n = 392, 91%) and giving out brochures (n = 404, 93%) were reported to be the most feasible methods for PA promotion by health professionals |
| Freene et al. 2017 | On general knowledge regarding PA, participants recommended the following: taking the stairs by 54%; 30 mins walk on most days by 43%; exercise that makes you puff and pant by 32%; several 10 minutes shot walks on most days by 78% | 95.3% of participants indicated that they would feel confident in giving general PA advice to patients while 93% of participants indicated that they would feel confident in suggesting specific PA | | Over 97% of participants indicated that; some parts of their role to patients are: discussing the benefits of PA, suggesting ways to improve PA and also acting as PA role model | | 93.8% practised brief PA during consultations with patients, separate one-on-one consultations was practiced by 52.5% of participants, group sessions by 67.3% and distribution of resources (such as brochures) by 93.4% of participants |
| Hausmann et al. 2018a | HCPs expressed their wish for more PA related information for themselves and their patients with cancer | NA | | The perceived patient characteristics influencing HCPs impression for PA assessment were patients' physical condition (n = 16), | NA | |

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| | | | | patients' assumed interest in PA (n = 11) and patients' former PA lifestyle (n = 10). | |
| Hausmann et al. 2018b | 69.5% of all participants requested at least one offered PA information resource. 53.5% requested a booklet, scientific paper by 53.0%, and educational course by 27.6%. | NA | | | PA was recommended often or routinely in 88.5% of physicians working in outpatient care, 78.1% of physicians working in inpatient care, and 73.1% of oncology nurses. Three HCPs (indicated that they advised against doing PA |
| Hurkmans et al. 2011 | 54% (n = 68) of Rheumatologists indicated that they were interested in additional education on the promotion of PA compared to Clinical Nurse specialists (n = 112, 85%) and Physical therapists (n=81, 72%) (both p<0.001) | NA | Majority of Rheumatologists (n=118, 94%), Clinical Nurse specialists (n=132, 100%), and Physical therapists (n = 109, 100%) agreed that obtaining and/or maintaining a sufficient level of PA is an important health goal in the management of patients with rheumatoid arthritis | NA | 86% (n = 107) of Rheumatologists gave advice on PA, 95% of Clinical Nurse specialists (122) and 99% of Physical therapists (n = 109). More Clinical Nurse specialists (n = 52, 41%) and Physical therapists (n = 54, 49%), use the public health recommendation on moderate-intensity PA for patients' advice |
| Jorgensen et al. 2012 | NA | | 80.2% of GPs reported that promoting PA was one of their work tasks while 19.8% (43/217) did not | NA | 57% of GPs promoted PA daily, 38.6% weekly and 4.5% monthly or seldomly. In about 60% of cases GPs gave PA advice with recommended exercise type, duration, |

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| | | | perceive it as their job or were in doubt | | frequency, and intensity and in 40% of cases PA promotion included written material | |
| Kinnafick et al. 2018 | NA | All HCPs agreed that exercise was beneficial for patients' physical and mental health | HCPs agreed that PA promotion was part of their role, but the extent to which they should encourage PA was unclear to them | | NA | |
| Leemrijse et al. 2015 | NA | | Half of the GPs thought that they had an important role in stimulating physical activity, while the other half considered their role present but 'limited | NA | All GPs said they recommend PA to their patients. This was given when PA was relevant for the patients' health problem or health status. About 70% of GPs referred patients for PA interventions | |
| Litchfield et al. 2019 | NA | Dietitians were comfortable presenting advice to individuals who consistently indulge in PA like running or cycling. The standard at which Dietitians exercised or played sport informs the confidence in promoting PA | NA | | Participants promoted PA based on their personal experiences of a particular sport or activity | NA |
| Lowe et al. 2018 | NA | | Their role in educating patients on PA came through strongly as a means of supporting self-management | Participants integrated PA questions into the subjective assessment and specifically into the social history of their patient | Participants promoted PA by providing brief advice, brief intervention, cognitive behavioural therapy, and motivational interviewing to their clients | |

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| Mulligan et al. 2010 | Participants have developed knowledge on and were aware of and supported current national health policies toward PA enhancement | NA | Participants perceived that they had moved away from what they considered traditional physiotherapy practice and now practised with a wider scope. | NA | Educational seminars provided opportunities for people with neurological conditions to support and learn from one another while building efficacy and acquiring strategies to take responsibility for their own future health and well-being |
| O'Brien et al. 2019 | 64.1% of participants indicated the correct weekly levels of PA recommended by the National PA Guidelines for Ireland. 29% of participants accumulated 4 hours of PA promotion training. | Confidence was identified as an important factor in undertaking PA counselling activities, with a significant association between confidence and PA enquiry and counselling activities observed | NA | | 88.0% of doctors enquired about PA levels and 86.2% provided verbal PA counselling to at least some of their patients. The majority of participants reported that they did not provide either written advice (82.6%) or PA prescriptions (89.3%) |
| Omura et al. 2018 | | NA | | Discussing PA with at-risk patients was higher among non-Hispanic PCPs compared to others. | 92% of participants who encouraged their clients to increase PA used counselling, 78.7% by assessing PA levels, 41.5% provided educational materials, 25.6% by written exercise prescription and 15.1% referred patients for PA interventions. |
| Patel et al. 2011 | NA | GPs perceived Green Prescription to be a beneficial PA tool for drug-free therapeutic | | | NA |

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|----------------------|---|----|--|--|--|---|----|
| | | | processes and health gain, endorsed by them and presented in the same format as prescription medication | | | | |
| Patel et al. 2012 | | | | | | | NA |
| Patra et al. 2013 | 24.7% of doctors reported that they had attended classes on PA in medical college and 26% received formal training for PA counselling | | 81% of doctors perceived PA to be important. 52% perceived PA to be beneficial in depression, 22.6% in chronic respiratory disease and 19.8% in cancers | 78% of doctors agreed that PA has a role in primary, 91% in secondary prevention of chronic diseases and a beneficial role in the prevention of heart diseases, obesity and diabetes | 42.5% doctors reported that they always 'asked' their patients about their current PA levels | 46.6% doctors always gave 'verbal advice'. 25.3% always asked and advised' their patients regarding PA. | NA |
| Pearson et al. 2018 | In the perceived behavioural control category, high mean scores were noted regarding knowledge, skills and intention to promote PA | NA | The item with the highest mean score (i.e., most agreement with the statement) was PA increases activity tolerance. Mean attitude scores were lowest related to PA causes harm | Mean scores were noted to be highest in the subjective norm category in regard to promotion of PA being a priority of nursing and that engaging patients in PA is the responsibility of RNs. | | | NA |
| Pojednic et al. 2017 | Physicians were most familiar with four activities: walking, aerobic activity, strength | | | | 49% of physicians included PA assessment as a vital sign. | About 74% of physicians recommended and talked about PA 26% provided a written PA prescription. Physicians who provided a | NA |

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|---------------------|--|---|----|--|--|---|
| | training and cycling. 37% of physicians used Exercise is Medicine resources, 19% used tools created individually by clinicians drawn from the internet, books, or elsewhere, and 12% used American Heart Association resources | | | | written PA prescription reported seeing more improvement in their patients' physical activity levels | |
| Sassen et al. 2011 | | NA | | | 56.8% of the HCPs encourage PA among cardiovascular patients. | |
| Shirley et al. 2010 | Only one third of the respondents could name the national physical activity recommendation for Australian adults | Physical therapists who gave more patients physical activity advice were more likely to feel confident in suggesting specific physical activity programmes | NA | In both groups, almost all physical therapists thought it should be part of their role to give their patients physical activity advice | NA | Above half of the physical therapists (54%) reported that they encouraged 10 or more patients each month to lead a more physically active lifestyle |
| Speake et al. 2019 | NA | HCPs found it challenging to give advice that reflected individual differences. In particular they perceived a need for lower entry points to PA interventions that | | There was a lack of consensus about roles and responsibilities for promoting PA. HCPs indicated that their primary role was to focus on their patient's physical | | NA |

| | | | | | | | |
|----------------------|----|--|---|--|---|---|----|
| | | might be more palatable for their most inactive patients | | health and the specialty of their training. Bringing PA into consultation, had to be linked to the health condition | | | |
| Spellman et al. 2014 | | 83.9% (n=26; M=4.2, SD=0.76) of the Clinicians agreed or strongly agreed that they were confident in providing general advice about physical activity to prostate cancer survivors | Almost all the clinicians (n=29, 93.6%; mean (M)=4.52, standard deviation (SD)=0.51) strongly agreed or agreed that regular physical activity can improve cancer patients' quality of life | On who's role to recommend PA, over 50% of participants (n=16) nominated a Physiotherapist; followed by a Urology Nurse (n=14, 46.7%) and an Exercise Specialist (n=14, 46.7%) | NA | On recommended PA, 3.2% (n=1) of participants always gave advice; 36% (n=11) often gave advice, 45.2% (n=14) sometimes gave advice and 16% (n=5) rarely gave advice, 80.8% (n=25) recommended cardiovascular PA followed by weights training. On how PA was recommended; all participants (n=31) gave advice verbally and 9.7% (n=3) provided pamphlets to their patients. No participant reported the referral of patients to an exercise specialist | NA |
| Suija et al. 2010 | NA | | | | Family doctors claimed that they counsel over 94% of their patients about physical activity | | |
| Tucker et al. 2017 | NA | Physicians expressed confidence in their ability to counsel their patients to engage in adequate amounts of PA (68% strongly agreed, 24% somewhat agreed) | Approximately 88% of the Physicians agreed that patients were more likely to adopt healthier lifestyles if their healthcare providers counselled them to do so (44% strongly agreed, 44% agreed somewhat) | 88% of Physicians strongly agreed that it was their responsibility to promote a PA, weight loss and healthy weight maintenance among their patients | NA | Most Physicians at least somewhat agreed that they were effective in encouraging patients to engage in health-promoting PA (44% strongly agreed, and 44% somewhat agreed) | |

| | | | | | | | |
|----------------------|--|----|---|---|----|--|----|
| Williams et al. 2018 | PA knowledge was gained through the practical experience of caring for people with Spinal Cord Injuries (SCI) over time. Participants revealed that: they were not educated on PA during their degree course and had a limited range of other sources of PA knowledge. The value of PA was learnt through seeing the perceived detrimental effects of physical inactivity. | NA | Physiotherapists recognised the value that PA played both in Spinal Cord Injury (SCI) rehabilitation and upon discharge to the community. They drew upon PA in rehabilitation to improve balance, flexibility, strength, and cardiovascular fitness with the aim to improve function and independence | One reason why most of the Physiotherapists failed to promote PA was because it was deemed not to be part of their role | NA | Physiotherapists promoted PA for SCI rehabilitation by providing structured gym sessions and group exercises and recreational sport activities organised by other health professionals | NA |
|----------------------|--|----|---|---|----|--|----|

* Patel et al., 2012 was not included in the table because, participants did not record their perceptions on any of the factors contained in Table 2.6.

2.3.4.5 HCPs' perceived importance of PA and its promotion

HCPs' perceptions about the importance of promoting PA was evident in 35.2% (n = 12) of the studies (Table 2.6) (Abaraogu et al., 2016; Burton et al., 2010; Cantwell et al., 2018; Din et al., 2015; Hurkmans et al., 2011; Kinnafock et al., 2018; Patel et al., 2011; Patra et al., 2015; Pearson et al., 2018; Spellman et al., 2014; Tucker et al., 2017; Williams et al., 2018). In these studies, 86 to 100% of participants indicated that PA was important for their patients. They agreed that PA could be essential in the management of a myriad of diseases (e.g. rheumatoid arthritis, mental health, respiratory diseases, cancers and spinal cord injuries), rehabilitation and the improvement of quality of life. In one of these 12 studies however, only 12% of psychologists noted that PA was important for their patients (Burton et al., 2010). In another study, physicians signalled the importance of promoting PA to patients by expressing that patients will value their PA advice (Tucker et al., 2017). Similarly, GPs affirmed that prescribing PA could be a viable non-pharmacological intervention (Patel et al., 2011).

2.3.4.6 HCPs' perceived role in PA promotion

HCPs' perceptions about their role in PA promotion was examined in 58.8% (n = 20) of the included studies (Table 2.6). Between 78% and 97% of HCPs indicated that PA promotion was part of their role in 13 of the 20 included studies (Abaraogu et al., 2016; Barrett et al., 2013; Cantwell et al., 2018; Courtney-Long et al., 2017; Eisele et al., 2020; Freene et al., 2017; Jorgensen et al., 2012; Lowe et al., 2018; Mulligan et al., 2011; Patra et al., 2015; Pearson et al., 2018; Shirley et al., 2010; Tucker et al., 2017). However, HCPs' views on their part in PA promotion was divergent in seven studies (Din et al., 2015; Freene et al., 2019; Kinnafock et al., 2018; Leemrijse et al., 2015; Speake et al., 2019; Spellman et al., 2014; Williams et al., 2018). Four of these seven studies examined the views of heterogenous groups of HCPs while the remaining three examined the views of a homogenous group of HCPs (GPs, healthcare assistants and physiotherapists respectively) (Kinnafock et al., 2018; Leemrijse et al., 2015;

Williams et al., 2018). Across the heterogenous group, some HCPs thought their role in PA promotion was limited and that they should only advise patients on PA when requested (Din et al., 2015; Leemrijse et al., 2015). Others thought PA should only be promoted when linked to a condition (Speake et al., 2019), however, nurses (16% of the total participants) were less likely to acknowledge a role in PA promotion (Freene et al., 2019). Over half (51.6%) of the HCPs in a cross sectional study nominated physiotherapists as the specialists suited for PA promotion while unspecified exercise specialists was nominated by 46.7% (Spellman et al., 2014). Healthcare assistants viewed PA promotion as part of their role but were uncertain to what extent (Kinnafick et al., 2018). Interestingly, one of the qualitative studies indicated that physiotherapists did not promote PA because they considered it outside their role (Williams et al., 2018).

2.3.4.7 HCPs' perceptions on PA assessment

Only eight (23.5%) of the included studies recorded HCPs' perceptions about their assessment of patients' PA (Table 2.6) (Abaraogu et al., 2016; Barrett et al., 2013; Burton et al., 2010; Haussmann, et al., 2018a; Lowe et al., 2018; Omura et al., 2018; Patra et al., 2015; Pojednic et al., 2017). Across these studies, between 42.5% to 61% of HCPs reportedly assessed patients for PA. However, HCPs in one of the studies indicated that a patient's physical condition (ability to participate in PA), interest in PA and former PA lifestyle were three factors informing their decision for PA assessment (Haussmann, et al., 2018a).

2.3.4.8 HCPs' perceptions on how PA was promoted

The majority of the included studies 79.4% (n = 27) recorded the perceptions of HCPs on how they promoted PA (Table 2.6). Four categories emerged from HCPs' views regarding how PA was promoted. They included: those who indicated that they provided verbal advice, written materials (e.g., PA pamphlets or brochures), referral to an exercise specialists (e.g. EPs, physiotherapists or sports medicine specialists) and those who recommended PA interventions

to manage the risk factor(s). In 85% (n = 23) of these studies, majority of HCPs indicated that they promoted PA by providing some form of PA advice and/or counselling. Across the homogenous participant group studies, 78 – 93.8% of physiotherapists, 57-100% of GPs, 88% of physicians, 74% of sport medicine physicians, 54% of physical therapists and 33% of psychologists indicated that they regularly advised their patients to participate in PA. Across the heterogenous participant group studies, 50.6 to 98% of HCPs noted that they promoted PA to their patients by providing advice or counselling.

Some HCPs in a qualitative study however, indicated that the advice was targeted at the individuals they perceived would be motivated to change PA habits (Din et al., 2015), others claimed they promoted PA based on their experience of a particular sport (Litchfield et al., 2019) while three HCPs in a cross-sectional study indicated that they advised their clients not to do PA for unstated reasons (Hausmann, et al., 2018b). In another study, sport medicine physicians revealed that those who promoted PA by giving written PA prescriptions recorded better improvements in their patients PA levels (Pojednic et al., 2017). In 14.8% (n = 4) of these studies, 73 – 93.4% of physiotherapists noted that they promoted PA by providing some form of written material (Barrett et al., 2013; Eisele et al., 2020; Frantz & Ngambare, 2013; Freene et al., 2017). In three different cross-sectional studies respectively, 24% of physiotherapists (Abaraogu et al., 2016) and 40% of GPs (Jorgensen et al., 2012) indicated that they provided written materials to patients while some HCPs stated that giving out written materials was most feasible for them in the last study (Freene et al., 2019). HCPs (Majority of which are GPs) across five studies (18.5%), referred patients to exercise specialists for PA intervention (Barnes et al., 2019; Barrett et al., 2013; Cantwell et al., 2018; Leemrijse et al., 2015; Omura et al., 2018).

Across another five studies, HCPs managed the risk factors (promoting PA via other means outside advice/counselling, providing writing materials and referral to exercise specialists)

(Barrett et al., 2013; Mulligan et al., 2011; Omura et al., 2018; Pojednic et al., 2017; Williams et al., 2018). This group consisted of mainly physiotherapists (Barrett et al., 2013; Mulligan et al., 2011; Williams et al., 2018) and physicians (Omura et al., 2018; Pojednic et al., 2017). Among the studies that patients were referred to exercise specialists, only in one study did 40% of HCPs indicate that they referred clients to physiotherapists (Cantwell et al., 2018), others did not specify the specialists they referred their clients to. Across the five studies reporting the views of HCPs who managed their client's risks factors, two stated that, about 26% of the HCPs provided written PA prescription (Omura et al., 2018; Pojednic et al., 2017), interventions to change behaviour was used in one study (Barrett et al., 2013), PA seminar in another study (Mulligan et al., 2011) while structured gym sessions, group exercises and recreational sports activities were conducted by physiotherapists in the last study (Williams et al., 2018).

2.3.4.9 HCPs' perceived effectiveness in promoting PA

The perceived effectiveness of PA promotion was recorded in only three studies (8.8%) (Table 2.6) (Abaraogu et al., 2016; Burton et al., 2010; Tucker et al., 2017). Sixty-six (66) to 93% of the HCPs signalled that they were effective in promoting PA. Each of the three studies explored the perceptions of a single homogenous group of HCPs including: 88% of physicians who indicated that they were effective in promoting PA to their patients (Tucker et al., 2017), 93% of psychologists, who suggested that PA advice and counselling could be vital in psychological treatment (Burton et al., 2010) and 66% of physiotherapists who reported that PA counselling was effective in promoting PA among their clients (Abaraogu et al., 2016).

2.3.4.10 HCPs' perceived barriers and facilitators to PA promotion

Table 2.7 contain a summary of HCPs' perceptions about the barriers and facilitators to PA promotion respectively. Over seventy six percent (76.5%; n = 26) of the studies included in this review examined participants' views about barriers to PA promotion, while only 26.5% (n

= 9) of the studies examined participants' views about facilitators to PA promotion. Based on the TDF domain classifications, the extracted barriers and facilitators were coded and categorised into themes. Across these studies, 131 data points for barriers and 29 for facilitators to PA promotion were identified. Among all the factors grouped into the TDF domains, environmental context and resources domain ranked highest among HCPs' perceived barriers with 39 data points, whereas reinforcements ranked as the most perceived facilitator to PA promotion with 8 data points.

Other notable barrier domains in descending order included: 18 data points for knowledge, 14 each for beliefs about consequences and social influences, 10 for skills, eight for optimism, seven for intentions, six for reinforcement, four for emotion, three each for beliefs about capabilities, and social/professional role and identity, two for goals, and one each for memory, attention, decision process and behavioural regulation. For facilitators, other notable domains in descending order included: Six data points for environmental context and resources, five for knowledge, three for social/professional role and identity, two for social influences, and one each for skill (Din et al., 2015), intentions (Eisele et al., 2020), goals (Patel et al., 2011), memory, attention, decision process (Eisele et al., 2020), emotions (Lowe et al., 2018) and behavioural regulation (Kinnafick et al., 2018). No facilitating determinants were recorded for TDF domains of optimism, beliefs about capabilities and consequences.

Table 2.7: Participants’ perceived barriers and facilitators to PA promotion

| TDF Domains | Rank (B – Barriers and F – Facilitator) | Barrier constructs & Reference Numbers | Facilitator constructs & Reference Numbers |
|--|---|--|---|
| TDF domain 1: knowledge (This is the recognition that something exists) | B1; F3 | Lack of knowledge or training on PA: n = 9 | Providing education to HCP’s and patients about the benefits of PA and available promotional programmes: n = 1 |
| | | Lack of knowledge of PA & promotional pathways: n = 9 | Assessible resources on PA promotional programmes (e.g., smart phone apps, assessment tools etc): n = 4 |
| TDF domain 2: skill (This is talent acquired by repeated practice) | B5; F5 | Lack of knowledge or training on PA: n = 9 | Providing supportive and individualised PA programmes: n = 1 |
| | | Lack of motivational skills to encourage participants: n = 1 | |
| TDF domain 3: social/professional role and identify (This is the logical sequence of character exhibited by a person) | B10; F3 | Perception of limited role in PA promotion: n = 1 | Professional collaboration among HCPs: n = 2 |
| | | Lack of cooperation among HCP’s: n = 2 | HCPs physical active lifestyles: n = 1 |
| TDF domain 4: beliefs about capabilities (This is the honest and rational acceptance of a particular talent or expertise that can be useful to an individual) | B10; F(Non) | Language barrier: n = 1 | Not indicated |
| | | Lack of motivational skills to encourage participants: n = 1 | |
| | | Lack of confidence in promoting PA: n = 1 | |

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|--|------------|--|--|
| TDF domain 5: optimism (This is the conviction that an event will occur, or an expected aim will be achieved) | B6; F(Non) | Perceived feeling that PA advice will not convince patient to change behaviour: n = 3 | Not indicated |
| | | Perceived feeling that PA will not be beneficial for patient: n = 5 | |
| TDF domain 6: beliefs about consequences (This is the act of embracing the honest and rational result of a particular conduct in a certain circumstance) | B3; F(Non) | Perceived fear of liability and litigation: n = 3 | Not indicated |
| | | Perceiving investments in PA promotion to be a misuse of government funds: n = 1 | |
| | | Perceived feeling that PA advice will not convince patient to change behaviour: n = 3 | |
| | | Perceived feeling that PA will not be beneficial for patient: n = 5 | |
| | | Perception that PA could be counter-productive: n = 2 | |
| TDF domain 7: Reinforcements (This is an enhancement of the likelihood of reaction by organising a conditioner connection between the reaction and the stimulus) | B8; F1 | Lack of remuneration or incentives: n = 6 | Reported beneficial outcomes of PA: n = 2 |
| | | | Repeat appointments with patients: n = 1 |
| | | | Feedback to HCPs on patient's progress in a programme: n = 1 |
| | | | Affordability of PA and referral pathways services: (Leemrijse et al., 2015) |
| | | | Positive feedback from other patients on PA referral: |

| | | | |
|--|---------|--|--|
| | | | n = 1 |
| | | | Financial incentives to patients: n = 1 |
| TDF domain 8: Intentions (This is the deliberate resolve to perform an act in a particular manner) | B7; F5 | Patient's comorbidities or other immediate health issues: n = 2 | Self-motivation and interest by patient to participate in PA: n = 1 |
| | | Patient's reduced health status: n = 2 | |
| | | Prioritizing other interventions: n = 2 | |
| | | Feeling uncomfortable/inappropriate to speak to patient about PA: n = 1 | |
| | | Not interested in promoting PA: n = 2 | |
| TDF domain 9: Goals (This is the intellectual depiction of results that one desires to attain) | B12; F5 | Patient's comorbidities or other immediate health issues: n = 2 | Pre-existing indication for PA intervention: n = 1 |
| TDF domain 10: Memory, Attention, Decision process (This is the capacity to keep details, critically concentrate on different parts of the environment and select between different options) | B13; F5 | Prioritizing other interventions n = 1 | Self-motivation and interest by patient to participate in PA: n = 1 |
| TDF domain 11: Environmental Context and Resources (This is an individual's | B1; F2 | Lack of PA resources (e.g., education leaflets and materials): n = 8 | Assessible resources on PA promotional programmes (e.g., smart phone apps, assessment tools etc): n = 4 |

| | | | |
|---|--------|---|--|
| conditions that enables or prevents the development of expertise, social capabilities, and modifiable habits) | | Inadequate staffing: n = 1 | Formal and central process for PA intervention: n = 1 |
| | | Inaccessible PA supportive environment: n = 2 | Promotion of active treatment, home services and sporting activities: n = 1 |
| | | Inadequate or lack of PA support services: n = 2 | |
| | | Lack of specific PA guidelines: n = 1 | |
| | | Limited counselling time: n = 17 | |
| | | Lack of PA infrastructure and funding: n = 1 | |
| | | Poor implementation and inconsistent support: n = 1 | |
| | | Lack of PA facilities and funding: n = 3 | |
| | | Paucity of PA specialist: n = 4 | |
| | | Patient safeguarding procedures (i.e., for patient with mental health challenges): n = 1 | |
| | | Long awaiting list to assess PA services: n = 1 | |
| | | Transportation barrier: n = 1 | |
| | | Lack of referral pathways for promotion: n = 3 | |
| TDF domain 12: Social influence (They are relational procedures that | B3; F4 | Lack of support from practice or other colleagues: n = 1 | Encouraging informal communication strategies (e.g., building rapport, providing information, social support and |

| | | | |
|---|---------|--|--|
| can influence the thinking and behavioural processes of a person) | | | understanding patient needs): n = 1 |
| | | Lack of patient interest or motivation in PA: n = 9 | Opportunities for empathy and connection among HCPs and patients: n = 1 |
| | | Patient preference for other intervention (e.g. drugs): n = 1 | |
| | | Lack of cooperation among HCP's: n = 1 | |
| TDF domain 13: Emotion (This is a complicated pattern of reaction, including practical, psychological and biological components which a person tries to use in the management of a crucial issue) | B9; F5 | Feeling uncomfortable/inappropriate to speak to patient about PA: n = 1 | Opportunities for empathy and connection among HCPs and patients: n = 1 |
| | | Perceived fear of liability and litigation: n = 3 | |
| TDF domain 14: Behavioural Regulation (This is anything intended for controlling or modifying a neutral event or measures) | B13; F5 | Cultural restriction: n = 1 | Compulsory PA interventions to patients: n = 1 |

2.3.4.11 Assessment of methodological quality

QATSDD assessment indicated that 67.6% (n = 23) of the included studies were medium quality, 17.6% (n = 6) were high quality studies and 14.7% (n = 5) were low quality studies (Table 2.8). Individual scores ranged from 35.7 to 83.3%. All except one (O'Brien et al., 2019) of the top-quality studies were qualitative and were judged to be explicit in their methodology while all the low-quality studies were quantitative and some of the weaknesses identified from these studies included: lack theoretical framework, inadequate sample sizes and poor reliability.

Table 2.8: Quality assessment of the included studies

| QATSDD criteria Author & Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Total score | Max score (%) |
|-------------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----------------|---------------------|
| Abaraogu et al. 2016 | 0 | 3 | 3 | 1 | 3 | 3 | 2 | 2 | 3 | 2 | NA | 2 | 1 | NA | 2 | 1 | 28/42 | 66.7 |
| Barnes et al. 2019 | 0 | 3 | 3 | 2 | 3 | 3 | 0 | 2 | 0 | 3 | NA | 0 | 0 | NA | 0 | 2 | 21/42 | 50 |
| Barrett et al. 2013 | 0 | 3 | 3 | 2 | 3 | 3 | 1 | 3 | 0 | 2 | NA | 2 | 0 | NA | 1 | 0 | 23/42 | 54.8 |
| Burton et al. 2010 | 0 | 3 | 2 | 0 | 3 | 3 | 2 | 3 | 0 | 2 | NA | 2 | 3 | NA | 2 | 3 | 28/42 | 66.7 |
| Cantwell et al. 2018 | 0 | 3 | 3 | 1 | 2 | 3 | 2 | 3 | 1 | 3 | 2 | 3 | 2 | 1 | 1 | 3 | 33/48 | 68.8 |
| Courtney-Long et al 2017 | 0 | 3 | 2 | 0 | 2 | 3 | 1 | 2 | 0 | 1 | NA | 2 | 3 | NA | 0 | 2 | 21/42 | 50 |
| Din et al 2015 | 0 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | NA | NA | 3 | 3 | 3 | 2 | 0 | 3 | 28/42 | 66.7 |
| Eisele et al. 2020 | 0 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | NA | NA | 2 | 3 | 3 | 2 | 3 | 3 | 34/42 | 81.0 |
| Frantz & Ngambare 2013 | 0 | 2 | 2 | 1 | 3 | 3 | 3 | 2 | 1 | 3 | 3 | 2 | 1 | 0 | 0 | 0 | 26/48 | 54.1 |
| Freene et al. 2019 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 1 | NA | 3 | 3 | NA | 0 | 2 | 22/42 | 52.3 |
| Freene et al. 2017 | 0 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 0 | 3 | NA | 3 | 3 | NA | 0 | 2 | 28/42 | 66.7 |
| Hausmann et al. 2018a | 0 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | NA | NA | 2 | 3 | 2 | 2 | 1 | 2 | 24/42 | 57.1 |
| Hausmann et al. 2018b | 0 | 3 | 2 | 1 | 3 | 3 | 2 | 3 | 0 | 2 | NA | 2 | 3 | NA | 2 | 3 | 29/42 | 69 |
| Hurkmans et al. 2011 | 0 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 0 | 0 | NA | 2 | 3 | NA | 2 | 3 | 25/42 | 59.5 |
| Jorgensen et al. 2012 | 0 | 2 | 2 | 0 | 2 | 2 | 1 | 1 | 2 | 2 | NA | 2 | 3 | NA | 2 | 3 | 24/42 | 57.1 |
| Kinnafick et al. 2018 | 0 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | NA | NA | 2 | 2 | 2 | 2 | 0 | 3 | 25/42 | 59.5 |
| Leemrijse et al. 2015 | 0 | 3 | 1 | 0 | 3 | 1 | 1 | 1 | 0 | 1 | NA | 1 | 0 | NA | 0 | 3 | 15/42 | 35.7 |
| Litchfield et al. 2019 | 0 | 1 | 3 | 1 | 2 | 2 | 2 | 3 | NA | NA | 2 | 1 | 1 | 1 | 0 | 3 | 22/42 | 52.3 |
| Lowe et al. 2018 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | NA | NA | 3 | 3 | 3 | 2 | 0 | 3 | 34/42 | 81.0 |
| Mulligan et al. 2010 | 0 | 3 | 2 | 1 | 2 | 3 | 2 | 2 | NA | NA | 1 | 2 | 3 | 2 | 0 | 3 | 26/42 | 59 |
| O'Brien et al. 2019 | 0 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | NA | 3 | 2 | NA | 3 | 3 | 35/42 | 83.3 |
| Omura et al. 2018 | 0 | 3 | 2 | 1 | 2 | 3 | 2 | 3 | 0 | 3 | NA | 3 | 3 | NA | 0 | 3 | 28/42 | 66.7 |
| Patel et al. 2011 | 0 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | NA | NA | 2 | 2 | 2 | 2 | 0 | 3 | 29/42 | 69 |
| Patel et al. 2012 | 0 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | NA | NA | 3 | 3 | 2 | 3 | 0 | 3 | 34/42 | 81.0 |
| Patra et al. 2013 | 0 | 1 | 3 | 1 | 3 | 1 | 1 | 2 | 0 | 2 | NA | 2 | 2 | NA | 0 | 2 | 20/42 | 47.6 |
| Pearson et al. 2018 | 2 | 3 | 3 | 1 | 1 | 3 | 2 | 2 | 0 | 2 | NA | 3 | 2 | NA | 0 | 2 | 26/42 | 62 |
| Pojednic et al. 2017 | 0 | 3 | 2 | 1 | 1 | 3 | 1 | 2 | 0 | 3 | NA | 2 | 0 | NA | 0 | 3 | 21/42 | 50 |
| Sassen et al. 2011 | 3 | 3 | 2 | 1 | 3 | 3 | 1 | 2 | 0 | 2 | NA | 2 | 2 | NA | 1 | 2 | 26/42 | 62 |
| Shirley et al. 2010 | 0 | 3 | 1 | 1 | 3 | 2 | 2 | 2 | 0 | 2 | NA | 2 | 2 | NA | 0 | 3 | 23/42 | 54.8 |
| Speake et al. 2019 | 0 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | NA | NA | 2 | 3 | 3 | 3 | 2 | 3 | 35/42 | 83.3 |
| Spellman et al. 2014 | 0 | 3 | 1 | 0 | 1 | 1 | 2 | 2 | 0 | 2 | NA | 2 | 1 | NA | 0 | 3 | 18/42 | 43 |
| Suija et al. 2010 | 0 | 0 | 3 | 1 | 2 | 2 | 1 | 3 | 1 | 2 | NA | 0 | 2 | NA | 0 | 3 | 20/42 | 47.6 |
| Tucker et al. 2017 | 0 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 0 | 2 | NA | 2 | 1 | NA | 0 | 2 | 19/42 | 45.2 |
| Williams et al. 2018 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | NA | NA | 3 | 3 | 2 | 3 | 0 | 2 | 35/42 | 83.3 |

QATSDD criteria: This row shows a list of all the Quality Assessment Tool for Studies with Diverse Designs (QATSDD) item employed in this review. Criteria: (1) theoretical framework; (2) aims/objectives; (3) description of research setting; (4) sample size; (5) representative sample of target group, (6) procedure for data collection; (7) rationale for choice of data collection tool(s); (8) detailed recruitment data; (9) assessment of reliability and validity of measurement tool(s) (Quantitative only) (10) fit between research question and method of data collection (Quantitative only) (11) fit between research question and data collection method (Qualitative only) (12) fit between research question and method of analysis; (13) good justification for analytical method selected; (14) reliability of analytical process (Qualitative only); (15) evidence of user involvement in design (16) strengths and limitations. 0 = not at all; 1 = very slightly; 2 = moderately; 3 = complete; N/A = not applicable.

2.3.5. Discussion

This systematic review explored and synthesised the perceptions of HCPs about key factors influencing effective promotion of PA.

This review has highlighted pertinent issues including increased workload and time pressure on frontline HCPs such as GPs in the promotion of PA. The underutilisation of the services of PA specialists such as EPs who perhaps, are best suited for effective PA promotion is also highlighted. This is evident from the insights provided by the HCPs in relation to how they promote PA with most HCPs viewing inadequate counselling time as a major barrier to PA promotion. These findings corroborate the work of other studies (Din et al., 2015; Hébert et al., 2012). For example, Hébert et al (Hébert et al., 2012), indicated that HCPs are open to the view of PA promotion, however, personal and organisational obstacles might prevent effective integration of PA promotion into primary healthcare. This was further reiterated by Din et al, (Din et al., 2015), who concluded that barriers to PA promotion including expertise and time limitations should be resolved in order to facilitate HCPs' ability to promote PA. Consequently, continuous training for HCPs, the adoption of PA prescription and referral programmes as universal standard treatments and the integration of PA and healthcare services might enhance individual levels of PA and help meet the WHO goals for the reduction of inactivity, morbidity and mortality (Vuori et al., 2013).

HCPs' reported knowledge of PA and its promotion pathways were quite varied and this could be an indication that more awareness and training may be required. These finding was evident in the study by Cantwell et al. (Cantwell et al., 2018) who indicated that HCPs can provide crucial PA prompts to patients but may lack the requisite knowledge to give explicit PA advice. Given that the findings from this review include an assortment of HCPs' opinions, it therefore provides an extension to the work of Cantwell and colleagues who explored the perceptions of mainly oncology specialists. Factors making up three domains of TDF (knowledge, skills and

reinforcement) signalled the major impact knowledge has on HCP's propensity to promote PA. Jones et al., (Jones et al., 2019) suggested that ongoing training and the employment of evidenced-based practice to promote PA or refer cases to PA specialists could be helpful. Despite the divergence in knowledge, there were optimistic views from HCPs about the importance of promoting PA, their effectiveness and confidence in promoting it. For example, majority of physicians, psychologists and physiotherapists from a cross-sectional study, indicated that they were confident in promoting PA, perceived PA to be effective and all except psychologists considered PA to be important for their patients. The low perception of the importance of PA among psychologists could be due to paucity of knowledge about the benefits of PA among this group of HCPs required to inform positive behavioural change towards PA promotion (Bartlem et al., 2016; Burton et al., 2010). HCPs' views regarding their assessment for PA were inconclusive. Their views suggested that several factors impacted on their decision for PA assessment and as a result, there might be need for consensus on the standard PA assessment procedures (Lobelo et al., 2018). This could enhance evidence-based practice, inform the need for timely PA intervention for chronic diseases and improve the quality of care and outcome for patients' conditions.

The majority of HCPs viewed PA promotion to be part of their role. Despite this overwhelming agreement, some HCPs in a qualitative study thought their role was limited and nurses were the least to accept PA promotion as part of their role. When asked about whose role is best suited for promoting PA, HCPs in a cross-sectional study ranked physiotherapists highest and the least were other unspecified PA specialists. However, Williams et al., (Williams et al., 2018) argued that physiotherapists failed to promote PA because they viewed it outside their role. Possible reason for this could be because PA promotion is not an integral component of most physiotherapists practice (Freene et al., 2017; Lowe et al., 2017). Another group of eligible PA specialists who could be best suited for this role are EPs although, their valuable

skills in PA promotion are probably underutilized (James et al., 2017; Soan et al., 2014). EPs emerge as the best option by virtue of their training in the delivery of clinical PA interventions for the prevention and management of chronic and complex disease conditions (Cheema et al., 2014). Contrary to expectation, only one of the included studies explored the perceptions of EPs. Consolidating the valuable access of frontline HCPs like GPs with the PA expertise and extended consultation time of PA specialist like physiotherapists and EPs, could perhaps be the catalyst for the achievement of PA goals (Cheema et al., 2014). Hence, further studies into the effectiveness of PA promotional interventions provided by EPs and reasons for weak referral pathways between key healthcare gatekeepers such as GPs and PA specialists such as EPs will be highly valuable.

HCPs' perceptions about the factors within the TDF domains for barriers and facilitators to PA promotion revealed that, achievement of PA promotion goals could be improved by minimizing identified obstacles and boosting the enabling factors. The obstacles included inadequate consultation time and paucity of knowledge about the importance of PA and its promotional pathways, while the facilitators were incentives for key frontline HCPs, providing further training on PA and access to PA educational materials. Addressing these factors therefore, could enhance HCPs' knowledge, effectiveness, readiness and confidence in promoting PA (Jones et al., 2019). HCPs viewed "limited consultation time" as the greatest barrier within the environmental context and resources domain of TDF. Based on this result, referral of identified clients to PA specialists for prolonged and effective PA consultations could be a remedy (James & Fiona, 2011; James et al., 2017). For example, one of the significant findings from the study by Freene et al. (2019) and echoed by O'Brien et al. (2017), indicated that physiotherapists and EPs were more confident in providing PA advice to patients. Hence, indicating that these PA specialists can be key players in interventions designed to combat complex and chronic diseases. In view of the perceived facilitating TDF factors, the

gains of PA promotion could be enhanced if all the potential pathways for PA promotion are utilised to their full capacity.

In summary, the general perceptions of HCPs about key determinants of PA promotion is encouraging. Current PA promotion practices could be made more efficient if fundamental obstacles such as limited consultation time, underutilisation of PA referral services and the lack of PA knowledge and resources are addressed.

2.3.5.1 Implications for practice

The evidence from this review could inform future research on improving the integrative health promotional practice in healthcare settings. It could also be translated into evidence-based practice for PA promotion in healthcare settings. To facilitate the translation of research into practice, stakeholder networks could be established to train, encourage and enforce PA promotional goals for sustainable and enhanced patient health outcomes. The key PA determinants identified in this review can be used to educate and enhance the PA knowledge of frontline HCPs like GPs. Particularly, the unique expertise of different PA specialists and the varied roles they can play in the effective delivery of optimum healthcare services can be further emphasised. Stakeholders can also utilise the findings in this review to plan, implement and evaluate PA promotional interventions in healthcare settings. Future studies that focus on modifying HCPs' PA habits and promotion practices as well as strengthening referral pathways between key healthcare gatekeepers such as GPs and PA specialists will be helpful.

2.3.5.2 Strength and Limitation

To the best of our knowledge, this is the first systematic review on PA promotion that explored the perceptions of varied HCPs regarding key determinants to PA promotion. The results from this review could strengthen the evidence-base for research on ways to enhance sustainable interprofessional relationships among HCPs. Employing the TDF behavioural domain

framework and assessing the quality of the included studies, further strengthened the evidence in this systematic review. QATSDD assessment indicated that almost two-thirds of the studies were medium quality studies. The studies were judged to be strong in their aims and objectives and the methods used for recruitment, collection and the analysis of data. The studies, however, lacked or failed to explicitly describe relevant theoretical frameworks, research questions and sample sizes. Other limitations of this review include the heterogeneity of the included studies and the exclusion of some relevant studies due to pre-set inclusion criteria such as the selection of English language studies only.

2.3.6. Conclusion

The findings of this review revealed that the optimum utilisation of all PA promotion pathways (Advice/counselling, provision of PA resources or prescription and the onward referral to PA specialists such as EPs) and addressing key TDF domain factors could be the potential turning point in a bid for sustainable solutions to the success of PA promotional goals. There is an accessible PA expertise for the non-pharmacological prevention and treatment of chronic diseases within healthcare systems, though this pathway is currently underused. Hence, an effective framework for HCPs' behavioural modification and the enhancement of collaborative interdisciplinary care for chronic and complex disease management will be invaluable. Ultimately, development of functional stakeholder networks for training, promotion, implementation and the evaluation of PA promotional goals could offer sustainable solutions and improved health outcomes for patients.

The findings from this review revealed that several obstacles including time pressures and increasing workload limit GPs' ability to promote PA and PARS. Additionally, the services of EPs are underexplored. For instance, only one study considered the views of EPs, indicating poor visibility of EPs compared to other HCPs. Therefore, it would be invaluable to explore the perspectives of Australian GPs and EPs to support the knowledge gap on the poor visibility of EPs. These findings from 2B formed the basis for the study presented in **Chapter 4**.

Chapter THREE: Australian Patients' Perception of the Efficacy of the physical activity referral scheme (PARS)

3.1 Chapter Overview

Abstract

Optimum physical activity (PA) interventions could be delivered via physical activity referral schemes (PARS) if utilised adequately. However, the evidence supporting PARS effectiveness is weak due to low uptake and non-adherence to interventions. Patients' experiences of PARS were explored to obtain in-depth insight into their perceived quality of care and practical ways to optimise the programme's effectiveness. A sequential explanatory mixed methods design was employed to probe cross-sectional quantitative survey data (n=111) on patients' knowledge and beliefs about PA and PARS and qualitative interview data (n=15) on their experiences of PARS. Informed by Donabedian framework of healthcare quality assessment, quantitative and qualitative findings were integrated to identify practical ways to enhance PARS effectiveness. Participants displayed good PA knowledge, had positive beliefs and perceived PARS to be useful. Nonetheless, bottlenecks in the structure and process of PARS impact on patient health outcomes and hinder the programme's uptake. Exploring other referral mechanisms into PARS such as self or nurse-initiated referrals could improve the programme's visibility and effectiveness. Improved support, enhanced visibility of EPs, ongoing interactions between GPs and EPs and education about referral pathways would foster improved uptake, adherence and health outcomes for patients.

3.2 Introduction

Physical activity (PA) is any movement initiated by the skeletal muscles (WHO., 2018) that requires energy and helps to prevent, manage and treat diseases (Health., 2014; Pedersen & Saltin, 2015) and disabilities (Pahor et al., 2014). Published evidence stressed the need to promote PA due to the increasing threat of physical inactivity (PIA) (Berra et al., 2015; WHO., 2018; Pedersen & Saltin, 2015). For example, a quarter of the world's adults are inactive and PIA is now linked to 3.2 million yearly deaths (WHO, 2015; Wen & Wu, 2012). Promoting PA could boost its uptake and may extend peoples' lifespan by over four years (Holtermann et al., 2013).

To support behavioural change, promotional programmes like physical activity referral schemes (PARS) have been established in various countries (Hillsdon et al., 2005; Woods et al., 2016), however, the name and structure of the schemes differ across settings (Gademan et al., 2012; Karjalainen et al., 2012; Pavey et al., 2011a; Romé et al., 2014). In PARS, patients are typically referred by frontline Health Care Professionals (HCPs) like General Practitioners (GPs) to PA specialists like Physiotherapists or Exercise Physiologists (EPs) for structured PA intervention (NICE, 2014).

Studies suggest that PARS can be a robust public health tool for managing PIA related diseases but the evidence in support of its effectiveness is weak (Orrow et al., 2012; Pavey et al., 2011b; Wade et al., 2020). Patient recruitment and referral, perhaps from key gatekeepers like GPs, could be crucial to PARS success (Birtwistle et al., 2019; Shaw et al., 2012). However, HCPs' lack of PA knowledge, time constraints (Albert et al., 2020b) and low patient motivation could hinder PARS' effectiveness (Albert et al., 2020a; Britt et al., 2015; Moore et al., 2013). A review by Wade et al. (2020) concluded that examining PARS implementation could reveal ways to improve its effectiveness. Additionally, recent findings on the underutilisation of PA

specialist services indicate that evidence-driven interventions are required to strengthen PARS' health gains (Albert et al., 2020a).

However, studies on patients' opinions regarding mechanisms and effects of PARS referrals are lacking (Orrow, et al., 2012; Wade et al., 2020). This is particularly relevant to Australia, where there are fewer exploratory studies on PARS compared to the UK (NICE, 2014). Utilising a theoretically informed approach in exploring patients' experiences of PARS and perceived quality of care received from the relevant HCPs could unearth gaps in the system and proffer solutions that could improve the programme's effectiveness (Tashakkori & Newman, 2013). The Donabedian theoretical framework of healthcare quality assessment is a useful tool that considers three interrelated aspects of care (structure, process and outcomes) (Donabedian, 2005). Structure includes availability of resources and access to healthcare delivery system, while process includes the actions of providers in diagnosis, treatment and cycle-of-care activities that ultimately affect patient health outcomes (Donabedian, 1988). Utilising the Donabedian theoretical framework for quality assessment of PARS could inform the development of interventions that would reflect end-users' pragmatic needs and may lead to the restructuring of schemes for improved effectiveness (Farrance et al., 2016; Gates et al., 2016; Harden et al., 2017). Consequently, this study aimed to:

- 1) Investigate patients' knowledge, beliefs and attitudes to PA and PARS; and
- (2) Explore their perceptions of the referral process for an in-depth understanding and informed decision-making on ways to improve the effectiveness of PARS.

3.3. Methods

3.3.1 Study Design

This study employed a sequential explanatory mixed methods approach guided by a pragmatic paradigm to collect, analyse and integrate quantitative cross-sectional survey and qualitative

interview data (Creswell & Clark, 2017). The qualitative interviews were influenced by, and aimed at, explaining the quantitative survey results, with an integration of both findings (Harden et al., 2017) (see Figure 3.1). The Human Research Ethics Committee (HREC) of James Cook University (JCU) granted approval for this study (Reference number: H7661).

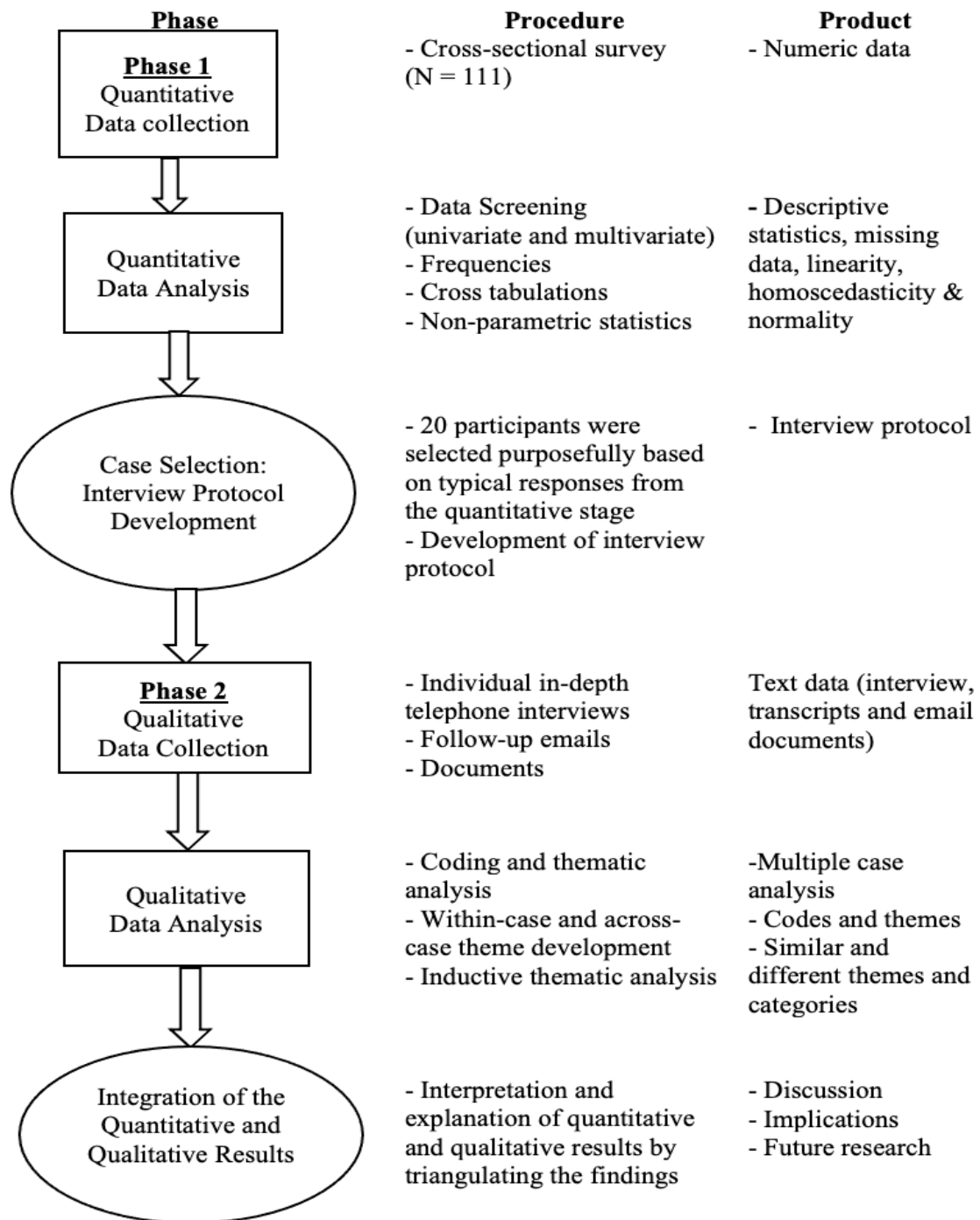


Figure 3.1: Sequential explanatory mixed methods study procedures

3.3.1.1 Quantitative Phase

This phase involved the collection and analysis of numeric data to provide a snapshot of patients' knowledge, beliefs and behaviours in relation to PA and PARS. An *a priori* G-power analysis indicated that 64 participants were needed to have an 80% power for detecting a medium-sized effect with a statistical significance criterion level of 0.05.

3.3.1.1.1 Survey Instrument Development

The survey instrument (Appendix B) was developed based on pertinent issues related to PA and PARS identified from previous reviews (Albert et al., 2020a, 2020b) and adapted from a previously validated PA questionnaire (Lorig & Laurent, 2007). A panel of reviewers and health professionals involved with PA and PARS ascertained the content validity of the survey. Also, the reliability of the instrument's items and scales were established by inter-item correlations and internal consistency reliability indexes. The questionnaire was then pilot tested on 20 participants.

3.3.1.1.2 Participant Recruitment and Data Collection

Participants were Australian patients (18 years and above) with chronic diseases, who have been involved in PARS. A maximum variation purposive sampling technique was used to recruit participants through online fora including Facebook, Twitter and participants' health affiliations or organisations. The researcher (FAA) sent the survey link or printed copies (if preferred) through a health organisation's representative to participants. Anonymous survey responses were collected via online Survey Monkey® (by SVMK Inc.) from November 2019 to July 2020. Responses were promoted by reminders and a chance to win one of 25 \$20 gift vouchers incentive. An optional last question on the survey was used to recruit interview participants.

3.3.1.1.3 Quantitative Data Analysis

Quantitative data were analysed using SPSS software version 26. Descriptive and non-parametric (Mann-Whitney U and Kruskal Wallis) inferential statistical tests were used to analyse the survey data. Given that this study focused on assessing the quality of patient care in PARS, it was essential to examine the different PARS referral mechanisms and how these impact on uptake and intervention outcomes. Thus, participants were categorised into the following three PARS referral mechanism groups: Those referred to PARS by GPs (GP group), themselves (Self-initiated group) and other health care professionals (Other HCPs group). Data were presented as frequencies and means \pm SD and the alpha value was set at 0.05.

3.3.1.2 Qualitative Phase

The qualitative phase involved purposive sampling of consenting participants from the survey and utilised semi-structured questions (Appendix B) for the collection and analysis of individual telephone interview data between August and September 2020. The interviews lasted between 21 to 50 minutes and allowed participants to freely share their PARS experiences (Sofaer, 1999).

3.3.1.2.1 Interview Protocol and Data Collection

Three pilot telephone interviews were conducted by FAA and the recordings were reviewed by BSM-A to ensure clarity of questions and accuracy of data. Trustworthiness and shared understanding were fostered through member-checking (summarizing interview accounts with each participant whilst still on the phone) (Shaw, 2010). Interviews continued until data saturation was reached (Clark & Creswell, 2005).

3.3.1.2.2 Qualitative Data Analysis

Interviews were audio-recorded, transcribed verbatim and de-identified before data analysis (Clark & Creswell, 2005). All data were imported into NVivo version 12 (QSR International

Pty Ltd., Victoria, Australia: 2018) to facilitate storage, coding and theme development. Inductive thematic analysis based on the tenets of Braun and Clarke (Braun & Clarke, 2006) was adopted and emerging themes were identified and independently confirmed by FAA and BSM-A. Discrepancies were resolved in a consensus meeting of team members. Participants were assigned with pseudonyms to maintain confidentiality and illustrative quotes were presented verbatim. The consolidated criteria for reporting qualitative research (COREQ) checklist (Tong et al., 2007) was used to guide the procedures used in the qualitative phase.

3.3.2 Triangulation of Quantitative and Qualitative Data

Triangulation was used to increase research rigour, validity and trustworthiness of the data (Tashakkori & Newman, 2013). Framework analysis which involved the application of the concept-driven Donabedian model of healthcare quality assessment (Donabedian, 1988) was utilised to integrate, synthesise and interpret the quantitative and qualitative findings.

3.4 Results

3.4.1 Quantitative Phase

There were one hundred and thirty-eight (138) survey responses, 111 of which were complete and analysed. Table 3.1 portrays the demographic characteristics of the participants. Respondents were predominantly females, obtained post-secondary education, retired, with more living in capital and regional cities than rural areas and their ages ranged from 20 to 81 years. Majority of the participants (57.6%) self-initiated their PARS referral compared to 32.4% whose referral were initiated by GPs and 10% by other HCPs. The typical reasons for referral were diabetes, overweight/obese and back pain, and 76.6% of respondents said they paid for PARS services.

Table 3.1: Descriptive characteristics of participants referred into PARS (N = 111)

| | GP | Self-initiated | Other HCPs | Total (%) |
|--|-----------|-----------------------|-------------------|------------------|
| Referrer | 36 | 64 | 11 | 111 (100) |
| Age (years) | | | | |
| ≤ 58 | 9 | 26 | 1 | 36 (29.7) |
| 59.00 – 67.00 | 12 | 24 | 6 | 42 (37.8) |
| ≥ 68 | 15 | 14 | 4 | 33 (32.4) |
| Gender | | | | |
| Female | 24 | 31 | 7 | 62 (55.9) |
| Male | 12 | 33 | 4 | 49 (44.1) |
| Education | | | | |
| Secondary | 11 | 26 | 6 | 43 (38.7) |
| Post-secondary | 25 | 38 | 5 | 68 (61.3) |
| Work Status | | | | |
| Unemployed | 2 | 7 | 1 | 10 (9.5) |
| Employed | 9 | 24 | 3 | 36 (34.3) |
| Retired | 24 | 28 | 7 | 59 (56.2) |
| State/Territory | | | | |
| New South Wales | 21 | 19 | 3 | 43 (38.7) |
| Queensland | 4 | 22 | 5 | 31 (27.9) |
| Victoria | 5 | 11 | 3 | 19 (17.1) |
| South Australia | 4 | 10 | 0 | 14 (12.6) |
| Australian Capital Territory | 1 | 1 | 0 | 2 (1.8) |
| Western Australia | 1 | 1 | 0 | 2 (1.8) |
| Environment (Location) | | | | |
| Capital city | 14 | 30 | 2 | 46 (41.4) |
| Regional | 15 | 22 | 6 | 43 (38.7) |
| Rural | 7 | 12 | 3 | 22 (19.8) |
| Source of PA knowledge | | | | |
| Allied health personnel | 22 | 48 | 8 | 78 (70.3) |
| General practitioner | 20 | 43 | 6 | 69 (62.2) |
| Internet | 21 | 29 | 8 | 58 (52.3) |
| Books, Newspapers & Magazines | 19 | 22 | 4 | 45 (40.5) |
| Family and friends | 15 | 24 | 2 | 41 (36.9) |
| Television | 12 | 19 | 4 | 35 (31.5) |
| Clubs, Groups or Lectures | 9 | 17 | 1 | 27 (24.3) |
| Nurse | 5 | 10 | 1 | 16 (14.4) |
| Personal trainer | 3 | 3 | 2 | 7 (6.3) |
| Reason for referral | | | | |
| Diabetes | 24 | 31 | 7 | 65 (58.6) |
| Overweight/obese | 18 | 26 | 3 | 47 (42.3) |
| Back pain | 10 | 28 | 4 | 42 (37.8) |
| Arthritis | 9 | 18 | 3 | 30 (27.0) |
| Sedentary/Inactive | 10 | 15 | 2 | 27 (24.3) |
| Mental health | 7 | 14 | 0 | 21 (19.1) |
| Rehabilitation | 3 | 6 | 3 | 12 (10.8) |
| Coronary heart disease | 4 | 5 | 0 | 9 (8.1) |
| Cancer | 1 | 4 | 2 | 7 (6.3) |
| Smoking | 1 | 2 | 0 | 3 (2.7) |
| Alcoholic | 1 | 1 | 0 | 2 (1.8) |
| Payment for referral pathway services | | | | |
| Patient paid | 32 | 44 | 9 | 85 (76.6) |
| Health Insurance | 1 | 13 | 0 | 14 (12.6) |
| Free | 3 | 7 | 2 | 12 (10.8) |

3.4.1.1 Participants' Attitudes to PARS

As shown in Table 3.2, participants visited a GP at least once a year and the majority (67.6%) of participants reported receiving PA or PARS advice from their GP between one and three times in the last 12 months. However, more than half of the participants (59.5%) said they had initiated the conversation and the three likely situations in which this discussion took place included when: treating a health problem (65.8%), maintaining their health (55.9%) and improving their quality of life (38.9%). When participants were asked about attendance (how often they participated in PA interventions), most participants (85%) underlined three (3) or more times per week. Regarding the duration of PA interventions, the majority (80%) of survey responders indicated that the programme lasted between 5 to 10 weeks. On barriers, only 5 participants responded to the question on personal barriers.

Table 3.2: Participants' attitudes to PA and PARS

| | GP | Self-initiated | Others | Total (%) |
|--|-----------|-----------------------|---------------|------------------|
| Visits to doctor in the last 12 months | | | | |
| Greater than 6 times per year | 10 | 20 | 3 | 33 (29.7) |
| 4 – 6 times per year | 13 | 25 | 5 | 43 (38.7) |
| 1 – 3 times per year | 13 | 19 | 3 | 35 (31.5) |
| Frequency of doctor's advice on PA/PARS in the last 12 months | | | | |
| At each visit | 4 | 8 | 0 | 12 (10.8) |
| 1 – 3 times | 18 | 49 | 3 | 75 (67.6) |
| Never | 14 | 7 | 8 | 24 (21.6) |
| PA conversation initiator | | | | |
| Me | 25 | 37 | 4 | 66 (59.5) |
| My doctor | 11 | 27 | 7 | 45 (40.5) |
| PA conversation situations | | | | |
| Treating a health problem | 24 | 43 | 6 | 73 (65.8) |
| Maintaining my health | 19 | 36 | 7 | 62 (55.9) |
| Improving quality of life | 10 | 28 | 5 | 43 (38.7) |
| Weight loss | 15 | 24 | 1 | 40 (36.0) |
| Reducing medication intake | 5 | 6 | 1 | 12 (10.9) |
| Reason for Taking part in PA | | | | |
| Healthy lifestyle | 26 | 42 | 7 | 75 (67.6) |
| Manage my disease condition | 28 | 35 | 8 | 71 (64.0) |
| Lose weight | 19 | 36 | 5 | 60 (55.6) |
| Enjoyment | 20 | 30 | 6 | 56 (50.5) |
| Relieve stress | 17 | 20 | 3 | 40 (36.0) |
| Socialize | 10 | 17 | 1 | 28 (25.2) |
| Hobby | 8 | 9 | 1 | 18 (16.2) |

3.4.1.2 Participants' PA Knowledge

Table 3.3 contains participants' scores on each of the seven knowledge questions. Overall, the Self-initiated group scored the least (76.8%) compared to the GP (82.5%) and other HCPs (79.2%) groups. Participants scored high on all the knowledge questions except one, where

they scored well below 50%. This question may have been misinterpreted as any activity that confers health benefits rather than recommended levels of PA. Mann-Whitney U test revealed a significant difference between the PA knowledge levels of females (Md =30, n = 62) and males (Md =25, n = 49), $U = 2019.5, z = 3.097, p = .002, r = 0.30$.

Table 3.3: Participants’ PA knowledge

| | GP (N = 36) % correct | Self-referred (N = 64) % correct | Other HCPs (N = 11) % correct |
|---|--------------------------------------|---|--|
| Physical activity is any movement that involves contraction of muscles? | 94.4 | 95.3 | 100 |
| Physical activity has to be high intensity to benefit health? | 91.7 | 79.7 | 81.8 |
| Climbing the stairs is a form of physical activity? | 100 | 100 | 100 |
| Exercise is form of physical activity | 100 | 98.4 | 100 |
| Physical activity is only beneficial if performed for at least 20 minutes at a time? | 80.6 | 60.9 | 81.8 |
| The recommended PA for adults is at least 150 minutes low – moderate physical activity per week or 10, 000 steps per day? | 83.3 | 70.3 | 63.6 |
| Adults are encouraged to engage in 30 minutes of physical activity per week or 5000 steps per day to confer relevant health benefits? | 27.8 | 32.8 | 27.3 |
| Total percent score \pmSD | 82.5\pm25.3 | 76.8\pm24.4 | 79.2\pm26.6 |

3.4.1.3 Participants’ PA and PARS Beliefs

Participants’ PA and PARS beliefs are presented in Table 3.4. In eight of the ten Likert scale questions, over 55.6% of the participants either “Strongly agreed” or “Agreed” to the questions

asked. Kruskal-Wallis test was used to evaluate the influence of the referral mechanisms on participants' beliefs and showed a significant difference, $X^2(2, n = 111) = 6.55, p = .038$. The averaged sample rank results indicated that self-initiated group had stronger beliefs in PARS (62.7%) compared to those referred by other HCPs (47.3%) and GPs (46.8%). The self-initiated group (47.7%) strongly agreed that they do more PA now than pre-PARS referral compared to those referred by GPs (27.8%) and other HCPs (45.5%). However, participants referred by GPs (52.8%) strongly agreed that they had become more knowledgeable about the health benefits of PA compared to the self-initiated group (39.1%) and those referred by other HCPs (36.4%). When respondents were asked if their doctors had good PA and PARS knowledge, 53.7% of the self-initiated group, 34.4% of GP-referred and 33.3% of those referred by other HCPs agreed. Overall, participants (58.3% of GP-referred, 82.1% of self-initiated and 72.8% of those referred by other HCPs) indicated that they were pleased with the PARS support received.

Table 3.4: Participants' PA and PARS beliefs

| | GP N (%) | Self-referred N (%) | Other HCPs N (%) | Mean (SD) |
|--|--------------------|-------------------------------|----------------------------|------------------|
| Belief Questions | | | | |
| <i>Physical activity is beneficial to patients with lifestyle diseases</i> | | | | 4.59 (0.68) |
| Strongly agree | 30 (83.3) | 38 (59.4) | 6 (54.5) | |
| Agree | 3 (8.3) | 25 (39.1) | 4 (36.4) | |
| Neither agree nor disagree | 1 (2.8) | 1 (1.6) | 1 (9.1) | |
| Disagree | 1 (2.8) | 0 (0) | 0 (0) | |
| Strongly disagree | 1 (2.8) | 0 (0) | 0 (0) | |
| <i>Physical activity counselling is important in medical practice</i> | | | | 4.26 (0.85) |
| Strongly agree | 18 (50) | 27 (42.2) | 6 (54.5) | |
| Agree | 11 (30.6) | 30 (46.9) | 3 (27.3) | |
| Neither agree nor disagree | 4 (11.1) | 5 (7.8) | 2 (18.2) | |
| Disagree | 2 (5.6) | 2 (3.1) | 0 (0) | |
| Strongly disagree | 1 (2.8) | 0 (0) | 0 (0) | |
| <i>I have become more knowledgeable about the health benefits of physical activity</i> | | | | 4.22 (0.89) |
| Strongly agree | 19 (52.8) | 25 (39.1) | 4 (36.4) | |
| Agree | 12 (33.3) | 30 (46.9) | 5 (45.5) | |
| Neither agree nor disagree | 3 (8.3) | 7 (10.9) | 0 (0.0) | |
| Disagree | 1 (2.8) | 1 (1.6) | 2 (18.2) | |
| Strongly disagree | 1 (2.8) | 1 (1.6) | 0 (0) | |
| <i>I do more physical activity now compared to before I got referred for the programme</i> | | | | 3.75 (1.25) |
| Strongly agree | 10 (27.8) | 27 (47.7) | 5 (45.5) | |
| Agree | 7 (19.4) | 19 (29.7) | 1 (9.1) | |
| Neither agree nor disagree | 9 (25.0) | 10 (15.6) | 1 (9.1) | |
| Disagree | 7 (19.4) | 7 (10.9) | 2 (18.2) | |
| Strongly disagree | 3 (8.3) | 1 (1.6) | 2 (18.2) | |
| <i>My doctor has the knowledge to tell me about physical activity or referral pathways</i> | | | | 3.18 (1.44) |
| Strongly agree | 8 (25) | 16 (29.6) | 0 (0) | |
| Agree | 3 (9.4) | 13 (24.1) | 3 (33.3) | |
| Neither agree nor disagree | 7 (21.9) | 10 (18.5) | 2 (22.2) | |
| Disagree | 6 (18.8) | 7 (13.0) | 3 (33.3) | |
| Strongly disagree | 8 (25.0) | 8 (14.8) | 1 (11.1) | |

| | | | | |
|--|-----------|-----------|----------|-------------|
| <i>Referral pathways for physical activity programme is vital in the management of patient with lifestyle diseases</i> | | | | 4.34 (0.85) |
| Strongly agree | 19 (52.8) | 37 (57.8) | 3 (27.3) | |
| Agree | 11 (30.6) | 19 (29.7) | 6 (54.5) | |
| Neither agree nor disagree | 4 (11.1) | 8 (12.5) | 0 (0) | |
| Disagree | 1 (2.8) | 0 (0) | 2 (18.2) | |
| Strongly disagree | 1 (2.8) | 0 (0) | 0 (0) | |
| <i>If my doctor discusses physical activity and referral pathways with me, this will encourage me to be active and adhere to prescribed programmes</i> | | | | 3.88 (1.07) |
| Strongly agree | 10 (27.8) | 21 (33.3) | 4 (40) | |
| Agree | 10 (27.8) | 30 (47.6) | 3 (30) | |
| Neither agree nor disagree | 8 (22.2) | 9 (14.3) | 1 (10) | |
| Disagree | 5 (13.9) | 2 (3.2) | 2 (20) | |
| Strongly disagree | 3 (8.3) | 1 (1.6) | 0 (0) | |
| <i>I value my doctor's advice about physical activity and referral pathways</i> | | | | 4.05 (1.12) |
| Strongly agree | 13 (36.1) | 33 (51.6) | 4 (40) | |
| Agree | 8 (22.2) | 22 (34.4) | 4 (40) | |
| Neither agree nor disagree | 5 (13.9) | 6 (9.4) | 1 (10) | |
| Disagree | 6 (16.7) | 3 (4.7) | 1 (10) | |
| Strongly disagree | 4 (11.1) | 0 (0) | 0 (0) | |
| <i>I am confident of my own physical activity abilities after the referral pathway programme</i> | | | | 3.99 (0.99) |
| Strongly agree | 11 (30.6) | 22 (34.9) | 6 (54.5) | |
| Agree | 12 (33.3) | 30 (47.6) | 2 (18.2) | |
| Neither agree nor disagree | 5 (13.9) | 9 (14.3) | 1 (9.1) | |
| Disagree | 7 (19.4) | 2 (3.2) | 2 (18.2) | |
| Strongly disagree | 1 (2.8) | 0 (0) | 0 (0) | |
| <i>I am pleased with the care and support I got from my exercise physiologists during the PA programme training</i> | | | | 4.11 (1.07) |
| Strongly agree | 12 (33.3) | 35 (55.6) | 4 (36.4) | |
| Agree | 9 (25) | 23 (36.5) | 4 (36.4) | |
| Neither agree nor disagree | 8 (22.2) | 3 (4.8) | 1 (9.1) | |
| Disagree | 5 (13.9) | 2 (3.2) | 0 (0) | |
| Strongly disagree | 2 (5.6) | 0 (0) | 2 (18.2) | |

3.4.1.4 Perceived Benefits, Barriers and Recommendations about PARS

As shown on Table 3.5, participants viewed patient-reported improved health outcome (64.9%), presence of objectively measured outcome (55.9%) and reduced work burden on doctors (e.g., GPs) (34.2%) as the major benefits of PARS. The highest ranked barrier to PARS was the undervaluing of PA support services (50.5%), followed by scarcity of referral pathways (43.2%) and the lack of knowledge about referral pathways (36.9%). Participants' recommendations for improved PARS effectiveness included improved visibility of EPs (58.6%), ongoing interactions between GPs and EPs (58.6%) and education about referral pathways (55.9%).

Table 3.5: Perceived benefits, barriers, and recommendations about PARS (N = 109)

| | | Frequency (%) |
|-----------------|--|----------------------------|
| Benefits | Patient-reported improved health outcome (improved health condition due to PA programme) | 72 (64.9) |
| | Presence of objectively measured outcome (The health gains can be measured) | 62 (55.9) |
| | Reduces the work burden placed on doctors/GPs | 38 (34.2) |
| Barriers | Physical activity support services are highly undervalued | 56 (50.5) |
| | Scarcity of referral pathways | 48 (43.2) |
| | Lack of knowledge on referral pathways | 41 (36.9) |
| | Lack of reference materials | 39 (35.1) |
| | Lack of financial incentive | 28 (25.2) |
| | Lack of national collective goal or coordination process on referral pathways | 24 (21.6) |
| | Recommendations | Improved visibility of EPs |
| | Ongoing interactions between GPs and EPs | 65 (58.6) |
| | Education about referral pathways | 62 (55.9) |
| | Easily accessible or ease of use of PARS | 61 (55.0) |
| | An overview of available referral pathways | 43 (38.7) |
| | Workbook function and process (problem or disease and the optimum process of management) | 28 (25.2) |
| | Financial incentives or subsidies for patients | 8 (7.2) |

3.4.2 Qualitative Phase

Fifteen participants comprising 12 females (80%) and 3 males (20%) participated in the interviews. Three overarching themes including (i) bottlenecks with the PA referral pathway (ii) experiences with GPs and (iii) experiences with EPs and eight (8) sub-themes including (i) scarcity/low visibility of PARS (ii) cost (iii) GP attitude (iv) time (v) lack of knowledge (vi) adequate support (vii) improved health outcomes and (viii) self-seeking information were identified and related to the three aspects (structure, process and outcomes) of the Donabedian quality of care model. A detailed description of the themes and sub-themes is provided below.

3.4.2.1 Bottlenecks with the PA referral pathway – PARS Structure

The participants reported two major bottlenecks in relation to the structure of PARS which limited the effectiveness of the PA referral pathway. These included: scarcity/low visibility, and cost of PARS.

3.4.2.1.1 Scarcity/Low Visibility of PARS

Participants acknowledged the prophylactic effects of PARS interventions but lamented about the current scarcity, under-utilisation and poor/non-existent promotion of the programme.

“I don't think I've ever seen any sort of advertising or promotion of exercise physiologists as health professionals who might be able to make a difference for you. And as said I sort of regard them as a bit of preventative health rather than a lot of the other things that are promoted” (KR 60).

3.4.2.1.2 Cost

Participants also perceived cost to be a hindrance to their PARS uptake. To ease the burden of cost and promote PARS uptake, the Australian government has provided some incentives to participants through the Medicare health scheme. Patients with chronic disease(s) can access five free sessions per year to see any AHP of their choice through the Enhanced Primary Care

(EPC) system. However, participants felt these sessions were too few to be split among all the essential AHP services they required.

“The only problem is it doesn't cover [much], if I was to go on a GP management programme with a pain care arrangement, I could only have five sessions to the gym in any calendar year. That would exclude me from all of the other things that I would need, like podiatry, dieticians and all of that. If somebody has multiple co-morbidity, and needs complex care and management, five is just not going to do it and for a person receiving a limited income or superannuation type pension or aged care pension or DDA pension, its cost prohibitive” (DM 70).

3.4.2.2 Experiences with GPs - PARS Process

Participants' perceptions about their experiences with GPs were categorised into three sub-themes including the attitude, time constraints and the lack of knowledge of PA and PARS exhibited by GPs and these were also considered as barriers to the PARS process.

3.4.2.2.1 GP Attitude

Participants claimed that the lack of support from GPs is a significant hindrance for taking up PARS interventions, particularly when seeking approval to participate in the programme.

“I had to take a form in to give to the doctor to get the doctor to sign off each time we do these courses for the four times that I did the ‘Beat It’ programme, one that I went to and told him “I need you to fill this”, he goes “what do you need to do this for?” all you need to do is get out there and do a bit more walking and exercise, you don't need to go to this rubbish. I thought what... just couldn't believe it, fortunately, I disregarded this person when they said things like this. Anyway, He filled it out for me but the attitude when I went to get the form filled was incredible” (RS 65).

3.4.2.2.2 Time Constraints

Respondents saw PARS as a useful programme which depends on GPs being the gatekeepers. However, they indicated that the short consultation time slots constitute a barrier to effective discussion. They suggested that a designated HCP such as a nurse could help drive the process.

“No, I think the programme is good, it really does rely on general practitioners driving this and they're not going to be able to drive this if they are doing the seven-minute consultations, that's what a GP does. You know, they really do need to spend time and you know, a registered nurse as part of a GP practice can drive some of it” (BR 65).

3.4.2.2.3 Lack of Knowledge

Participants mentioned that GPs are generally limited in their knowledge of the role of EPs.

“No, it's pretty pointless talking to your GP because they are just as uneducated as the specialists are, they will refer to a physio and that's about as far as you can get. EPs are not even on the map” (KS 64).

3.4.2.3 Experiences with EPs - PARS Outcomes

In response to the question on past PA experiences, participants' views generally indicated that they used to be involved in varied forms of PA (i.e., took part in sports, gym activities or walking). A few of them stated that they were inactive or did non-structured PA activities (such as carrying out house chores like gardening). When asked about their motivation to attend the PARS programme, responders' perceptions generally revealed that they wanted to improve their health and wellness or give the programme a try because it was available. Participants' perceptions about their experiences with EPs were categorised into three 3) sub-themes (adequate support, improved health outcomes and self-seeking information) which related to PARS outcomes.

3.4.2.3.1 Adequate Support

Respondents felt they were adequately supported by EPs and found the instructions from the PARS programme helpful in achieving their goals and correcting habitual shortcomings.

“The benefit for me was that it got me going and this our exercise physiologist took us on as a group and but also as individuals. Very good instructions, I think I was about 61 years of age when I started, and it turned out I wasn't walking properly and I was taught how to walk properly” (AN 62).

3.4.2.3.2 Improved Health Outcomes

Participants indicated that PARS was well organised, beneficial and improved their health outcomes remarkably.

“I know they make a big difference to my outcomes. My health outcome, my comfort outcome and so it led me to do them at home even. It's been positive. When I went back to the surgeon for a check-up, He did his stuff you know his tests and then he looked at me and he said, what have you been doing? And I thought, oh, my God, I've done too much, I have damaged something, whatever. And so I told him and told him all the exercises that I'd taken up boxing, which was actually on the advice of the EP. And he basically said to me at the time that the level of healing that I had at the three-month point was what he would normally expect to see after 12 months” (KS 64)

3.4.2.3.3 Self-seeking Information

Nonetheless, many participants felt the low visibility of PARS and the poor support and knowledge exhibited by their GPs affected their ability to access and take up PA referrals on time. They had to self-seek PARS information and EP services and thought the benefits of the programme would have been maximised if commenced earlier. *“I didn't really get any information, from the GP but rather I gave it to him. Yeah, I suppose I just approached the GP*

and said, look, this is what I want to do. This is who I want to do it with. This is where I want to do it. This is how it can be funded. And he said, okay. So, he completed the veteran healthcare form” (DR 69).

“From even before I started, I said in my head, I thought this will help me and it did pretty well. But they would have been incredibly helpful early on” (AL 65)

3.4.3 Triangulation/ Integration of Findings

Integration and synthesis of the qualitative interview findings and quantitative survey results as aligned with the Donabedian theoretical framework is summarised in Table 3.6.

Table 3.6: Triangulation of study findings embedded within the Donabedian quality of care model

| Donabedian aspect of care (Overarching theme) | Sub-themes | Quantitative findings | Qualitative findings | Synthesis of Findings |
|---|--|---|--|---|
| PARS Structure (Bottlenecks with the PA referral pathway) | | | | |
| | <i>Scarcity/Low visibility of PARS</i> | Participants scored high on all of the PA knowledge questions (GP-referred – 82.5%, Self-initiated referral - 76.8% and those referred by other HCPs – 79.2%), this was however insufficient to motivate referrals into PARS. | Some participants lamented the lack of PARS promotion “ <i>I don't think I've ever seen any sort of advertising or promotion of exercise physiologists as health professionals who might be able to make a difference for you. And as said I sort of regard them as a bit of preventative health rather than a lot of the other things that are promoted</i> ” (KR - 60). | This implies that patients have good knowledge of PA but not enough to motivate PARS referral. Thus, enhancing the availability of PARS information and making it more accessible could improve its functionality and improve health outcomes for patients. |
| | | | Other participants expressed disappointments with the lack of visibility and difficulty with accessing PARS “ <i>There is no referral pathway here in XXX to go from GPs to exercise physiologists. It just would be good if we had these specialist people in the regional towns</i> ” (NT - 51). | |
| | <i>Cost</i> | Participants (76.6%) indicated that they paid for PARS services. | Respondents viewed cost as a hindrance to their PARS uptake and effectiveness despite the Australian Government’s incentives. “ <i>The only problem with that is, it doesn't cover, is only five, if I was to go on a GP management programme with a pain care arrangement, I could only have five sessions to the gym in any calendar year. And then that would exclude me from all of the other things that I would need, like podiatry, dieticians and all of</i> | Increasing current PARS incentives and making the programme more affordable for patients could improve uptake and enhance patients’ health outcome. |

| | | | | |
|--|--------------------|---|--|--|
| | | | <i>that. Somebody is got multiple co-morbidity, and needs complex care and management, five is just not going to do it and if a person receiving a limited income or superannuation type pension or aged care pension or DDA pension, its cost prohibitive” (DM - 70).</i> | |
| | | | Other participants reiterated the burden of cost although paid out of pocket for PARS services due to their perceived value for the programme. <i>“I would say as you're getting older cost is a thing and let's face it, prevention is far better than cure. So, for me, it's an investment, so I'm prepared to pay but there is a limit to what I can pay” (LR 61)</i> | |
| PARS Process (Experiences with GPs) | | | | |
| | <i>GP attitude</i> | The highest-ranked barrier to PARS was the undervaluing of PA support services (50.5%). | Participants felt the attitudes of GPs hindered the uptake of PARS <i>“I had to take a form in to give to the doctor to get the doctor to sign off each time we do these courses for the four times that I did the ‘Beat It’ programme, one that I went to and told him “I need you to fill this”, he goes “what do you need to do this for?” all you need to do is get out there and do a bit more walking and exercise, you don't need to go to this rubbish. I thought what... just couldn't believe it, fortunately, I disregarded this person when they said things like this. Anyway, He filled it out for me but the attitude when I went to get the form filled was incredible” (RS - 65).</i> | Educating key stakeholders (e.g. patients and GPs) on the values of PARS, how to access the programme and the efficient promotion of PARS could increase the functionality of PARS and increase the gains for optimum patient health outcomes. |
| | | | Other respondents claimed GPs are sometimes not keen to refer them to PARS <i>“I refer myself everywhere, like I do an MRI just to see what my brain looks like. The doctors won't refer you anywhere, because I've got a feeling, GPs don't want to bring up exercise, they want to bring up diet. But they don't want to bring up exercise because I have a suspicion, they don't do any themselves” (SM – 63).</i> | |

| | | | | |
|---|---------------------------------|---|---|--|
| | <i>Time constraints</i> | Participants viewed the reduction of the burden of work placed on GPs as one of the benefits of PARS. | Some participants expressed that GPs might lack adequate time to drive the PARS process <i>“No, I think the programme is good, it really does rely on general practitioners driving this and they're not going to be able to drive this if they are doing the seven-minute consultations, that's what a GP does. You know, they really do need to spend time and you know, a registered nurse as part of a GP practice can drive some of it”</i> (BR - 65). | GPs are somewhat promoting PA but might lack time to drive PARS referral and follow-up their clients progress in the programme. This suggests that patients might have no choice but to seek other ways and means of referral to PARS to achieve their health and wellness goals. There is also the need to involve other gatekeepers in the referral process. |
| | <i>Lack of knowledge</i> | When asked if their doctors had good PA and PARS knowledge , respondents (43.8% of GP referred group; 53.7% of self-initiated referral group and 44.4% of other HCPs group) either “Disagreed” or “Strongly disagreed” | Some participants viewed that GPs might lack the knowledge to drive PARS <i>“No, it's pretty pointless talking to your GP because they are just as uneducated as the specialists are, they will refer to a physio and that's about as far as you can get. EPs are not even on the map”</i> (KS - 64). | Further information into ways to increase PARS accessibility for patients and the need to further PA and PARS understanding among key HCPs like GPs will be valuable. |
| PARS Outcomes (Experiences with EPs) | | | | |
| | <i>Adequate support</i> | Respondents “Strongly agreed” or “agreed” that they enjoyed good support from the PARS programme (GP-referred – 58.3%, Self-referred – 82.1% and those referred by other HCPs – 72.8%. | Respondents reportedly enjoyed the support they got from PARS <i>“The benefit for me was that it got me going and this our exercise physiologist took us on as a group and but also as individuals. Very good instructions, I think I was about 61 years of age when I started, and it turned out I wasn't walking properly and I was taught how to walk properly”</i> (AN - 62). | Seeking patients’ views on ways to provide practical PARS support, and their preferred referral mechanism could facilitate uptake, adherence and ultimately improve patient health outcomes. |
| | <i>Improved health outcomes</i> | Respondents viewed patient-reported improved health outcome (64.9%) and the presence of objectively | Participants recorded positive outcomes by participating in PARS | If used to its full capacity, PARS could be a useful tool in the public health toolbox to manage PIA and chronic diseases. |

| | | | | |
|--|---------------------------------|---|--|---|
| | | measured outcome (55.9%) as the top two benefits of PARS. | <p><i>“I know they make a big difference to my outcomes. My health outcome, my comfort outcome and so it led me to do them at home even. It’s been positive. When I went back to the surgeon for a check-up, He did his stuff you know his tests and then he looked at me and he said, what have you been doing? And I thought, oh, my God, I’ve done too much, I have damaged something, whatever. And so I told him and told him all the exercises that I’d taken up boxing, which was actually on the advice of the EP. And he basically said to me at the time that the level of healing that I had at the three-month point was what he would normally expect to see after 12 months” (KS 64)</i></p> <p><i>“The exercises that were offered to me were very suitable to what I wanted, and I ascertained that initially I didn’t find them very easy, not very hard. But, you know, it was a good level that I was put on and I become fitter and stronger as the levels increased. It was very well organised. They were clear and obviously from even before I started, I said in my head, I thought this will all help me, and it did pretty detailed” (AL - 65).</i></p> | |
| | <i>Self-seeking information</i> | Participants visited a doctor at least once a year and the majority (67.6%) of participants reported receiving PA or PARS advice from their doctor between one and three times in the last 12 months. However, more than half of the participants (59.5%) said they had initiated the conversation. | Participants expressed their frustration with the lack of PA and PARS information among their GPs <i>“I didn’t really get any information, from the GP but rather I gave it to him. Yeah, I suppose I just approached the GP and said, look, this is what I want to do. This is who I want to do it. This is where I want to do it. This is how it can be funded. And he said, okay. So, he completed the veteran healthcare form” (DR – 69).</i> | Patients could serve as crucial drivers of the PARS programme, enhancing its accessibility and effectiveness, if duly informed and supported. |
| | | | Some respondents felt their outcome would have been better if they knew early enough about PARS <i>“From even before I started, I said in my head, I thought this will help</i> | |

| | | | | |
|--|--|--|---|--|
| | | | <p><i>me and it did pretty well. But they would have been incredibly helpful early on” (AL - 65)</i></p> <p>Others urged the government to improve its support for PARS due to the programme’s preventative benefits <i>“Government should really do a bit more for they call it preventive methods, because they spend so much money on the medical side, but that's too late when [patients] are sent to the hospital, it's too late. So, it's a big gap” (LD 62)</i></p> | |
|--|--|--|---|--|

3.5 Discussion

This study adds to previous work by adopting a theoretically informed and comprehensive mixed methods design to investigate patients' perspectives on PARS effectiveness. Utilising the Donabedian model for assessing the quality of care, quantitative survey results were integrated with qualitative interview findings to identify existing challenges and uncover better approaches to optimising PARS effectiveness. Both phases of this study highlighted that patients could be critical drivers of the PARS programme as evidenced by their high knowledge scores, strong PA beliefs and perceptions of PARS as invaluable. Nonetheless, this was not a sufficient motivational drive for uptake and adherence to PARS interventions due to barring obstacles like the cost of EP services, inadequate support and paucity of PARS knowledge among frontline HCPs like GPs. Participants' reported perceptions of HCP influence and obstacles to PARS functionality in the current study substantiate previous findings by Albert et al. (2020a) and Birtwistle et al. (2019).

The participants identified major issues in relation to the current structure (resources and access to healthcare delivery) of PARS that limited its effectiveness. Participants reported that the cost and low visibility (scarcity) of PARS hindered its uptake and accessibility. They complained about the exorbitant out-of-pocket costs for PARS programmes and that the five free EPC sessions were insufficient. Increasing current incentives and making PARS more affordable for patients could help resolve this problem. Furthermore, more promotion and longer follow-up are required to achieve desirable PA behavioural change, sustain long-term gains and increase PARS effectiveness (Orrow, et al., 2012; Pahor et al., 2014).

Exploring the PARS process (actions of providers in diagnosis, treatment and cycle-of-care) showed that the attitudes, time constraints and lack of PARS knowledge exhibited by the main PARS gatekeepers (GPs) hinder the programme's success. Examining patients' attitudes in the quantitative phase highlighted that although GPs advise patients on PA, this discussion is often

initiated by the patients themselves. Qualitative results indicated that most interviewees are the PARS information source to GPs, which ideally, should be the other way round. Their experiences with GPs further signalled that they are frustrated by the weak support from GPs to take up PARS referrals and the absence of PARS promotion. This finding signifies that patients could foster the accessibility and effectiveness of the PARS process, if they are duly informed and supported (Angwenyi et al., 2019). Similarly, participants perceived the undervaluing of PA support services as the major hindrance to the success of PARS in the quantitative phase. This implies that relying on GPs to drive the PARS process would not suffice to enhance its effectiveness. Thereby, emphasising the need to seek other ways (e.g. empowering nurses) to proactively disseminate information about PARS that will be far-reaching to the general public to facilitate and improve PARS visibility and effectiveness (Albert et al., 2020b; NICE, 2014). Additionally, EPs could be more proactive in educating and engaging with other HCPs such as GPs, to improve their inter-professional relationship and disseminate information about EPs' roles within the healthcare system.

Concerning the PARS outcome, quantitative results indicated that over half of the participants found PARS supportive. This finding was corroborated in the qualitative results as participants valued the support (such as correcting working posture) they got from PARS and wished they had discovered the initiative early enough to reap its full benefits. Survey results on the benefits of PARS showed that over half of the participants perceived the programme to be crucial to achieving their health and wellness goals. This outcome was confirmed in the interviews, where participants stated that PARS interventions were appropriate for their needs and effective in meeting their health and wellness goals. The participants urged the government to increase its support for PARS to foster its citizens' wellbeing, minimize treatment cost for lifestyle diseases and reduce the burden on the healthcare system. Thus, if used in good time and to its maximum capacity, PARS could be a useful tool in the public health toolbox to

manage PIA and chronic diseases (Dugdill et al., 2005). Patients' perceptions about PARS' structure, process and outcomes have uncovered that minimizing structural and procedural obstacles including cost, accessibility, GPs' poor support, time constraints and lack of information could improve the programme's effectiveness.

This is the first conceptual theory-driven (Donabedian model) study that focuses on patients' perspectives on the effectiveness of PARS. Employing a sequential explanatory mixed methods design which ensured integration of both quantitative and qualitative study findings is another strength of this study. However, there are some drawbacks that could limit generalisability of the findings. The quantitative results were based on participants' self-reported data and there were few interviewees who may have participated due to their positive inclination towards PARS. Additionally, the study design restricted opinions to those Australian patients who have used the services of EPs and GPs. Furthermore, patients' views (including those who have used the services of other HCPs) in different settings were excluded.

3.5.1 Implications for Practice and Research

This study contributes to existing knowledge and evidence on the mechanisms to improve the effectiveness of PARS programmes. PARS administrators including EPs, could translate this study's findings into practice by enhancing the awareness of EPs' roles and services, increasing visibility and facilitating more effective mechanisms of referral into PARS. This study could also inform policy on how patients seek clearance to take up PA referral programmes and help such patients to determine their referrals choice and type of intervention that best suits their health and wellness needs. Similarly, increasing the free EPC sessions can motivate patients to continue the PARS programme and augment current gains. Studies on the relationship between the PARS referral mechanism and its effect on crucial PARS performance indicators, especially from other settings, are needed. Additionally, future studies that explore the views

of HCPs (GPs and EPs) on the functionality of PARS are required to have a complete picture of the programme.

3.6 Conclusion

This study demonstrated that considerable potential exists for other effective forms of referral pathways into PARS (e.g., patient self-initiated referrals). Patients displayed good general PA knowledge, strong beliefs and perceived PARS to be useful. Effective management of the perceived obstacles in the interplay between the structure, process and outcomes of PARS could be pivotal in enhancing the programme's success. Therefore, to foster PARS' functionality, promotional strategies that will facilitate the visibility and accessibility of PARS and distinctively attract patients' attention could be invaluable. Finally, early PA interventions and efficient information sharing between HCPs and patients should be promoted for better decision making, patient empowerment and enhanced health outcomes.

The findings from this study revealed patients' perspectives on quality care and ways to improve the success of PARS. Given the importance of shared decision making between patients and HCPs, it is important to explore the views of Australian HCPs to ascertain the similarities and divergence in these stakeholders' views. This holistic approach may foster in-depth understanding of the difficulties limiting the PARS programme's performance and proffer solutions on how to overcome them. Therefore, it became vital to investigate the opinions of GPs and EPs to better comprehend coordination of care and interprofessional relationships within the Australian context. These results provided a Segway to the study presented in **Chapter 4** of this thesis.

Chapter FOUR: Optimising Care Coordination Strategies for Physical Activity

Referral Scheme Patients by Australian Health Professionals

4.1 Chapter Overview

Abstract

Physical activity (PA) has been identified as an essential tool for the prevention and management of multi-morbidity in patients. Coordination of patients' care through interventions like physical activity referral schemes (PARS) could foster the utilization of PA. To explore the views of General Practitioners (GPs) and Exercise Physiologists (EPs) as key stakeholders, for optimizing patient care and efficiency of PARS. Sequential explanatory mixed methods design was used to explore the perceptions of health professionals on PA and coordination strategies for PARS patient care. Data analyses included descriptive and inferential statistics for questionnaires and theoretical framework analysis for the semi-structured interviews. Participants demonstrated a good knowledge of PA and valued PARS. However, the findings unravelled external factors, inter-organisational mechanisms, and relational coordination obstacles that hinder efficient coordination of PARS patient care and delay/limit beneficial health outcomes for patients. Incentivising the PARS initiative and empowering patients to seek referral into the programme, are strategies that could boost PARS efficiency. Improving inter-professional relationships between GPs and EPs could lead to enhanced PARS functionality and efficient coordination of care for patients with chronic diseases.

4.2 Introduction

Globally, chronic diseases are the leading risk factors for disability and mortality (Vos et al., 2020). Three out of every five deaths are attributed to chronic conditions including cardiovascular disease, cancer, chronic lung disease and diabetes (Wang et al., 2016). Research has linked numerous chronic diseases to the lack or shortage of physical activity (PA) and urged its promotion (Berra et al., 2015; WHO, 2019; Pedersen & Saltin, 2015). To enhance PA, myriads of integrated care programmes, including physical activity referral schemes (PARS) that support and promote PA to patients through interprofessional collaboration among health professionals, have been developed in various settings across the world (Hillsdon et al., 2005; Van Dijk-de Vries et al., 2016; Catherine Woods et al., 2016). In Australia, one of such pathways is the Medicare-funded chronic disease management (CDM) plan, where patients with chronic diseases can access rebates for five sessions per year with any allied health professionals (AHPs) of their choice, including exercise physiologist (EPs) (Cant & Foster, 2011). Australian patients need a formal GP referral to access these rebates and would have to pay out of pocket or a combination of out-of-pocket cost and private health insurance for subsequent sessions if they exhaust their rebatable sessions within a year (Foster et al., 2015). Over 90% of Australians see a GP at least once a year (Britt et al., 2015), and about half of these patients have multimorbidity (Harrison et al., 2017). Leveraging on GPs' accessibility to patients and complimenting it with the expertise of PA specialists like EPs could help reduce the rising cases of chronic and complex disease conditions (Livingstone et al., 2015).

However, current evidence calls into question the effectiveness of care coordination between health professionals. This is ascribable to time constraints, lack of knowledge, shared understanding of common goals and role clarity, cost implications and weak collaborations influenced by organisational culture and structure (Abu-Rish et al., 2012; Al Sayah et al., 2014; Albert et al., 2020b; McInnes et al., 2015; Schweizer et al., 2017). For example, studies on the

coordination of care for patients have shown that the stewardship of some health professionals such as GPs is essential (Nolte et al., 2016). However, these doctors may not feel obliged to coordinate patient care or be part of the healthcare team (Skrove et al., 2016). Similar issues could be hindering the functionality of PARS, considering that this programme is a typical example of coordinated care. For instance, studies have highlighted that including stakeholders like GPs in the design and development of PARS initiatives (Bird et al., 2019) and supporting them to promote the programme (Buckley et al., 2020) are critical to PARS success. Nonetheless, other studies have revealed that crucial decisions are taken by stakeholders involved in care coordination without inputs from GPs (Spehar et al., 2017). This suggests that health professionals' coordination of care for PARS participants warrants further exploration. Seeking health professionals' perspectives could aid amelioration of the identified bottlenecks in the structure and process of PARS, foster patients' health outcomes and the optimisation of inter-professional care coordination strategies.

Coordination of care through interprofessional collaboration could be enhanced by adopting care frameworks focused on the promotion of teamwork, interprofessional channels and fostering the health and wellbeing of the populace (Hansson et al., 2008; Loewenson & Simpson, 2017). A detailed assessment of care coordination frameworks led to the adoption of an emergent care coordination framework (Van Houdt et al., 2014). This framework pinpoints critical components of care coordination that promote responsiveness, service consolidation, and expertise for improved patient health outcomes (Van Houdt et al., 2014). The model (Appendix C) proposes that links between the functionality of healthcare interventions like PARS and key care coordination variables influence patients' health outcomes. The framework was employed in this study to aid in-depth understanding of the GPs and EPs' experience of care coordination for PARS patients and their perceived areas of contention in the coordinated care process.

Therefore, this mixed methods study employed an emerging care coordination framework to investigate the perceptions of Australian health professionals (GPs and EPs) regarding the coordination of care for PARS participants to determine effective ways to enhance the programme's efficacy. The hypothesis guiding this study is that Australian health professionals including GPs and EPs are knowledgeable and value PA and PARS interventions and as such effectively coordinating PARS care for their patients.

The study sought to answer the following research questions (RQs):

RQ1. What are Australian health professionals' knowledge, beliefs, and attitudes towards PA and PARS?

RQ2. What are Australian health professionals' views regarding the coordination of PARS care for participants and how to optimize the programme?

4.3 Methods

4.3.1 Study Design

A sequential explanatory mixed methods design guided by a pragmatic approach (Creswell & Clark, 2017) that included two study phases was used to answer the research questions. A general overview of the experiences (knowledge, beliefs, and attitude) of health professionals (GPs and exercise physiologists) in coordinating PARS care for patients was explored in the first (quantitative) phase of the study. In the second phase (qualitative), semi-structured interviews were conducted to understand participants' perception about care coordination through PARS. The findings from the quantitative phase of the study guided the development of the qualitative interview protocol and selection of participants for the qualitative phase.

Mixed methods design involves collecting, analysing and integrating of quantitative and qualitative data within the same study to answer specific research questions (Creswell & Clark, 2017). Combining both methods in a single study and triangulation of findings aided

comprehensive and critical analysis of health professionals' account of the complicated issues surrounding the coordination of patients' care via PARS (Creswell & Clark, 2017).

The ethical clearance for this study was secured from the Human Research Ethics Committee (HREC) of James Cook University (JCU) (Reference number: H7661). Designated health organisation representatives who assisted with participant recruitment were provided with the ethics approval details. Participants were further provided with the relevant information sheet, their privacy rights, and the possible benefits of the study. While keeping confidentiality and anonymity, electronic and verbal consents were sought from participants before the commencement of both phases of the study (Hewson & Buchanan, 2013).

4.3.2 Quantitative Phase

The first phase of the study answered RQ1 and utilised quantitative data collection and analytical techniques to examine GPs and exercise physiologists' (EPs) knowledge, beliefs and attitudes about PA and PARS. An *a priori* G-Power analysis (Faul et al., 2007) revealed that 64 participants per group was required to achieve 80% power for detecting a medium-sized effect at a 0.05 level of statistical significance.

4.3.2.1 Survey Development

A cross-sectional survey design was used to collect data from participants in this phase of the study. Issues identified from past PARS and care coordination studies informed the development and structure of the survey tool (Albert et al., 2020b; Wan et al., 2018). The questionnaire was subdivided into five sections: participant demographics, knowledge, beliefs, attitudes and recommendations for improved PA and PARS. Each section featured different types of questions including a 5-point Likert scale type (ranging from "1=Strongly disagree" to "5=Strongly agree") for the belief section, multiple-choice and dichotomous questions for the knowledge, PA behaviour and recommendation sections. For the dichotomous knowledge

of PA questions, each correct answer had a score of one (1), while a wrong answer had zero. Key stakeholders in PA and PARS including health professionals served as a review panel and verified the survey's content validity. The survey was pilot-tested on 15 randomly selected participants (10 EPs and 5 GPs) and the feedback was used to revise the survey items.

4.3.2.2 Data Collection

Data were collected electronically via Survey Monkey® (by SVMK Inc.) between November 2019 and August 2020. Eligible participants were GP or EP, above 18 years and registered to practice in Australia. Participants were recruited via their work affiliations (organisation or clinical settings where the GP or EP worked) and online fora including Twitter and Facebook. While GPs were recruited from clinical settings across Australia, EPs were mainly recruited via Exercise and Sports Science Australia (ESSA), the professional body for EPs. The first named author (FAA) facilitated and handled the correspondence for the recruitment application process. The process included the application and provision of an online survey link to participants or their affiliations. There was also an option of hard copies. To increase survey responses, reminder emails and incentives (a chance to win one of 10 \$100 or five \$200 gift vouchers) were used. Participants were assigned pseudonyms to protect their identity and were asked an optional question to request their participation in an interview.

4.3.2.3 Quantitative Data Analysis

Data management and analysis were performed using IBM's SPSS statistics software version 26. The survey data (including the pilot-tested data) were analysed using descriptive statistics (for the demographic, PA behaviour and recommendation data), cross tabulations (for knowledge data) and Mann-Whitney U (for the belief data) statistical tests. Participants were categorised into groups (GP and EP groups) based on their professional affiliation. Results were displayed as frequencies and means \pm SD and a p-value of ≤ 0.05 was considered significant.

4.3.3 Qualitative phase

Participants who agreed to participate in the qualitative phase were purposively selected (selecting a heterogeneous mix of respondents based on their survey responses, demographics, and availability to inform a greater understanding of the coordination of care in PARS referrals) to provide responses to RQ2. Semi-structured open-ended questions were then used to interview eligible participants between September and December 2020.

4.3.3.1 Qualitative Data Collection

A draft interview guide with open-ended questions based on the findings from the first stage of the study was pilot tested with five (5) participants (three EPs and two GPs) by the first author (FAA) and transcripts checked by another author (BSMA) to confirm the validity and suitability of the questions. The findings from the pilot test were used to refine the interview guide. Telephone interviews were used to explore participants' perceptions on coordination of care through PARS. Each interview commenced with a verbal acknowledgement of consent. Interviews continued until data saturation was achieved (Clark & Creswell, 2005).

Ten (10) semi-structured interview questions were used to explore participants' views about coordinating PARS care for patients who utilized the programme's services. Interview questions examined participants' perception of their roles in coordinating PARS referrals for patients, PARS knowledge, beliefs and attitudes, influences of other health professionals (GPs or EPs), perceived challenges and benefits of PARS and their thoughts on how to improve the effectiveness of the patient care coordination for PARS. Prompts and probes were developed concerning the interview topics, when necessary, to kindle further responses from participants. Telephone interviews lasted between 16 and 50 minutes.

The interviewer (FAA) concluded each interview with a summary of interview accounts to secure trustworthiness and mutual understanding between both parties (Shaw, 2010). Data

saturation was reached at the 22nd interview after which three more interviews were conducted, totalling 25 interviews. Pseudonyms were assigned to respondents to aid anonymity.

4.3.3.2 Qualitative Data Analysis

Before data analysis, interviews were audio taped, transcribed verbatim and identity information removed. Interview transcripts (including those from the pilot test) were imported into QSR International's NVivo version 12 for theoretical framework analysis. Framework analysis involves the screening, sorting, and charting of data based on crucial issues and themes (Srivastava & Thomson, 2009). The identified themes were then deductively mapped to the care coordination framework. Framework analysis was employed to help identify the factors that influence health professionals' coordination of PARS care and their perception of the programme's effectiveness. It involves a five-step process: (1) Reading and re-reading the textual data to familiarise with the data, (2) Identifying, devising, or refining a thematic framework to facilitate data analysis, (3) Indexing the data to corresponding themes, (4) Charting the identified themes (5) Mapping and interpreting the themes generated (Ritchie & Spencer, 2002). Information source triangulation, member checking, review and resolution of disconfirming evidence and researcher verification were used to secure the trustworthiness of the findings (Creswell, 2015). Two researchers (FAA and BSMA) independently coded the data and developed and mapped all themes against those of the care coordination model. Discrepancies regarding the addition, removal or refinement of codes and themes were resolved in a consensus meeting with all research team members. The protocols of the consolidated criteria for reporting qualitative research (COREQ) checklist helped guide the qualitative phase (Tong et al., 2007).

4.3.4 Triangulation of Quantitative and Qualitative Data

Framework analysis (Ritchie & Spencer, 2002) and the principles described by O'Cathain et al. (2010) facilitated the triangulation of the findings from both phases of this study. The

procedure involved (1) independently, analysing the findings and developing threads (themes) from each phase of the study, (2) linking the threads from the first to the second phase of the study, so that they could be interpreted together and (3) drawing overarching conclusions and meta-inferences by integration and refining the findings from both phases of the study (Almalki, 2016; Creswell & Clark, 2017; Curry & Nunez-Smith, 2014; Guetterman et al., 2015).

4.4 Results

Two hundred and thirty-eight (238) participants (121 GPs and 117 EPs) responded to the surveys. Thirty-one (31) incomplete survey responses (19 from GPs and 12 from EPs) were excluded, while 207 completed responses (including 105 from EPs and 102 from GPs) were analysed. This response rate exceeds the required 64 participants per group required from the statistical power analysis.

4.4.1 Quantitative Phase

Table 4.1 portrays the demographic characteristics of the two study participant groups, including age, gender, location, years of experience and the types of patients referred or received in PARS referrals. Two hundred and thirty-eight (238) participants (121 GPs and 117 exercise physiologists - EPs) responded to the survey. However, data from only the 207 participants who provided complete responses (including 105 from EPs and 102 from GPs) were analysed. Overall, there was an approximately equal representation of male (52%) and female (48%) respondents, with Queensland recording more participants than any other state across Australia. The EPs were younger in age (28 – 37 years) compared to the GPs (39%) who were mostly above 38 years of age. More participants lived in cities (43%) compared to regional (40%) and rural (17%) centres. EPs (37%) reported between two (2) to five (5) years of working experience, while GPs (39%) recorded above five (5) years of working experience. GPs and EPs identified similar patient conditions in relation to the top three four reasons for

referral (overweight/obese, diabetes, cardiovascular diseases and musculo-skeletal disorders). For GPs, the ranking order was overweight/obese (85%), diabetes (80%), cardiovascular diseases (79%) and musculo-skeletal disorders (64%), indicating that they mostly referred overweight or obese patients. For EPs, the ranking order was musculo-skeletal disorders (82%), overweight/obese (74%), diabetes (72%) and cardiovascular diseases (70%), indicating that they admitted more patients with musculoskeletal disorders (data not shown). For both groups, the least referred or admitted into PARS were older or frail patients (data not shown).

Table 4.1: Descriptive characteristics of participants (GPs and EPs) (N = 207)

| | GPs | EPs | Total (%) |
|---|--------------------|--------------------|------------------|
| Health professionals | N (%) 102 (100) | N (%) 105 (100) | 207 (100) |
| Age (years) | | | |
| ≤ 27 | 11 (11) | 40 (38) | 51 (24) |
| 28 – 37 | 31 (30) | 45 (43) | 76 (37) |
| ≥ 38 | 60 (59) | 20 (19) | 80 (39) |
| Gender | | | |
| Male | 59 (58) | 48 (46) | 107 (52) |
| Female | 43 (42) | 57 (54) | 100 (48) |
| State/Territory | | | |
| Queensland | 61 (60) | 40 (38) | 101 (49) |
| Victoria | 18 (18) | 24 (23) | 42 (20) |
| New South Wales | 2 (2) | 21 (20) | 23 (11) |
| South Australia | 16 (16) | 2 (2) | 18 (9) |
| Western Australia | 1 (1) | 12 (11) | 13 (6) |
| Other States/Territories (Australian Capital Territory, Tasmania, and Northern Territory) | 4 (3) | 6 (6) | 10 (5) |
| Environment (Location) | | | |
| Capital city | 48 (47) | 40 (38) | 88 (43) |
| Regional | 42 (41) | 41 (39) | 83 (40) |
| Rural | 12 (12) | 24 (23) | 36 (17) |
| Years of experience (years) | | | |
| < 2 | 44 (44) | 32 (31) | 76 (37) |
| 2 – 5 | 11 (11) | 39 (37) | 50 (24) |
| > 5 | 46 (45) | 34 (32) | 80 (39) |

4.4.1.1 PA/PARS Attitudes

As portrayed in Table 4.2, most participants (91%) indicated that they were involved in PA. A further assessment showed that 99% of the EPs were involved in PA, compared to 82% of the GPs. Additionally, 48% of the GPs reported being either inactive or below 150 minutes of PA per week, compared to only 10% of the EPs. Notwithstanding, the 1% inactive EP could be an artifact because the option “Not active” recorded a 0% score for EPs when asked about their exercise intensity. The three most common reasons participants gave for taking part in PA included healthy and lifestyle benefits (24%), to relieve stress (19%) and enjoyment (18%). EPs who considered PA as a hobby (55%), means of socialization (51%) or example to patients (46%) more than doubled the GPs (20%, 17% and 12%, respectively). Also, while 45% of GPs indicated that they took part in PA for weight-loss reasons, only 28% of EPs endorsed this point. Participants indicated that they referred (77% of GPs) or received (91% of EPs) patients via PARS. Pursuing this further in the method for patient referral, however indicated that over one third (32%) of these referrals were initiated by patients themselves (one in every three patients). Forty-four per cent (44%) of GPs indicated that they don't receive feedback from EPs on the patients they refer to them while the majority of EPs (91%) claimed the opposite (i.e., they provide feedback to GPs on the patients they received from them).

Table 4.2: Participants' PA/PARS Attitudes (N = 207)

| | GPs N (%) | EPs N (%) | Total (%) |
|---|---------------------|---------------------|------------------|
| Are you involved in PA? | | | |
| Yes | 84 (82) | 104 (99) | 188 (91) |
| No | 18 (18) | 1 (1) | 19 (9) |
| Minutes of PA per week | | | |
| Not active | 13 (13) | 1 (1) | 14 (7) |
| < 150 | 35 (35) | 9 (9) | 44 (22) |
| 150 – 299 | 31 (31) | 40 (38) | 71 (35) |
| ≥ 300 | 21 (21) | 55 (52) | 76 (37) |
| Intensity of PA | | | |
| Not active (≤ 1.5 METs) | 13 (13) | 0 (0) | 13 (6) |
| Low (1.6 - 2.9 METs.) | 9 (9) | 2 (2) | 11 (5) |
| Moderate (3.0 - 5.9 METs) | 55 (54) | 43 (41) | 98 (48) |
| Vigorous (≥ 6.0 METs) | 25 (25) | 59 (57) | 84 (41) |
| Reason(s) for taking part in PA | | | |
| Healthy lifestyle benefits | 79 (78) | 99 (94) | 178 (24) |
| Relieve stress | 54 (53) | 88 (84) | 142 (19) |
| Enjoyment | 46 (45) | 91 (87) | 137 (18) |
| Hobby | 20 (20) | 57 (55) | 77 (10) |
| Weight loss | 46 (45) | 29 (28) | 75 (10) |
| Socialize | 17 (17) | 53 (51) | 70 (9) |
| Example to patients | 12 (12) | 48 (46) | 60 (8) |
| Skill development/competition | 0 (0.0) | 9 (9) | 9 (1) |
| Patient referral via PARS | | | |
| Yes | 78 (77) | 95 (91) | 173 (84) |
| No | 23 (23) | 10 (9) | 33 (16) |
| Method of patient referral | | | |
| GP initiated (Referral letter) | 52 (51) | 63 (66) | 115 (58) |
| Patient initiated | 41 (41) | 23 (24) | 64 (32) |
| Within practice referrals | 9 (8) | 10 (10) | 19 (10) |
| Feedback to GPs on PARS intervention | | | |
| Yes | 56 (56) | 88 (91) | 144 (73) |
| No | 44 (44) | 9 (9) | 53 (27) |

4.4.1.2 PA Knowledge

As shown in Table 4.3, independent-samples t-test revealed a significant difference between the PA knowledge scores of GPs (80 ± 15.5) and EPs (90 ± 11.9), $t(157) = -5.4$, $p < 0.001$,

two-tailed). The magnitude of the difference in the means (mean difference = -3.70, 95% CI: -5.05 to -2.36) was moderate (eta squared = 0.13).

Table 4.3: Participants' PA knowledge (N = 207)

| | GPs | EPs | p-values |
|---|---------------|---------------|-----------------|
| Knowledge Questions | (N = 102) | (N = 105) | |
| | % Correct | % Correct | |
| Physical activity is any movement that involves contraction of muscles? | 75 | 92 | <0.001* |
| Physical activity has to be high intensity to benefit health? | 82 | 97 | <0.001* |
| Climbing the stairs is a form of physical activity? | 94 | 100 | 0.011* |
| Exercise is form of physical activity | 95 | 97 | 0.445 |
| Physical activity is only beneficial if performed for at least 20 minutes at a time? | 84 | 97 | 0.001* |
| The recommended PA for adults is at least 150 minutes low – moderate physical activity per week or 10, 000 steps per day? | 79 | 81 | 0.781 |
| Adults are encouraged to engage in 30 minutes of physical activity per week or 5000 steps per day to confer relevant health benefits? | 52 | 68 | 0.022* |
| Total percent score \pm SD | 80 \pm 15.5 | 90 \pm 11.9 | 0.0001* |

* $p < 0.05$

4.4.1.3 PA and PARS Beliefs

Generally, EPs reported slightly stronger beliefs in PA and PARS value than GPs (Table 4.4).

When participants were asked if they were confident in their ability to prescribe PA, 67% of GPs either strongly agreed or agreed, while 99% of EPs either strongly agreed or agreed. A

Mann-Whitney U test was calculated for all the total scores for the belief questions to determine the difference in the levels of belief between GPs and EPs. The results indicated that EPs are more agreeable with the statements about the value of PA counselling to their field of practice, health professionals' confidence in prescribing PA and PA benefits to their patients. GPs (Md =14, n = 102) and EPs (Md =20, n = 105) with a large effect size ($r = 0.85$), $U = 141.000$, $z = -12.289$, $p = .0001$.

Table 4.4: Participants' PA and PARS beliefs (N = 207)

| Belief Questions | GPs N (%) | EPs N (%) | Combined Mean score (SD) |
|---|---------------------|---------------------|---------------------------------|
| <i>Physical activity counselling is important in my field of practice</i> | | | 4.18 (0.76) |
| Strongly agree | 61 (57) | 81 (77) | |
| Agree | 40 (39) | 22 (21) | |
| Neutral | 1 (1) | 2 (2) | |
| Disagree | 0 (0) | 0 (0) | |
| Strongly disagree | 0 (0) | 0 (0) | |
| Mean group score (SD) | 3.59 (0.51) | 4.75 (0.48) | |
| <i>I am confident in prescribing PA to my patients</i> | | | 3.92 (1.26) |
| Strongly agree | 32 (31) | 91 (87) | |
| Agree | 37 (36) | 13 (12) | |
| Neutral | 24 (23) | 0 (0) | |
| Disagree | 7 (7) | 0 (0) | |
| Strongly disagree | 2 (3) | 1 (1) | |
| Mean group score (SD) | 2.88 (0.99) | 4.84 (0.50) | |
| <i>PA is beneficial to my patients</i> | | | 3.44 (0.83) |
| Strongly agree | 69 (68) | 98 (93) | |
| Agree | 32 (31) | 7 (7) | |
| Neutral | 1 (1) | 0 (0) | |
| Disagree | 0 (0) | 0 (0) | |
| Strongly disagree | 0 (0) | 0 (0) | |
| Mean group score (SD) | 3.67 (0.49) | 4.93 (0.25) | |
| p = 0.0001 | | | |

4.4.1.4 Perceived Benefits, Barriers and Recommendations about PARS

As displayed in Table 4.5, GPs and EPs identified similar reasons in their responses to the pre-set answers on their perceptions of the benefits of PARS (Patient-reported improved health outcome, presence of objectively measured output and reduced the work burden placed on doctors/GPs) respectively. For barriers, while most EPs (79%) saw the lack of knowledge on referral pathways as the main hindrance to the programme's functionality, GPs (50%) noted the scarcity of PARS as the main barrier. Again, while 55% of EPs viewed the lack of patient motivation to take up PARS as a key barrier, only 5% of GPs supported this statement. For recommendations, GPs indicated improved visibility of EPs whilst more EPs indicated ongoing interactions between GPs and EPs to improve referral programmes.

Table 4.5: Perceived benefits, barriers, and recommendations about PARS (N = 207)

| | | GPs N (%) | EPs N (%) | Total (%) |
|------------------------|--|---------------------|---------------------|------------------|
| Benefits | Patient-reported improved health outcome (improved health condition due to PA programme) | 76 (75) | 93 (90) | 169 (82) |
| | Presence of objectively measured outcome (The health gains can be measured) | 53 (53) | 76 (74) | 129 (62) |
| | Reduces the work burden placed on doctors/GPs | 44 (44) | 62 (60) | 106 (51) |
| Barriers | Lack of knowledge on referral pathways | 37 (36) | 81 (79) | 118 (57) |
| | Physical activity support services are highly undervalued | 41 (40) | 69 (67) | 110 (53) |
| | Scarcity of referral pathways | 51 (50) | 38 (38) | 89 (43) |
| | Inadequate consultation time | 22 (22) | 47 (46) | 69 (33) |
| | Lack of financial incentive | 35 (34) | 32 (31) | 67 (32) |
| | Patients not motivated to take up PARS referral | 5 (5) | 57 (55) | 62 (30) |
| | Lack of national collective goal or coordination process on referral pathways | 20 (20) | 42 (41) | 62 (30) |
| | Lack of reference materials | 14 (14) | 28 (27) | 42 (20) |
| Recommendations | Ongoing interactions between GPs and EPs | 66 (65) | 96 (93) | 162 (78) |
| | Improved visibility of EPs | 73 (72) | 87 (84) | 160 (77) |
| | Education about referral pathways | 37 (37) | 68 (66) | 105 (51) |
| | An overview of available referral pathways | 43 (43) | 49 (48) | 92 (44) |
| | Easily accessible or ease of use of PARS | 47 (46) | 42 (41) | 89 (43) |
| | Simplify PARS documentation process (documentation should be optimised for disease management) | 20 (20) | 29 (28) | 49 (24) |
| | Financial incentives or subsidies for patients | 8 (8) | 34 (33) | 42 (20) |

4.4.2 Qualitative Phase

Twenty-five (25) participants eight (8) GPs (32%) and 17 EPs (68%) participated in the individual telephone interviews. Participants included 14 males (56%) and 11 (44%) females. Qualitative findings were mapped onto the constructs of the care coordination theoretical framework. Based on the care coordination constructs, five overarching themes (1) External factors, (2) Patient knowledge and motivation, (3) (Inter)organizational mechanisms, (4) Relational coordination and (5) Outcomes were identified. Each theme is discussed below, and the representative quotes are presented in Table 4.6.

4.4.2.1 External Factors

Participants highlighted the effects of some external factors which serve as obstacles to the effectiveness of the PARS programme. These obstacles included limited government support in terms of inadequate Medicare-funded CDM sessions which ultimately led to increased burden of cost (extra sessions) for patients. All participants perceived that PARS was undervalued by the government due to the few free CDM-funded sessions and Medicare rebates allocated to patients. The inadequate funding of PARS served as a barrier to the programme's uptake and effectiveness. EPs reported that the limited funding for the programme compelled them to charge extra fees to compensate for the time they invest in patient care. They perceived that the undervaluing of their services ultimately impacts on continuity of care for patients who are unable to afford ongoing engagement with the PARS programme. GPs supported the EPs' notion and indicated that the current five Medicare-funded sessions patients get to see any allied health professional of their choice are not enough and should be reviewed.

4.4.2.2 Patient Knowledge and Motivation

An investigation into the perceptions of the participants about PARS patients' characteristics showed that motivating patients and providing adequate knowledge regarding PARS are

essential for effective uptake of the programme. GPs expressed the importance of providing background PA and PARS knowledge to patients to help the patients appreciate and value the services of EPs, with subsequent better motivation and uptake of the referral. EPs substantiated the views of the GPs. Nonetheless, the EPs indicated that the patients were more knowledgeable than the GPs about PARS and often the patients were the ones providing information about PARS to GPs and proactively seeking referral into the programme.

4.4.2.3 (Inter)organisational mechanisms

The participants expressed strong beliefs in the value of PARS and the need to coordinate care for patients through the programme. GPs spoke of the importance and need to collaborate with other HCPs. EPs substantiated the views of the GPs and emphasised the value patients attach to the involvement of GPs who help them achieve their health and wellness goals. However, poor visibility of EPs was identified by GPs as a major obstacle to the success of the PARS programme. They regarded the scarcity of EPs, particularly in regional and remote settings, as a critical factor that impedes the usability of the PARS programme. The limited availability was also reiterated by EPs who indicated that EP to patient ratio was low. Both GPs and EPs highlighted knowledge gap as another major obstacle to the success of the programme and this was attributed to poor information sharing about the benefits it has to offer. EPs also indicated that being time-poor, and overburdened with work, GPs might struggle to promote PARS to patients even if they have the information. In response to this, GPs faulted the PARS documentation process and time constraints as limiting factors for promoting PARS to patients.

4.4.2.4 Relational Coordination

GPs and EPs had different approaches to patient care in relation to PARS. While GPs proposed PA and PARS interventions to patients and leave patients with the choice of uptake, EPs emphasised the importance of motivating patients and guiding them to see the benefits of taking up the intervention. This could be partly attributed to the lack of understanding of the roles and capabilities

of EPs and how this affects patients' ability to access the PARS programme. EPs were of the opinion that GPs were mostly unaware of the services that EPs offer. GPs admitted that they lacked understanding of the roles of EPs and perceived a need to clarify the boundary in the roles of EPs and other AHPs such as physiotherapists. Both participant groups indicated that an improved interprofessional relationship could be beneficial in the coordination of optimum for patients. They stressed the need for feedback and information sharing to foster trust and improved functionality of the PARS programme. GPs indicated that they don't receive feedback from EPs on the patients they refer to the EPs, while the EPs claimed that the GPs were not proactive enough in following up with the feedback from the PARS consultation. Instead, the feedback is often filed away by administrative staff, and this might prevent information from getting across to the doctors.

4.4.2.5 Outcomes

Both participant groups reiterated the value of PARS in helping users achieve their health goals and regain the ability to perform their usual activities. GPs viewed collaboration with EPs as very essential and crucial to the improved wellbeing of the patients. The EPs emphasised the invaluable impact of shared experiences among PARS members. However, they expressed concerns about the delayed referral of patients to PARS and how this could make it difficult for the clients to achieve their health goals.

4.4.3 Triangulation/ Integration of Findings

The findings from both the quantitative and qualitative phases were synthesised and mapped to the themes of the care coordination framework. Table 4.6 portrays a summary of the integrated findings and representative participant quotes.

Table 4.6: Triangulation of study findings embedded within the Care Coordination framework

| Care Coordination factors (Overarching theme) | Quantitative findings | HCP Quotes | | Synthesis of Findings |
|--|---|---|---|--|
| | | GPs | EPs | |
| <p>External Factors</p> <p>These included limited government support, increased burden of cost (extra sessions) and poor continuity of care for patients</p> | <p>Undervaluing of physical activity support services was the second most highlighted barrier to PARS effectiveness by the participants (40% GPs and 67% EPs). Participants (44%) recommended a review of available referral pathways and 20% proposed giving financial incentives or subsidies to patients to enhance the functionality of PARS.</p> | <p>GPs voiced their discontent with the limited number of EPC sessions allocated to patients</p> <p><i>“Interventions from allied health professionals is not a one off. Take the exercise physiology for instance, there's a need first of all to assess the patient, which may be done at the first visit and develop a plan of intervention and then you now need to begin to implement that and then there's a need to monitor see how it is. And this cannot be done with just five visits and sometimes not even the entire five because the patient wants to also use some of it for some other allied health professionals, so no. Five is certainly not enough” (Dr ON 52)</i></p> | <p>EPs perceived that the government undervalued their services. They also reported that the free EPC sessions were inadequate and impacted on continuity of care.</p> <p><i>“One of the barriers is just that the government severely underestimates our worth and just not pay enough in terms of the Medicare rebate” (AN 31)</i></p> <p><i>“The main problem with only having a couple of sessions would be that we don't get that continuity of checking up on the client” (JT 26)</i></p> | <p>Improving PARS incentives (e.g., financial incentives) for HCPs could motivate stakeholders to promote PARS and enhance the programme's functionality.</p> <p>Increasing the CDM rebates or sessions for patients could foster PARS uptake by patients and enhance the programme's functionality.</p> |
| <p>Patient Knowledge and Motivation</p> <p>Perceptions about PARS patients' characteristics showed that motivating patients and providing adequate knowledge regarding PARS are essential for effective</p> | <p>While 55% of EPs viewed the lack of patient motivation to take up PARS as a critical barrier, only 5% of GPs supported this point. Additionally, More EPs (79%) indicated the lack of knowledge on referral pathways among patients as a major barrier to the uptake and effectiveness of the</p> | <p>GPs reported that their discussion with patients is guided by patients' interests.</p> <p><i>“Patient wise, they may not be interested in that discussion at that point in time because they may have come for a different concern. Dr CF 43</i></p> <p><i>“The patients are happy especially if the patient education has occurred at the</i></p> | <p>EPs indicated that patient are the ones providing information about PARS to GPs to seek for referral into the programme. EPs were dissatisfied with how GPs' leave crucial PARS referral decisions to patients</p> <p><i>“Most of the time, if the patient is going to get referred by their GP, is because they ask for it. And most of my</i></p> | <p>Empowering patients to decide on their referral choices or delegating a designated HCP such as a nurse might coordinate the referral of patients into PARS and enhance uptake, the referral process and reduce the burden of work on GPs.</p> |

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| <p>uptake of the programme</p> | <p>PARS programme in comparison to GPs (36%)</p> <p>Participants (77% of GPs and 91% of EPs) indicated that they referred or received patients via PARS. Pursuing this further in the method for patient referral, however indicated that over one third (32%) of these referrals were initiated by patients themselves.</p> | <p><i>time of diagnosis. At the time of diagnosis, the background education helps a patient to comprehend what they need and how the exercise physiologist will be key or will be part of their management team. So, they are quite happy to go” (Dr CL 44)</i></p> | <p><i>experience with that, isn't that necessarily that the GPs has instigated it” (NK 29)</i></p> <p><i>“I found the last few years a lot of GPs just say to their client; oh, go and find an EP and then I would refer you. So, GPs are getting a bit lazy by saying to the patient, you go and find them, and I'll refer you” (MD 43)</i></p> | <p>Insights on effective ways to promote PA and PARS initiatives to patients prior to taking up the programme's initiative could foster uptake and enhance the efficiency of the programme.</p> |
| <p>(Inter)organisational Mechanism</p> <p>Major (inter)organisational obstacle to the success of the PARS programme included poor EP accessibility, knowledge gaps, complicated administrative processes and time constraints</p> | <p>Participants (GPs = 50% and EPs = 38%) highlighted the scarcity of PARS as one of the barriers to the functionality of the programme</p> <p>An exploration of participants' location showed a similar distribution of HCPs across capital cities (43%) followed by regional areas (40%) and less in rural areas (17%).</p> <p>Most EPs (79%) saw the lack of knowledge on referral pathways as the main barrier to the programme's functionality, while more GPs (51%) noted the scarcity of PARS as a barrier.</p> | <p>GPs regarded the scarcity of EPs and burdensome administrative processes as critical factors that impede the usability of the PARS programme.</p> <p><i>“The availability of EPs in the first place. Compared to other allied health fields EPs are still few and far between. There is concentration of EPs only in urban areas, most of the regional areas have no EP whatsoever and even urban areas they are not that readily available. So, availability of the EPs is certainly an issue” (Dr ON 52)</i></p> <p><i>“We will start with knowledge. So, like I said, that most patients would be with their conditions for a long period of time. Which means that one way or the other doctors have not identified that someone else could be involved in that treatment. So, there's that knowledge gap it is still there” (Dr CL 44)</i></p> | <p>EPs echoed the opinions of the GPs and attributed it to GPs' time constraints and minimal information sharing opportunities. They specified that the information deficiency might be around the value of the services they provide to patients.</p> <p><i>“I'm the only EP in say a 10K radius. So, I suppose some of the barriers are, the doctors just don't know who to contact” (SU 33)</i></p> <p><i>“With GPs referring I think it can be a lack of knowledge about the benefits that we can provide. And the safety that we can guarantee for these people with education. So that's not always known, and I think that creates barrier” (LR 28)</i></p> <p><i>“If you give them your information by the end of the day, I find they are just so busy. They don't have the time to actually think about when they have</i></p> | <p>Promotion of PARS initiatives, better remuneration under CDM and incentivising the services of EPs could attract more HCPs into the profession and increase their availability and accessibility.</p> <p>Making PARS information more accessible to patients and key HCPs like GPs through workshops and constant reminders and printed materials like pamphlets could foster PA and PARS knowledge and increase the programme's usability.</p> |

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| | | <p><i>“The amount of paperwork involved in setting up the care plan, the team care arrangement and the referral and then doctors not having enough time for a longer consult or to take the patients questions and all that” (Dr GE 44)</i></p> <p><i>“We are restrained as GPs, because you've got fifteen minutes to deal with. I mean, not even coming for any concerns relating to exercise, but we use that opportunistically, especially for somebody who is overweight, has a chronic condition. So, it is something you just [briefly] discuss but well most times most GPs don't have that time” (Dr CF 43)</i></p> | <p><i>seen a patient who would benefit from seeing an exercise physiologist” (MD 43)</i></p> | |
| <p>Relational Coordination</p> <p>Participants ‘perceptions about the relationship between EPs and GPs bothered around EP roles, exchange of information, quality of the interprofessional collaboration and sharing of common goals</p> | <p>Overall, EPs recorded a slightly stronger belief in the value of PA and PARS compared to GPs.</p> <p>Forty-four per cent (44%) of GPs indicated that they don’t receive feedback from EPs on the patients they refer to the EPs, while the majority of EPs (91%) claimed the opposite (providing feedback to GPs on the patients they refer to them).</p> <p>In relation to recommendation, GPs (72%). emphasised EPs’ improved visibility while EPs (93%) emphasised ongoing</p> | <p>GPs admitted that they lacked understanding of the roles of EPs but were in favour of interprofessional coordination of care.</p> <p><i>“Now, sometimes there's a struggle with respect to, this is my opinion anyway; what are the boundaries of a physiotherapist and an exercise physiologist. If there is a major difference as to when to involve a physiotherapist and when to involve an exercise physiologist (Dr CF 43)</i></p> <p><i>“I try to base my judgement not just on the feedback from the exercise physiologists, I also base my judgement on how well the patient had fared by</i></p> | <p>EPs said that GPs exhibited a lack of knowledge about EP duties and were also too busy, which hindered access to PARS for patients.</p> <p><i>“There's a big gap in GP understanding of EPs role and what they could do. I think a lot of people miss out on the service just because the GPs aren't referring” (AD 32)</i></p> <p><i>“What I gather though when you send those [report] to the surgery, they are just filed automatically by reception staffs. The GPs don't get to see them unless the patient goes back and they say, oh let's see how you went. But they don't, so if the patient doesn't go back or</i></p> | <p>The lack of clarity on the roles of EPs among GPs could be leading to wrong referrals, this could be addressed, through education and training workshops.</p> <p>Professional ongoing interaction among HCPs through seminars and workshops and in foundational training could foster the knowledge of the roles of EPs and provide insights on the value and scope of their services.</p> |

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| | interactions between GPs and EPs. | <p><i>engaging with their service.” (Dr KC 42)</i></p> <p><i>“Every patient with a chronic disease condition requires multidisciplinary approach to the management. The GP will be at the centre of it to coordinate and make the necessary referrals, coordinate the treatments, receive reports from the allied health professionals and review the patients as we go on” (Dr GE 44)</i></p> | <p><i>the conditions get sorted, so they don't need to talk about that again. I think often the GP doesn't see those letters” (SU 33)</i></p> <p><i>“If a GP refers someone to an EP and that client gets great outcomes from that EP. They are going to trust that GP, they going to keep going back to that GP, and you know, whenever there's an issue - it's a nice little loop. That's how it should be, we should be looking out for each other and having the client's outcomes as our first and foremost goal” (ER 26)</i></p> | Information sharing among HCPs is key to the success of PARS and needs improvement. The ability for HCPs to freely share professional information among themselves could promote access to PARS, speed up the process and enhance its ease of use and effectiveness. |
| <p>Outcome</p> <p>Participants commended the PARS programme and indicated that it had enhanced patients' health outcomes. Need for improvement on team and inter-organisational outcomes</p> | Participants (EPs – 82% and GPs - 62%) reported objectively measured improved patient health outcomes as a major benefit of PARS. | <p>GPs found PARS to be helpful in helping users achieve their health goals and regained the ability to perform their usual activities.</p> <p><i>“I've had patients who have had knee surgeries, ... So, I refer them to exercise physiologist, and then after a while, they were back on their feet and back to their sporting activities” (Dr KC 42)</i></p> <p><i>“It's very important because the more we engage with exercise physiologists, the better for the community especially, for GPs who are in remote areas where people seldom engage in exercises. You know, it is very good that they refer their clients to exercise physiologists” (Dr KC 42)</i></p> | <p>EPs saw value in PARS' ability to help clients perform certain activities and daily chores with ease. However, they harped on the delayed referral of patients to PARS and how this could make it difficult for the clients to achieve their goals.</p> <p><i>“I've had patients say that they can do the gardening or mowing without getting out of breath probably tired. They've got the confidence to get back on a normal road bike again. They walked to work” (NK 29)</i></p> <p><i>“We used to only see people when they were all done, and all the damage is already done and trying to rebuild the person from ashes is hard experience” (LR 28)</i></p> | <p>Participants perceived PARS to be invaluable in helping patients achieve their health outcomes.</p> <p>Improved collaboration among HCPs such as GPs and EPs and timely referral of patients into PARS could enhance the programme's viability, functionality, and better health outcome for patients.</p> |

4.5 Discussion

This mixed methods study employed a care coordination framework to explore the perceptions of key PARS' health professionals (GPs and EPs) regarding the coordination of care for PARS patients to determine effective and sustainable ways of fostering the health outcomes of patients and enhancing the effectiveness of PARS. Quantitative findings highlighted that GPs and EPs have good knowledge of PA and value PARS. Qualitative findings unravelled external factors, inter-organisational mechanisms, and relational coordination obstacles that hinder the ability to efficiently coordinate PARS patient care and delay/limit beneficial health outcomes for patients. These results substantiate our previous findings on the perspectives from patients (Albert et al., 2021) and uncover the need for policies that would reflect value for PARS initiatives, promote information sharing and strengthen inter-professional relationships between GPs and EPs (Albert et al., 2020b; Vassbotn et al., 2018). Similarly, a mixed methods study by Buckley et al. (2020) highlighted that a multifaceted approach is required to support GPs in promoting PA and PARS programmes.

An assessment of the external factors influencing the coordination of care by participants in the quantitative phase showed that barriers, including an undervaluing of the PARS programme, lack of financial incentive hinder the ability of GPs and EPs to coordinate patient care. A study by Clark et al. (2017) revealed that health professionals including doctors are hindered from implementing PA guidelines due to lack of insights on referral options, programme resources, increasing workload and the absence of incentives. These findings were substantiated in the interview when respondents lamented about the poor funding and low rebatable sessions. Thus, supporting PARS stakeholders with incentives (e.g., increased EPC for patients and increased funding for health professionals) could enhance the programme's uptake, functionality and boost health outcomes for patients (Birtwistle et al., 2019; Leemrijse et al., 2015).

Participants gave dissenting views on how the characteristics of patients influence the way they coordinate care. In the surveys, while GPs and EPs indicated strong beliefs in the value of PA for managing chronic conditions and praised the impacts of the PARS programme, they disagreed on the enthusiasm of patients to take up PARS initiatives. The interviews revealed that GPs and EPs value background PA and PARS education for patients before referral into PARS. EPs however, perceived that GPs were abdicating their frontline roles as PARS gatekeepers leading to patients initiating PARS referrals. A mixed methods study that explored the effects of empowering patients through self-management support, concluded that collaboration between patients and healthcare providers, access to self-management information and more diversified care for chronic diseases could optimise patient empowerment (Angwenyi et al., 2019). Therefore, enhanced information sharing among stakeholders and patients, promoting the benefits of PARS and empowering patients to take up PARS intervention could foster adherence to programme interventions and optimal health outcomes for patients (Foster et al., 2015; Albert et al., 2021).

Examining the inter(organisational) mechanisms and relational coordination among health professionals revealed a complex coordination of care PARS process. Enhanced functionality of PARS would require further insights into the roles of EPs and improved accessibility to their services (Schweizer et al., 2017; Clark et al., 2017). These issues could be addressed through ongoing professional interaction among health professionals such as GPs and EPs, particular during the foundational training years to become a healthcare professional and in-service training via workshops or seminars (Moore et al., 2011). An exploration of the views of exercise referral trainers regarding the uptake and attendance in PARS highlighted that those who deliver the programme could benefit from ongoing training and support from colleagues (Shore et al., 2021). In addition, raising PARS awareness through different sources such as the media and printed materials like pamphlets could augment the programme's insight,

accessibility and functionality (Albert et al., 2020b). Participants were full of praise for the positive outcomes that have come out of the PARS programme. GPs and EPs commended the impacts of the PARS initiatives for helping to foster the health and wellbeing of patients, enhancing the bonding among community dwellers, and reducing the burden on the healthcare system. Therefore, developing strategies that would aid PA promotion and PARS initiatives could foster collaboration among health professionals and help them coordinate the best care for patients, share information efficiently, and achieve sustainable goals (Livingstone et al., 2015; Mills et al., 2012).

To the best of our knowledge, this is the first study in an Australian context, that has used a care coordination model to explore the experiences of GPs and EPs regarding PARS. As key PARS stakeholders, the inputs of GPs and EPs would strengthen the evidence base on the coordination of care for PARS participants. Employing a sequential explanatory mixed methods approach ensured integration and in-depth understanding of the findings. However, the findings should be cautiously interpreted in the light of the following limitations: (1) The study considered only the perceptions of Australian GPs and EPs. (2) Although using a random sampling strategy facilitated the collection of information that could be useful for successful implementation of care coordination goals among health professionals, this strategy could have biased the responses of health professionals, as some respondents with affinity for PA and PARS could have been attracted to the study. (3) Finally, the results from this study were based on self-reported opinions of participants, which could have been either over- or underestimated, owing to the specialty of health professionals who took part in the study.

Health professionals' views about care coordination for PARS participants have revealed desired outcomes. However, obstacles in most of the critical factors (external factors, knowledge and motivation, (inter)organisational mechanisms and relational coordination) facilitating the functionality of the care pathway limit the programme's efficiency. Therefore, strategies that would promote GPs

and EPs' behavioural change towards effective care coordination are needed to foster quality care for patients, improve their health outcomes and forge a solid and efficient healthcare system.

4.6 Conclusion

This study set out to critically appraise the views of GPs and EPs on the coordination of PARS care for patients to improve its efficiency and actively inform policy on PARS development or restructuring. Participants displayed good knowledge and firm belief in PARS, but health professionals, particularly GPs, require more knowledge, support, and incentives to promote, drive and coordinate PARS initiatives for patients effectively. Strategies to foster inter-professional relationships and efficient exchange of information between GPs and EPs are urgently required. This would enable insights into the roles and boundaries of PA specialists like EPs and unearth the values of the services they render. The findings from this research could inform policies that will enhance interest in PARS utilisation by frontline health professionals like GPs and the coordination of optimum care for patients, particularly those with multi-morbidity. A policy shift towards improving current incentives such as better PARS pay for health professionals and increased free EPC visits for patients could enhance positive mindsets and attitudes towards PARS initiatives among stakeholders. A broader view of all key PARS stakeholders, including GPs, EPs, and patients, concerning efficient ways to coordinate care for PARS participants could be invaluable to the initiative's success.

Overall, the questions raised from the systematic reviews in Chapter 2 have now been addressed. Until now, the framework and operations of the PARS programme have been informed by literature and lacked input from key stakeholders. The need to inform optimum quality care delivery and develop interventions that will reflect the end user's perspectives necessitated the exploration and synthesis of the recommendation of all PARS stakeholders (GPs, EPs and patients) on how to promote quality care in PARS interventions. This informed the study conducted in **Chapter 5**.

Chapter FIVE: The ‘PRICE’ of Physical Activity Referral Schemes (PARS):

Stakeholders’ Recommendations for Delivering Quality Care to Patients

5.1 Chapter Overview

Abstract: Evidence-based strategies are needed to curb the growing cases of physical inactivity related morbidities. Delivering holistic care through collaborative shared decision making could boost the effectiveness of physical activity referral schemes (PARS) and foster the quality of care for patients with multimorbidity. A qualitative study involving semi-structured telephone interviews was utilised to gain insights from Australian PARS stakeholders (general practitioners, exercise physiologists, and patients). A pluralistic evaluation approach was employed to inductively explore and integrate participants’ opinions and experiences of PARS and their recommendations were used to develop a model for quality care delivery in PARS initiatives. Five overarching themes: promote, relate, incentivise, communicate, and educate were identified as the ‘PRICE’ for developing effective and functional PARS programmes that foster quality patient care. It was evident that PARS programmes or policies aimed at optimising publicity, encouraging incentives, improving interdisciplinary information sharing and professional relationships between patients and healthcare professionals can transform healthcare delivery and provide top quality PARS care services to patients. Therefore, governments, healthcare systems, and PARS administrators can translate and leverage the insights from this study to optimise the delivery of high-quality care to PARS patients.

5.2 Introduction

Healthcare delivery models and policies need to be updated to meet the growing morbidity rate (Vos et al., 2020) and trends in healthcare systems (Avery et al., 2021; Kruk et al., 2018; National Academies of Sciences & Medicine, 2018). Numerous studies have been conducted to assess the quality of care delivered by healthcare organisations (Avery et al., 2021; Donabedian, 1988; Kumah et al., 2017; Li et al., 2015; Mosadeghrad, 2012; Padma et al., 2009; Park et al., 2016). Abundant evidence supports the exploration of physical activity (PA) as a therapeutic strategy for the prevention, treatment, and management of morbidities (including some cancers) and mortalities in various settings (Bae et al., 2019; Berra et al., 2015; Fong et al., 2012). Morbidities and mortalities could be reduced by promoting PA interventions, such as brief advice, counselling, and collaborative care through onward exercise referral (patient care transition from frontline primary health care professionals, such as general practitioners (GPs) to PA specialists, e.g. exercise physiologists (EPs) (Hoffmann et al., 2016; Thornton et al., 2016).

Collaboration via GP to EP referrals would be invaluable in developed countries, such as Australia, where nine out of ten patients see a GP at least once a year (Bell et al., 2021; Britt et al., 2015). This highlights the enormous potential of leveraging the access of frontline healthcare professionals (HCPs), such as GPs, as gatekeepers and vanguards of PA promotion to the population (McNally, 2020). The efficiency and long-term sustainability of these primary healthcare interventions are, however, fraught with doubts due to obstacles, such as the lack of time, adequate skill, and knowledge to promote PA by frontline HCPs (Pavey A. et al., 2011b; Wade et al., 2020), and low patient referrals from healthcare gatekeepers, such as GPs to PA specialists (e.g. EPs) (Craike et al., 2019). Given that patients with multimorbidity require long-term quality care from different HCPs (Bodenheimer, 2008), the current healthcare service delivery structure might struggle to provide optimum and quality healthcare services to these

patients (Rittenhouse et al., 2010). This necessitates a paradigm shift in healthcare systems towards delivering sustainable and efficient chronic disease management interventions (Zaletel & Maggini, 2020).

Collaborative shared decision making (a team care approach where the care provided to a patient by a group of HCPs reflects the values and choice of the patient) (Coulter & Collins, 2011) could foster the delivery of quality care to patients and enhance their health outcomes (Brown et al., 2016). Delivering high quality care to patients could improve wellbeing and quality of life, optimise the quality of healthcare service delivery, and reduce hospital admissions (Robyn et al., 2013). The quality of healthcare initiatives are constantly evolving, and the evidence in support of current strategies are inconclusive (Beattie et al., 2015; Flanagan et al., 2017; Smith et al., 2017). For example, previous studies examining the quality of care have primarily focused on patient satisfaction and are now shifting towards patient experiences (Beattie et al., 2015; Elwyn et al., 2007). Furthermore, current studies advocate for evidence-based, meaningful, and consistent interactions between healthcare professionals and patients (Allen-Duck et al., 2017; Zaletel & Maggini, 2020).

However, research into the factors that foster the promotion of quality healthcare to patients is scarce, particularly regarding PARS interventions. Thus, employing a pluralistic approach to explore the views of key PARS stakeholders (GPs, EPs, and patients) would help inform the development of policies that could foster quality care delivery and boost the effectiveness of the PARS programme (Hall, 2004). Recommendations of key PARS stakeholders, such as GPs, EPs, and patients on how to promote the PARS programme in an Australian context within one study has not been previously explored. Thus, this qualitative study aimed to fill this research gap by empirically exploring the views of GPs, EPs, and patients on the quality of care in PARS referrals. It also aimed to substantiate the evidence base and inform a quality of care model that

could optimise healthcare delivery to patients for improved health outcomes and PARS effectiveness.

This study was guided by the research question: What are participants' (GPs, EPs, and patients) views on how to optimise the quality of care in PARS referrals to enhance PA and patient health outcomes? It is surmised that insights gained from the views of stakeholders will assist to inform policies for an effective PARS programme and healthcare delivery.

5.3. Methods

5.3.1. Study Design

A qualitative study design guided by the tenets of the consolidated criteria for reporting qualitative studies (COREQ) guidelines (Tong et al., 2007) and pluralistic evaluation (Hall, 2004) approach was employed to explore the opinions and experiences of the PARS stakeholder groups (GPs, EPs, and patients). The pluralistic approach involved synthesising PARS stakeholders' views to reach a consensus on the best approach to promoting quality care in PARS referrals (Hart, 1999).

5.3.2. Participants

Participants included Australian HCPs (registered GPs and EPs) and patients who have used PARS services. Respondents were 18 years and above and based in Australia at the time of this study. A purposive sampling strategy (non-random identification and selection of suitable study participants) was used to recruit the participants for this study. This technique included: 1) identification of participants who were a representative sample of the population via a pre-interview survey; 2) purposively selecting and contacting respondents who could provide valuable information and represent heterogeneity in the population; and 3) acknowledgment of consent and commitment by participants to take part in the interview.

5.3.3 Data Collection

To understand HCPs' and patients' views and experiences of quality care in PARS initiatives, semi-structured individual telephone interviews of approximately 40 minutes duration with GPs, EPs, and patients were conducted and audio taped. A semi-structured interview approach was used to allow the interviewer prepare questions beforehand to help guide the conversation and allow for more in-depth focused discussion on the topic (Sofaer, 1999). The telephone was used because of its flexibility and access to respondents across the country (Sturges & Hanrahan, 2004). Interview questions (10 semi-structured questions) were developed based on findings from previous PARS studies (Albert et al., 2020a, 2020b) and pilot tested on eight participants (two GPs and three each of EPs and patients) by the primary researcher (FAA) and reviewed by BSM-A to test the usability and credibility of the interview questions. In addition, the findings from the pilot interviews were used to refine the final interview questions.

The interviews were conducted between August and December 2020, and each interview began with an acknowledgement of consent and concluded with a summary of interview accounts with respondents to facilitate transparency and shared understanding. Major areas of exploration in relation to this study were participants' experiences of PARS and their recommendations to foster an improvement of the programme. Follow-up probes and prompts were used to encourage further insights into respondents' views and experiences. Interviews were stopped when data reached saturation (when no new information enhanced the researchers' understanding of quality care in PARS referrals) (Shaw, 2010).

5.3.4. Data Analysis

Audio-recorded interviews were transcribed verbatim by F.A.A., identifying information removed and pseudo-names assigned to quotes. Pseudo-names beginning with Dr were given to GPs, ending with EP to EPs and none for patients. Transcribed interview data were imported into NVivo software version 12 (QSR International Pty Ltd., Victoria, Australia: 2018) for data

storage, management, and analysis. Attride-Stirling's (Attride-Stirling, 2001) inductive thematic analysis principles were used to analyse the interview data. This process included 1) familiarisation with the interview transcripts to identify codes; 2) grouping of codes into themes based on their commonalities; 3) grouping of themes into thematic networks based on their conceptual content; 4) further exploration of thematic networks for cause-and-effect relationships; 5) development of a model linking the conceptual findings in the thematic network to the research question.

Data transcription, coding, and theme generation were independently conducted and confirmed by F.A.A. and B.S.M.A. Discrepancies were resolved in a consensus meeting.

5.3.5. Ethical Consideration

This study was approved by James Cook University's (JCU) Human Research Ethics Committee (HREC) (reference number: H7661). Prior to participating in the study, participants were furnished with detailed information about the study, and they were required to provide consent.

5.4. Results

Forty (40) respondents, including GPs (n = 8; 0% female), patients (n = 15; 80% female), and EPs (n = 17; 65% female) took part in this study. Participants' average ages were 44 years for GPs, 31 years for EPs, and 61 years for patients. All GPs indicated they worked in private practice with an average work experience of 13 years. EPs had an average work experience of 7 years, and all except three of the EPs worked in private practice. Two out of these three EPs noted their practice as a teaching setting (university), while the remaining EP worked with a non-governmental organisation (NGO). The main reasons patients gave for their referral to PARS included diabetes, stroke, chronic back pain, and overweight/obesity.

Five overarching themes and 10 sub-themes emerged from this study. They include promote (sub-theme: creating awareness through publicity), relate (sub-themes: interprofessional relationship building and HCP–patient relationship), incentivise (sub-themes: government incentives, reduced cost, and increase chronic disease management (CDM) rebates), communicate (sub-themes: good feedback loop and designated care coordinator), and educate (sub-themes: educating the public and foundational training reforms. Based on the study findings, a model is presented for fostering effective PARS referrals and promoting quality care for PARS patients, see Figure 5.1.

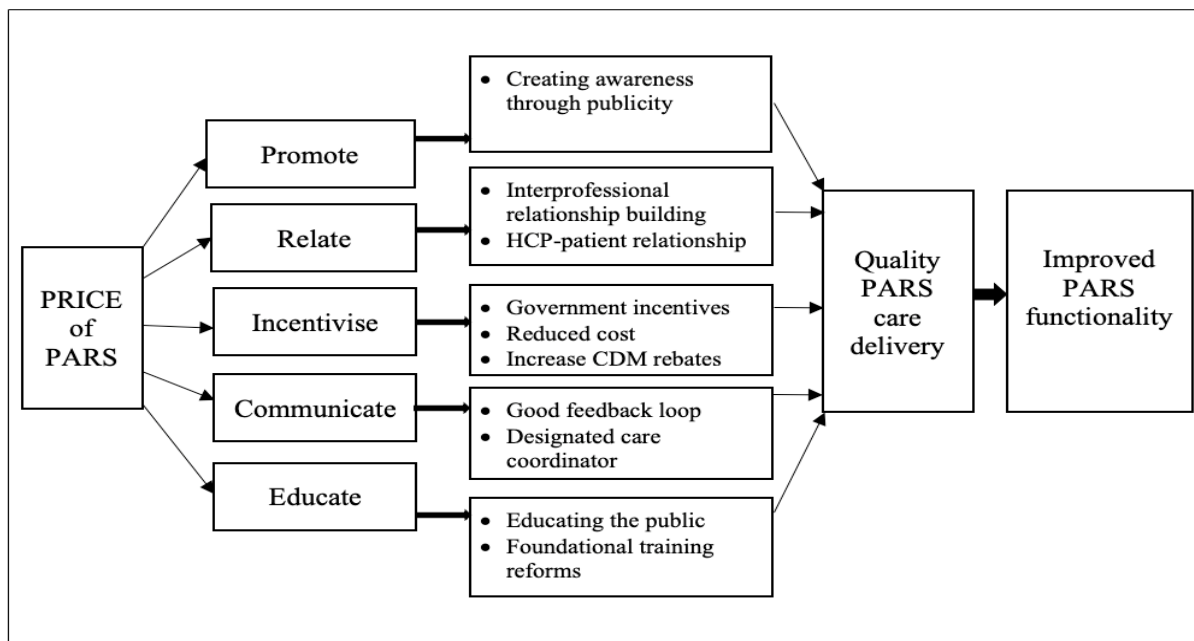


Figure 5.1: A model for promoting quality care in PARS referrals.

5.4.1. Promote

Participants perceived that the direct promotion of PA and PARS information by HCPs would foster the functionality of the PARS process and enhance the delivery of quality care to patients. Respondents’ perceptions regarding how to promote PA and the PARS programme were categorised into the sub-theme: creating awareness through publicity.

Creating awareness through publicity: all participants identified the promotion of PA and PARS as an important initial step in improving quality of care for patients. They recommended the use of avenues, such as information sessions, campaigns, and media to promote the programme.

GPs urged EPs to use forums, such as information sessions to inform the public about distinctions between their roles and other allied health professionals. Furthermore, GPs suggested the need to improve the media promotion of EP services through multiple channels.

“The exercise physiologist has to do a lot of campaigns to convince people how their service is probably different from that of a chiropractor or a physiotherapist. Media coverage is also important. I do see that some of the exercise physiologists in this town place some adverts on the television. They should also do broadcasts through the radio stations to enlighten the community more about what they stand to gain from such exercise referrals. I think enlightenment is very important” Dr KC 42.

EPs corroborated the views of the GPs by saying that the dissemination of PARS information could help enlighten the public on the benefits of taking up PA interventional programmes, improve awareness about the roles and services EPs provide and help patients seek referrals themselves.

“An awareness campaign to the general public could be quite beneficial, because if you are getting more people aware of the system, they’re going to come in and ask the doctor about it without their doctor having to bring it up” JT 26 (EP).

In addition, EPs indicated that GPs’ awareness of the roles and services they [EPs] render is critical to the programme’s success.

“When the GPs have more of an understanding about what we do and how to talk to patients about it, we get better success rates and people taking up that kind of programme” LR 28 (EP).

Some patients supported this notion by suggesting that information about the services of EPs be made readily available in the community, particularly in key healthcare centres (e.g., hospitals).

“I think really [it is about] information, even if as I was discharged, there was a brochure for an exercise physiologist, ... as you know these are the things that you might want to follow up”
NB 41.

Other patients further added that making promotional materials, such as pamphlets, available to GPs could help the doctors promote the programme better.

“What I will say is leaflets, like good quality advertising pamphlets sent to GPs that they could put in their waiting rooms. I think it’s that kind of stuff – Look, I do want to give patients something, what can I give them; Oh, hang on there is a pamphlet here” SM 63.

5.4.2. Relate

Participants regarded the building of successful interprofessional relationships among HCPs as well as patient-HCP relationship as key determinants of quality healthcare delivery to patients. This would in turn enhance the functionality of the PARS programme. Respondents’ comments on how to relate were categorised into the subthemes of interprofessional relationship building and HCP–patient relationships.

5.3.2.1. Interprofessional Relationship Building

Participants perceived that developing respectful and efficient interprofessional relationship among HCPs could foster information sharing and improve the quality of care for patients.

GPs voiced that a consistent engagement between them and EPs could advance insights into available EP services.

“If we see them, if we talk to them. Usually, why do you think the drug reps come to see us almost every week. The closer they are to us, the more they remind us of what they sell. If the

exercise physiologists come to see us, even if it is once a month, one way or the other, they will answer questions, they will provide solutions and some advice on what they could offer and what is available” Dr CL 44.

EPs echoed the views of the GPs by saying that engaging with GPs would make it easier for the doctors to refer patients for PARS interventions and facilitate the exchange of supporting materials that could ease the referral process.

“If you build a relationship with the GP, that GP is probably going to refer to you because it’s easy to do so. So, we need to make it easy for GPs to refer in the first place.” LB 34 (EP).

Patients endorsed the views of the HCPs by advocating for stronger ties between GPs and EPs.

“I think you have to address that issue, which is my personal experience. There is a break down [in communication] between the GP and the EPs” LD 68.

5.3.2.2. HCP–Patient Relationships

Rapport building between HCPs and patients was viewed by participants as pivotal to improving the functionality of PARS. GPs felt that spending more time with patients could help them better promote PA to the patient.

“If one could have an opportunity to have more time with patients. I think it would go a long way in improving the delivery of PA information to the patient” Dr CF 43.

EPs substantiated the views of the GPs by noting that collaboration between a GP and an EP who share a common goal would enhance quality PA and PARS care delivery to patients.

“The biggest thing that I’ve learnt in practice is finding that key GP. Someone who is as motivated as you are, who is as passionate as you are and is really willing to take time out of their day. And you’re willing to take time out of your day for the patient care” ER 26 (EP).

Patients emphasised the importance of rapport building between HCPs and patients as this is essential for patient uptake and adherence to recommended PA and PARS.

“Well, it depends, we can be referred to these things, we can talk to the referred person right, but if there’s no connection between that person and you yet again, you won’t do anything. If there was a connection then, that becomes a different thing...there’s got to be something there to make you want to do it” BR 65.

5.4.3. Incentivise

There was consensus among respondents on the need to use incentives as a strategy to facilitate HCPs’ provision of quality care in PA and PARS to enhance uptake and adherence to intervention goals by patients. Participants’ recommendations on incentives were categorised into three sub-themes including government incentives, reduced cost and increase CDM rebates.

5.4.3.1. Government Incentives

Respondents urged the government to review currently available incentives to intensify efficient delivery of PARS. GPs argued for increases in payment as an incentive for coordinating PARS.

“Government can increase the payments to the GPs as incentive to coordinate patients’ care plan and team care arrangements and the referrals” Dr GE 44.

EPs and patients supported this notion and emphasised the importance of holistic approach to healthcare delivery.

“There should be more emphasis on GPs. We should probably actually think about prevention and actually incentivising GPs to make these kinds of referrals” LB 34 (EP).

“The government should make it financially worthwhile for GPs to actually do what most of them want to do and that is manage all of this care and to coordinate it all and to look at a person’s overall health file rather than just the acute things that they come in with” DM 70.

5.4.3.2. Reduced Cost

Participants reported cost as a barrier to HCPs coordinating PARS care for clients and patients' uptake of PA and PARS initiatives.

GPs urged the government to subsidise PA and PARS intervention cost for patients, particularly the elderly, because of the positive effects of the interventions on their wellbeing.

“The government should also throw more weight in terms of subsidising the costs of people gaining access especially for the elderly. I find them to benefit more because they have to do some balance and stability training” Dr KC 42.

EPs and patients reiterated the burden of cost challenges expressed by GPs. EPs suggested the delivery of affordable care by specialists.

“Cost is quite something you know, it's one prohibitor of people attending services. So, you know, referral schemes are really helpful in how you provide your service to minimise, to reduce the cost to the client is important” LS 35 (EP).

Patients advocated for cost subsidies to help patients afford the preventative benefits of the programme, rather than paying a huge cost to seek an overdue solution.

“Another big piece of this problem is the economic issue. Lots of people are unable to afford that. So, for that, government should really do a bit more for they call it preventive methods, because they spend so much money on the medical side, but that's too late when they are sent to the hospital, it's too late. So, it's a big gap” LD 68.

5.4.3.3. Increase CDM Rebates

Participants argued that the current five CDM rebate-able sessions provided by Medicare are inadequate.

GPs proposed a refinement of the number of free CDM sessions allocated to patients per year. They suggested an increase from five to 10 sessions per year.

“Medicare reviewing the enhanced primary care [EPC] pathway and see if it’s possible to increase the number of referrals yearly, may be from five to maybe about 10. That will be one way that it could be improved” Dr ON 52.

EPs substantiated the perspectives of the GPs and argued against setting a limit for the number of free sessions at the beginning of PA and PARS interventions to allow specialist enough sessions for behavioural change.

“I think it’s important that we always focus on getting someone independent and I think that’s the idea as five sessions only is to stop seeing people when they probably don’t need it. So there needs to be things in place to stop people doing that, but I feel that in the first, two, three months, that’s really critical for behaviour change. And if we can just get more sessions in that time and then get less for the rest of the year just to monitor them and make sure they’re keeping on top of everything. I think that will be a better approach and they’ll be more successful” LS 35 (EP).

Patients supported the views of the HCPs and called for extra free sessions to help maximise the gains of PA and PARS interventions.

“We need more of that and that was the whole idea of doing this interview with you, there needs to be more. If people want to fight the obesity, if they want to fight the diabetes that goes along with that, then people who need it, should get to it without a great expense” DM 70.

5.4.4. Communicate

Clear and effective communication among HCPs and between HCPs and patients were viewed as vital to achieving success in delivering quality care in PA and PARS services. Respondents’ suggestions on ways to communicate were summarised into two sub themes including good feedback loop and designated care coordinator.

5.4.4.1. Good Feedback Loop

Participants' views regarding efficient two-way communication show the importance of maintaining an efficient feedback loop among HCPs.

GPs emphasised the need to maintain a good information exchange channel to help them keep up to date with the care of the patients they referred into PA and PARS programmes.

“A lot of times you don't hear anything from the EP so you are kind of in the dark in terms of what is happening and because you see many patients you might not even keep track of the patient you refer to the EP if you don't hear from them” Dr BO 40.

EPs substantiated the views of the GPs and suggested an overview of current communication pathways to include useful tools, such as templates to help guide the information exchange between them and frontline HCPs (e.g., GPs).

“Communication channels need to be refined between the two. So there's specific templates that go back and forth that are more detailed in nature. So there's an expectation from the GPs that the goals are more specific [and reported] in a measured, smarter way essentially, so the practitioner knows what they're going to be dealing with. The GPs should expect a more detailed report that actually stipulates what assessments they did and what they found from those assessments and potentially the plan moving forward” LB 34 (EP).

Patients recommended that frontline HCPs, such as GPs, should be constantly reminded of available EP services and provided with printed information to be disseminated to their patients.

“They need to be reminded constantly and given something like hardcopy [information] for their patients, not just on an e-mail or something, because they'll forget about it” SM 63.

5.4.4.2. Designated Care Coordinator

Participants reported similar views regarding the nomination of a specialist HCP whose primary duty will be to coordinate PARS for patients. All respondents nominated a nurse as the best suited HCP for that role.

GPs supported their choice of a nurse with a view that nurses can make out time for providing quality care for patients involved in PARS initiatives.

“If the patient liaises with the practice nurse in the preparation of the chronic disease plan, the patient can be educated more. The nurse has more time to discuss further with the patients and answer all the questions thereby increasing compliance on the side of the patient” Dr GE 44.

EPs echoed the thoughts of the GPs and felt that nurses are the largest homogenous group of HCPs in the hospital, and they are vital for improved functionality of PARS.

“Nursing staff mainly because of the fact that they are the biggest proportion in the hospitals because nurses are also a key to initiate referrals” LS 35 (EP).

Patients endorsed the views of the HCPs and argued that nominating a particular HCP, such as a nurse as a PA and PARS expert, would help them coordinate effective and quality care during PA referrals. They also perceived that it would relieve them [patients] of the burden of coordinating their own care.

“So, it would have been good to have someone sort of coordinating all this, even a nurse or an allied health professional or someone that was like a coordinator rather than leaving the burden with me to sort of keep on top of it. Because I’ve got all these conditions and it’s hard to keep track of them all, even though I know what I’m doing and that caused me more stress” RS 65.

5.4.5 Educate

Participants perceived education as a vital tool for informing quality care delivery and suggested ways to go about it. Respondents' perspectives on how to educate the population about PARS were grouped into two sub-themes (educating the public and foundational training reforms).

5.4.5.1 Educating the Public

There was consonance between respondents' views regarding the need to enlighten the public particularly, frontline HCPs, such as GPs, on the value, role, and availability of PA and PARS services, and how to deliver quality care for patients.

GPs proposed a general orientation on the services provided by EPs. They urged that relevant stakeholders' knowledge about the roles of EPs could be enhanced, particularly through media channels, such as television and the internet.

"I recommend better education, on the side of the GPs about exercise physiologists. Again, education or mass orientation. The department of health could do a good job by letting the people know out there, that supervised exercise regimen is necessary for the treatment of many chronic disease conditions, in fact in the form of social mobilisation, online, TV and the rest of them" Dr GE 44.

EPs substantiated the views of the GPs by suggesting that PA and PARS education for frontline HCPs, such as GPs, be incentivised to make it worthwhile for the gatekeepers.

"GP education is a big one, but you've got to make it so they are actually getting something out of it. So rather than it being just like disbursed information and then it's up to them to follow up on it; GPs should be allowed to use that as a continuing professional development point, so that they're having incentive to do it. They're so busy all of the time, you can give

them extra work that they're not being paid to do, if they are not getting anything out of it, they are just not going to do it" AN 31 (EP).

Patients suggested that GPs may not be fully aware of the promotional incentives provided by the government. They proposed more educational/awareness programmes to help GPs promote the initiative effectively.

"I've only just found out that the government is subsidising some of these things, but I don't know whether that's new or whether that has been around. From my point of view, it would be really worthwhile for people like myself to know that is available, particularly for pensioners or people with lower income to be able to access these things. So, if the GPs were more aware of that, too, they might even recommend it" LR 61.

5.4.5.2 Foundational Training Reforms

Participants proposed the inclusion of PA and PARS training in the curriculum of prospective medical graduates.

GPs felt that being knowledgeable about interventions that could be useful to their patients and implementing them would be invaluable to their practice.

"It is about the GPs being knowledgeable in what will help their patient in certain conditions and be able to implement that" Dr CL 44.

EPs argued that including PA and PARS information into the medical curriculum would help GPs to effectively deliver quality PA and PARS care to their patients.

"My idea will be to educate the next generation of GPs coming through, so they are in university, explaining what our services are and how it can help their clients" SM 22 (EP).

Patients corroborated these views.

“It needs to start within the university medicine programmes around the country. It almost looks like we just have to wait it out and as more graduates come through and get into practice, then things will start to change” NB 41.

5.5. Discussion

This qualitative study explored the recommendations of key PARS stakeholders (GPs, EPs, and patients) on PA and PARS and developed a model for improving the functionality of PARS to ensure delivery of quality care to PARS patients. The findings revealed that education about and promotion of PARS services, ongoing interprofessional collaboration, HCP–patient relationship building, and proper incentivising are critical to delivering quality care through PARS. These participants’ recommendations reinforce the need for reforms in healthcare delivery policies that foster financial support from government, innovative patient engagement and HCP interprofessional collaborative care (Frost et al., 2020; WHO, 2020; Vetrano et al., 2018).

Ongoing interactions, exchange, and promotion of useful information about PARS among HCPs were perceived as crucial for improved PARS functionality and a conduit for delivering quality care to users. Sustained information sharing culture among HCPs could help frontline HCPs such as GPs, to be up to date with PA and PARS information and provide motivation to recommend it to their clients when needed. Therefore, mass promotion of PARS initiatives via primary healthcare interventions supported with printed materials such as pamphlets and diverse media publicity platforms, could enhance the effectiveness of the PARS programme and provide further insights into the roles, benefits, and availability of EP services (Albert et al., 2020b). Participants also proposed nominating designated PA and PARS specialist in healthcare centres to support GPs, in promoting and coordinating quality care for PARS users. In light of this, nominating other HCPs such as nurses, to coordinate quality care for PARS

participants could foster the programme's uptake and ease the extra burden on GPs (Bonner et al., 2020; Gleeson et al., 2021).

Respondents perceived that the development and nurturing of interprofessional and HCP–patient relationships could boost the gains made from the PARS initiative and improve quality care delivery for the programme's users. Strong interprofessional collaborations and HCP–patient interactions through shared decision making could promote trust, confidence in the use of EP services and strengthen patients' perception of quality care (Brown et al., 2016). For example, a six-month intervention that included education workshops to increase teamwork among HCPs in 26 general practices enhanced professional collaboration among HCPs and improved patients' involvement and empowerment in the care process (Chan et al., 2010). Furthermore, enabling a multidisciplinary care approach among frontline HCPs such as GPs and allied health professionals, particularly EPs, could enhance quality of care delivery to patients and increase positive behavioural change towards PA and PARS interventions (Lion et al., 2019; Wei et al., 2020). Respondents believed that incentives from the government could enhance patient access and affordability of PARS initiatives and boost the delivery of quality care for the programme's users. Therefore, an efficient use of incentives to promote PA and PARS initiatives could enhance the delivery of quality care in PARS, increase the programme's usage and potentially enhance patient health outcomes (Ahmed et al., 2021; Fernholm et al., 2019).

Recommendations by participants to educate the general population on PARS initiatives, implied that they perceived education as the bedrock for building a solid foundation for quality care delivery in PARS. It also suggests the lack of general understanding of EPs' roles in the Australian healthcare system, both by other HCPs and the public. Participants proposed a continuing professional development reward system for GPs to help them see the value of engaging with new knowledge about PA. In addition, they perceived the enlightenment of

community members to be critical to the uptake and functionality of the PARS programme. Some participants suggested the inclusion of PA and PARS training programmes as components of the medical education curriculum to help doctors gain insights into various intervention strategies including those of PA that could assist them to provide optimal care to patients. Reforms or policies that encourage frontline HCPs such as GPs, to seek PA and PARS knowledge could be invaluable to delivering quality care to patients and enhance the functionality of the PARS programme (Darlow et al., 2015; Watanabe et al., 2019).

5.5.1 Strengths and Limitations

To our knowledge, this is the first qualitative study that explored the voice of key PARS stakeholders to develop a model for the effective use of PARS and the promotion of quality care through the referral pathway. Employing a pluralistic strategy ensured that all participant groups had their views represented in this study. Representing the views of PARS' main stakeholders further strengthens the evidence in this study. However, considering the perspectives of particular groups of patients and HCPs (GPs and EPs) means that this study did not include other HCPs (such as occupational therapists and physiotherapists) involved in PARS. Additionally, this study's results should be interpreted with caution because the findings are based on the views of Australian participants, which may not be directly transferable to other settings. Furthermore, participants' responses, particularly those of HCPs, could have been biased due to their work affiliations and interest in PARS initiatives.

5.5.2. Implications for Practice and Research

The model developed from this study can be used as a guide for delivering optimum care to patients in PARS interventions. The evidence from this study can be used to support the development of policies and interventions, such as the inclusion of PA promotional information in the curriculum of learners who are training to become doctors. This measure could promote quality PA and PARS care for patients, and ultimately lead to better health outcomes for

patients and improve the functionality of the PARS programme. The model could help identify key factors that hamper (e.g., poor feedback) or promote (e.g., incentives or promotions via diverse media outlets and pamphlets) the delivery of effective quality care services in PARS. Furthermore, PARS administrators can leverage participants' suggestions about better ways to relate (e.g., building rapport), educate (e.g., professional development points) and communicate (such as designating a specialised care coordinator e.g. a nurse) PA and PARS intervention goals to refine or reform programmes that reflect end users' choices. This will encourage the promotion of quality care and augment the functionality of the PARS programme. Further studies from diverse settings and involving other HCPs on how to effectively promote quality PA and PARS care to patients are needed. This would substantiate the evidence base and provide a clear understanding and consensus on the quality and effectiveness of PA and PARS care delivery across the globe.

5.6 Conclusion

This study employed a pluralistic approach to explore the views of key PARS stakeholders (GPs, EPs, and patients) to develop a model for promoting quality care in PARS and enhancing the functionality of the referral pathways. Identifying critical quality care constructs is essential to the optimisation of sustainable interventions and programme development. Findings from the study highlighted that, to propagate effectiveness and quality care delivery, PARS administrators need to develop policies that support promotion, communication, and education about PARS services and provide incentives to service providers and users. This approach would promote collaborative care among HCPs, boost the uptake and functionality of the PARS programme and enhance patients' experiences of quality care and beneficial health outcomes.

Chapter SIX: General Discussion

6.1 Chapter Overview

This chapter provides a general discussion of the findings reported in previous chapters. The main results from each chapter and their contributions to the thesis are summarised in Table 6.1. The findings from this research are placed in context with the literature. Insights from each of the studies and the practical implications in a broader context, particularly for the government, policymakers, providers, HCPs and patients are presented. The strengths and limitations of the research and recommendation for future research are also covered in this chapter.

6.2 Synthesis of Research Findings

The findings from the systematic reviews in **Chapter 2A** highlighted that PARS is crucial to the achievement of PA intervention goals. However, the programme's effectiveness is influenced by support provided to clients, accessibility, and awareness about the initiative. **Chapter 2B** revealed the inability of frontline HCPs such as GPs, to effectively promote PA and PARS services due to limitations including their growing work burden and time constraints. Also, the underutilisation of PA promotional pathways including EPs' services, was evident from the study.

As portrayed in Figure 6.1, participants for the primary research components (**Chapters 3, 4 and 5**) of this project were drawn from across Australia to collect relatively generalisable data on the public impressions of the promotion of PA and the functionality and promotion of PARS across Australia. The study sample comprised 318 participants for the quantitative phase including 102 GPs, 105 EPs and 111 patients; while 40 respondents including 8 GPs, 17 EPs and 15 patients were involved in the qualitative phase.

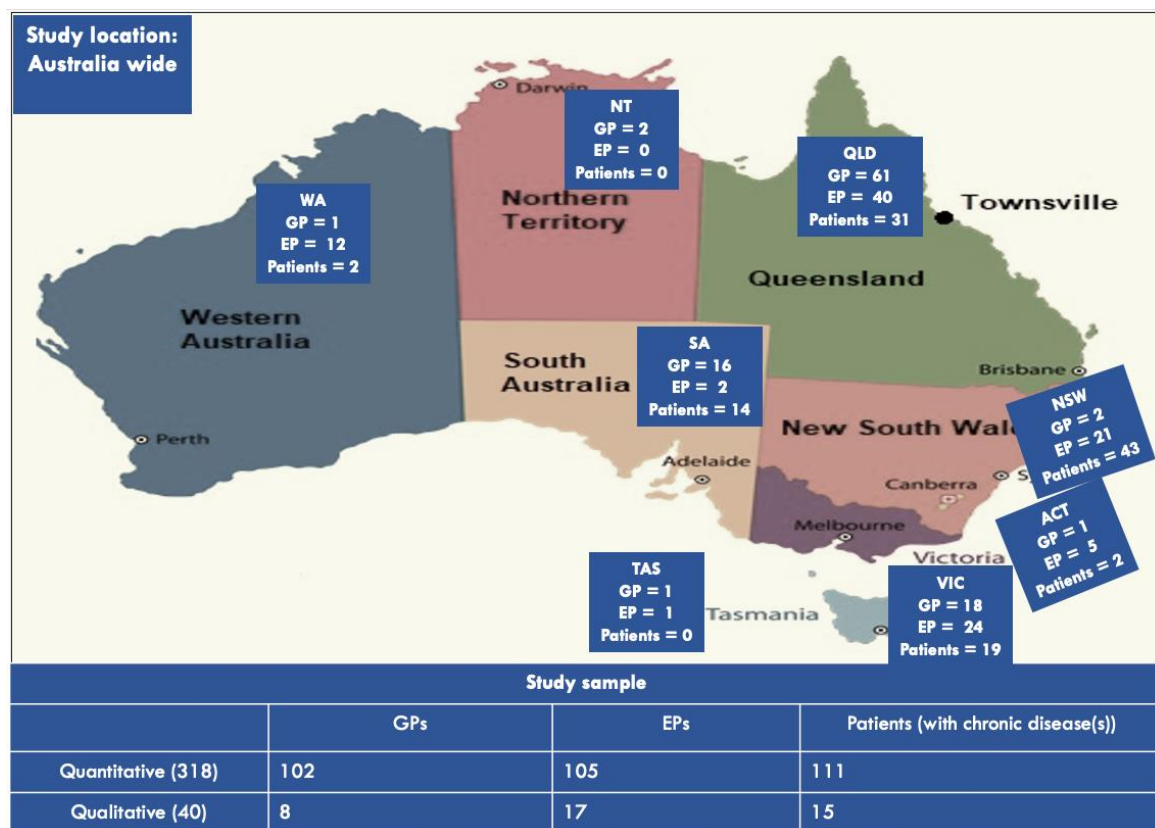


Figure 6.1 A depiction of the study location, participants, and study sample

Employing sequential explanatory mixed methods in **Chapters 3 and 4** facilitated an exploration of Australian PARS stakeholders' (GPs, EPs and patients) perspectives about the issues surrounding the promotion of PA and PARS and the programme's effectiveness. The findings from **Chapter 3** indicated that patients value PA and PARS interventions and could potentially drive the effectiveness of the PARS programme, if adequately empowered. **In Chapter 4**, the results showed that EPs, and to a lesser extent GPs, are knowledgeable about PA, and both groups perceive PARS to be useful. The results however revealed that the effectiveness of the programme is hindered by obstacles including poor GP-EP collaborations and the lack of awareness about the programme. The use of incentives and ongoing PARS information sharing were proposed to foster the programme's functionality. The results from **Chapter 5** highlighted that PARS initiatives that optimise patient and HCP communication, collaboration and nominating a designated PARS coordinator could enhance quality care

delivery in PARS interventions and the overall quality of healthcare services. Overall, the main findings from this thesis highlight that the reformation or development of PARS interventions that will propagate measures like ongoing promotion, quality care delivery, interdisciplinary (GP-EP) and HCP-patient collaboration and rapport building could optimise PARS effectiveness.

6.2.1 Examining the functionality of PARS by investigating the influence of type of disease and intervention on uptake and health outcomes as well as patients' perceptions of motivators and barriers to effective PARS processes.

Chapter 2A was guided by the RQ *what is the global patient perspective on the functionality of PARS?* The review unearthed that the lack of PARS awareness limits its effectiveness, however the strategies (e.g. support from PA specialist) employed in PARS programmes are crucial to the uptake and adherence to PA intervention goals and fostering health and wellness outcomes. This finding was corroborated by Arsenijevic & Groot (2017) and substantiated by those of Wade et al. (2020), who suggested that strategies that will maximise the effectiveness of PARS initiatives be considered before implementing the programme.

Although GPs could promote PA via counselling (Jones et al., 2021), they might struggle to sustain long-term adherence to PA in patients due to the lack of ongoing clinical support and reinforcements (AuYoung et al., 2016). Also, the ability to deliver PA interventions with adequate intensity to support optimum health awareness and lifestyle change in patients (Dennis et al., 2012) is crucial. Patients would require tailored exercise and longer duration (e.g., above 20 weeks) programmes to motivate long term adherence and the achievement of PA objectives (Rowley et al., 2018). Therefore, referral of patients to EPs for expert PA interventions could enhance PA (James et al., 2017; O'Brien et al., 2021) and minimise chronic diseases (Pearce & Longhurst, 2021).

The scarcity of PARS studies from settings other than the UK is another key highlight of this review. This could be due to the nationwide implementation of PARS policies leading to rapid proliferation and adoption of different PARS variants across UK settings (NICE, 2014; Rowley, 2019). The findings also highlighted that the reason for referring participants into PARS interventions influence participants' uptake and adherence to programme's objectives. For example, participants with specific chronic conditions, particularly cardiovascular diseases, recorded good uptake, adhered to intervention goals and obtained positive health outcomes when referred to PARS (Rowley et al., 2018). Therefore, focusing on specific referral conditions such as participants characteristics and health conditions when prescribing PA could optimise uptake, adherence and improve health outcomes (Hanson et al., 2013; Hanson, et al , 2020a; Shore et al., 2021).

Ultimately, this systematic review indicated that support and reason for referring patients into PARS are important for the success of the programme. Also, the review highlighted the need for more PARS studies, particular mixed methods studies. Given that these are patients' perspectives, and most of the information has come out of the UK, there is a need to understand the perspective in the Australian context to provide informed recommendations that could support the gaps in current literature about few referrals from GPs to EPs. It will be valuable to conduct another study that will help to identify what the bottlenecks are within the Australian context. The results from this review informed how Chapter 3 was conducted.

6.2.2 Synthesizing from the global perspective of HCPs, the research evidence on PA promotion and the key determinants impacting the optimum achievement of PA promotional goals in healthcare systems.

Chapter 2B was guided by the RQ what are the global HCPs' perspectives about PA and PARS promotion? It was evidenced from this review that frontline HCPs such as GPs, might struggle to sustain PA promotion due to increasing work burden and time pressures and the need to

leverage the expertise of PA specialists such as EPs. This findings about burden of work and time constraints were also echoed in the patients review paper (Chapter 2A). Thus, initiatives fostering preventive and integrative PA promotion techniques are required to widen HCPs' chronic disease management techniques (Short et al., 2016; Zubala et al., 2017). Such techniques could include those that will promote integrated care (Flanagan et al., 2017), support self-efficacy and enhance PARS users' beliefs and motivation about the programme (Eynon et al., 2019). Integrated care has the potential to foster patient satisfaction, perceived quality of care and service accessibility (Baxter et al., 2018; Pérez Bazán et al., 2019).

HCPs perceived PA promotion to be critical and an essential part of their duties. However, barriers including time constraints and the limited knowledge about PA and PARS on the part of GPs, limit their ability to sustain its promotion. Synthesis of influential factors that promote PA and PARS as highlighted by the TDF, indicated that the factors under the environmental context and resources domain (including limited counselling time, limited PA resources and inaccessible PA environment), featured as the main barriers to PARS. Furthermore, incentives ranked as the top facilitator to PA and PARS – an indication that proper incentives could be used to enhance awareness and facilitate the promotion of the PARS programme. Financial incentives could facilitate behaviour change and foster PA and PARS intervention uptake (Giles et al., 2014). Moreover, patients, HCPs including GPs and EPs, and PARS administrators can all benefit from better awareness and information sharing about PARS programmes (Birtwistle et al., 2019; Craike et al., 2019).

Only one study among all the reviewed studies in this review considered the views of EPs, indicating low visibility and weak connection between EPs and other healthcare team members. PA counseling and referrals from GPs to EPs could be improved by addressing barriers including GPs' attitudes and beliefs towards PA intervention (Omura et al., 2018). These barriers could be addressed by including lifestyle medicine content in the undergraduate

medical curriculum (Weiler et al., 2012) and continuing education for GPs (Antognoli et al., 2017). However, the overcrowded medical curriculum is often an impediment to change (Slavin and D'Eon, 2021). Therefore, it behooves educators developing new curricula to take into consideration what should be removed before adding a new development to ensure effective curriculum changes. Referral to EPs has been shown to improve subjective and objective (aerobic fitness) PA outcomes (O'Brien et al., 2021), and is valuable for long term behaviour change and improved health outcomes (Ewald et al., 2018). EPs could address several barriers to PA promotion including low uptake and adherence and musculoskeletal limitations (Franklin et al., 2009).

The findings of this study suggest that interdisciplinary skill sets, and HCP self-efficacy are significant mediators in any intervention aimed at improving PA behavioral change and fostering health outcomes. The low visibility of EPs was also highlighted. Therefore, it is pertinent to explore the perspectives of GPs and EPs on how to improve the interprofessional relationship between GPs and EPs and the coordination of care for PARS users, particularly from an Australian perspective. These outcomes informed the study in chapter 4.

6.2.3 Understanding Australian patients' experiences of PA and PARS for insights on how to improve the programme's effectiveness.

The systematic review in Chapter 2A underlined hindrances to the promotion of PA and PARS due to factors including time constraints and the paucity of PARS studies. It also revealed that patients could foster PARS effectiveness if adequately supported. It was therefore important to investigate if this review findings remain true within the Australian context, especially given that only two Australian-based studies were included in the review. This issue was therefore explored in *Chapter 3 which seeks answers to the RQ, what are Australian patients' perceptions of the efficacy of PARS?* This study examined Australian patients' views about PA and PARS to better understand their perceptions of quality care and the efficacy of PARS. The

synthesis from the Donabedian framework for healthcare quality revealed that bottlenecks in the structure (e.g., the scarcity and cost of the PARS programme) and process (e.g., patients' discontentment with their experiences with GPs), limit the effectiveness of the PARS programme. Despite the inefficiencies in the structure and process of PARS, patients held positive views about the programme, recorded good scores for PA knowledge and found the programme effective. However, more than half of the participants indicated that they had initiated the conversation about PARS with their GPs. The findings regarding the scarcity of PARS and poor support from GPs corroborate those from the review in Chapter 2A. Therefore, interpersonal and organizational reforms such as patient-HCP collaboration and improved access to support and self-management resources for patients, could empower PARS users to self-refer and reduce the work burden on frontline HCPs like GPs (Angwenyi et al., 2019; Birtwistle et al., 2019).

Self-initiated referral (patients initiating their referrals into PARS programmes) has been successful in some healthcare settings (Bleyer et al., 2020) and could improve the use of the services of AHPs (Swinkels et al., 2014). However, other studies have highlighted that self-initiated referral could widen health inequalities because people who could benefit from this approach might be the least likely to self-refer into initiatives like PARS (Shaw et al., 2014). Therefore, it is crucial to ensure that the uptake of interventions such as PARS is equally accessible to potential users, including the socioeconomically disadvantaged (Hämäläinen et al., 2016). Notwithstanding, GP-initiated referrals might not be sustainable due to barriers including the lack of time and growing workload on the part of GPs (Pavey et al., 2012; James et al., 2017). Thus, initiatives that would promote other referral mechanisms such as self-referral (Bury & Stokes, 2013), could enhance PARS' visibility and efficacy. For example, interactive web-based interventions have the potential to empower patients, foster PA, and its related health outcomes (Kuijpers et al., 2013). Participants found PARS beneficial however,

the programme's high cost and low visibility might be limiting its effectiveness. Shared decision making could support quality care and reduced healthcare cost (Oshima et al., 2013). Shared decision making (Stiggelbout et al., 2015) is a two-way transaction where the diagnosis includes both the doctor's expertise and the patient's input into the treatment plan. It is considered the most crucial determinant to patient-centered care (Barry & Edgman-Levitan, 2012). Therefore, treatment guidelines should acknowledge the therapeutic value of a positive doctor-patient interaction and consider patients' emotional needs during interventions (Parker et al., 2020).

Put together, this study's findings showed that optimised PARS support, ease of use, and access to resources could boost the programme's successes and patients' health outcomes. This study explored the views of patients. It was therefore expedient to investigate the perspectives of GPs and EPs to compare and see if their accounts are similar or conflicting. This informed the need for the study reported in Chapter 4.

6.2.4 The findings from the systematic review in Chapter 2B revealed that the GP-EP relationship and information sharing is crucial to PARS uptake and efficiency.

Chapter 4 was guided by the RQ how do Australian HCPs (GPs and EPs) perceive the coordination of care for PARS users? Chapter 4 investigated the perspectives of Australian GPs and EPs on improving the coordination of care and PARS effectiveness. The study uncovered that efficient GP-EP relationships and information sharing, improved PARS incentives and ongoing information sharing could improve the programme's efficiency and the insights on EPs' services. The study findings about information sharing and use of incentives are supported by the review in Chapter 2B and substantiate the findings of Birtwistle et al., (2019) and Liddle et al., (2020).

The promotion of PARS initiatives and use of incentives such as increased rebatable sessions for patients and remunerations for HCPs, could strengthen the programme and improve patient outcomes. The study by Scott et al. (2018) highlighted that paying HCPs incentives for improved performance are less likely to succeed. However, allowing funds to be used for specific reasons such as quality improvement, had a better chance of success. Also, integrating quality care initiatives with healthcare rebates could foster sustainable goals (Wen et al., 2018). Therefore, the proper use of incentives for promoting PARS interventions could transform the initiative and foster long term positive behavioral change (Giles et al., 2014; Hafner et al., 2020).

Synthesising the views of GPs and EPs via the emerging care coordination framework emphasised the complexity of care coordination and effective healthcare delivery. It also highlighted the need to foster inter-organisational mechanisms such as promotional strategies, accessibility, knowledge of the EP services and relational coordination (e.g. understanding EP roles, approach to care and collaboration) between GPs and EPs. Improved PA and PARS knowledge, accessibility and the need for relational coordination between GPs and EPs featured among the main findings from review 2B (Chapter 2). The relational coordination between GPs and EPs and communication through effective feedback mechanisms are important for valuing PARS interventions and encouraging referrals. The study by Vassbotn et al. (2018) revealed that GPs require informal fora to talk with other primary healthcare practitioners and be supplied with information essential for facilitating coordinated care. Assigning a designated care coordinator and reducing the administrative burdens associated with the PARS process may increase the adoption and efficacy of the programme (Leemrijse et al., 2015). This is in line with participants' remarks about struggling with the cumbersome PARS documentation process. The study by Stumm et al., (2019) concluded that GPs find it challenging to coordinate the whole care process for multimorbid patients in a complex

multidisciplinary setting. Therefore, GPs are receptive to assigning a coordinator within the healthcare team (Stumm et al., 2019).

This study's results highlight the need for effective collaboration and information sharing strategies between GPs and EPs. This could enhance insights into the roles and value of EPs in healthcare teams, promote EP services and enhance the effectiveness of the PARS programme. To substantiate the evidence on delivering PARS interventions, the last study in this thesis explored and synthesised the recommendations of all PARS stakeholders to inform quality care delivery and inform the development of interventions that will reflect end users' perspectives and meet their needs. This led to the evolution of the study in **Chapter 5**.

6.2.5 Synthesizing the PARS recommendations of stakeholders (GPs, EPs and patients) to inform the optimisation of care in PARS initiatives. Chapter 5 was guided by the RQ, what are Australian PARS stakeholders' (GPs, EPs, and patients) recommendations for improving PARS? This study's participants were Australian GPs, EPs and patients. The most intriguing aspect of the research in this thesis is the development of a model of quality care delivery in PARS interventions, based on the recommendations of the stakeholders. This novel model presents five overarching constructs - promote, relate, incentivise, communicate, and educate as the 'PRICE' for developing efficient and functional PARS programmes that foster quality patient care. The success of the PARS programme is rooted in the ongoing promotion and education about PARS, quality interprofessional and HCP-patient rapport, and providing appropriate incentives.

Participants' views indicated that the continuous mass publicity of valuable PARS information through various outlets including the media and printed materials, is pivotal to improving the insights and effectiveness of the programme. The review by Zubala et al. (2017) suggested that only few PARS interventions are effective. The authors recommended the utilization of a holistic approach to the promotion of PA interventions. This involves consideration of social,

individual, and environmental issues while providing services to clients. A study that explored the effect of campaigns on PA interventions showed a significant correlation between higher outcome expectations and campaign awareness (Leavy et al., 2014). Participants believed that fostering interprofessional and HCP–patient interactions will support quality care delivery and strengthen PARS efficiency. Moreover, sustained follow-up and publicity of PARS interventions could increase and maintain the programme’s gains, effectiveness, and positive behaviour change (Lundqvist et al., 2017; Murray et al., 2017; Rowley et al., 2018).

Delivering care through an integrated approach can increase patient’s perceived quality of care and satisfaction (Baxter et al., 2018). Also, providing care using a team care approach could promote the achievement of optimal patient health outcomes (Pérez Bazán et al., 2019) including those involved in PARS interventions (Flanagan et al., 2017). Participants viewed incentives as stimulants for patients’ uptake of PARS interventions and HCPs’ improved quality care delivery. They believed that increased funding for PARS could make the programme more affordable and motivate frontline HCPs such as GPs to recommend the initiative (Ahmed et al., 2021; Fernholm et al., 2019). Respondents perceived that maintaining professional and explicit communication channels among HCPs and between HCPs and patients could potentially increase PARS awareness and confidence in the programme. Furthermore, better communication about the technical and procedural aspects of interventions such as PARS, would help customers evaluate their reputation and make decisions about the programme (Avery et al., 2021). Participants suggested designating PA and PARS specialists in primary healthcare settings to assist GPs in promoting and coordinating quality PARS care. Delegating other HCPs (such as nurses) to coordinate care for PARS users may help increase participation in the programme and reduce GP workload. Nurse-led services have the potential to minimise treatment burden, improve health outcomes, and provide a paradigm for enhanced primary care (Bonner et al., 2020).

Participants' perspectives on education showed that they considered PARS enlightenment invaluable to the success of the programme. Participants advocated for PARS training for key gatekeepers such as GPs. They proposed incorporating or substituting other subjects for PA and PARS courses in the medical education curriculum to broaden their knowledge of different therapies including PA interventions. This may be an efficient channel to improve PA intervention knowledge, PA and PARS delivery and beneficial effects for the intervention users (Darlow et al., 2015; Watanabe et al., 2019).

Table 6.1: Major findings of each chapter and contributions to the thesis

| Chapter | Major findings | Contributions to the thesis |
|---------|---|---|
| 2A | <p>This systematic review uncovered that:</p> <ul style="list-style-type: none"> • PARS is a key motivator to the uptake and adherence to PA intervention goals, but the dearth of PARS information hampers the programme’s effectiveness. • It is important to use evidence-based interventional PA guidelines for different chronic conditions, involving PA experts in delivering the intervention • Promoting supervised group activities can increase adherence and deliver beneficial health outcomes to patients. <p>The review revealed the scarcity of PARS studies from settings other than the UK and limited mixed methods studies.</p> | <p>Chapter 2A addressed RQ1: What is the global patient perspective on the functionality of PARS?</p> <p>The findings from this review facilitated the understanding of patients’ perspectives about the promotion of PA and PARS. This informed the need for the study presented in Chapter 3, which was used to gather information from Australian patients regarding the delivery of quality care in PARS interventions. Also, the findings from this chapter informed the development of the data collection tools (survey and interview questions) used in chapters 3 and 4.</p> |
| 2B | <p>This systematic review found that:</p> <ul style="list-style-type: none"> • Increasing workload and time constraints might be limiting the ability of frontline HCPs such as GPs to promote PA. • There was an under-utilisation of the services of PA specialists, particularly EPs. • The optimal use of all PA promotion pathways is crucial to the success of PA intervention goals and the achievement of positive health outcomes. • Strategies are needed to integrate HCPs’ (GPs and EPs) preventive and treatment approaches through PA interventions. <p>The review unearthed the lack of insights about EPs, poor knowledge of PARS and the need for a structural framework for PARS.</p> | <p>Chapter 2B addressed RQ2: What are global HCPs’ perceptions about PA and PARS promotion?</p> <p>The findings from this review facilitated the understanding of HCPs’ perspectives from a global context, about the promotion of PA and PARS. This informed the need for the study presented in Chapter 4, which gathered information from Australian HCPs regarding the coordination of quality care in PARS interventions. Also, the findings from this chapter contributed to the development of the data collection tools (survey and interview questions) used in chapters 3 and 4.</p> |

| | | |
|-----------------|--|--|
| <p>3</p> | <p>This first mixed methods study highlighted that:</p> <ul style="list-style-type: none"> • Patients could boost PARS effectiveness if duly informed and supported • Empowering patients to seek PARS referral would reduce GPs' burden of work. • Efficient patient-HCP collaboration is key to the success of PARS <p>Other referral methods into PARS, such as nurse-initiated and equity-focused self-initiated referrals could help the programme become more visible and effective.</p> | <p>Chapter 3 addressed RQ3: What are Australian patients' perception of the efficacy of PARS?? This study's findings aided the understanding of the patients' perspectives about the delivery of quality care in PARS initiatives and the factors influencing the functionality of the PARS programme.</p> |
| <p>4</p> | <p>It was evident from this second mixed methods study that:</p> <ul style="list-style-type: none"> • Fostering GP-EP relationships could improve the insights on EPs' services and PARS efficiency • Efficient PARS information sharing between stakeholders is crucial to the programmes' uptake and long-term sustainability • Incentivising PARS initiatives could boost referrals and enhance the programme's effectiveness <p>Designing policies that would promote and reflect value for PARS could improve the programme's uptake, adherence and efficiency.</p> | <p>Chapter 4 addressed RQ4: How do Australian HCPs (GPs and EPs) perceive the coordination of care for PARS users? The findings from this study fostered in-depth understanding of the views of HCPs about PA and PARS initiatives and their perceived role in coordinating quality care for the programme's users.</p> |
| <p>5</p> | <p>The qualitative study identified the crucial elements/constructs required to optimise quality care delivery and increase PARS effectiveness. PARS programmes should promote policies that:</p> <ul style="list-style-type: none"> • Create awareness through publicity, • Foster interprofessional and HCP-patient relationships, • Provide government rebates and incentives to reduce cost, • Encourage good communication and feedback channels, and • Provide PARS education. <p>This strategy would encourage holistic and collaborative care among HCPs, increase PARS uptake and effectiveness and enhance patients' achievement of positive health outcomes.</p> | <p>Chapter 5 addressed RQ5: What are Australian PARS stakeholders' (GPs, EPs, and patients) recommendations for improving PARS? This study's findings fostered in-depth understanding of PARS stakeholders' (GPs, EPs and patients) views on how to optimise quality care for the programme's users. Based on the stakeholders' recommendations, the 'PRICE' model for quality care delivery in PARS interventions was developed.</p> |

6.3 Implications for Practice and Policy

The findings from this research have several practical implications for coordinating and delivering care in PARS interventions. The use of various theoretical frameworks has helped to identify the complexity of the continuity of care in the PARS programme. For example, the Donabedian framework has showed that there are bottlenecks in the structure and process of PARS. Therefore, the findings from this study could inform policies that will support and empower patients to self-initiate PARS intervention referrals. This initiative is important because it could influence patients' choice of appropriate referral interventions for their health condition and facilitate uptake and adherence to the PARS programme. The evidence in chapters 3 and 4 showed that patients could potentially drive the referral process and enhance the effectiveness of the PARS programme with adequate support and information. Providing an alternative pathway (e.g. nurse-led referrals and patient self-referrals) for prospective PARS participants to enroll in the CMD programme could accelerate PARS access, particularly for participants who are reluctant to seek referrals from primary healthcare and this will ultimately reduce the burden on frontline HCPs such as GPs.

The emerging care coordination framework helped reveal that the effectiveness of PARS is hindered by inter-organisational mechanisms and the relational coordination between GPs and EPs. Therefore, policies that will promote quality interdisciplinary rapport and PARS information sharing are crucial to PARS success. It was evident in chapters 4 and 5 that ongoing interprofessional interactions and sharing useful information through feedback mechanisms are critical to improved PARS awareness, increased visibility of EPs and enhanced patient referrals. In addition, quality rapport among HCPs will help them see value in PARS programmes and gain confidence to promote the initiative. The sharing of PARS information can be achieved via workshops, HCPs' undergraduate training and continuing professional developmental systems.

PA and PARS policymakers can design policies that will incentivise the coordination and delivery of quality care to patients. Doing this could foster patients' health outcomes and ensure long-term sustainability of the programme. This was supported by the findings from chapters 3 and 5. The findings indicated that government incentives (such as the increase in current CDM rebates) and financial incentives for HCPs to promote PARS, could increase referrals into PARS and improve the programme's effectiveness. A review of current CDM rebates could provide the opportunity for more PARS referrals and make the programme more affordable for participants with chronic diseases. Greater government support for rebatable EP services would increase the perceived value of EPs in the community and therefore the likelihood that patients will value and seek EP services.

Ultimately, the 'PRICE' model in chapter 5 could inform the development or reform of PARS programmes that will reflect end-users' perspectives. Therefore, PARS administrators can leverage these findings to design policies that encourage promotion (e.g. the use of pamphlets, media, and incentives), quality rapport (e.g. among HCPs and between HCPs and patients), incentives for patients and HCPs, ongoing communication (e.g., via a designated care coordinator), and education (e.g. inclusion of PA and PARS training in medical education curriculum) about PARS. Using the 'PRICE' model to inform PARS interventions could transform the coordination and delivery of care in PARS interventions and ultimately enhance patients' health outcomes.

6.4 Strengths and Limitations of the Study

The strengths of this study include the use of mixed-methods data-gathering strategy, which allows two sources of data to complement each other and reduces the chances of acquiring data by coincidence. This is the first study from the Australian context to explore the effectiveness of the PARS process using a mixed methods approach. The utilisation of established theoretical

frameworks (such as the Donabedian and TDF) to examine and synthesise the results from this research enhances the validity of the findings from this study.

Also, employing the tenets of the pluralistic evaluation to synthesise all stakeholders' views ensured that each stakeholder group's views were heard and represented in the research. The findings of the pluralistic evaluation informed the 'PRICE' model, a novel model for promoting quality care in PARS interventions. The study however has some limitations which should be considered when translating the findings to other settings. The second phase of the research considered the views of only Australian participants. This was however done to stay within the limited time frame and resources and to bridge the knowledge gap on the paucity of PARS studies from Australia compared to places like the UK. While employing a random sample technique allowed the collection of data that may provide valuable insights for enhancing PARS effectiveness, this strategy may have caused sample bias, as some respondents with an interest in PA and PARS may have been drawn to the research. Additionally, the research relied on participants' self-reported opinions, which may have been exaggerated or underestimated due to the research's focus on HCPs with particular expertise.

Chapter SEVEN: Conclusion and Recommendations

7.1 Chapter Overview

An overview of the research and the recommendations based on the findings from the study is presented in this chapter. Overall, the research explored the referral pathways between GPs and EPs to optimise the functionality of PARS and potentially, improve patients' health outcome. The research questions explored the views of PARS stakeholders (GPs, EPs and patients) on key determinants of PA and PARS promotion. The factors explored included participants' knowledge, beliefs, behaviours, perceptions and recommendation about PA and PARS. The research was conducted in three sequential stages which included systematic review, mixed methods and qualitative studies. This approach provided rationale and evidence-based procedure for gaining an in-depth understanding of how to enhance the effectiveness of the PARS process.

7.2 Summary of the Study Findings

The research presented in this thesis highlighted that ongoing promotion of PARS, increased use of the services of PA specialists like EPs, building strong and professional relationships among HCPs and between them and patients, and including PA and PARS subjects in the educational curriculum for future HCPs, could promote positive behaviours towards PARS, optimise the effectiveness of the programme and ultimately enhance patients' health outcomes. Furthermore, self-initiated referral opportunities could be made equally accessible to all potential users, including those who are socioeconomically disadvantaged, to optimise uptake and adherence to PARS programmes. The systematic reviews indicated that PA and PARS interventions could be potent therapeutic strategies if explored efficiently. The reviews revealed five knowledge gaps including the scarcity of PARS studies, limited mixed methods studies, poor PARS knowledge, lack of insights about EPs and the absence of a structural framework for PARS, limiting the effectiveness of the PARS programme.

Exploring the care circle in PARS indicated that barriers including limited PARS knowledge and time constraints and the attitude exhibited by frontline HCPs such as GPs, limit the success of PARS programmes. Ongoing promotion of PA and PARS initiatives could strengthen the awareness of PA and PARS and minimize the undervaluing of PA and PARS services. Patient-centered early PA interventions should be encouraged to improve shared-decision making, patient empowerment, and positive health outcomes. Furthermore, participants proposed nominating alternative healthcare team members such as nurses, as designated PARS coordinators to accelerate the PARS referral process and ease the burden on frontline HCPs like GPs. Increasing the use of the services of EPs could foster patients' health outcomes. Interprofessional relationship-building among GPs and EPs and HCP-patient rapport could enhance interdisciplinary care, promote coordination and delivery of quality care in PARS interventions and ultimately boost the use of EP services. The government could also support an increase in the use of EP services by reviewing the current CDM rebates for patients and providing incentives such as financial remuneration for PARS gatekeepers like GPs, to promote patient-initiated and GP-initiated referrals, respectively. Furthermore, including PA and PARS subjects in the educational curriculum for future HCPs could increase their therapeutic knowledge base and better prepare them to deliver PA and PARS services to patients and potentially inform an efficient and functional PARS structure.

Overall, the findings from this thesis are encapsulated in the 'PRICE' framework. The framework pinpoints that the interplay and propagation of five key constructs in PARS interventions are crucial to the programme's success. The constructs comprise the 'PRICE' acronym and include 'promote', 'relate', 'incentivise', 'communicate' and 'educate'.

7.3 Recommendations

Considering the preventive capabilities of PA interventions such as PARS (Ekelund, et al., 2019b), policies that will inform early identification and referral of sedentary individuals and patients with chronic diseases to PARS should be considered a preventive approach to reducing the spread of lifestyle diseases and their related complications. Guidance on evidence-based interventional PA for various conditions, common group supervised activities, and PA specialists' involvement may help stakeholders navigate the complex PARS process and promote PA adherence and beneficial health outcomes. To facilitate the translation of the findings from this research into practice, existing stakeholder networks could be motivated (and new ones could be established) to implement, train, and encourage PA promotional goals for sustainable and enhanced patient health outcomes. Detailed recommendations for each stakeholder group are presented below.

7.3.1 Patients

Patients should be empowered and supported to make informed and rebatable self-initiated PARS referrals (Angwenyi et al., 2019). Empowering patients to undertake PARS interventions could increase the programme's uptake and effectiveness and reduce the burden on healthcare gatekeepers such as GPs. Patients' inputs should also be considered when designing PARS initiatives to ensure those intervention goals reflect those of the end-users. Incentives such as reduced cost and increased CDM rebates could help patients afford the PARS programme, better value the intervention and increase their uptake.

7.3.2 HCPs

A model for changing the behaviour of HCPs and improving multidisciplinary treatment for chronic and complex diseases would be invaluable. Developing effective stakeholder networks to facilitate PA and PARS promotion training, implementation, and assessments may provide

long-term and sustainable solutions and improve patients' health outcomes. PA specialists such as EPs, could increase public awareness of the social, economic, and environmental benefits of PA and PARS via knowledge and information sharing initiatives such as EP-led seminars. Mechanisms that will ease PA assessment, counselling and referral to PA experts should be implemented in primary and secondary healthcare and social service settings. This could be facilitated by assigning designated PARS coordinators such as nurses within the primary healthcare setting. Frontline HCPs should be encouraged to use effective behaviour change strategies such as motivational interviewing, to boost their ability to convince patients to undertake PA and PARS interventions.

7.3.3 PARS Administrators and Providers

PARS administrators and providers should develop and promote interventions that reflect end-users' perspectives and integrate positive PA behavioural change strategies, professional and social ongoing support, and incentives for users. These elements could improve the effectiveness of PARS and foster the achievement of patients' health outcomes. Providers should create social marketing strategies that are tied to community initiatives.

7.3.4 Policy makers

A change in current PA and PARS policies is pivotal to the success of the programme. Policies that will incentivise and promote early PARS uptake for patients, particularly those with signs or at risk of developing chronic diseases. Therefore, designing policies that will consolidate interprofessional knowledge in various sectors within and outside the health sector, including tertiary institutions is invaluable to enhancing PARS insights and effectiveness.

7.3.5 Government

Government should design reforms that will strengthen national policies on PARS, recommend action plans and develop multi-sectoral channels for coordinating and monitoring the

implementation of intervention goals. Government should increase funding to support PARS interventions and consider the increase of CDM rebates.

7.4 Directions for Future Research

This section presents areas that could be considered and addressed in future PARS studies. Future PARS research should investigate the physical, mental and wellbeing outcomes of PARS interventions in relation to participants' reasons for referral. The findings from chapter 2 indicated that the reason for participants' referral into PARS influences the PARS programme's uptake, adherence, and effectiveness. Therefore, to minimise complexities and optimise the gains from the PARS programme, future studies should explore effective ways to design, implement and assess the outcomes from PARS initiatives based on functional programme characteristics such as the reasons for referral (Parretti et al., 2017).

Due to the heterogeneity in the implementation and operations of the PARS programmes globally, future studies could evaluate PARS' effectiveness using evidence-based tools such as the PARS taxonomy tool which was recently developed by Hanson et al, (2020b). This tool documents practical facts within scheme delivery to identify existing variations among programmes nationally and internationally. Using such a tool could provide an evidenced-based framework that could inform future policies, care delivery, and assessment of PARS interventions. Utilisation of information and digital technologies could also be considered for improved PARS monitoring and decision making.

Furthermore, to provide consensus, strengthen the evidence base and understanding of PARS, large scale multinational studies are needed to examine different PARS delivery strategies to determine best practice and inform the development of future PARS programmes. Such studies could utilise the 'PRICE' model developed in this research to enhance PARS delivery strategies and subsequently evaluate its impact on the functionality of PARS and the promotion of PA in relation to both the delivery and receipt of PA interventions. Understanding how to

individualise behavioural change strategies and not rely on a “one size fits all” approach is key to unlocking potential behaviour change towards PA and PARS interventions. Encouraging better patient outcomes and a robust healthcare system may require input from other patient groups and health care professionals other than GPs and EPs. For example, exploration of the functionality of PARS from indigenous perspectives could reveal ideas that could inform the tailoring of PARS interventions to facilitate the uptake and adherence to intervention goals by a particular cultural or social group of people. Furthermore, better interdisciplinary communication between EPs and other HCPs that is facilitated right from undergraduate training could foster better coordination of care for PARS patients as well as increase the visibility and value of EPs and the services they render.

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Appendices

Appendix A - Ethics Approval

This administrative form
has been removed

Appendix B - Survey Instruments and Interview Protocols for all Primary Studies

B.1 Patients' Survey Utilised in Chapter 3

| | |
|---|--|
| Please read and consider each of the following questions carefully. Your candid responses are essential to ensure the reliability of this study. Please ensure that you answer all the questions. | |
| Section A: Socio-demographic characteristics | |
| Gender | <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Others (Specify)..... |
| Age | _____ (Years) |
| What is your highest level of Education? | <input type="checkbox"/> Elementary school <input type="checkbox"/> High school <input type="checkbox"/> Trade school <input type="checkbox"/> College or University |
| What is your first language? | _____ |
| Do you have a doctor you see regularly (e.g. you see the same doctor each time?) | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Other (Specify)..... |
| If yes, how many times have you seen this doctor in the last 12 months? | <input type="checkbox"/> 0 <input type="checkbox"/> 1 – 2 <input type="checkbox"/> 3 – 5 <input type="checkbox"/> > 6 <input type="checkbox"/> Don't know <input type="checkbox"/> Other (Specify)..... |
| If no, what other doctor do you see? (click all that apply) | <input type="checkbox"/> Cardiologist (heart doctor) <input type="checkbox"/> Oncologist (cancer doctor) <input type="checkbox"/> Surgeon <input type="checkbox"/> Rheumatologist (arthritis doctor) <input type="checkbox"/> Endocrinologist (diabetes, thyroid or hormone disease doctor) <input type="checkbox"/> Psychiatrist <input type="checkbox"/> Orthopaedic surgeon (bone doctor) <input type="checkbox"/> None |
| Work Status | <input type="checkbox"/> Retired <input type="checkbox"/> Employed <input type="checkbox"/> House work <input type="checkbox"/> Volunteer work <input type="checkbox"/> Seeking work <input type="checkbox"/> Student |
| Who referred you for physical activity programme? | <input type="checkbox"/> GP <input type="checkbox"/> Primary care <input type="checkbox"/> Self referred <input type="checkbox"/> Other (Specify)..... |
| Reason for referral (Click all that apply) | <input type="checkbox"/> Sedentary/inactive <input type="checkbox"/> Coronary Heart Disease (CHD) <input type="checkbox"/> Diabetes <input type="checkbox"/> Mental health <input type="checkbox"/> Overweight/obese <input type="checkbox"/> Arthritis <input type="checkbox"/> Back pain <input type="checkbox"/> Smoking <input type="checkbox"/> Alcoholic <input type="checkbox"/> Musculoskeletal pain <input type="checkbox"/> Cancer <input type="checkbox"/> Other (Specify)..... |
| How will you classify the environment you reside? | <input type="checkbox"/> Remote Village <input type="checkbox"/> Small rural town <input type="checkbox"/> Large rural town <input type="checkbox"/> Major regional city <input type="checkbox"/> Capital city |
| Section B - The next set of questions relate to your knowledge of physical activity (PA) | |
| Indicate if each of the following statement about physical activity (PA) is true or false | True False |
| | PA is any movement that involves the contraction of muscles |
| | PA has to be high intensity to benefit health. |
| | Climbing the stairs is a form of PA |
| | Exercise is a form of PA |
| | PA is only beneficial if performed for at least 20 minutes at a time |
| | The recommended PA for adults is at least 150 mins low – moderate PA or 10, 000 steps per day |
| | Adults are encouraged to engage in 30 minutes of PA per week or 5000 steps per day to confer relevant health benefits |

| | | | | | |
|---|---|--------------------------|--------------------------|--------------------------|--------------------------|
| What are the sources of information you refer to in relation to PA? (click all that apply) | <input type="checkbox"/> Books, Newspapers and magazines <input type="checkbox"/> Television <input type="checkbox"/> Clubs, groups or lectures <input type="checkbox"/> Internet <input type="checkbox"/> Family or friends <input type="checkbox"/> GP <input type="checkbox"/> Nurse <input type="checkbox"/> Allied health personnel (physiotherapist, EP etc) <input type="checkbox"/> Others (Specify)..... | | | | |
| In the last 12 months how often has your doctor spoken to you about PA or referral pathways for PA intervention? | <input type="checkbox"/> Once <input type="checkbox"/> 2 or 3 times <input type="checkbox"/> At each visit <input type="checkbox"/> Don't know. <input type="checkbox"/> Others (Specify)..... | | | | |
| When this conversation takes place who usually brings the subject of up? | <input type="checkbox"/> I usually bring it up (ask questions) <input type="checkbox"/> My doctor usually brings it up (ask me about my PA history) <input type="checkbox"/> Sometimes I bring it up and sometimes my doctor does <input type="checkbox"/> Does not apply to me <input type="checkbox"/> Others (Specify)..... | | | | |
| When such conversations take place, in what terms does it occur (click all that apply) | <input type="checkbox"/> Treating a health problem I have (diabetes, CHD, high blood pressure, breathing problems, muscle arches, joint pain etc) <input type="checkbox"/> Maintaining my health <input type="checkbox"/> Reducing medication intake <input type="checkbox"/> Improving quality of life <input type="checkbox"/> Weighty loss <input type="checkbox"/> Others (Specify)..... | | | | |
| Are these conversations useful? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | |
| Section C - The next set of questions relate to your beliefs about PA and referral pathways | | | | | |
| Please indicate the extent to which you agree or disagree with the statements below. | | | | | |
| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| PA is beneficial to patients with lifestyle diseases. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PA counselling is important in medical practice. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I have become more knowledgeable about the health benefits of PA. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I do more PA now compared to before I got referred for the PA intervention | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I don't think my doctor has the knowledge to tell me about PA or referral pathways | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Referral pathway for PA intervention is vital in the management of patients with lifestyle diseases. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| When my doctor discusses PA and referral pathways with me this encourages me to be physically active even when I don't feel like it | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | | |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|
| I value my doctor's opinion about PA and referral pathways | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I am confident in my own PA abilities with or without referral pathway interventions | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I am pleased with the care and support I get from my exercise physiologist during the PA intervention training. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Section D - The next set of questions relate to your individual PA behaviours | | | | | |
| Do you engage in any form of physical activity (e.g. gardening, walking your dog, cycling etc) | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | |
| What kind of physical activity do you currently do? | <input type="checkbox"/> Light Activity – heart beats slightly than normal and you can talk or sing (e.g. walking, stretching and gardening) <input type="checkbox"/> Moderate Activity – heart beats faster than normal and you can talk but not sing (e.g. fast walking, aerobics, strength training and swimming gently). <input type="checkbox"/> Vigorous Activity – heart rate highly increased than normal and difficulty in talking (e.g. jogging, soccer, tennis and running on the treadmill). <input type="checkbox"/> Others (Specify)..... | | | | |
| Please identify your reason for taking part in physical activity (click all that apply) | <input type="checkbox"/> Lose weight <input type="checkbox"/> Enjoyment <input type="checkbox"/> Relieve stress <input type="checkbox"/> Hobby <input type="checkbox"/> Healthy lifestyle <input type="checkbox"/> Manage my disease condition <input type="checkbox"/> Socialize <input type="checkbox"/> Others (Specify)..... | | | | |
| Do you engage in any formal/programmed physical activity (needing a specialist to prescribe an individualised programme)? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | |
| How often per week do you participate in PA interventions? | <input type="checkbox"/> 3 or more times per week <input type="checkbox"/> 1 or 2 times per week <input type="checkbox"/> Seldom or never | | | | |
| How long is the duration of physical activity programme (total time it will take you to complete the programme from start to finish)? | <input type="checkbox"/> < 5 weeks <input type="checkbox"/> 5 – 10 weeks <input type="checkbox"/> 10 – 15 weeks <input type="checkbox"/> 15 – 20 weeks <input type="checkbox"/> > 20 weeks <input type="checkbox"/> Other (Specify)..... | | | | |
| How did you pay for the formal physical activity programme? | <input type="checkbox"/> Paid in full <input type="checkbox"/> You paid half the price <input type="checkbox"/> Programme was free <input type="checkbox"/> Payment covered by health insurance or government subsidy (e.g. Medicare) <input type="checkbox"/> Other (Specify)..... | | | | |

| | |
|---|--|
| <p>If you are currently inactive or do not engage in PA regularly, what are your current barriers towards physical activity? (click all that apply)</p> | <input type="checkbox"/> Inadequate time <input type="checkbox"/> Cannot afford it <input type="checkbox"/> Injured or Disable <input type="checkbox"/> Not important <input type="checkbox"/> Poor or lack of facilities <input type="checkbox"/> Care for kids and others <input type="checkbox"/> Not motivated <input type="checkbox"/> Lack of transport <input type="checkbox"/> Other (Specify)..... |
| <p>How would you classify your overall health</p> | <input type="checkbox"/> Excellent <input type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> Very poor |
| <p>Section E - The next set of questions relate to your PA recommendations</p> | |
| <p>Will you give feedback to your doctors and ask them to recommend other patients for PA interventions?</p> | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| <p>If No, please state your reason</p> | |
| <p>What are some of the benefits of referral pathways? (Click all that apply)</p> | <input type="checkbox"/> Patient-reported improved health outcome <input type="checkbox"/> Presence of objectively measured outcome <input type="checkbox"/> Reduces the work burden placed on GPs |
| <p>What do you consider as the barrier(s) to the effective use of GP-EP referral pathways in your setting? (Click all that apply)</p> | <input type="checkbox"/> Scarcity of referral pathways <input type="checkbox"/> Lack of reference materials <input type="checkbox"/> Lack of quality of financial incentive <input type="checkbox"/> Lack of knowledge on the subject matter <input type="checkbox"/> Lack of national coordination of process <input type="checkbox"/> PA support services are highly undervalued <input type="checkbox"/> Others (Specify)..... |
| <p>What changes would you suggest that could help improve referral programs? (Click all that apply)</p> | <input type="checkbox"/> Ease of use <input type="checkbox"/> Dynamic interactions between GPs and EPs. <input type="checkbox"/> Improved communication between GPs and EPs <input type="checkbox"/> An overview of available referral pathway(s) in your setting <input type="checkbox"/> Education about referral pathway programs implementation <input type="checkbox"/> Workbook function and process (problem or disease and the optimum process of management) <input type="checkbox"/> Others (Specify)..... |

B.2 Patients' Interview Guide Utilised in Chapters 3 and 5

| No | Questions | Probes and Prompts |
|--|--|--|
| <i>A. Pre- PARS history</i> | | |
| 1. | To start with, can you share with me information on your health status prior to engaging in a physical activity programme (before you joined the scheme): What was your health like at this point? | (a) What kind of health challenges were you having? (b) What was your lifestyle like? (c) Could your lifestyle have predisposed you to this disease? |
| 2. | In general terms, what was your experience of PA in the past? | (a) How often did you do this? (b) How long each time? (c) Any reason why? (d) Were there any barriers and/or facilitators that influenced your participation in physical activity? (e) How are you keeping active now? |
| <i>B. PARS knowledge</i> | | |
| 3. | Now focusing on the physical activity referral scheme (PARS) if yes, what are your suggestions, how did you learn about the referral pathways for PA interventions? | (a) Who referred you? (b) Who/what has motivated you to attend? (c) What made you decide that this is the right time to take part in the scheme? (d) Did you have any expectations about the referral scheme, and was this expectation met? |
| 4. | Did the information received about PARS influence your participation in physical activity? | (a) How was the information disseminated to you? (b) How useful was this information? |
| 5. | In relation to your time on the PARS referral scheme, what is your perception about the intervention programmes or sessions? | (a) What was the duration of the programme? (b) What did you enjoy most? (c) Was there anything you found challenging or did not enjoy much? (e.g. getting to venues, problems with the venues, advisors, support received, attending at set times etc.). (d) For you, how important are attendance to programme sessions and adherence to programme goals? (e) Have you experienced any notable outcomes by participating in the scheme? (f) If yes, can you tell me more about this achievement? (g) If no, can you tell me why? (h) What do you think are the benefits of referral pathways? (i) How confident are you about your knowledge of PA? (j) What's your health status like now? |
| <i>C. Influence(s) of HCPs (GPs and EPs)</i> | | |
| 6. | How have your health care professionals influenced your knowledge of physical activity? | Possible areas: prescription, counselling and advice and providing factsheet. |
| 7. | How have your health care professionals influenced your uptake of physical activity? | Possible areas: improved participation in PA, more understanding of the benefits for PA and can perform PA unsupervised. |
| <i>D. Perceived Challenges or Barriers to PARS</i> | | |
| 8. | From your viewpoint, what are the challenges associated with the physical activity referral scheme/pathway? | (a) What are your thoughts about Medicare or enhanced primary care (EPC) pathway referrals? (b) Possible areas including cost, distance, support, timings etc. |
| <i>E. Perception on how to Improve PARS</i> | | |

| | | |
|---|--|--|
| 9. | From your viewpoint, do you think PARS needs improvement? | (a) if yes, what are your suggestions? |
| <i>F. On a final note:</i> | | |
| 10. | Is there anything else you would like to tell me about your experience of the physical activity referral scheme? | (a) To summarise my understanding of what you said.... (b) Is there any information you would like to add, rephrase or remove from all you have said today? |
| This interview is now over. Thank you for your time and have a great day. | | |

B.3 EPs' Survey Utilised in Chapter 4

| | | | | | |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|
| Please read and consider each of the following questions carefully. Your candid responses are essential to ensure the reliability of this study. Please ensure that you answer all the questions. | | | | | |
| Section A: Socio-demographic characteristics | | | | | |
| Do you hold ESSA accreditation | <input type="checkbox"/> AES <input type="checkbox"/> AEP <input type="checkbox"/> AspS <input type="checkbox"/> AHPM | | | | |
| State and region of residence (e.g Queensland, Townsville) | _____ | | | | |
| Gender | <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Others (Specify)..... | | | | |
| Age | _____ (Years) | | | | |
| Years of EP Experience | _____ (Years) | | | | |
| What industry do you practice in? (click all that apply) | <input type="checkbox"/> Community/Public health <input type="checkbox"/> Corporate Health/Occupational Health and Safety <input type="checkbox"/> Education Research <input type="checkbox"/> Aged Care and Disability <input type="checkbox"/> Private Practice <input type="checkbox"/> Tertiary Sector <input type="checkbox"/> NGO <input type="checkbox"/> Schools <input type="checkbox"/> Gym Other (Specify)..... | | | | |
| Work Status | <input type="checkbox"/> Employee <input type="checkbox"/> Employer/contractor <input type="checkbox"/> Casual <input type="checkbox"/> Both <input type="checkbox"/> Other (Specify)..... | | | | |
| Practice Environment | <input type="checkbox"/> Remote Village <input type="checkbox"/> Small rural town <input type="checkbox"/> Large rural town <input type="checkbox"/> Major regional city <input type="checkbox"/> Capital city <input type="checkbox"/> Other (Specify)..... | | | | |
| Section B - The next set of questions relate to your knowledge of physical activity (PA) | | | | | |
| Indicate if each of the following statement about physical activity (PA) is true or false | <p style="text-align: right;">True OR False</p> PA is any movement that involves the contraction of muscles PA has to be high intensity to benefit health. Climbing the stairs is a form of PA Exercise is a form of PA PA is only beneficial if performed for at least 20 minutes at a time The recommended PA for adults is at least 150 mins low – moderate PA or 10, 000 steps per day Adults are encouraged to engage in 30 minutes of PA per week or 5000 steps per day to confer relevant health | | | | |
| Section C - The next set of questions relate to your beliefs about PA | | | | | |
| Please indicate the extent to which you agree or disagree to the statements below. | | | | | |
| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Patients with lifestyle diseases should be managed with PA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PA counselling is important in my field of practice. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | | | | | |
|---|---|--------------------------|--------------------------|--------------------------|--------------------------|
| I am confident in prescribing PA to my patients. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Patients would adhere to prescribed PA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PA is beneficial to my patients | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Most GPs in my practice have information about EPs | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| GPs refer patients to me for individualised PA intervention as required | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Healthcare practitioners should be role models to their patients | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physically active healthcare practitioners would be more likely to encourage their patients to take part in PA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Section D - The next set of questions relate to your individual PA behaviours | | | | | |
| Are you involved in any form of PA | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | |
| How many minutes of moderate to vigorous activity do you engage in each week? | | | | | |
| Please identify your reason for taking part in physical activity (click all that apply) | <input type="checkbox"/> Lose weight <input type="checkbox"/> Enjoyment <input type="checkbox"/> Relieve stress <input type="checkbox"/> Hobby <input type="checkbox"/> Health benefits <input type="checkbox"/> Example to patients <input type="checkbox"/> Socialize <input type="checkbox"/> Others (Specify)..... | | | | |
| If you are currently inactive or do not take part regularly, what are your current barriers towards physical activity? (click all that apply) | <input type="checkbox"/> Inadequate time <input type="checkbox"/> Cannot afford it <input type="checkbox"/> Disabled <input type="checkbox"/> Not important <input type="checkbox"/> Poor or lack of facilities <input type="checkbox"/> Care for kids <input type="checkbox"/> Not motivated <input type="checkbox"/> Others (Specify)..... | | | | |
| Section E - The next set of questions relate to your PA recommendations | | | | | |
| Do you frequently recommend your services and explain your role in the management of lifestyle disease to GPs? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | |
| If No, please state your reason | | | | | |
| If yes, has this influenced the referral of patients from GPs to you? | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> | | | | |
| How do GPs refer patients to you? (click all that apply) | <input type="checkbox"/> Referral letter <input type="checkbox"/> Word of mouth <input type="checkbox"/> Telephone call <input type="checkbox"/> Others (Specify) | | | | |
| On average, how many patients do GPs refer to you per month | | | | | |
| What type of patient do GPs refer to you? (click all that apply) | <input type="checkbox"/> Patient with cardiovascular diseases <input type="checkbox"/> Patient with diabetes <input type="checkbox"/> Sedentary patients <input type="checkbox"/> Patients with Asthma <input type="checkbox"/> Overweight/Obese patients <input type="checkbox"/> Chronic smoker <input type="checkbox"/> Patients with cancer <input type="checkbox"/> Mental health patients <input type="checkbox"/> Patients with musculoskeletal disorders <input type="checkbox"/> Others (Specify) | | | | |

| | |
|--|---|
| Do you give regular feedback to GPs on the outcome of your interventions with the referred patient? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| If no, please state your reason | |
| Do you mostly get feedback from patients on the outcome of their programme with you? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| If yes, was the feedback positive? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| What are some of the benefits of referral pathways? (Click all that apply) | <input type="checkbox"/> Patient-reported improved health outcome <input type="checkbox"/> Presence of objectively measured outcome <input type="checkbox"/> Reduces the work burden placed on GPs <input type="checkbox"/> Others (Specify)..... |
| What do you consider to be the barriers militating against the effective use of GP-EP referral pathways in your setting? (Click all that apply) | <input type="checkbox"/> Scarcity of referral pathways <input type="checkbox"/> Lack of reference materials <input type="checkbox"/> Lack of quality of financial incentive <input type="checkbox"/> Lack of knowledge on the subject matter <input type="checkbox"/> Lack of national coordination of process. <input type="checkbox"/> PA support services are highly underestimated. <input type="checkbox"/> Inadequate consultation time for GPs <input type="checkbox"/> Patients might not be motivated to take up referral or participant in Pa interventions <input type="checkbox"/> Not enough EPs <input type="checkbox"/> Others (Specify)..... |
| What changes would you suggest that could help improve referral programs? (Click all that apply) | <input type="checkbox"/> Ease of use <input type="checkbox"/> Dynamic interactions between GPs and EPs. <input type="checkbox"/> Improved communication between GPs and EPs <input type="checkbox"/> An overview of available referral pathway(s) in your setting <input type="checkbox"/> Education about referral pathway programs implementation <input type="checkbox"/> Workbook function and process (problem or disease and the optimum process of management) <input type="checkbox"/> Financial incentives or subsidies for patients <input type="checkbox"/> Others (Specify)..... |

B.4 EPs' Interview Guide for Chapters 4 and 5

| No | Questions | Probes and Prompts |
|---|--|--|
| A. ROLE | | |
| 1. | To start with, can you briefly explain your role in the management of patients with chronic and lifestyle diseases? | <ul style="list-style-type: none"> • Where is your practice located? • Would you consider your practice public or private? • What is your level of involvement with patients? |
| B. PARS knowledge | | |
| 2. | Now focusing on the physical activity referral scheme (PARS), how are patients referred to you? | <ul style="list-style-type: none"> • What type of patient do you see? • Any specific type of programme for your clients? • What is the duration of this programme? • On a scale of 1 – 10 with 1 being the least and 10 the most, how would you rate the general success or outcomes of your clients? • Can you describe any scenario where you helped change your client's PA behaviour to achieve a goal? |
| C. Professional Relationship with other HCPs (e.g. GPs) and patients | | |
| 3. | In general terms how do you feel about discussion physical activity with your clients? | <ul style="list-style-type: none"> • What advice do you give them about PA? • What advice gets your patients moving? • Is this advice feasible? • Are they receptive? |
| 4. | Do you get feedback from patients about the outcome of your intervention with them? | <ul style="list-style-type: none"> • What do they say? • Are they positive? |
| 5. | Do you often discuss your role with GPs and give feedback to them on the outcome of your intervention with patients? | <ul style="list-style-type: none"> • Has these influenced the number of referrals you get from GPs? • Any reason why? |
| 6. | What do you think are the benefits of physical activity referral pathways? | |
| D. Perceived Challenges or Barriers to PARS | | |
| 7. | From your viewpoint, what are the challenges associated with the physical activity referral scheme/pathway? | <ul style="list-style-type: none"> • What are your thoughts about Medicare or the chronic disease management (CDM) pathways? • Possible areas including cost, distance, support, timings etc. |
| E. Perception on how to Improve PARS | | |
| 8. | From your viewpoint, do you think PARS needs improvement? | <ul style="list-style-type: none"> • if yes, what are your suggestions? |
| F. On a final note: | | |
| 9. | Is there anything else you would like to tell me about your experience of the physical activity referral scheme? | <ul style="list-style-type: none"> • To summarise my understanding of what you said... • Is there any information you would like to add, rephrase or remove from all you have said today? |
| This interview is now over. Thank you for your time and have a great day. | | |

B.5 GPs' Survey Utilised in Chapter 4.

| | |
|---|--|
| Please read and consider each of the following questions carefully. Your candid responses are essential to ensure the reliability of this study. Please ensure that you answer all the questions. | |
| Section A: Socio-demographic characteristics | |
| State and region of residence (e.g Queensland, Townsville) | |
| Gender | <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Others (Specify)..... |
| Age | _____ (Years) |
| Years of GP Experience | _____ (Years) |
| Work Status | <input type="checkbox"/> GP Partner <input type="checkbox"/> Salaried GP <input type="checkbox"/> Locum GP <input type="checkbox"/> Other (Specify)..... |
| Practice Setting | <input type="checkbox"/> Private <input type="checkbox"/> Teaching <input type="checkbox"/> Hospital |
| Average number of patients seen per day | <input type="checkbox"/> < 10 <input type="checkbox"/> 10 - 20 <input type="checkbox"/> 20 – 30 <input type="checkbox"/> Other (Specify)..... |
| Practice Environment | <input type="checkbox"/> Remote Village <input type="checkbox"/> Small rural town <input type="checkbox"/> Large rural town <input type="checkbox"/> Major regional city <input type="checkbox"/> Capital city <input type="checkbox"/> Other (Specify)..... |
| Practice aims/vision | <input type="checkbox"/> Holistic approach <input type="checkbox"/> Chronic disease management <input type="checkbox"/> Other (Specify)..... |
| Are exercise physiologist (EPs) on staff at your practice? | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Other (Specify)..... |
| Section B - The next set of questions relate to your knowledge of physical activity (PA) | |
| Indicate if each of the following statement about physical activity (PA) is true or false | True OR False |
| | PA is any movement that involves the contraction of muscles PA has to be high intensity to benefit health. Climbing the stairs is a form of PA Exercise is a form of PA PA is only beneficial if performed for at least 20 minutes at a time The recommended PA for adults is at least 150 minutes low – moderate PA or 10, 000 steps per day Adults are encouraged to engage in 30 minutes of PA per week or 5000 steps per day to confer relevant health |
| PA clinical scenario | |
| Patient: Mr Robson, 49-year-old High School Teacher | |
| History: A Caucasian with 3 years history of diabetes which is under control. He has no allergies and is not asthmatic. No history of injury and no previous surgeries. Previously, an alcoholic and smoked heavily for about 29 years but stopped last year after the advice of his GP. He has not been involved in any form of physical activity (PA) for 18 months. | |
| Medication: Nil | |
| Examination | |
| Fasting plasma glucose level = 5.61 mmol/L, Oral glucose tolerance test = 7.88 mmol/L BP = 135/88, Weight = 90kg, Height = 166cm and Body Mass Index = 32.6 | |
| As a priority, what will be your fist line of action/advise to this patient? | <input type="checkbox"/> Place patient on drug regimen (prescribe drugs) <input type="checkbox"/> Prescribe/recommend physical activity (PA) and advise client on diet <input type="checkbox"/> Refer patient for an ultrasound scan |

| | | | | | |
|---|---|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> Recommend surgery to patient <input type="checkbox"/> Recommend patient for admission in the hospital | | | | |
| What type of PA programme will be appropriate for this patient? | <input type="checkbox"/> A combination of moderate to vigorous intensity cardiovascular, resistance and flexibility exercises <input type="checkbox"/> A combination of vigorous intensity cardiovascular, resistance and flexibility exercises <input type="checkbox"/> Low intensity physical activity (e.g walking) programme <input type="checkbox"/> A vigorous running programme | | | | |
| If No, please state your reason | | | | | |
| If Yes, what type of PA would you recommend? | <input type="checkbox"/> Cardiorespiratory <input type="checkbox"/> Resistance/muscular <input type="checkbox"/> Both <input type="checkbox"/> Others (Specify)..... | | | | |
| At what intensity? | <input type="checkbox"/> Light <input type="checkbox"/> Moderate <input type="checkbox"/> Vigorous <input type="checkbox"/> Others (Specify)..... | | | | |
| Frequency of PA per week? | <input type="checkbox"/> Once <input type="checkbox"/> Twice <input type="checkbox"/> Thrice <input type="checkbox"/> Others (Specify)..... | | | | |
| At what duration in time (minutes)? | <input type="checkbox"/> 5-10 <input type="checkbox"/> 10-20 <input type="checkbox"/> 20-30 <input type="checkbox"/> Others (Specify)..... | | | | |
| Section C - The next set of questions relate to your beliefs about PA | | | | | |
| Please indicate the extent to which you agree or disagree to the statements below. | | | | | |
| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Patients with lifestyle diseases should be managed with PA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PA counselling is important in my field of practice. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I am confident in prescribing PA to my patients. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Patients would adhere to prescribed PA | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| PA is beneficial to my patients | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Section D - The next set of questions relate to your individual PA behaviours | | | | | |
| Are you involved in any form of PA? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | |
| How many minutes of moderate to vigorous activity do you engage in each week | | | | | |
| Please identify your reason for taking part in physical activity (click all that apply) | <input type="checkbox"/> Lose weight <input type="checkbox"/> Enjoyment <input type="checkbox"/> Relieve stress <input type="checkbox"/> Hobby <input type="checkbox"/> Healthy lifestyle <input type="checkbox"/> Example to patient <input type="checkbox"/> Socialize <input type="checkbox"/> Others (Specify)..... | | | | |
| If you are currently inactive or do not take part regularly, what are your current barriers towards physical activity? (click all that apply) | <input type="checkbox"/> Inadequate time <input type="checkbox"/> Cannot afford it <input type="checkbox"/> Disabled <input type="checkbox"/> Not important <input type="checkbox"/> Poor of lack of facilities <input type="checkbox"/> Care for kids <input type="checkbox"/> Not motivated <input type="checkbox"/> Others (Specify)..... | | | | |
| Section E - The next set of questions relate to your PA recommendations | | | | | |
| Do you recommend PA to your patients? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | |
| Do you refer your patients to an exercise physiologist (EP) for PA intervention? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | | |

| | |
|--|---|
| <p>What type of patient(s) would you refer to EPs? (click all that apply)</p> | <input type="checkbox"/> Patient with cardiovascular diseases <input type="checkbox"/> Patient with diabetes <input type="checkbox"/> Sedentary patients <input type="checkbox"/> Patients with Asthma <input type="checkbox"/> Overweight/Obese patients <input type="checkbox"/> Chronic smoker <input type="checkbox"/> Patients with cancer <input type="checkbox"/> Mental health patients <input type="checkbox"/> Patients with musculoskeletal disorders <input type="checkbox"/> Others (Specify) |
| <p>How do you refer your patients to EPs? (click all that apply)</p> | <input type="checkbox"/> Referral letter <input type="checkbox"/> Word of mouth <input type="checkbox"/> Telephone call <input type="checkbox"/> Patient's choice <input type="checkbox"/> Others (Specify) |
| <p>What are some of the benefits of referral pathways? (Click all that apply)</p> | <input type="checkbox"/> Patient-reported improved health outcome <input type="checkbox"/> Presence of objectively measured outcome <input type="checkbox"/> Reduces the work burden placed on GPs <input type="checkbox"/> Others (Specify) |
| <p>Do you routinely get feedback from EPs on the patients you refer to them?</p> | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| <p>If no, please state your reason</p> | |
| <p>What do you consider to be the barriers preventing the effective use of GP-EP referral pathways in your setting? (Click all that apply)</p> | <input type="checkbox"/> Scarcity of referral pathways <input type="checkbox"/> Lack of reference materials <input type="checkbox"/> Lack of quality of financial incentive <input type="checkbox"/> Lack of knowledge on the subject matter <input type="checkbox"/> Lack of national coordination of process <input type="checkbox"/> PA support services are highly undervalued <input type="checkbox"/> Inadequate consultation time <input type="checkbox"/> Others (Specify)..... |
| <p>What changes would you suggest that could help improve referral programs? (Click all that apply)</p> | <input type="checkbox"/> Ease of use <input type="checkbox"/> Dynamic interactions between GPs and EPs. <input type="checkbox"/> Improved communication between GPs and EPs <input type="checkbox"/> An overview of available referral pathway(s) in your setting <input type="checkbox"/> Education about referral pathway programs implementation <input type="checkbox"/> Workbook function and process (problem or disease and the optimum process of management) <input type="checkbox"/> Others (Specify)..... |

B.6 GPs' Interview Guide for Chapters 4 and 5

| No | Questions | Probes and Prompts |
|---|--|--|
| <i>A. Role</i> | | |
| 1. | To start with, can you briefly explain your role in the management of patients with chronic and lifestyle diseases? | <p>Where is your practice located?</p> <p>Would you consider your practice public or private?</p> <p>What is your level of involvement with patients?</p> <p>What kind of health challenges inform your choice of PARS referral?</p> <p>What was their lifestyle like?</p> <p>Could their lifestyle have predisposed them to lifestyle diseases?</p> |
| <i>B. PARS knowledge</i> | | |
| 2. | Now focusing on the physical activity referral scheme (PARS), what are your experiences with PARS and other pathways for PA interventions? | <p>How did you learn about it?</p> <p>Who/what has motivated you to use this pathway?</p> <p>What type of patient do you refer?</p> <p>Did you have any expectations about the referral scheme, and was this expectation met?</p> |
| <i>C. Professional Relationship with other HCPs (e.g. EPs) and patients</i> | | |
| 3. | How have other HCPs such as EPs influenced your knowledge of physical activity? | Possible areas: prescription, counselling and advice and providing factsheet. |
| 4. | How have you influenced your patient's uptake of PA and PARS? | Possible areas: improved participation in PA, more understanding of the benefits for PA and can perform PA unsupervised. |
| 5. | Do EPs discuss their roles with you and provide feedback on the outcome of their intervention with the patient you refer to them? | <p>What do you think about the feedback?</p> <p>Is it useful for your practice?</p> <p>Does it inform your future referral choice?</p> |
| <i>D. Perceived Challenges or Barriers to PARS</i> | | |
| 8. | From your viewpoint, what are the challenges associated with the physical activity referral scheme/pathway? | <p>What are your thoughts about Medicare or the chronic disease management (CDM) pathways?</p> <p>Possible areas including cost, distance, support, timings etc.</p> |
| <i>E. Perception on how to Improve PARS</i> | | |
| 9. | From your viewpoint, do you think PARS needs improvement? | if yes, what are your suggestions? |
| <i>F. On a final note:</i> | | |
| 10. | Is there anything else you would like to tell me about your experience of the physical activity referral scheme? | <p>To summarise my understanding of what you said...</p> <p>Is there any information you would like to add, rephrase or remove from all you have said today?</p> |
| This interview is now over. Thank you for your time and have a great day. | | |

Appendix C - Supplementary Materials

C.1 Study Search Terms for the Systematic Review in Chapter 2A

exercise* OR "physical activit*" OR sport* OR walk* OR run* OR "physical fitness" OR exertion OR "exercise on referral" OR "physical activity on prescription" OR "exercise on prescription" OR "medicine is exercise" OR "green prescription" OR “exercise referral scheme” OR “physical activity promotion”

AND

“general practice physician” OR “general practi*” OR "family physician*" OR "family practi*" OR "family doctor*" OR gp OR "home doctor*" OR generalists

AND

"physical therap*" OR physio* OR "exercise physiolog*" OR "physical trainer*" OR "personal trainer*" OR "fitness train*" OR "fitness instruct*" OR “health personnel” OR “primary care” OR “primary healthcare” OR “patient care team” OR “Integrated healthcare” OR “integrated health care” OR “patient care team*” OR “allied health p*”

AND

refer* OR "secondary car*" OR transfer OR send OR "consultation, referral" OR "health service gatekeeper*" OR "second opinion" OR consult*

AND

"life style*" OR "life style induced illness*" OR sedentary OR “sedentary behaviour” OR "health behavio*" OR "lifestyle disease*" OR "life style, sedentary" OR "life style change*" OR barrier* OR facilitat*

C.2 Study Search Terms for the Systematic Review in 2B

“primary care” OR “primary healthcare” OR “Integrated health*” OR "primary healthcare p*" OR "patient car*" OR "healthcare p*" OR "general practi*" OR "family doctor*" OR doctor* Or gp* OR physician* OR surgeon* OR nurse* OR "physical therapist*" OR physio* OR "exercise physiologist*" OR "health p*" OR dietitian* OR “occupational therapist*” OR chiropractor* OR podiatrist* OR “allied health p*” AND perception* OR know* OR inform* OR perspective* OR view* OR believe* OR opinion* OR idea* OR impression* OR proficiency OR "uptake and knowledge” OR behaviour AND "physical activit*" OR exercise* OR sport* OR walk* OR run* OR "physical fitness" OR "exercise on referral" OR "physical activity on prescription" OR "exercise on prescription" OR "exercise is medicine" OR "green prescription" OR “exercise referral scheme” OR “physical activity promotion” OR “health promotion” AND inactiv* OR “chronic disease*” OR disease* OR sedentary OR “sedentary behaviour*” OR "lifestyle disease*" OR "life style, sedentary" OR "life style change*"

C.3 Key Factors Influencing Healthcare Professionals' Coordination of Care Utilised in

Chapter 4.

Adapted from: Van Houdt S, Sermeus W, Vanhaecht K, De Lepeleire J. Focus groups to explore healthcare professionals' experiences of care coordination: towards a theoretical framework for the study of care coordination. BMC Fam Pract. 2014;15(2011):1-11.

