Curtin School of Allied Health

Physical Activity for Older Aboriginal People of the South West of Western Australia

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This thesis is presented for the degree of
Doctor of Philosophy
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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made. This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. I have clearly stated the contribution by others to jointly authored works that I have included in my thesis. Signed statements of consent for inclusion of jointly authored works in this thesis were obtained from all co-authors (see Appendix A).

Human Ethics

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council Ethical conduct in research with Aboriginal and Torres Strait Islander Peoples and communities: Guidelines for researchers and stakeholders 2018. The proposed research study received human research ethics approval from the Curtin University Human Research Ethics Committee (EC00262), Approval Number #HRE2018-0425 and the WA Aboriginal Health Ethics Committee Approval Number #HREC842.

Signature Redacted

Margaret Gidgup

December 2022

Acknowledgement to Country

"I wish to acknowledge that this research was conducted on the lands of the Noongar people of the South West of Western Australia (WA). I want to acknowledge my Yamatji Mother (RIP) and my Noongar Wadjuk Father, who have given me my bloodline connection to both Boodja's (Countries) of the South West of WA and the Gascoyne Murchison. I respectfully acknowledge the Traditional custodians of Aboriginal and Torres Strait Islander Nations or Countries and all Traditional owners of colonised Countries worldwide. I pay my respects to Indigenous Communities and Nations that are still struggling to right the wrongs of the past, to make their futures brighter and healthier for their families and the communities they live in. I acknowledge and recognise all Indigenous peoples' continuing connection to lands, waters, and communities and finally I want to pay my respects to my Ancestors and all Indigenous Elders of the past and present and say, 'thank you' for your guiding spirits that have placed me here today."

Abstract

Background: There is limited research that has investigated physical activity (PA) programs for older Aboriginal and Torres Strait Islander peoples in Australia. Few older Aboriginal and Torres Strait Islander people can access suitable PA programs in their community. The aim of this research was to translate and evaluate the impact of the Ironbark PA program on older Aboriginal people living on Noongar Boodja (Country) in the South West of Western Australia.

Methods: A mixed methods research design, consisting of four studies, which followed principles of Indigenous research methodology was conducted. The research used a decolonising approach. Two groups operated on Noongar Boodja, one in a regional town and the other in a metropolitan setting. Each group participated in the Ironbark PA program designed for older Aboriginal and Torres Strait Islander people. Participants were Aboriginal Elders aged 45 years and older. Study one was a qualitative systematic review that explored the barriers and enablers to older Indigenous peoples engaging in physical activity and used a thematic synthesis. Studies two and four used a qualitative exploratory design and data were thematically analysed. Study two explored the impacts of engaging in the program on the participants' lived experiences. Study three used a longitudinal design to evaluate the impact of the program on Elders' physical function, including functional ability and cardiovascular risk factors, measured at baseline, 6, 12 and 24 months. Data were analysed using mixed effects linear modelling. Study four conducted semi-structured interviews with key stakeholders (program staff, community members), to identify barriers and enablers to program success.

Results: Synthesised results from Study one (23 studies from four countries) found there was limited knowledge about the barriers and enablers of PA for older Indigenous peoples. Findings showed that taking a decolonising approach that addressed cultural safety and security and social determinants of health was critical for success. Study two interviews (n=23 Elders) found that Elders experienced the PA program as being culturally appropriate, concurred that they enjoyed the program, and experienced emotional, social, and physical benefits. Overall, they said it created a sense of belonging and reconnecting with culture. Study three demonstrated that Elders made significant improvements in physical function at 12 months compared to baseline [short physical performance battery (SPPB) at baseline, 8.85 points (95% CI 8.10, 9.61); 12 months 10.28 points (95% CI

9.44,11.13), p=0.001]. There was a non-significant improvement in cardiovascular risk markers. Study four found that key stakeholders (n= 17) agreed with Elders' perspectives that the program was successful, culturally appropriate, and that challenges, such as chronic illness, could be addressed with local expertise if resources were available.

Conclusion: Aboriginal Elders living on Noongar Boodja reported substantial, holistic health benefits from participating in a culturally appropriate PA program. All stakeholders affirmed the success of the program. Further research to continue to improve health outcomes for older Aboriginal and Torres Strait Islander people is required. Unforeseen challenges impacted on program delivery. Lessons learned suggest that by taking a decolonising approach to PA programs and with adequate resources older Aboriginal and Torres Strait Islander people will access such programs and can experience substantial positive results.

Keywords: *Aboriginal and Torres Strait Islander Peoples, Indigenous, Physical Activity, Older People*

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Terminology Used in the Thesis

Throughout this Thesis I have respectfully used the term Aboriginal and Torres Strait Islanders when referring to multiple studies conducted in Australia, or to Aboriginal and Torres Strait Islander peoples if making a general point about a topic, for example the impacts of colonisation.

If I refer to one study, I have used the terms of the authors to describe the study population or the relevant information. Where studies are reported in communities in other countries, I have aimed to use the authors' terms, for example for Māori in New Zealand (NZ), First Nations, Innu/Inuit and Métis in Canada, and American Indian and Alaska Native tribes in the United States of America.

Where the study refers to a general point that applies to multiple communities in more than one country, respectfully I have sought to use the term Indigenous or Indigenous people. I have instinctively referred to Aboriginal Elders living on Noongar Boodja as the people who participated in the research, simply because some of the Aboriginal Elders came from the North West and the East Coast of Australia.

This meant that the Elders were not only Noongar Elders from Noongar Boodjas, including Wadjak and Wardandi, but were from other regions of Australia. There were Koori people who identified as Wiradjuri (NSW), Yamatji people from the Gascoyne Murchison and Ngadju people (South East of WA).

Publications, Presentations and Awards

Published Works by the Author Incorporated into This Thesis

Gidgup MJR, Kickett M, Weselman T, Hill K, Coombes J, Ivers R, Bowser N, Palacios V, Hill AM. Barriers and enablers to older Indigenous people engaging in physical activity- a qualitative systematic review. *J Aging Phys Act*. 2022 Apr 1;30(2):340-352. doi: 10.1123/japa.2020-0465. Epub 2021 Aug 18.

Gidgup MJR, Kickett M, Hill KD, Francis-Coad J, Weselman T, Coombes J, Ivers R, Bowser N, Palacios V, Hill AM. Connecting and reconnecting to a community, with a sense of belonging - Exploring Aboriginal Elders' perspectives of engaging in a physical activity program. *Health Promot J Austr*. 2022 Feb 15;33 Suppl 1:138-149. doi: 10.1002/hpja.582.

Gidgup MJR, Kickett M, Jacques A, Weselman T, Hill KD, Coombes J, Ivers, R, Bowser, N, Palacios, V, Hill, A-M. Translating and evaluating a physical activity program for Aboriginal Elders on Noongar Boodjar (Country) - A longitudinal study. *Front Public Health*. 2022 Jul 22;10:904158. doi: 10.3389/fpubh.2022.904158.

Conference Podium (Oral) Presentations by Author During Candidacy Period

2019

Grassroots Falls festival Perth, Western Australia, Esplanade Hotel February 2019. Invited plenary team presentation led by PhD student Ms Margaret Gidgup with project officer Ms Karen Williams and other members of the research team.

2021

Mirrabooka Public Forum. May 2021. Seminar and luncheon at Herb Graham recreation centre to which all staff, supporters and participants attended, Included launch of Ironbark project video which is on Youtube. https://youtube/wSrMHJguRds

Published media of Ironbark video through Injury Matters June 2021. https://www.injurymatters.org.au/stay-on-your-feet/spotlight-ironbark-fallsprevention-program/

2022

Gidgup MJR, Kickett M, Hill K, Francis-Coad J, Weselman T, Coombes J, Ivers R, Bowser N, Palacios V, Hill AM. Exploring Aboriginal Elders' perspectives of engaging in a physical activity program. *55th Australian Association of Gerontology Annual Conference*. November 2022. **Adelaide**, Australia (oral podium presentation).

Gidgup MJR, Kickett M, Jacques A, Weselman T, Hill KD, Coombes J, Ivers, Bowser N, Palacios V, Hill AM. Evaluating a physical activity program for older Aboriginal peoples on Noongar Boodja. *55th Australian Association of Gerontology Annual Conference.* November 2022. **Adelaide,** Australia (oral podium presentation).

Statement of Contributors

Contributions to Jointly Authored Works

Signed statements of consent and contribution for inclusion of jointly authored works in this thesis were obtained from all co-authors (see Appendix A).

Publication 1 (Contributing to Chapter 3)

Gidgup, M.J.R., Kickett, M., Weselman, T., Hill, K., Coombes, J., Ivers, R., Bowser, N., Palacios, V., Hill, A-M. (2022)
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Author Contributions:

M.J.R. Gidgup led the original drafting of the manuscript, supported by A.- M. Hill with input from K. Hill. M.J.R. Gidgup, T. Weselman, M. Kickett, and A.-M. Hill completed searching, screening, and critical appraisal of included studies. M.J.R. Gidgup and A.-M. Hill led analyses with support from M. Kickett. K. Hill, J. Coombes, R. Ivers, V. Palacios, and N. Bowser provided critical manuscript review and editing and all authors approved the final manuscript for publication.

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Publication 3 (Contributing to Chapter 5)

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Submitted Manuscript (Contributing to Chapter 6)

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Author Contributions:

M.J.R. Gidgup, A.-M Hill, M. Kickett, K. Hill, J. Coombes and R. Ivers, led the study conception and design. M.J.R. Gidgup led the original drafting of the manuscript. M.J.R. Gidgup and A.-M. Hill led analyses with support from J. Francis-Coad and J. Umbella. Review of analyses was provided by J. Coombes. Critical manuscript review and editing was provided by all authors and all authors approved the final manuscript for publication.

Conflicts of Interest:

For all publications, the authors have no conflicts to declare.

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I want to thank my Ancestors who have guided me to this place today, who have been by my side throughout my research journey. I wish to pay my respect to my mother RIP and my father for my mixed heritage of Noongar Wadjuk and Yamatji that allows me to seek direction for my work in two Boodja's, being the South West of Western Australia and the Gascoyne Murchison Region.

I wish to acknowledge and thank the supervisors Professor Anne-Marie Hill and Dr. Marion Kickett, both of whom mentored and assisted and supported me to complete this thesis.

Aboriginal Elders and local community members were also instrumental in mentoring me and supporting me and a huge thanks to Karen Williams my djook (sister) who was such a pillar of strength who supported me through the entire thesis, and still does today.

My thanks and gratitude go to the very resourceful academic team who helped me to complete my thesis by assisting me with the many aspects of the research, including referencing, library research, statistical support and on-country program support to help me to keep my focus on track. I can now say I completed it, and I am so glad I got through this with you all by my side.

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Chapter One

1

Introduction

1.1 Background

Physical activity (PA) is an excellent means of improving health and well-being and being able to undertake regular PA is known to be an effective component of achieving optimal good physical and mental health outcomes (1, 2). Undertaking PA reduces older peoples' risk of mortality and the risk of developing chronic diseases, including cardiovascular disease, type 2 diabetes, and some types of cancer (1, 2, 3). Regular PA is also associated with better sleep, better mental health, and better cognitive function (3). Conversely, sedentary activity has negative effects, being associated with developing diabetes, poor cardiovascular health and psychosocial wellbeing and stimulating weight gain (4).

Physical activity is defined as "any bodily movement produced by skeletal muscles that requires energy expenditure and can be performed at a variety of intensities, as part of work, domestic chores, transportation or during leisure time, or when participating in exercise or sports activities"(5). Guidelines for physical activity, such as those from the World Health Organisation (WHO), recommend that all older people undertake regular physical activity (5). This PA for older adults is recommended to include: at least 150– 300 minutes of moderate-intensity aerobic physical activity; or at least 75–150 minutes of vigorous intensity aerobic physical activity; muscles strengthening activities at moderate or greater intensity that involve all major muscle groups on two or more days a week; varied multicomponent physical activity that emphasises functional balance and strength training (5). These recommendations presented in the WHO Guidelines on physical activity and sedentary behaviour are for all populations and age groups, irrespective of gender, cultural background or socioeconomic status, and are relevant for people of all abilities (5).

However, PA programs are developed from a Western perspective, without reference to different cultures (6). Ignorance of culturally appropriate services continues to perpetuate marginalisation of vulnerable groups such as older Aboriginal and Torres Strait Islander peoples when they seek to access suitable PA programs (7, 8).

Aboriginal and Torres Strait Islander people's life expectancy is still comparatively poor when compared to non-Aboriginal people in Australia and is estimated to be 71.6 years for males (80.2 years non-Indigenous males) and 75.6 years for females (83.4 years non-Indigenous females) (9). Aboriginal and Torres Strait Islander peoples' health and the health of Indigenous peoples' worldwide have historically and systematically been

affected by the impacts of an ongoing colonial history (6, 10). The sedentary lifestyles that have resulted from colonisation have become normalised and are connected to the burden of chronic disease including mental health conditions. Chronic diseases continue to affect the health and wellbeing of many Aboriginal and Torres Strait Islander people (11). Ageing is associated with the development of chronic disease (12). However, Aboriginal and Torres Strait Islander people are burdened at a younger age than non-Aboriginal people with chronic health conditions, which contribute to about 80% of the mortality gap for Aboriginal and Torres Strait Islander people aged 35 to 74 years (13).

Poor health for Aboriginal and Torres Strait Islander people is strongly connected to social determinants of health that are symptoms of past discriminative Acts and Policies of Government, particularly the 1905 Act (14, 15). The Act recommended and authorised the removal of children from their parents to be placed into Institutions and raised by non-Aboriginal people (sometimes Missionaries) who frequently abused and forcefully controlled the children, causing life-long trauma. Many Aboriginal and Torres Strait Islander people continue to experience ongoing trauma from the loss of traditional land, language, family connections, customs, and hunting rights (16, 17). Children of the Stolen Generations are now the Elders of today (16, 17). Throughout their lives there were no established pathways to access appropriate evidence-based health care. When these children were allowed to leave the missions aged 16 years, they were prevented from integrating into mainstream society and were forced to survive on the outskirts of towns, living on reserves (18). While living on the fringes of white societies they were not allowed to access good quality health care therefore they could not learn about how to keep themselves fit and healthy, for their movements were strictly limited (15, 19, 20). This history assists to explain why older Aboriginal and Torres Strait Islander people are not currently participating in high quality PA programs that could improve their health (8).

1.2 Research Gap

Given this history, PA is an important topic to discuss with older Aboriginal and Torres Strait Islander people. Previous research has highlighted that older Aboriginal and Torres Strait Islander people understand what is needed to improve their communities' health and wellbeing (8, 21). However, barriers to engagement in PA have been identified. These barriers include poverty, cost, shame factors, gender concerns, lack of transport, lack of cultural knowledge and understanding, lack of compassion and empathy, and lack of understanding about the way that an Indigenous person may present to a PA program and how they may seek to engage in such programs (22, 23, 24, 25).

Many PA programs suitable for older people are designed to attract non-Indigenous older Australian people. These programs are designed using a Western world perspective, which presumes that this dominant view of healthcare is the way that they should be (6). Aboriginal and Torres Strait Islander people seek out health care services that welcome them and where they feel a sense of safety and security, knowing that they can receive health care without being subjected to ignorance and humiliation (26). However, a perspective on health services in Australia summarised that poor communication, racism and lack of culturally safe care is contributing to very poor, even life-threatening gaps in care for Aboriginal and Torres Strait Islander people (26).

Racism is ongoing and has existed since first European settlement in Australia in 1788 on the east coast. It has existed in Western Australia (WA) since the time of settlement in 1829, and racism continues to be embedded within health infrastructures and political frameworks, perpetuating a lack of culturally appropriate health services (25). Placed alongside social determinants of health, this continues to lead to poor management of health, as only Western focused services are being provided (6, 24, 25).

Research conducted in WA found that past and present assumptions made by non-Indigenous health workers and researchers resulted in Aboriginal people having a mistrust of engaging in non-Indigenous mainstream health programs (27). When health care is led by Aboriginal people, such as when provided by an Aboriginal Community Controlled Health Organisation, it enables access to health programs, reduces racism, and is inclusive. These types of services offer culturally strong models of care that improve health outcomes for Aboriginal people by Aboriginal people (28). However very few PA programs are provided with this type of leadership.

When seeking to undertake PA, older Aboriginal and Torres Strait Islander peoples are not known to frequent gyms or programs in their local communities. They may see PA as being related to family activities and sports and some traditional or semi-traditional activities that some Aboriginal communities, and Indigenous communities in other countries are still practicing, such as being out on country, hunting for wild game, fishing off the coast, and walking in the bush to gather traditional foods (29,30). On Noongar Boodja, men still like to go on weekend hunting trips to bring kangaroo meat home for their families. During the hunting trips they may walk, run, or stalk a kangaroo from a vehicle. Skinning and gutting the kangaroo will be done by hanging the carcass from a tree before it is then taken home to be cut up into portions for extended family members. This is considered getting back to Country by doing some cultural activities and it is done

frequently. Many Aboriginal and Torres Strait Islander Elders today consider that being active around their home, doing the garden, house cleaning and walking to the shop and home is enough PA (7, 31). While there are high quality guideline recommendations for PA for older people (5), these have not been consistently translated and addressed for Aboriginal and Torres Strait Islander people.

However, there is very limited research evaluating PA programs for older Aboriginal and Torres Strait Islander people and indeed for Indigenous peoples' worldwide (7, 32, 33, 34). Therefore, it was important to undertake this research to address this gap in PA programs for older Aboriginal and Torres Strait Islander people. My thesis addressed this problem and sought to translate and evaluate a new program for older Aboriginal people in the South West of WA. This program was the Ironbark program. The Ironbark Program is a falls prevention program (35) that was designed in New South Wales (NSW) by Aboriginal researchers with Elders and local community health service providers' input.

The program engaged older Aboriginal people in PA within a culturally secure setting that was flexible for each local community (35). Elders in NSW made improvements from attending the program (35). There were no existing local PA programs specifically designed and running for older Aboriginal people in the South West of WA. To address this gap, there was a need to introduce and evaluate new PA programs for older Aboriginal people in the local communities of the South West of WA (Noongar Boodja). The Ironbark program from NSW was suggested by local community workers as being suitable to be evaluated by Elders and communities in the South West of WA. The adaptation of the program design and its delivery in WA as part of this research, included modifying the program to include more modes of PA. The original program focused on strength and balance exercises and while these were retained and evaluated, some aerobic and flexibility elements were added with circuit type individualised training, and social outcomes were also of interest. The program design, including the type of PA undertaken and the outcomes that were measured, is described in full in Chapter 2 (see section 2.8).

The research conducted as part of my thesis evolved from conversations had between the Ironbark program team in NSW, South West Aboriginal Medical Services (SWAMS), Bunbury, Aboriginal Health Council of WA and North Metropolitan Health Service (Aboriginal Health Unit) who were aware of the gap in PA program options for older Aboriginal people in WA. The research team consisted of myself as the student researcher supported by my supervisors and community organisation team members. The team also contained Aboriginal and non-Aboriginal research workers and health workers from the

community who assisted to deliver the program. This included, for example, a physiotherapist to undertake the exercise component of the program with my support. The research procedure including how the team supported my research, is described in full in Chapter 2 (see sections 2.7. 2.8, 2.10 and 2.11).

1.3 Summary

There have been few studies worldwide that have evaluated PA programs for older Indigenous peoples, including in Australia. Very few programs are designed in a culturally appropriate manner that would attract and engage older Indigenous peoples (8, 36). Older Aboriginal and Torres Strait Islander people of the South West of WA have limited access to culturally appropriate PA programs. Social determinants of health and systemic barriers to accessing culturally appropriate health care prevent them from successfully engaging in regular physical activities. My research was conducted over approximately three years and focused on translating and evaluating a PA program that was originally designed by Aboriginal researchers and Aboriginal Elders in NSW (35). This program had resulted in positive outcomes in NSW but had not been previously delivered in WA.

1.4 Thesis Aims

The overall aim of this thesis was to translate and evaluate a PA program (the Ironbark program) for older Aboriginal people in the South West of WA. The specific aims of the thesis were to:

1. Synthesise all available evidence regarding the enablers and barriers to older Indigenous people engaging in physical activity.
2. Explore how engaging in an Aboriginal-specific PA program impacted on the lived experiences of Elders in the South West of WA.
3. Evaluate the impact of a PA program (the Ironbark program) on: i) physical function and; ii) functional mobility, cardiovascular risk factors (weight, waist circumference), falls self-efficacy and health related quality of life on Aboriginal Elders on Noongar Boodja in WA.
4. Explore the barriers and enablers to Ironbark program success and provide feedback about how a culturally appropriate, decolonising physical activity program for older Aboriginal people could be successfully implemented on Noongar Boodja with Aboriginal communities in the South West of WA.

1.5 Thesis Overview

This thesis comprises seven Chapters, including three Chapters that are based on published articles and one chapter based on a manuscript under peer review at a journal. A summary of each Chapter is presented as follows:

Chapter 2: This Chapter describes the methods that researcher used to conduct the research presented in this thesis. An overview of the methods for the whole thesis is provided in this Chapter, and the specific methods for each Study are outlined in the relevant Chapters.

Chapter 3: This Chapter consists of a systematic review that synthesised the available evidence to understand the barriers and enablers to older Indigenous peoples (aged 40 years and older) engaging in physical activity. The Chapter is based on the following article:

Title: Barriers and enablers to older Indigenous people engaging in physical activity-a qualitative systematic review. *J Aging Phys Act.* 2022;Apr 1;30(2):340-352. https://doi.org/10.1123/japa.2020-0465

Authors: Gidgup MJR, Kickett M, Weselman T, Hill K, Coombes J, Ivers R, Bowser N, Palacios V, Hill AM.

Status: Published April 1, 2022

Chapter 4: This Chapter provides the perspectives of the Elders who participated in the Ironbark PA program on Noongar Boodja (Country). The Chapter is based on the following article:

Title: Connecting and reconnecting to a community, with a sense of belonging - Exploring Aboriginal Elders' perspectives of engaging in a physical activity program. *Health Promot J Austr*. 2022;Oct;33 Suppl 1:138-149. https://doi.org/10.1002/hpja.582. Epub 2022 Mar 23.

Authors: Gidgup MJR, Kickett M, Hill K, Francis-Coad J, Weselman T, Coombes J, Ivers R, Bowser N, Palacios V, Hill AM.

Status: Published February 15, 2022

Chapter 5: This Chapter presents the evaluation of the effectiveness of the Ironbark program on Elders' health outcomes over the time of the program. The Chapter is based on the following article:

Title: Translating and evaluating a physical activity program for Aboriginal Elders on Noongar Boodja (Country) – A longitudinal study *Front Public Health*. 2022;10: 904158. https://doi.org/10.3389/fpubh.2022.904158

Authors: Gidgup MJR, Kickett M, Jacques A, Weselman T, Hill KD, Coombes J, Ivers R, Bowser N, Palacios V, Hill AM.

Status: Published online July 22, 2022

Chapter 6: This Chapter presents the findings of a qualitative Study that aimed to explore the views of key stakeholders about the barriers and enablers to Ironbark program success and provide feedback for future program delivery. The Chapter is based on the following submitted manuscript:

Title: 'Nih Waangkiny Kaadatjiny' - listening learning and knowing'. Stakeholders' perspectives about barriers and enablers to delivering a physical activity program for older Aboriginal peoples.

Authors: Gidgup MJR, Kickett M, Francis-Coad J, Hill K, Umbella J, Coombes J, Ivers R, Bowser N, Palacios V, Hill AM.

Status: Submitted and under peer review at journal

Chapter 7: This Chapter summarises and synthesises the results of the research to provide recommendations about future directions for research and practice in this field, both with older Aboriginal people in the South West of WA and worldwide. It also provides information that can assist researchers and health professional practitioners who seek new directions for working and collaborating with older Indigenous people.

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Chapter Two

2

Research Methods

Preface

Chapter 2 provides an overview of the methods used in the research conducted for the thesis. An outline of the thesis structure is provided and then an overview of the design and methods of the research. Detailed methods for Studies 1 to 4 are then provided in the relevant Chapters.

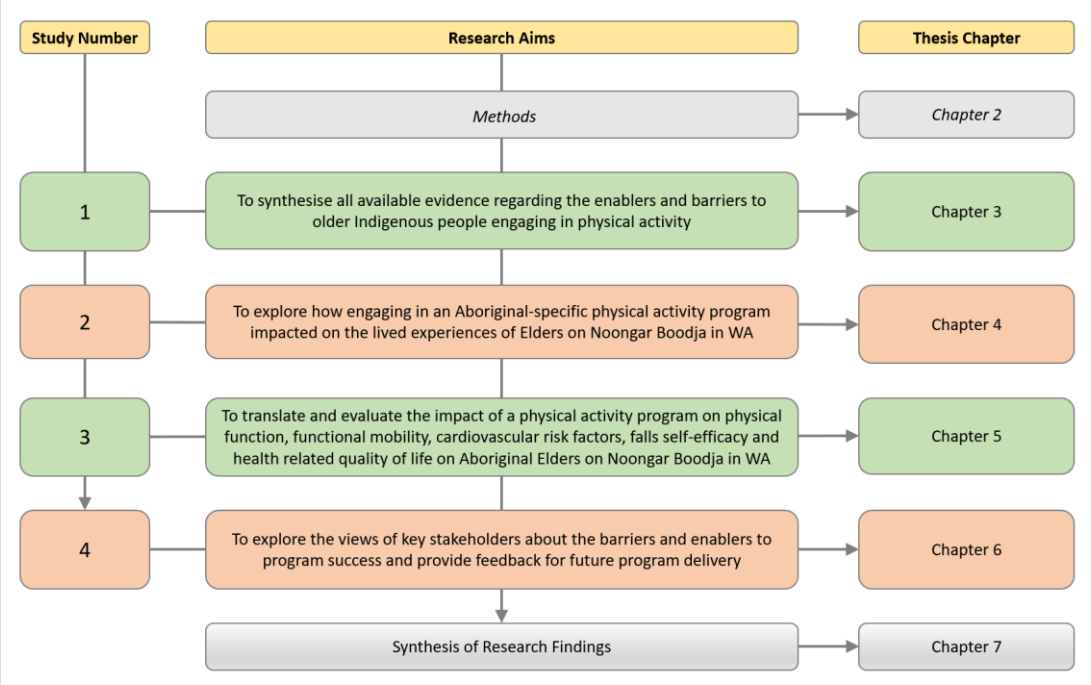
2.1 Research Structure

The overall aim of the thesis was to evaluate the impacts of a physical activity program for older Aboriginal people living on Noongar Boodja (Country) in the South West of WA. The aims of each study conducted as part of the thesis and how they relate to the thesis structure are presented in Figure 2.1.

2.2 Ethics and Values

The research was conducted according to the National Health and Medical Research Council of Australia ethical guidelines for conducting research with Aboriginal and Torres Strait Islander peoples (1). The team of Aboriginal and non-Aboriginal researchers were also guided by the terms of reference that each Aboriginal community group provided when the program commenced. Development of the terms of reference is described in section 2.7.1. Ethics approvals were obtained from WA Aboriginal Health Ethics Committee (HE number 842) (see Appendix B) and Curtin University (HE number 2018-0425) (see Appendix C).

Figure 2.1
Summary of Thesis Structure



2.3 Research Design

A mixed methods research design which included quantitative and qualitative research methods was used. Using a mixed method design allowed qualitative and quantitative data

collection from a variety of sources, permitting triangulation of the results in the final synthesis (Chapter 7) of the research (2).

The student researcher applied an Indigenous framework to design the research plan. The principles of this framework are described in Section 2.4. Using an Indigenous framework suggested that a holistic approach to health should be applied to the research as the Aboriginal concept of health and wellbeing is centered around mental, emotional, and spiritual wellbeing and that of their community. Physical activity is not focused solely on the fitness of the individual but rather the fitness of the whole community (1). Therefore while measuring physical outcomes, for example gait speed, was important, it was also important to understand the effect of the program on Elders' social, mental wellbeing and to explore the community perceptions about the program. The design included modifying the Ironbark program to ensure it was appropriate to deliver to Noongar Elders in WA. This is an Indigenous framework that is described in full in Section 2.4. An Indigenous framework emphasises that research is about knowledge being shared through building relationships. The student researcher also created a personal ‘ways of working’ framework that was applied to each study. This is described in Section 2.4.

Finally, specific procedures within the design within each of the four studies also aimed to strengthen the decolonising approach to the research. The decolonisation of the research and how it was applied specifically to the procedures is described in Section 2.11.

In Study 1 (Chapter 3), a systematic review that synthesised the best evidence available about older Indigenous people’s engagement in PA programs worldwide was completed. Study 2 (Chapter 4) was a qualitative study that explored the experiences of older Aboriginal people in the South West of WA when they engaged in a PA program (the Ironbark program). Study 3 (Chapter 5) used a quantitative longitudinal design to evaluate the impact of the PA program on the physical function of older Aboriginal people of the South West of WA. Study 4 (Chapter 6) used a qualitative design to explore local community members and key service providers’ views and perspectives of the delivery of a PA program for older Aboriginal people living on Noongar Boodja. This final study took an implementation science approach (3) to explore the barriers and enablers to successfully translating the PA program into WA Noongar community settings.

2.4 Indigenous Framework Used in the Research

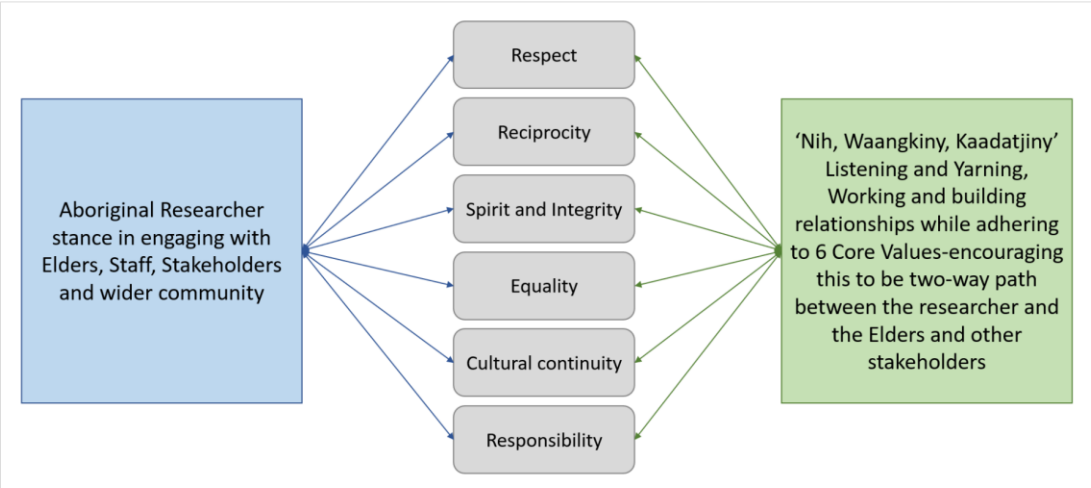
The research was conducted by referring to the principles outlined for Indigenous research methodology (4). These principles include the research being led by an Aboriginal researcher who was capable and confident in her comprehension of Indigeneity, respecting

Indigenous knowledge (of the Elders and the communities) and Aboriginal peoples and honouring relationships (4). The student researcher and the team of Aboriginal and non-Aboriginal researchers who supported the program were conscious of the research methodology of "weaving at the interface" of Indigenous and Western systems (5). This Indigenous research method privileges Aboriginal and Torres Strait Islander voices, showing a central focus on mutual respect, reciprocity, cultural integrity, equality, cultural continuity, and responsibility for Aboriginal and Torres Strait Islander communities (5). A critical focus of the research was ensuring that a decolonising approach was undertaken that recognised that Indigenous research must be accountable and transparent to the Elders and their communities to allow them to feel that they have been properly consulted with and that they can maintain their resilience in the research space (4, 5, 6, 7). As a senior Noongar woman, the student researcher led the monitoring of the project, with support from her supervisors, to ensure that all procedures followed this framework. Regular team meetings allowed the student to build relationships with all team members and build their understanding of taking a decolonising approach to the research (8).

The student researcher also developed a 'ways of working' framework (see Figure 2.2), based on NHMRC research guidelines for working with Aboriginal and Torres Strait Islander people (1). These principles and values of working with Aboriginal Elders were used by the student researcher as a guide for ensuring quality and integrity throughout each stage of the research.

Figure 2.2

A holistic 'ways of working' framework



Based on NHMRC guidelines Australia, 2018

2.5 Researcher Standpoint

The PhD student researcher is a local Noongar Wadjuk woman who has had a diverse range of experience working across Australia, including in places as remote as the Central Desert Region with traditional Pintubi peoples, who speak English as a fourth language. The student researcher worked with Aboriginal and Torres Strait Islander people for several years in the Kimberley, the Pilbara and the Gascoyne Murchison regions of WA and in the upper South West of WA. The student researcher also lived and worked in NSW for a number of years within Koori communities during the 1980s. These lived, and real experiences of working within different Aboriginal and Torres Strait Islander language groups, communities and with individuals in those communities gave the researcher a deep insight into the marginalisation and disparities faced by many Aboriginal and Torres Strait Islander communities and a strong realisation and conviction that something needed to change.

Researcher: *"My reason for completing this research, was to highlight a problem, that has affected Noongar Wadjuk people as a whole and me personally. I was emotionally devastated when I lost my grandparents (my father's parents) who passed in their early sixties. When they passed within six months of each other, they were younger than I am now. I believe had they been able to have a choice about doing PA in their lifetime within their local community, they would have lived a longer life to see their grandchildren grow up and have their own children. A pivotal moment was when my mother passed away in 2008. My Mum and my grandparents were sedentary people through no fault of their own throughout their adult lives until they passed away. Losing Mum was the push I needed to make me look toward undertaking a recognised and accredited level of study in health that took a focus on PA, that could eventually help bring more awareness locally and nationally about the lack of involvement in PA and the lack of available programs. This hopefully could better influence positive change in policies to address the neglected health gaps for many older Indigenous peoples in Australia and worldwide.*

For the Noongar Wadjuk researcher, it was important to always display respect and acknowledge cultural differences within each setting, to allow the voices of all participants to be heard (4, 5). It was equally important to have an awareness of power imbalances between myself as the researcher and the Aboriginal Elders on Noongar Boodja. Most important of all, I showed leadership and provided feedback that displayed a high level of accountability and transparency that needed to be evident throughout the three years of the

research (5, 8). I also supported all the research team members involved in the research to raise the team's level of awareness and understanding of communities' values and ethics to be able to work with Elders and communities to deliver the PA program. This was important to ensure the overall success of the PA program.

2.5.1 Researcher Diary

A researcher's diary (see Appendix D) was important to maintain by the student researcher throughout the three years of undertaking the research as a means of personal reflections, reflexivity and bracketing (9). Bracketing is described as a qualitative research technique, where researcher aims to be honest and regularly and accurately monitor their personal perspective. This includes being aware of pre-existing thoughts and beliefs and then engaging in the self-reflective process of "bracketing." This process involves recognising and setting aside (but not discarding) their prior knowledge and assumptions. They aim to attend to the participants' accounts with an open mind. The process of bracketing ideally occurs throughout all the research and for the student researcher was a process of taking accountability for the research and ensuring the results truly represented the community (4, 9). This assisted me as a Noongar person to understand my own biases and yet provide authenticity throughout the research. This meant preparing myself for the likes and dislikes within the two settings, as not all Elders or stakeholder organisations were able to communicate effectively with one another.

It was important that I presented myself in a neutral manner that was supportive of all participants and other stakeholders. This stance ensured that the focus of the research and the underpinning ethical approach were never lost (8, 9). This approach also helped me to navigate through challenging aspects of program delivery and data collection and it helped at times to influence Elders to focus on the PA rather than focusing on whether a person they disliked was part of the PA group. It was not easy navigating through many of the challenging aspects of the program delivery because the researcher was related to one Elder in the regional group and knew several of the other Elders from this group throughout her childhood, so being able to maintain a professional and neutral stance was vital to the success of the ongoing community communication and later data collections with each Elder.

2.6 Participants

Participants were older Aboriginal people 45 years and older and living on Noongar Boodja. The inclusion criteria of aged 45 years and older was based on the original Ironbark program inclusion criteria (10). The age of 45 years was based on Australian guides that identified population ageing and health service needs for Aboriginal and Torres Strait Islander populations (11, 12).

Elders who attended were predominantly from Noongar heritage and they identified as Noongar Wadjak and Noongar Wardandi. Some Elders were from the Gascoyne Murchison and they identified as Yamatji. Some Elders were from the South East of WA and they identified as Ngadju and one Elder from NSW identified as Wiradtjuri. Other Elders, who occasionally visited the groups, were from the 'top end' known as the Kimberley region of WA.

Participants in the research were referred to as Elders throughout the research and in publications. Using the term 'Elders' was done respectfully because the Elders participating in the Ironbark PA Program were accepted in their communities as people of wisdom, knowledge and leadership (13). They were referred to as 'Aunties' and 'Uncles' and that is one of the most respectful titles that is given to Elders who have reached that milestone in their lives where they have preserved knowledge and share through 'storytelling' to help the broader community to resolve the complexities within the broader community and to advocate for positive change for their communities. Unfortunately, many Aboriginal and Torres Strait Islander people who have chronic disease conditions will ultimately pass on before reaching that 'Aunty' and 'Uncle' stage of life (14). Therefore, younger participants were respectfully referred to as Elders in this research from the age of 45 years. Because of low life expectancy it is becoming increasingly acceptable to refer to this age bracket 45+years as leaders and Elders in their communities (15).

2.7 Settings

Two Elders' groups were supported at two sites in WA. The first group was hosted directly by Bunbury South West Aboriginal Medical Service (SWAMS) referred to in the thesis as the regional site (16). SWAMS is an Aboriginal community controlled health organisation (ACCHO) that provides medical services in the Noongar (Wardandi) region. The second group originally commenced at the Northside Wadjuk Community Centre in Mirrabooka, Perth and then shifted to its final venue at Herb Graham

Recreation Centre, Mirrabooka. This group was supported by the Aboriginal health services division of the North Metropolitan Health Services (NMHS) (referred to in the thesis as the metropolitan site) (17).

2.7.1 Community Engagement in the Research

Senior Researchers (my supervisors (AMH and MK) were instrumental in bringing the Ironbark PA program into the South West of WA and they worked tirelessly for two years prior to the commencement of the research program. This is described further in Chapter 5 (Section 5.2.6). They held several meetings with the original NSW Ironbark researchers (10) to plan the implementation and evaluation of the Ironbark PA program with older Aboriginal people living on Noongar Boodja. Several meetings were held with SWAMS, Wadjak Northside and NMHS after which Elders' groups agreed to work together with the research team to develop the project. Both community groups were named on the project grant application and provided representatives on the research team, who offered advice and guidance to the student researcher as she led the project, with support from the research team. After these initial funding agreements the student researcher commenced on the project team and attended meetings with both communities. The student researcher then designed the Indigenous framework required to conduct the project, which was incorporated into her research proposal. This proposal provided an overview of the design and planned delivery of the studies conducted as part of this thesis, as described earlier in Section 2.3.

2.7.2 Leadership of the research

Throughout the project, the student researcher led the planning and procedure of the research at both sites. While supported by the research team of Aboriginal and non-Aboriginal members, it was important that the student researcher led the program to ensure it was culturally safe for Elders and Aboriginal staff. Cultural safety can be briefly conceptualised as Indigenous-led care. It acknowledges the barriers to effective delivery of health programs caused by the inherent power imbalance between the health provider and the person. It moves to address this dynamic by making the clinician's cultural underpinning a critical focus for reflection (18).

Both planning and procedure was underpinned by the student researcher's own ways of working framework (see Section 2.4 and Figure 2.2). The student researcher led any personal engagement required with individual Elders. The first important step, after the

community engagement (described in 2.7.1) was providing Elders with information and seeking their informed consent to participate in the research. The student researcher was the sole researcher to undertake this task, being the appropriate researcher to engage with the Elders and provide them with clear and accurate information, in an ethical and culturally appropriate manner. She also re-confirmed participants' consent at each time point where data collection occurred. The student researcher planned the weekly program format. This included what task staff members would undertake and how the weekly yarning circles would be conducted. Elders were consulted regularly both individually and as a group to adapt aspects of the program as required, for example, when invited speakers could attend and whether an outdoor walk would be incorporated into a weekly exercise session.

The student researcher led all data collection procedure and ensured Elders understood what was required and assisted Aboriginal workers to collect data in a respectful manner that followed the required research procedure. This included conducting the yarning circles undertaken for all qualitative data collection and leading the procedure for quantitative data collection days. The student researcher conducted all interviews with participants. Using an Indigenous methodology meant that results needed to be conveyed to Elders at regular periods. This engagement with the Elders was led by the student researcher, with regular talks, some formal meetings and ongoing yarning. During the whole research period it was important to build relationships between the Elders, the community and the research team as part of an Indigenous way of working (4, 5). This was led by the student researcher. As described in Section 2.6, it was important that the student researcher was accountable for reporting the ongoing progress and results of the research to each group.

The terms of reference were an important part of leading the research. Encouraging Elders to create a plan of how they could engage well with one another and the health professionals was important to resolve prior to commencing PA. Since some Aboriginal communities are known to be divided, developing terms of reference (group rules) was necessary to ensure good communication and everyone feeling a sense of belonging because they had created their own set of rules to work with. The student researcher assisted the Elders and staff to develop their terms of reference. Terms of reference describe Elders setting their own rules and guidelines for how they wish to engage as a group and with each other. This will normally include respecting peoples' views, listening when someone else is speaking, and encouraging positive interactions. It allows successful engagement between families who would not normally meet (19). (See also Chapters 4

and 5, sections, 4.2.5 and 5.2.6). The procedure involved yarning with the Elders in the first session and then presenting Elders with the draft for confirmation before a final copy was presented to the group. A copy of the terms of reference is presented in Appendix E.

2.8 Intervention – The Ironbark Physical Activity Program

The Ironbark PA program is described in the published article that forms Chapter 5 (section 5.2.4) of this thesis. Briefly, the research team adapted the original Ironbark program from NSW (10) to suit the cultural needs of Aboriginal Elders residing on Noongar Boodja. Weekly one-hour exercise sessions were followed with a yarning circle and a light lunch. The program was modified for Elders by allowing for some slight changes in how the exercises could be done according to each Elder's health conditions and music being added. Each group and individual Elder received support that was led by the student researcher, with supported from the research team throughout the two years of attendance and participation (as described in Section 2.7.2).

The program focused on exercises that have been shown to be effective in reducing falls, namely exercises that have a strong balance and functional component (20). The exercises were led by health professionals who provided the training. The health professionals were supported by the student researcher and Aboriginal health workers, in a space that was culturally safe and secure. Some Elders had never participated in group exercises and hence it was a new experience for them.

The student researcher led the group procedure that included understanding relationships, respect and taking a decolonising approach. Procedures were discussed with the health professionals prior to each group commencing PA. She led the acknowledgement to country in the metro group but not in the regional group because they did not want to do WTC. She led staff in both groups to work with Elders in a way that welcomed Elders, made them feel comfortable and recognised the Elders' leadership within the program. She also assisted to interpret and re-explain the health professional's information and instructions on the exercise as required, in a respectful manner for Elders, and engaged in the program's physical activities alongside the Elders on frequent occasions. A debriefing session with the health professionals was held at regular intervals and the student researcher also engaged with the Aboriginal staff prior to and after each session to obtain feedback, provide advice and support for their role and address any required adaptations.

Each session commenced with a warm-up, then included a variety of lifting light weights, ball activities, balance and strength exercises. The original program focused on

falls prevention and hence balance and strength exercises were undertaken. However taking a broader focus on physical activity meant that additional components were included in the program translation. Other components included regular walking, either inside or outside and occasional dancing to music. There were group activities and a strong component of individual circuit type exercises or small group exercises, to allow each Elder to work at a suitable intensity for their health conditions. Individual advice regarding exercises was provided as appropriate for each participant by the attending health professional. A home exercise program (HEP) was also prescribed. Elders were given handouts of the exercises and encouraged to complete their HEP at home. Health educational topics relevant to fall prevention were discussed in the yarning circle using topics in the Ironbark manual (10) and other topics suggested by the Elders themselves.

The weekly one-hour PA component was delivered alongside yarning circles (10). Yarning in a group and individually is a preferred method of positive engagement because it is a culturally appropriate way to engage and present to older Aboriginal people who have been yarning for thousands of years (21). Yarning removes rigid formalities and replaces that with a relaxed and comfortable environment where Elders are not pressured into performing or listening to information that they may not want to hear. If the content is suitable to their needs they will come back (22). The yarning circles were a strong tool to use as part of the research because they allowed for reciprocal acknowledgement and respect and provided opportunities for all voices to be heard and that helped to break down barriers of dislike, mistrust and negativity.

2.9 Data Collection Phases

An overview of the data collection for each study is presented in Table 2.1, showing how data were collected according to the study design and the analysis that followed. Data collection for each Study is then presented in full in the relevant Chapters of the thesis.

Table 2.1
Study methods of the research: overview of data collection and analysis

Study	Data collection	Analysis type	Chapter
Study 1: Systematic Review	Database searches and synthesis of the best available evidence on the barriers and enablers for older Indigenous peoples to engage in Physical Activity	Thematic synthesis	3
Study 2: Qualitative exploratory study	Semi-structured interviews, researcher diary	Thematic Analysis	4
Study 3: Evaluation of program effectiveness using a longitudinal design	Measurement of health outcomes at baseline, 6, 12, 18 months using assessment tools	Generalised linear mixed effects modelling	5
Study 4: Qualitative, exploratory study	Semi-structured interviews, program notes, researcher diary.	Thematic analysis	6

2.10 Data Analysis

A detailed description of the statistical analysis for each Study is provided in the relevant Chapter. Briefly, data were presented using text, diagrams and tables. For Study 1 (The systematic review, Chapter 3) the Johanna Briggs Institute (JBI) critical appraisal tools were used to rate the included studies and the Aboriginal and Torres Strait Islander Quality Appraisal Tool (QAT) (23) to examine the cultural appropriateness of each included study.

In Study 2 and Study 4 qualitative data were collected and thematic analysis was undertaken (24). Transcribing interviews was a lengthy and sometimes tiring component of these studies as the student researcher needed to carefully listen to all transcripts to ensure the accuracy of what was said (25). This was because it was important that Elders and Aboriginal community members' voices were captured authentically and the student researcher took accountability for the data collection. The final data needed to pass the "Aunty or Uncle test" about findings being relevant and making sense to individual members when reported back to the community (4). Qualitative data were managed in QSR International Pty Ltd. (2012) NVivo (Version 11) (released in 2015) for some coding. Microsoft Excel 2021 (released in October 2021) spreadsheets were used extensively to review and check quotes and data to be sure a true sense of the data was gained (24). Analysis followed a six-stage process described previously (26). This is described fully in Chapter 4 (Table 4.1).

Quantitative data were collected in Study 3. These data measured participants' health outcomes. Health outcomes were measured at baseline, six months, 12 months and 24 months at conclusion of the PA program. All health outcomes' data from both regional and metropolitan groups were combined for analysis. Analyses were completed using STATA version 17.1 (StataCorp. 2019, Stata Statistical software: Release 17. College Station, TX: StataCorp LLC). Data collected from feedback questionnaires and open-ended questions were coded and summarised using frequency and percentages.

2.11 How the Procedure Aimed to Strengthen the Decolonising Approach to the Research

Keikelame and Swartz (2019) state that decolonisation of research has been summarised as addressing issues of "power, trust, cultural competence, respectful and legitimate research practice and recognition of individual and communities' health assets in a decolonising research process" (7). The following processes sought to strengthen the decolonising approach.

Study 1 (Chapter 3), the systematic review was conducted according to the PRISMA guidelines (27). It is important to note here that systematic reviews follow a positivist method rather than Indigenous research methods so taking a decolonising approach to complete this SR was conducted by the lead researcher who followed a quality rating tool for Indigenous studies (23). This meant that all the included studies were rated on their Indigenous leadership and whether they entered an agreement with Indigenous communities and involved Indigenous researchers in the research. The thematic synthesis was then undertaken privileging an Indigenous viewpoint (5). For the systematic review submission, the team requested the journal to seek Indigenous reviewers to peer review the manuscript. Two Indigenous reviewers, one from Canada and one from Australia, gave detailed feedback to the researcher and this feedback was accepted and used to improve the final presentation of the results and the final publication.

Study 2 used a descriptive phenomenology approach that sought to explore the perspectives of the Elders who participated in the Ironbark PA Program. A decolonising method of Indigenous research was applied that would uphold the principles of mutual respect, cultural integrity and reciprocity for Aboriginal and Torres Strait Islander peoples. This was important to implement because coming from a decolonising standpoint recognises leadership and resilience in the research space and it places importance on Indigenous engagement and relationships (5). The team of Aboriginal and

non-Aboriginal researchers (see sections 2.2 and 2.7) who supported the Noongar Wadjuk student researcher also provided support by providing a safe and comfortable space for data collection and assisting with the procedure by helping Elders fill out their forms and also helping staff with measurements, throughout the research.

Feedback was given to participants and communities and feedback sought from participants and communities when the initial results were ready. This was presented in newsletters (see Appendix F) and at community meetings. For example, prior to presenting the results at the Australian Association of Gerontology conference (November 2022) a community meeting was held and the researcher gave a presentation of the results and asked the community for approval and feedback to present at the conference. For study 2 (Chapter 4) the qualitative results were presented to the Elders, Aboriginal researchers and the non-Aboriginal researchers for feedback.

All initial coding and development of themes was first conducted by the student Aboriginal researcher (MG) and MG also was the person to listen to all audio files and review transcripts. Coding and theme development was reviewed by an independent Aboriginal researcher (MK), to ensure authenticity of the findings. When the research team was invited to comment on analyses, all discussion was undertaken led by the Aboriginal and Torres Strait Islander team members' perspectives of the findings (5). This was to protect the research outcomes and strengthen the relevance and benefits of the findings to Indigenous people and subsequent impact on both policy and practice (4). For all studies the Senior Aboriginal researchers on the research team (Dr. Marion Kickett and Dr. Julieann Coombes, who were authors on the publications and Ms K Williams who was the project officer who assisted with organising groups and liaising with the communities) were invited to give feedback about the presentation of the results and to check that results were presented in a way that privileged an Aboriginal viewpoint and ensured the community voices were being presented clearly (5). (See also Chapter 3, Section 3.2.6 and Chapter 5, Section 5.1).

Study 3 used a longitudinal design framed within an Indigenous methodology to successfully engage appropriately with the two Elders groups. Aboriginal and non-Aboriginal health workers collected quantitative data that measured physical and functional health related outcomes. After each timepoint of collecting the measurements and assessments they later followed up with timely feedback to the Elders. Individual support was provided to some Elders to help them to answer each question and, for any

Elders who may have missed answering some questions, the health workers and researchers then supported them to finish the unanswered questions.

Study 4 (Chapter 6) involved collecting qualitative data about key stakeholders' experiences and perspectives. In this study taking a decolonising approach meant recognising the importance of the wider community views about the research and listening carefully to the feedback being provided. Qualitative interviews were completed with key stakeholders that included local community members, family members of the Elders and local health service providers.

During the COVID-19 pandemic in 2020 it was important to sustain relationships with all participants. Weekly phone calls were made by research assistants and the student researcher to continue the program remotely where possible by encouraging Elders to continue their HEP and to offer support and a listening ear.

Noongar language was added into the research to honour and respect the diversity of the Noongar peoples and their ongoing process of reviving and rejuvenating what has been lost on their Boodja throughout the colonising years since 1829. Language is one of the key identifiers in the cultural acknowledgement of Traditional owners' connections to their Boodja. Results of Study 4, like those of Study 2, clearly showed that Aboriginal voices were being heard and properly represented in the findings.

Finally, each study submitted for journal publication contained an acknowledgement to the Indigenous knowledge that contributed to the research and paid respectful acknowledgement of the Nations and peoples who were named in the manuscripts.

2.12 Summary of Chapter

This Chapter provided an overview and summary of the design and methods of the research conducted as part of the thesis.

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Chapter Three

3

Systematic Review of the Literature

Preface

This Chapter describes Study 1, which was conducted as part of the research for the thesis. The specific aim of this Chapter was to synthesise all available evidence regarding the enablers and barriers to older Indigenous people engaging in physical activity.

The chapter is based on the published article: *Barriers and Enablers to Older Indigenous People Engaging in Physical Activity – A Qualitative Systematic Review*.

Publication 1 – Barriers and Enablers to Older Indigenous People Engaging in Physical Activity – A Qualitative Systematic Review

Publication Details

Title:	Barriers and Enablers to Older Indigenous People Engaging in Physical Activity – A Qualitative Systematic Review
Reference:	Gidgup MJR, Kickett M, Weselman T, et al. Barriers and Enablers to Older Indigenous People Engaging in Physical Activity – A Qualitative Systematic Review. J Aging Phys Act. 2022 Apr 1;30(2):340-352.
Online:	https://doi.org/10.1123/japa.2020-0465

The author's version of the manuscript is presented with modifications to suit the style and format of this thesis.

Abstract

The objective of this qualitative systematic review was to synthesise all evidence to understand the barriers and enablers to older Indigenous peoples (aged 40 years and older) engaging in physical activity. Four databases were searched. Study quality was assessed from an Indigenous perspective, using an Aboriginal and Torres Strait Islander quality appraisal tool. Data were analysed using thematic synthesis. There were 4246 articles screened with 23 articles and 1 report included from over 30 Indigenous communities across four countries. *Cultural Safety and Security* was a key enabler including developing physical activity programs that are led by Indigenous communities and preference Indigenous values. *Colonisation* was a key barrier that created mistrust and uncertainty. *Social Determinants of Health* including cost were supported by successful programs, but if not addressed, were de-motivators of engagement. Older Indigenous peoples identified barriers and enablers that can direct the development of sustainable, culturally appropriate physical activity programs.

Keywords: *Aboriginal, Indigenous, First Nations, Aged, Physical Activity, Exercise*

3.1 Introduction

Physical Activity (PA) is important for maintaining optimum physical and mental health and physical inactivity leads to high risk of chronic diseases and shorter life-expectancies (1, 2). High levels of physical activity are associated with reduced risks of developing cardiovascular and metabolic diseases, obesity cognitive impairments, osteoporosis and falls (1). Until European settlement of Australia 200 years ago, Aboriginal and Torres Strait Islanders enjoyed a non-sedentary lifestyle. Sedentary behaviour among Aboriginal and Torres Islander Australians can be traced back to the impacts of colonisation that led to Aboriginal and Torres Strait Islander nations being forced off their lands which meant the end of being physically active, confined to one space or in institutions and forced to be inactive (3, 4, 5). This has resulted in loss of language, cultural practices, kinship, lore and of spiritual connection to country and each other (6).

Indigenous health is widely understood to be impacted by cultural factors, including racism, and Indigenous-specific factors such as loss of language and connection to the land (7). Over time social determinants of health caused by colonisation have increased because the 'oppressors' have re-told the history based on their worldview perspectives, and placed blame on Indigenous peoples for the marked inequities in both health status and outcomes (6, 8). In Australia impacts of colonisation have led to social determinants of health being severely affected and resulting in an average eight-year gap in life-expectancy between Indigenous and non-Indigenous people (9, 10). In other colonised countries the same oppression has led to adverse health outcomes as well. In Canada and New Zealand (NZ) life-expectancy of First Nations, Innu/Inuit and Métis peoples and Māori peoples is approximately four to seven years less than non-Indigenous peoples (9). Addressing the social determinants of health inequities, including institutional, racism is critical to eliminating Indigenous health inequities (11).

Older Aboriginal and Torres Strait Islanders have been noted to have low levels of PA compared to younger Aboriginal and Torres Strait Islanders. The Australian Aboriginal and Torres Strait Islander health survey was developed with the assistance of an expert advisory group for health issues, many of whom were Aboriginal and Torres Strait Islander people (12). This survey reported that four in ten (38%) Aboriginal and Torres Strait Islander adults from non-remote areas were sufficiently active for optimum health (12). However, this declined in older adults surveyed, with only 18.5% of adults aged 45 to 54 years and 16.3% of adults 55 years and over being sufficiently active for optimum health. In spite of this identified gap in health services, there is limited research about the effectiveness of PA programs for older Aboriginal and Torres Strait Islanders.

A systematic review of PA interventions for Indigenous peoples in Australia and NZ only found 13 studies for inclusion (13). There was some evidence that interventions with elements of PA improved health outcomes. Apart from the limited number of studies, these studies included adults with ages ranging from 18 to 88 years, therefore the programs were not specifically designed for older Indigenous peoples (13). Research in Canada also found that there were few exercise programs for older First Nations, Innu/Inuit and Métis peoples even though fitness was declining (14).

Aboriginal and Torres Strait Islander peoples have reported that Western or mainstream exercise programs are culturally inappropriate and disconnected from their own cultural support systems (15, 16). Mainstream programs have also not provided genuine consultation or engaged Aboriginal and Torres Strait Islanders in aged care policy development and decision making (17). A recent study was the first to seek to present the views of Elders from Aboriginal and Torres Strait Islander communities about what healthy ageing means to them (18). Systematically seeking older Indigenous people's knowledge and hearing their voices regarding the barriers and enablers they identify to engaging in PA programs will assist to develop programs that are likely to succeed. However there have been no studies that have synthesised the literature on PA, with a focus on examining barriers and enablers to PA for older Indigenous people. This systematic review aimed to address the following questions:

1. Are there barriers and enablers that older Aboriginal and Torres Strait Islander peoples encounter when they seek to undertake PA?
2. In other communities internationally what barriers and enablers do older Indigenous peoples encounter when undertaking PA?

The objective of this review was to synthesise all available evidence regarding the enablers and barriers to older Indigenous people engaging in PA.

3.2 Methods

3.2.1 Design

A qualitative systematic review was conducted. The review was registered on PROSPERO (*registration number CRD 42020184505)* and was conducted in accordance with PRISMA guidelines (19). Systematic reviews follow a positivist method of research that do not use Indigenous research methods. Taking a decolonising approach includes recognising that Indigenous research should be designed, led and controlled by Indigenous

people and built on community strengths to make things better (6, 20). Therefore we used an Indigenous framework as our primary design, a method described previously to ascertain the quality of reviews that focus on Indigenous health research (21). Briefly these were: 1) undertaking the review using a systematic approach, 2) using relevant reporting guidelines, 3) using suitable methodology for conducting the review, 4) assessing the quality of the studies included in the review, 5) assessing the methodological rigour from an Indigenous perspective, and 6) assessing the Indigenous leadership and participation in the research. The researchers were conscious of working at the 'interface' of Indigenous and Western systems of knowledge (22). Therefore, the study aimed to take a decolonising approach, that included being critical and reflexive throughout the research process to protect the research outcomes (22). The leading researcher (MG) was aware of the importance of being accountable, transparent and respectful to the Indigenous communities worldwide in the studies that were included in the review.

3.2.2 Search Strategy and Study Selection

This review aimed to find both published and unpublished studies in English, and the searches were from database commencement until February 2020. Guidelines for conducting searches for systematic reviews from the Joanna Briggs Institute were followed (23): namely a three-step search strategy was undertaken. First, a limited search of MEDLINE and CINAHL was undertaken using an initial set of MeSH terms and keywords (*First Nations, Aboriginal, Physical Activity*) followed by the analysis of the text words contained in the title and abstracts of the retrieved articles, along with the index terms used to describe the articles. A second extended search using all identified keywords and index terms (Table s1, see Appendix G) was then undertaken across four databases (Informit, PubMed, Proquest and Scopus). Third, the reference lists of all identified reports and articles were hand searched for additional studies. A search for grey literature in Australia was also undertaken by searching the Australian Indigenous Healthinfonet. The searches were undertaken in January 2020 and re-run and updated in February 2021 to check for any additional articles. The following keywords were used: *PA, Exercise, Indigenous, First Nations, Aboriginal, Older, Seniors and Elderly* to ensure all available evidence was captured and variations of MeSH keywords were used for each database. These included *Indigenous peoples, Oceanic Ancestries, Alaska native, Inuits and Métis*. A Librarian, experienced in conducting health research provided advice for the search strategies and reviewed the final searches. An example of a search is presented in Table s1 (see Appendix G).

Following the search, all identified citations were collated and uploaded into a Microsoft Excel (2013) spreadsheet (Microsoft Corporation, Washington, USA) and duplicates removed. All studies identified were then examined by two independent reviewers (MG, TW) who read the title and where necessary the abstract, to ensure relevance and that they met the inclusion criteria, with discussion to resolve any differences. Finally, relevant studies that potentially met the criteria were retrieved in full and examined for eligibility for inclusion in the review. Any disagreements were raised with a third reviewer (AMH), who also independently viewed a selection of abstracts, and were resolved by consensus.

3.2.3 Inclusion Criteria

Types of Studies

Any type of study, both quantitative and qualitative, including controlled clinical trials, randomised trials and cohort and case control studies were included. Abstracts, theses, books and conference proceedings or poster abstracts were not included.

Types of Participants

Studies were included from any country if they enrolled Indigenous peoples. To be eligible for inclusion the population needed to include participants aged 45 years and older. The age of 45 years as a threshold was chosen for the purpose of this review based on previous work that identified population ageing and health service needs for Aboriginal and Torres Strait Islander populations (24). It is known that Aboriginal and Torres Strait Islander peoples have increased mortality and experience more chronic health conditions at a younger age than other older Australians (9, 10). Using a younger age reference point was also important for other countries, such as Canada where life expectancy for First Nations, Métis and Inuit household populations is consistently lower compared with non-Indigenous household populations (25). Briefly, this difference is associated with the social determinants of health caused by the effects of colonisation, racism and intergenerational trauma (25). Preliminary searches indicated that there was limited evidence that focused solely on Indigenous peoples within this age group. Therefore studies were excluded if they focused solely on adults below the age of 45 years. If the study enrolled participants from multiple age groups data were extracted separately where possible for those over the age of 45 years.

Types of Outcomes

The review focused on studies and reports that investigated engagement in PA by older Indigenous adults, but only those studies that specifically discussed barriers and enablers to engaging in these physical activities. Studies could include a variety of PA such as exercise programs, walking or sports and could include either barriers or enablers (or both), to participating in PA programs.

3.2.4 Assessment of Methodological Quality

Methodological quality of the included studies was assessed from an Indigenous perspective by two reviewers (MG, AMH) using the Aboriginal and Torres Strait Islander Quality Appraisal Tool (QAT) (26). The QAT has been explicitly informed by Australian national ethical guidelines for conducting research with Aboriginal and Torres Strait Islander peoples. The QAT takes an Indigenous perspective by assessing such domains as community engagement, Indigenous research paradigms, research leadership and control over data collection. This contrasts with other (non-Indigenous) critical appraisal tools that are framed around a Western, positivist interrogation to appraise study quality. The tool is specifically designed for studies about Aboriginal and Torres Strait Islander peoples and its authors caution that it may not be suitable for other Indigenous populations. However, authors also state that most importantly it gives voice to Aboriginal and Torres Strait Islander ways of understanding research. We were mindful that a previous review had found that 95% of reviews that stated they focused on Indigenous peoples did not use a quality appraisal tool that was specifically designed for Indigenous peoples (21). Therefore, we decided to also appraise included studies from Indigenous Nations in countries other than Australia using the QAT, rather than only use positivist critical appraisal tools. This aimed to strengthen the focus on asking questions about the quality of the study using a strengths-based approach and not privileging Western knowledge and constructs (22). We sought to use the keywords in the questions in the QAT items, for example "*local community perspectives*," to guide our appraisal of the included studies (Table s7, see Appendix G). Any differences of opinion were resolved by discussion and where necessary a third reviewer (MK) was invited to assist in achieving consensus. Following the recommendations for using the QAT, methodological quality of the included studies was also assessed by the two reviewers (MG, AMH) using standardised critical appraisal tools from the Joanna Briggs Institute's critical appraisal checklists for qualitative, quasi-experimental and cohort studies as appropriate (23). Any disagreements were resolved by discussion between the two reviewers to reach consensus.

3.2.5 Data Extraction

Data from each study regarding year, country, Indigenous Nation, authors, study design, participants, method of data collection (e.g. interview) were extracted. Due to the importance of taking an Indigenous worldview, including identification of authentic barriers and enablers, three additional questions were asked. Were barriers and enablers identified directly by the Indigenous participants themselves or indirectly observed by the researchers? Who interviewed the participants if direct interviews were undertaken? Were Indigenous researchers on the research team? The coding summary used to extract outcomes of "barriers and enablers to PA" is presented in Table s3 (see Appendix G). Researchers (MG, TW, AMH) hand-searched text for coding words such as barriers, enablers, obstacles, challenges, supports, benefits, encourages, improves, advantages, promotes, facilitators, problems or difficulties to identify relevant phrases in text. This assisted in identifying the concept (e.g. "…program being free was seen as a facilitator…" was coded as "enabler – cost"). The researchers worked independently, then met and compared and discussed results to reach consensus.

3.2.6 Data Synthesis and Analysis

The researchers were conscious of conducting the analysis in a manner that recognised the strengths that the communities and participants brought to the results (27). This involved examining the data with an understanding of the Indigenous knowledge system (knowing, being, doing) (22). The first researcher (MG) aimed to use her experiences and understanding in her community and her work in other Aboriginal and Torres Strait Islander communities in Australia to develop a clear perspective about what the community and participants in the included studies were really saying. Data were analysed using thematic synthesis, which followed a structure described by other researchers (28). In this approach the analysis was undertaken in three stages which took a back and forth approach. Extracted data for all information regarding barriers and enablers was placed under the free code headings, prior to analysis. First the free line-by-line coding of the findings and discussion sections of included studies was completed; second these 'free codes' were grouped and organised into related areas to construct 'descriptive' themes; and finally these themes were scrutinised for final development of 'analytical' themes (28). Descriptive themes are those that are closely related to the coded data, where the themes are generated directly from the data to capture the meaning of the coded data. Analytical themes are overarching themes, that are generated by discussion

and review of the descriptive themes and assist to answer the research questions. A consensus between the researchers is used to generate the final analytical themes (28). This method of analysis was viewed as appropriate by the researchers as findings could then be used to inform both policy and practice. Producing results that are useful for policy and practice meant that the review would return benefit to the Indigenous communities from where the research originated (21).

This approach identifies that it can be difficult to determine what data to extract from qualitative studies and suggests that findings be classified to be all of the text labelled as 'results' or 'findings' in the studies of interest (28). However, for quantitative and mixed methods studies, where barriers and enablers were not the primary outcome, we found that barriers and enablers to undertaking PA were frequently highlighted in the discussion. Hence, we took the approach to search both the findings and discussion sections of all included articles for any mention of our coding words, with ‘barriers’ and ‘enablers’ being our overarching key code words to assist in the coding process. The initial coding and development of themes (by MG, TW and AMH) was reviewed by an independent Aboriginal researcher (MK) (see Section 2.11). All four researchers (MG, TW, AMH, MK) then conferred to develop final analytical themes which represented barriers and enablers to older Indigenous people engaging in PA. This investigator triangulation of the analysis was used to enhance trustworthiness of the findings (21, 29). Finally, the research team was invited to comment and discussion was undertaken led by the Aboriginal and Torres Strait Islander researchers’ perspectives of the findings (22). This was to protect the research outcomes and strengthen the relevance and benefits of the findings to Indigenous people and subsequent impact on both policy and practice (21).

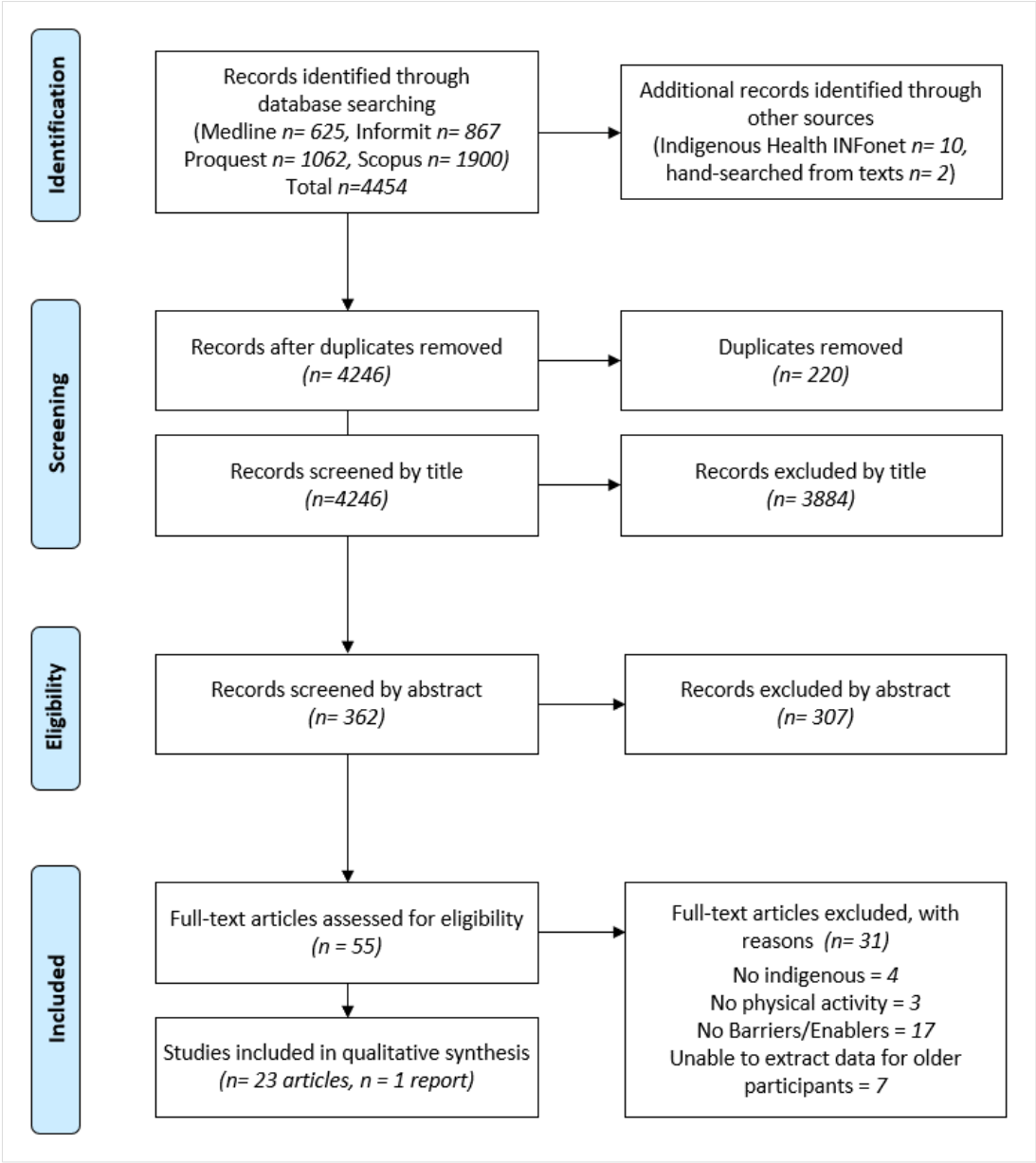
3.3 Results

3.3.1 Study Selection

A study selection flow chart is presented in Figure 3.1. The search identified 4466 articles for consideration, of which 23 studies and 1 report were eligible for inclusion. Excluded studies mainly did not focus on older Indigenous populations or identify barriers or enablers to PA. A list of excluded studies and reasons for their exclusion is presented in Table s2 (see Appendix G).

Figure 3.1

PRISMA Flowchart presenting screening and selection of studies included in the review



3.3.2 Study Characteristics

The communities and the older Indigenous participants within each included study are described in full in Table s3 (see Appendix G). The characteristics of the 23 included studies and the report are described in Table s3 (see Appendix G). The final included studies all reported barriers and enablers to PA of older Indigenous populations. There were seven studies and one report (30, 31, 32, 33, 34, 35, 36, 37) conducted with Aboriginal and Torres Strait Islander communities (Table s3, see Appendix G). Four studies were conducted with communities in Canada (38, 39, 40, 41), two studies with Māori

communities in NZ (8, 42) and 10 studies with communities in the United States (43, 44, 45, 46, 47, 48, 49, 50, 51, 52). Studies were conducted in both rural and urban settings.

Five studies enrolled both Indigenous and other participants (36, 43, 46, 47, 48). Data for Indigenous participants only were extracted from these studies and included in the analysis. Seven studies only included women participants (34, 37, 39, 41, 46, 47, 48) and one study only included men (8).

Fourteen studies (eight qualitative n=161 participants; six quantitative (n=1030 participants) enrolled Indigenous adults over the age of 40 years (range 40 - 90 years, Table s3, see Appendix G). Four studies enrolled participants from a broader age range and for these studies data were extracted only for the older participants (34, 36, 39, 40). Of the remaining six studies large proportions of older Indigenous adults were enrolled, quantitative data included age adjusted analyses and qualitative data contained strong voices of Indigenous Elders. Hence these studies were judged as relevant to include in the analyses (see Table s3 footnote).

3.3.3 Quality of the Included Studies

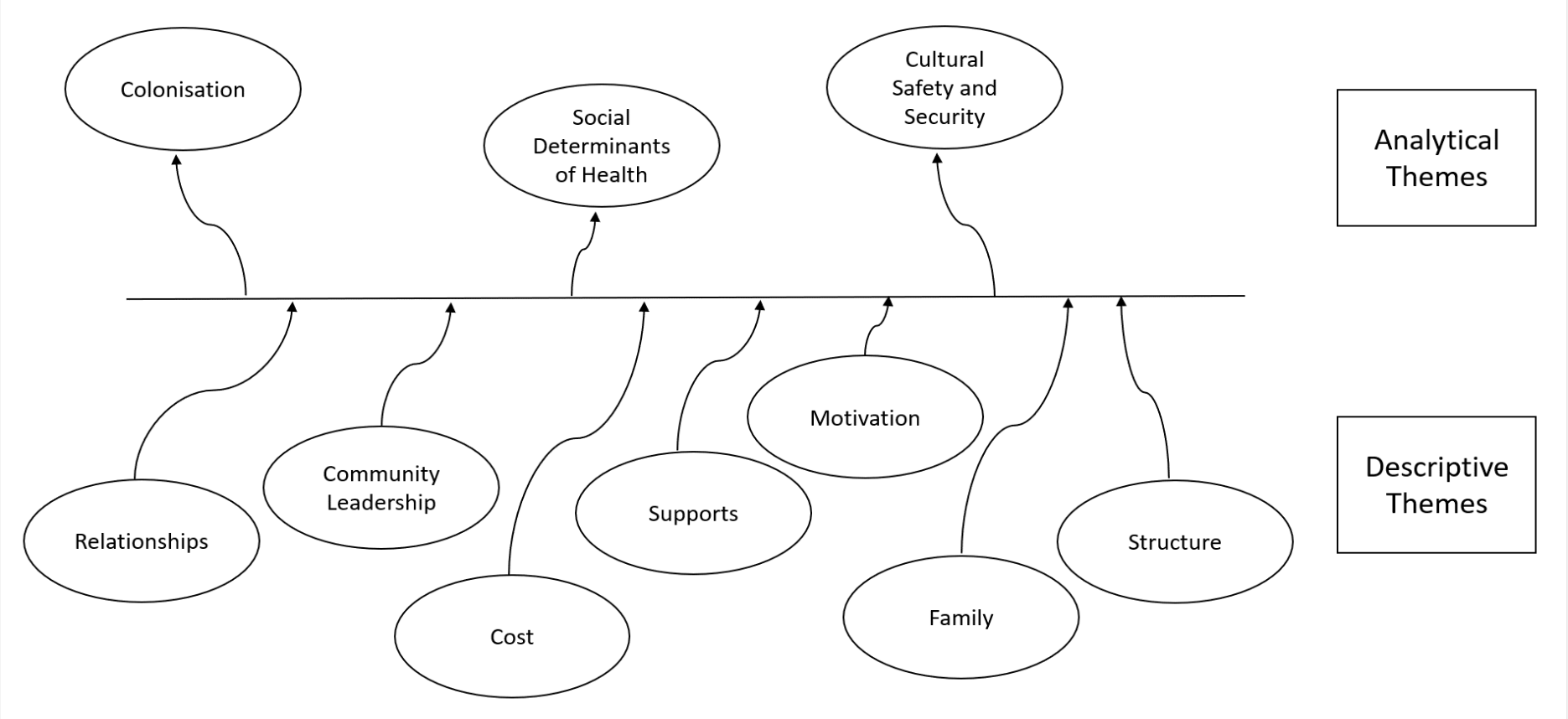
Critical appraisals of the 23 included studies using the QAT and JBI tools are presented in Tables s4, s5, s6 and s7 (see Appendix G). Two of the 23 studies were found to be methodologically of a high standard by both Indigenous and Western critical appraisal tools (30, 44). The QAT appraisal identified 19 studies that were rated as respecting and following community protocols. It was unclear in 12 studies if the researchers made an agreement with the Indigenous communities either to protect existing intellectual and cultural property or intellectual property and cultural property created through the research (see Table s7, Appendix G). There were eight studies conducted by teams that included Indigenous Researchers, and eight studies where non-Indigenous researchers collaborated with local Indigenous advisors or supporters. Eight studies either did not report or were unclear about whether there were Indigenous members on the research team (Table s3, Appendix G).

3.3.4 Barriers and Enablers to Undertaking PA

Overall themes and their relationships are presented in Figure 3.2. Descriptive themes that could be either barriers or enablers were identified depending on how the program addressed these elements. These ***Barriers and Enablers to Engagement*** in PA by older Indigenous peoples are presented in Table 3.1 and Table 3.2, with representative quotations. Barriers and enablers were:

Figure 3.2

Schematic map of analytical and descriptive themes



Coding examples: Communities; Traditional activities; Cultural; Consultation with Elders; Community ownership; Funding; Time; Childcare; Laziness; Encouragement; Elders; Safety; Illness; Environment; Opportunities; Activity; Motivation; Transportation; Unsafe; Cost; Location; Group fitness; Spiritual; Kids; Support; Family; Friends

Community Leadership

If the program privileged community leadership this was viewed as a key enabler. Researchers who worked with 19 Aboriginal communities across New South Wales, Australia stated that "a key strength of the Challenge model is that it was led by local Aboriginal communities and participants were local Aboriginal people" (35). Researchers found that including Alaska Native Elders in the leadership of programs, "…acknowledges their expert knowledge about successful ageing and their role in teaching others in their community" (44).

Structure: Using an Indigenous Knowledge Framework

Structuring programs in ways that privileged Indigenous worldviews where working, learning and doing are integrated and holistic (22) and suited the needs of local Indigenous people was also identified as an enabler or barrier to participation. "When asked why some of the Elders did not participate in the program… that it was likely because some of the Elders still lead traditional lives and the program was not based around traditional activities…" (38). Cultural understanding was important and another elder woman said that the health clinic staff should check on the homebound elders, saying, "it's nice to have your own people do that for you by phone" (52). Infrastructure that existed in local communities did not necessarily reflect an understanding of local Indigenous communities, with one study identifying that "local accessibility was an issue to ongoing participation" (32).

Differences between men and women was frequently mentioned, with both men and women stating that there was a need for separate programs (35, 39, 41). One female participant made the point about preferring "…women only programs…" and this perspective was felt to be a barrier if it was ignored.

Multiple studies in the review demonstrated that Yarning circles, Talking circles or Focus groups were successful ways of working with Indigenous people (8, 33, 41). Sitting together in an inclusive environment, respecting one another's views and points made during discussions promoted social inclusiveness. One study commented that "... the yarning led to then doing the PA" (33).

Family and Community Supports

Support, whether family, peer or structural was an important factor in all studies. Some participants indicated that it was important to have someone in a teaching or peer role to guide them and show them the way as they were not knowledgeable on what to do.

Family support was viewed as important, with family members being present to support and encourage each other through PA. Multiple studies suggested that interventions that included the entire family may be more sustainable (30, 36, 49). Responsibility to family was also an important factor in relation to PA. This could be a barrier as well as an enabler, as some men reported trying to find a balance between their own health and family priorities (8). Another study working with urban Aboriginal and Torres Strait Islander people stated that "…findings clearly emphasise the need to shift…from individual activity pursuits, to focus on family and community opportunities" (32).

Table 3.1

Enablers to participation and program success

Theme	**Exemplar Quote**		
Cost	"A donation of $2 could be asked for attendance to each program session. A robust, large-scale evaluation is needed to determine if the Ironbark Program can reduce falls in this population." (33)	"Other factors identified by both groups as facilitators included easy access to outdoor gym equipment and activities that are free of charge, such as walking and running." (36)	"Offering low- or no-cost classes; and involving older adults in program development." (43)
Family and Community Supports	"Results indicate that interventions aimed at encouraging physical engagement should preserve family connections and offer activities that are socially oriented." (36)	"The Elders – both men and women – also identified that teaching others was a means of actively participating in subsistence, which was an important aspect of Eldership." (39)	"Pacific Islander societies tend to place more emphasis on the family, group, or community as a whole rather than individual autonomy, comfort, and self-care." (49)
Relationships	"While involving community members can be time consuming, it is a necessary step if long term community interventions are to be feasible, effective and sustainable [30]. Community members have detailed knowledge of their local environment, organisations and networks." (42)	"From the gender lens, the group-based intervention fostered closeness and a sense of sisterhood among the women." (41)	"Camaraderie or 'broship' had an important role in motivating participants to be physically active." (8)

Theme	Exemplar Quote		
Structure - Using an Indigenous Knowledge Framework	"A strength based-approach with consistent and respectful listening to people with MJD" (30) "Participants in the AI/AN group were enthusiastic about the idea of getting together regularly to discuss their health concerns and to encourage each other to be active. They expressed a strong desire to be around people of similar background and identity." (43)	"Local Aboriginal people from the community should manage the program…as this facilitates the engagement of the local community and retains capacity …increasing the likelihood of program sustainability." (33) "The need for 'women only' programs to encourage physical activity was frequently highlighted." (39)	"The Talking Circle, which was reported to be 'the best part of the group experience,' was perceived as fostering connections, spirituality, and traditional learning." (41)
Community Leadership	"It would help if there were a group of elders who look like me." One participant wanted to serve as a role model and give his "children and grandchildren someone to emulate." (43)	"A key strength of the Challenge model is that it was led by local Aboriginal communities and participants were local Aboriginal people." (35)	"Incorporating a variety of activities suggested by the participants …. May encourage greater involvement and increase levels of PA among women in the community who are less active." (39)
Motivation	"One Elder described doing things independently, 'I'm trying to age well by trying to do things on my own instead of asking for help all the time." (44)	"Adult Metis who reported being very religious or spiritual were more likely to be active in their leisure time than those who were not at all spiritual or religious." (40)	"The cultural and community connection was seen as very important and as a motivator for participation." (43)

Table 3.2

Barriers to participation and program success

Theme	**Exemplar Quote**		
Cost	"I can't afford $80 a month for some of the gyms, let alone pay someone to help me work my way around the gym. I've never thought about putting that much money into the gym." (8)	However, the cost was again identified as a barrier. One participant's quote represents how many felt, "they are trying to promote sports but the cost factor involved, people can't afford to get the family involved." (32)	"I find registration fees are expensive this has, and does make it difficult for me, my family, extended family and friends, to participate in a sport we really do enjoy, at a club level in our community." (36) "…community barriers included, lack of transportation… and the cost of joining an exercise facility." (45)
Family and Community Supports	"It has further been suggested that interventions that include the entire family or consider familial responsibilities may be more sustainable and effective in encouraging PA." (36)	"For me my family is my priority and all my four kids play sport…and they all play on different days… so I've had no physical activity..." (8)	"Most participants had children, thus many suggestions related to the need to provide opportunities for families to be active together…" (30)
Relationships	Social leisure was also important in the health promoting behaviour of the elder woman with diabetes. She noted how difficult it was to maintain a walking program without social support: "You really need a companion or friend to do these things with ..." (52)	"I'm the aunty that will take all the kids to their sports. I think that's part of the kinship. That's what Aboriginal women bring to sport, the kinship ... With Aboriginal cultures, kids that aren't yours ... are kind of like your own little kids as well, you bring that emotional support to them as well." (37)	Pacific Islander societies tend to place more emphasis on the family, group, or community as a whole rather than individual autonomy, comfort, and self-care." (49)

Theme	Exemplar Quote		
Structure - Using an Indigenous Knowledge Framework	"One of the biggest barriers that we run across is that not all of the program leaders do have that full support to deliver an Elders' fitness program." (personal communication, June 20, 2013) (38) "Led by non-Aboriginal researcher..." (44)	"… As well as a lack of regularly organised activities… Lack of childcare support." (39) "There's no actual competition. It's not like you're competing, you're not chasing. If there was something to chase; if there was a win at the end. But the gym just seems like an ongoing thing that never ends." (8)	"When you see people doing fitness you don't see people who look like me." (43) "Aspects of the program actually reinforce colonialism." (38)
Motivation	"not having walking partners." (48) "Lack of willpower was the highest rated barrier by Elders." (51)	"A lack of time was the second most identified barrier to involvement." (36) "A key deterrent to using the gym for some men involved feeling like being in a 'fish bowl', which invariably affected performance because of their 'public' nature." (8)	"… Lack of time, bad weather, injuries, past trauma, or just lack of motivation." (41) "Lack of recreational resources was also reported by elders as a significant barrier." (50)

Relationships

Māori men expressed similar reflections about "…the importance of family, relationships and broship" (8). Participants in one community stated there had to be a good relationship between the researcher and the Elders (38).

Cost

Older Indigenous people mentioned cost as a barrier if this was not addressed sufficiently (32). However if cost were addressed to meet Indigenous Elders requirements, it then became an enabler that would allow participation, particularly for those Elders without much family support (36). Transport was another barrier along with cost that was frequently mentioned, these two issues often presented together and if both were not addressed, access to PA programs became very difficult. In one study, some participants linked barriers to a "lack of safety, no walking paths and a lack of transportation" (36, 50).

Motivation

Motivating factors were clearly related to personal goals, desire and opportunity to be involved in a PA that would help to improve physical fitness. "You have to help yourself, like me…you have to have therapies….it helps me. You can't dwell on your hurts and pain..." (52). In one study the participants perceived that psychosocial and health benefits of exercise were motivators – "…feeling better about yourself, get your mind off things." were mentioned as positive reasons for doing PA (39). American Indian Elders identified multiple facilitators such as the personal benefits of better health, pleasant weather and particularly a "…better built environment…closer to interesting places" (50). Self-determination was also a strong enabling theme that motivated Aboriginal communities of the Groote Eylandt Archipelago in remote Australia (30). The community formed a local foundation to help themselves and this was described as a "…testament to the strength and resilience…" of the families in the community (30).

Fear and shame were strong de-motivators for some Indigenous Elders. Once participants in the Groote Eylandt Archipelago community understood about their disease, they lost their feelings of shame, realising no-one was to blame. They became more physically active, searching for activities to help themselves and their families, believing that "keeping the body moving or 'keeping the blood pumping' stops the disease from covering you…" (30). The Woodland Cree older people also identified shame as a demotivating factor (39). For some Māori men, "A key deterrent to using the gym… involved feeling like being in a "fish bowl", which invariably affected performance because of their 'public' nature. There's all these mirrors and you're looking at yourself, and you're worried that others are looking at you" (8).

3.3.5 Overarching Analytical Themes

Three analytical themes (see Table 3.3) were identified as encompassing all the descriptive themes identified: *Cultural Safety and Security, Colonisation and Social Determinants of Health.*

Cultural Safety and Security

Cultural safety has been described as an Indigenous-led model of care that acknowledges the barriers to clinical effectiveness caused by the inherent power imbalance between the health provider and the patient and moves to redress this dynamic by making the clinician's cultural underpinning a critical focus for reflection (53, 54). Other researchers emphasise that cultural safety is not about the acquisition of cultural-knowledge but requires a focus on power relationships and inequities within health care interactions that reflect historical and social dynamics (11). Organisations that are led by Indigenous staff and family members were viewed as contributing to a culturally safe model of care. One woman mentioned, "…it's a safe space for them to come; it's an Aboriginal organisation. It's run by Aboriginal people" (37). Another study stated that "the Aboriginal people's point of view needed to be understood and not those of accepted service models" (32).

For a number of Indigenous communities, 'ways of working' was very important. For example, Yarning Circles were viewed as a culturally appropriate 'way of working' and engaging (33, 41). Evidence based programs that introduced culturally sensitive elements, designed and led by Indigenous researchers were found to be positive strategies (33, 45). Two studies reported that PA was not just seen as a personal responsibility to maintain health and age successfully, but also "a way to resist Western society's dominant view of older adults as deteriorating and declining", by being physically active" regardless of age" and "to improve or maintain their physical, mental, emotional and spiritual health" (39, 44).

American Indian women described that "they could identify some sociocultural factors as being linked to their PA. These perspectives related to "…history, marginality, and cultural pride" (48). Another study concluded that "findings…suggest strongly that interventions designed to increase PA participation among Métis would be more successful if they recognise the importance of cultural connections to health and that promoting cultural engagement could be an effective approach…" (40).

Table 3.3

Analytical themes of colonisation, social determinants of health and cultural safety and security

Colonisation	Social Determinants of Health	Cultural Safety and Security
"…can reinforce the colonial process. These include… standardised Western-based program, and not recognising and addressing the diversity of Aboriginal peoples and their communities… provides little opportunity for participants to engage in activities that reconnect them with their traditional lifestyles on the land…" (38)	"Those interested in a program raised concerns that it would be difficult to find a suitable location, the classes might not be well-attended, and reliable transportation would be an issue. Given the transportation difficulties, a twice- or thrice-a-week class was not preferred." (45)	Results…. suggest that culturally-specific factors are driving physical activity. Those culturally-specific variables must be identified, beginning with qualitative research methods and followed by quantitative assessments." (49)
"Frequently, Māori are subjected to negative stereotypes… Such attitudes disregard the pervasive influences of colonisation, contemporary socio-cultural and environmental factors…" (8)	"Therefore, understanding social and cultural factors that enable or inhibit engaging in PA may assist health practitioners in developing effective culturally-relevant PA programs and interventions for Aboriginal women." (39)	"Adapting programs ….and incorporating culturally based values, such as integrating other aspects of health that acknowledge the holistic and social dimensions of health..." (45)
"Mainstream health models often fail to take into account the holistic understanding of health and the central importance of spirituality in indigenous communities…NPs were challenged to balance Western traditional health promotion messages with indigenous healing ways. They navigated this experience as one of co-learning." (41)	"Sociocultural influences related to marginality were generally seen as negative. For several American Indian women, marginality related to the lack of recreation facilities available and the amount of work for pay that had to be done." (48)	"Through the appropriate use of culturally relevant processes and integration of culturally relevant content, traditional information-heavy health education materials can be transformed into opportunities for dialogue, reflection, and change." (41)
"A history of oppression and the resulting poverty and low self-esteem were common threads throughout the American Indian/Alaska Native" (AI/AN) group (43)	"The concern is that some participants taking part in the research may not have had the resources, skills or literacy to access and fully benefit from the digital health tracker's functionality." (34)	"The conversations and yarning circles with the women… privileged their voices, experiences and interpretations." (34)
		"...A key strength of the Challenge model is that it was led by local Aboriginal communities and participants were local Aboriginal people." (35)

Colonisation	Social Determinants of Health	Cultural Safety and Security
"…While historical, biographical, health promotion and community research is increasingly being undertaking to understand the significance of sport and physical activity to Indigenous Australians, the presence and voice of Indigenous women are mostly absent." (34)	"The causes of the health gap between Aboriginal and non-Aboriginal people are complex and include a range of social, cultural and environmental factors. Addressing health inequities and closing the life expectancy gap are key priorities for Aboriginal and non-Aboriginal organisations…" (35)	Identification with their culture, one woman commented that "Indian Culture taught her to go outside and walk in the morning before she said her prayers." (48)
"Traditional quantitative methods often have been unable to uncover the complex nature of women's attitudes and practices, especially for marginalised groups such as minority women…" (48)	"Psychosocial factors, such as indigenous cultural and social values, may be important determinants of leisure-based health behaviours." (52)	

Colonisation

Studies recognised that colonisation had devastating effects including loss of land, language and customs that communities had practiced for thousands of years prior to Invasion (5, 6). Therefore successful PA programs for Elders need to use a framework that provides a space for the impact of this history. One successful program that took a decolonising approach with Indigenous Elders from six communities in New South Wales (33). "Through acknowledging the broader concepts of health and well-being, Aboriginal-led services are better positioned to consider the physical, social, emotional and cultural needs of clients" (33). In contrast, another study that concluded… "interventions whose components draw from Western-based constructs may not be easily adapted to minority populations. Instead, interventions that attend to local contexts and values must be developed and tested to improve effectiveness, relevance, and acceptability" (45).

Multiple studies identified that PA is seen differently in Indigenous cultures compared to Western worldviews of PA (36, 45). Taking a decolonising approach meant designing programs with Indigenous views preferenced. For example themes demonstrated that family engagement appeared to be a strong motivator for PA as were group-based activities. One study recommended a "…focus on increased opportunities for family orientated activities…" (32). Another study emphasised that "…by encouraging and supporting the participants to have control over the program… and not just having a one-size-fits-all …could play a role in resisting colonialism in PA programs" (38).

Social Determinants of Health

Themes strongly identified that social determinants of health form a barrier to Elders commencing and engaging in PA programs in many Indigenous communities. A study described kinship responsibilities, feelings of isolation and lack of infrastructures and supports from outside the communities they resided in as making it extremely difficult to make changes (37). Cost of programs, especially transport, was frequently noted to be a barrier that impacted heavily on Elders' ability to participate in physical activities, i.e. not being able to go to places or attend programs where they can be active (37, 52). Indigenous Elders spoke about being more physically active if only there was transport available that would enable them to do that more often, instead of having to rely on their children who often worked (52). Other social determinants related to feelings of not being the same - connected to 'racism and vilification' out in public, which engendered feelings of shame (43). Participants in another study mentioned racism in sport as a barrier they experienced, with researchers describing "…racist issues or vilification based on skin colour still seem to pervade Indigenous women's involvement in sport" (37).

3.4 Discussion

This review synthesised evidence internationally to identify key factors that impact on older Indigenous peoples' engagement in PA. Older Indigenous peoples from over 30 communities across four countries identified that cultural safety and security, effects of colonisation and understanding the impact of social determinants of health were critical to address when developing PA programs. They advised that, successful programs facilitated a decolonising approach, provided culturally competent resources and addressed the ongoing inequity evidenced by the social determinants of health. Successful programs included features such as employing Indigenous staff, providing Indigenous leadership support from peers and families and addressing access barriers.

Taking a decolonising approach was identified as having a positive impact on older Indigenous peoples' participation in PA in all communities who were engaged in the research. Older Indigenous adults identified that they sought PA programs that respected Indigenous Elders' knowledge about their health. Nations shared similar wisdom, such as using Indigenous leadership, yarning circles, respect for culture and seeking family-based programs. Strong differences between Nations were not identified. A previous review that examined younger Aboriginal and Torres Strait Islander peoples' understanding about PA also concurred that undertaking exercise was supported when in the context of family and community (55). Findings also suggested that PA programs for older Indigenous people have often been constructed according to the western world views, which increases barriers rather than augmenting enablers to success. Our findings are supported by other research which has explained that programs designed using a Western model may use a limited medical model that is narrow and controlling (3). A review of PA interventions for Indigenous populations living in Canada recommended that moving past the damaging effects of colonisation requires an expansion beyond reliance on western-based measures and interventions (56). De-colonising ways of working around PA requires appreciation and understanding of how colonisation has impacted negatively on Indigenous peoples and communities (6).

The United Nations declaration of Indigenous rights states in part that Indigenous peoples have the right to be actively involved in determining and developing health programs affecting them (57). Our review highlighted that PA programs that partnered with Aboriginal controlled organisations and communities in Australia (30, 33) and with the community in the East Coast area of NZ (42) were effective at promoting older Indigenous peoples' engagement and participation. These findings are supported by other studies with

Aboriginal and Torres Strait Islander communities that have successfully used a decolonising approach when promoting PA (58, 59). In contrast two reviews evaluated the efficacy of cardiovascular disease interventions for Aboriginal and Torres Strait Islander older adults and American Indian and Alaska Native older adults (60, 61). They reported that programs were designed within a mainstream health model and did not preference culturally centred approaches. Researchers concluded that while there was some evidence of effectiveness, health outcomes from these programs could be strengthened by meaningful collaboration and partnerships with the communities involved (60, 61).

Our findings reflect a review by a Métis researcher who highlights that colonisation has meant that Indigenous peoples have been subjected to systems and models of care shaped for the dominant society (62). This review concludes that significant transformation of health systems, services and individual providers is required and will only be accomplished by demonstrating allyship with Indigenous leaders, communities and individuals (62). In WA for example, past and present assumptions made by non-Aboriginal and Torres Strait Islander Peoples health workers and researchers has led to mistrust of engagement in non-Indigenous mainstream health programs (16). In contrast, Aboriginal Community Controlled Health Services have been found to reduce unintentional racism and barriers to accessing health care, while improving individual health outcomes for Aboriginal and Torres Strait Islander peoples (63).

Older Indigenous people from multiple communities emphasised that cultural safety and security was a key consideration to deciding whether to commence or continue participation in a PA program. They sought health services that provided PA programs that accommodated their social and cultural needs, therefore understanding their views and preferences was critical. Successful programs addressed this throughout every phase of the design, such that older Indigenous peoples' knowledge was respected and they felt safe and secure (30, 33, 44). These findings are supported by a study partnering with Elders from six Nations in Australia (18). The Elders in this study explained that they did not attend healthy ageing mainstream programs because of transport and financial issues, but also because of the lack of cultural safety and absence of community networks (18). In contrast, a successful health initiative in that developed a back pain program used a "cultural security" framework and the research was conducted through partnerships between Aboriginal and non-Aboriginal investigators and participation of a project steering group consisting of local Aboriginal people (64).

Social determinants of health were clearly identified as an important barrier or enabler to PA. Older Indigenous peoples highlighted that accessibility and appropriate resources were vital enablers in supporting them to undertake culturally safe programs. Aboriginal communities in Australia, particularly through Aboriginal controlled medical services understand that effective delivery of health services includes taking a holistic view of health and employing practical strategies to factor in social and community determinants of health (3). In Australia a review of PA for Aboriginal and Torres Strait Islander people concluded that policies and strategies surrounding PA for Indigenous people must be viewed through a social determinants context, so that the disparities are reduced (4).

3.4.1 Strengths and Limitations of the Research

Western academic research often demonstrates limited knowledge about the strengths of and ways of working with Indigenous older people. A strength of this review was that it was led by an Aboriginal researcher, taking a decolonising approach, and therefore revealed different perspectives. Taking leadership allowed this researcher to ensure that the research was conducted using Indigenous principles and ethics (65). It strengthened the authenticity of the coding and subsequent data analysis by the team, which added to the credibility of the study (66). There was supportive evidence from differing communities which added to the strength of the evidence. However, it is important to recognise that all Indigenous groups are unique and findings may not be generalisable to other Indigenous communities (18, 36, 38, 52). Researchers who studied a PA program being delivered to Aboriginal Elders in the Northwest Territories highlight that it is important not to take a "one-size fits all" approach (38). Indigenous Elders including those from Aboriginal and Torres Strait Islander communities, Métis, Cree, Māori, Alaskan Native and other communities all provided valuable insights about the unique nature of their own programs. More differences might have been observed if a close observation and comparison of programs was conducted between Nations.

Limitations of the review were that the quality of the studies varied. Limited studies reported Indigenous leadership and not all studies appearing to engage the community in a leading role in the research. It has been summarised that research must move from a positivist to a decolonising methodology and must be completed with, and not on, Indigenous Elders (20). Therefore, more high-quality participatory research is required. Although only 18 studies focused on older people or included data specific to older people, six studies included some data that pertained to adults generally but not specifically to older adults. However, within these studies significant numbers of older adults were

enrolled and they included strong voices of older Indigenous participants. After appraisal of the studies we adjusted criteria (45 years and above) to include populations from 40 years upwards, as this was the most frequently described lower age range for the older participants in each study. While the results of our review are not generalisable to all Indigenous communities the findings can be valuable to provide supportive knowledge and promote allocation of resources for health services and communities when developing PA programs with older Indigenous peoples. We assessed the quality of the studies from countries other than Australia from an Indigenous perspective by adapting the QAT to apply the appraisal questions to the relevant context. Although the QAT was designed from an Aboriginal and Torres Strait Islander context (26), we found the items in the QAT were relevant to appraising research quality for studies conducted in other Indigenous populations. This is because the QAT privileges Indigenous epistemologies, values and principles (26). While we found that older Indigenous peoples expressed clear themes about what was required there has been limited evaluation of PA programs that prioritise older Indigenous peoples' preferences for PA in Australia, and in other colonised countries. More participatory research is required.

3.5 Conclusion

PA is well established as being highly beneficial for older adults' physical and mental health (2). Through reflecting on Indigenous Elders' perspectives we can better understand key barriers and enablers that exist within current PA programs. Barriers caused by colonisation have resulted in mistrust, oppression and lack of respect for older Indigenous peoples' knowledge and leadership. Colonisation has also resulted in programs being designed using a western view, hence Indigenous and non-Indigenous researchers and health professionals should work together to address socioeconomic and cultural factors by taking a de-colonising approach. Health providers should partner with older Indigenous peoples from conception through to delivery and evaluation of PA programs to privilege Indigenous knowledge, ways of working and cultural safety and security. Resources and funding should be adequately allocated to build partnerships with older Indigenous peoples to design and evaluate culturally appropriate PA programs.

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Chapter Four

4

Elders' Perspectives About Engagement in the Ironbark PA Program

Preface

This Chapter describes Study 2, which was conducted as part of the research for the thesis. The specific aim of this Chapter was to explore how engaging in an Aboriginal-specific PA program impacted on the lived experiences of Elders on Noongar Boodja in WA.

The Chapter is based on the published article: *Connecting and Reconnecting to a Community, With a Sense of Belonging – Exploring Aboriginal Elders' Perspectives of Engaging in a Physical Activity Program*

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Connecting and reconnecting to a community, with a sense of belonging – Exploring Aboriginal Elders' perspectives of engaging in a physical activity program

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The author's version of the manuscript is presented with modifications to suit the style and format of this thesis.

Abstract

Background: Culturally appropriate physical activity (PA) programs have values and principles that respect local community culture and knowledge. However, in WA there were no opportunities for older Aboriginal peoples to engage in a culturally appropriate PA program. The study objective was to explore how engaging in a culturally appropriate PA program impacted on the lived experiences of Aboriginal Elders.

Methods: A qualitative exploratory study was conducted using an Indigenous methodology. Participants were Aboriginal Elders in Noongar Country in WA. Two groups, engaged in the Ironbark program, which consisted of weekly exercise and a yarning circle. The program was developed in NSW specifically for older Aboriginal and Torres Strait peoples and adapted for use in WA. Semi-structured interviews utilising a yarning approach were facilitated by a Noongar Wadjuk researcher. Inductive thematic analysis was undertaken.

Results: Nineteen Elders were interviewed. The overarching theme was that participation led to *Connecting and reconnecting to community with a sense of belonging.* Elders affirmed the program as being appropriate and comfortable. They described experiences that were grouped into three main themes of *Positive mental and emotional changes, Physical improvements* and *Social benefits*.

Conclusions: Aboriginal Elders valued the opportunity to engage in a culturally appropriate PA program. Benefits were appreciated as holistic in nature, with Elders seeing improvements in their mental, physical and emotional health.

4.1 Introduction

Physical activity (PA) is known to improve older adults' health and overall well-being while also reducing the risks of physical and mental illness (1, 2). However, older people are less likely to be physically active than any other age group (3, 4, 5, 6). Older Aboriginal and Torres Strait Islander peoples do not regularly engage in mainstream PA programs because the features and characteristics of these programs do not attract them and programs rarely address cultural safety, security and competencies (7, 8). Health care systems are designed for the dominant society and hence many PA programs still adopt a Western worldview rather than privileging an Indigenous worldview (9), and addressing cultural competencies to facilitate Indigenous peoples' access (7). Culture is the way that Aboriginal and Torres Strait Islander peoples identify within their own communities, families and Country and shapes the relationship between self, family, and community (10, 11). Cultural safety is a critical examination of power imbalances between Indigenous patients and non-Indigenous health care providers. It therefore forms a core principle for re-orientation of health care services to better meet the needs of Indigenous groups (12), and has been articulated as a framework for underpinning culturally respectful health service delivery (13).

Older Aboriginal and Torres Strait Islanders peoples in Australia have also been prevented from engaging in suitable PA due to the effects of colonisation (14, 15). Introduction of policies and laws limited Aboriginal and Torres Strait Islander peoples' freedom of movement, caused severe disruption of social structure and community leadership and resulted in forced inactiveness (16). This has resulted in a severe negative impact on the social determinants of health, such that Indigenous peoples worldwide experience significantly higher levels of chronic disease and ill-health (17, 18). Concurrently, services have been limited and inappropriate. Therefore, options and choice of access to high quality PA programs is critical to improving Indigenous peoples' health (19).

Limited research has focused on developing effective PA programs for Indigenous peoples. PA programs that have reported high levels of community engagement and positive health outcomes in Indigenous communities have addressed cultural safety and security and taken a decolonising approach, including building their programs around the specific needs of their communities (8, 20, 21). Decolonisation for researchers is about having a critical understanding of the underlying assumptions and values that inform the research approach (22). It is about working collaboratively with Indigenous people and

ensuring their input informs the research project, including directing how research outcomes should be applied to any changes within communities (23, 24). Three systematic reviews have focused on Indigenous peoples' participation in PA. One review focused on Indigenous peoples in Australia and New Zealand, one focused on First nations, Inuit and Metis peoples of Canada, and a third reviewed PA within American Indians and Alaskan Natives communities. These reviews reported weak evidence that physical activity resulted in beneficial health outcomes for Indigenous peoples (25, 26, 27). All reviews additionally reported that the limited evidence available meant that further high-quality research was urgently required.

However, two of these systematic reviews included PA programs for individuals of all ages, rather than focussing specifically on PA programs for older Indigenous peoples (25, 26). The third review focused on older American Indians and Alaskan Natives but only found three studies that were able to be included (27). Older Indigenous peoples' needs differ from non-Indigenous older people due to the trauma engendered by colonisation, ongoing racism, and an absence of culturally appropriate health services (28, 29). Only a very small number of studies have evaluated PA programs specifically designed for older Indigenous peoples (20, 30, 31), one being the Ironbark program in Australia. The Ironbark program was specifically designed for older Aboriginal people and was developed in collaboration with Aboriginal communities in New South Wales (NSW) (30). The program is a community-based, Aboriginal-specific fall prevention program delivered via weekly sessions that consist of one hour of exercise (including strength, balance, and functional exercise) followed by *'Yarning'* about information related to fall prevention. Yarning has been used by Aboriginal people in Australia for thousands of years. It is an accepted research method used by Aboriginal and Torres Strait Islander researchers that allows sharing of information in a culturally safe manner with Aboriginal and Torres Strait Islander peoples (32). Elders in NSW who participated in the Ironbark program reported that they enjoyed it and recommended it to others. Participants also demonstrated significant improvements in physical function (30).

However, although the Ironbark program delivered positive outcomes in NSW, there was no PA program specifically designed for older Aboriginal people in WA. Therefore, to address this gap two Noongar communities in the South West of WA partnered with a research team to implement the Ironbark program in WA. The aim of undertaking this project was to translate and evaluate the Ironbark PA program with older Aboriginal people in WA. The communities and researchers recognised that the Ironbark program was purposefully designed for Aboriginal Elders in NSW and needed to be adapted to the

specific needs of older Aboriginal peoples the South West of WA. This was important because of differences in the history of colonisation between NSW and WA and differences in culture, including lore, customs and spoken dialects. Therefore, it was important to explore Elders' perspectives about the program when it was undertaken in WA. The objective of the study was to explore how engaging in an Aboriginal-specific PA program impacted on the lived experiences of Elders in the South West of WA.

4.2 Methods

4.2.1 Design

The study was nested within the larger project that aimed to translate the Ironbark Program into Aboriginal communities in Noongar Country, WA. In the WA groups, the one-hour exercise component of the Ironbark program also intermittently included dancing and walking to background music, and the subsequent yarning circles discussed falls prevention but also other health related topics. Yarning was undertaken with a shared lunch.

4.2.2 COVID-19 Lockdown period

The Ironbark PA program was conducted over approximately two years (2020-2021). However, there was a gap in program delivery of approximately six months due to social restrictions caused by the COVID-19 pandemic. Further intermittent restrictions occurred for short periods after the initial closure, and some Elders felt less confident to return to the program, meaning there were less participants by the end of the program.

The study used a descriptive phenomenology approach as it sought to explore the Elders' lived experiences of the Ironbark program (33). This was underpinned by principles outlined for Indigenous research methodology (34). These principles included leadership by an Aboriginal researcher who was capable and confident in her comprehension of Indigeneity, respecting Indigenous knowledge (of the Elders and communities) and peoples and honouring relationships (34). The team of Aboriginal and Western researchers who supported the program with the Aboriginal Elders, were conscious of the research methodology of "weaving at the interface" of Indigenous and Western systems (35). This Indigenous research method privileged Aboriginal and Torres Strait Islander voices, showing a central focus on mutual respect, cultural integrity and reciprocity for Aboriginal and Torres Strait Islander communities (35). Central to this method is taking a decolonising approach, which recognises that Indigenous research must decolonise and create empowerment and resilience in the research space (35, 36).

The research was led by a senior Noongar Wadjuk woman from WA (MJG) supported by a research team that included senior Aboriginal researchers. The lead researcher used her knowledge and lived experience to engage and work closely with the groups, having the ability to take an Aboriginal perspective of being mindful and flexible. This was important for her own understanding of working with complex Aboriginal communities. She was aware that things are not always going to run well, bearing in mind the effects of an oppressive history (37), and knowing that continuous listening, patience, respect and reciprocity is needed when working with Elders. This awareness enabled effective data collection.

4.2.3 Ethical Considerations

Approvals for the research were obtained from WA Aboriginal health ethics committee (HREC842) and the Curtin University human research ethics committee (HRE2018-0425). All Elders interviewed provided written informed consent to participate in the study. The research followed the National Health and Medical Research Council of Australia guidelines for ethical conduct in research with Aboriginal and Torres Strait Islander Peoples and communities (38). These principles guided each step of the research, including facilitating researchers to follow CARE principles of Indigenous data sovereignty (39).

4.2.4 Setting and Participants

Prior to the PA research program commencing, community consultation was undertaken for approximately two years (2017-2019) with older Aboriginal and Torres Strait Islander people and service providers on Noongar Country in the South West of WA. These community partners subsequently assisted in obtaining the funding for the research. After this two-year consultation period, two Elders' groups formed to commence the Ironbark PA program. The two groups included Noongar Elders and Aboriginal Elders who had migrated from other regions of WA and other States in Australia. This created a mix of cultures from around Australia within the groups. Both groups partnered with local organisations and the research team. One group operated in the metropolitan area with a government department, who provided an Aboriginal project officer to work with the group. The other group commenced in a regional town and was operated within the local Aboriginal Health Service, who provided Aboriginal health workers and non-Indigenous health workers as an operational team.

All Elders enrolled in the Ironbark program in WA were invited to participate in the study to gain a rich understanding regarding their experiences. Inclusion criteria were attending and being enrolled in the Ironbark program, remaining enrolled at the 12 months follow up period of the program and being 45 years of age or over.

4.2.5 Data Collection Procedure

Engaging with each Aboriginal Elder

The lead researcher (MJG) developed a plan to engage successfully with the Elders. This involved first developing her own values and ethics around engaging with Aboriginal and Torres Strait Islander peoples' (38) and second, becoming familiar with the Aboriginal terms of reference that had been developed by each group (see Chapter 2, section 2.7.1). These described their own rules and guidelines for how they wished to engage as a group and with each other, including respecting peoples' views, listening when someone else is speaking, and encouraging positive interactions (40).

The researcher visited each Elders' group weekly, to observe and participate in the PA and yarning, as it was considered vitally important to build relationships prior to conducting any interviews. The researchers aimed to reciprocate to Elders for their wisdom and knowledge by giving back through praise and recognition of their achievements with a certificate of participation in the program. Elders who completed an interview were also provided with a voucher, as a reimbursement for their extra time and travel.

Demographic data for each Elder was collected at baseline (such as age, gender and use of walking aid), as described in full in Chapter 5 (see section 5.2.5). This assisted in understanding the profile of the Elders who were attending, such as how many men and if participant had chronic diseases.

Researcher diary

The researcher kept a diary of observations, personal reflections and notes throughout the research. These observations and notes assisted in bracketing to ensure that the researcher set aside her own personal views and knowledge and focused on the Elders' perspectives. This allowed the researcher to take a reflexive approach that reduced her preconceptions impacting on the research and raised her awareness of potential power imbalances between herself and the participants (41). The diary created an audit trail which aimed to establish credibility. Diary data were triangulated with the interview data which aimed to improve the trustworthiness of the results (42).

Semi-structured Interviews Using a Yarning Approach

Interviews were completed approximately 12 months after commencement of the program. In the original Ironbark program evaluation in NSW the Elders provided feedback through one large yarning circle (30). In WA, individual yarning sessions were conducted to allow the researcher to conduct personalised, deep discussion about Elders' perspectives and experiences. The researcher first developed semi-structured interview questions by referring to a holistic viewpoint of health that is understood by Aboriginal and Torres Strait Islander peoples (43). Elders were asked broad questions about their spiritual, social, emotional, and physical health. When conducting these interviews with Elders a yarning approach was considered culturally appropriate as it is an acceptable way to sit and discuss with Elders any topics of interest, rather than following semi-structured interviews where the interview guide steers the interview (32).

4.2.6 Data Analysis

Qualitative data were analysed using thematic analysis (44). The steps of the analysis are summarised in Table 4.1.

Table 4.1

Summary of analysis process

Adapted from Braun & Clark, 2006: Using thematic analysis in psychology. Qual Res Psych 2006; 3;77-101.

	Step	Action
1.	Lead researcher familiarises themself with all data	Transcribes some interviews themself to understand data, reads through transcripts of professionally transcribed interviews, checks where required. Re-reads several times, note ideas, examine data sources
2.	Generates initial codes across entire dataset	Generate initial codes across all interviews and diary notes, work back and forth across the data, to compare, contrast and search for codes, collate data into groups according to codes. Second researcher contributes to coding ideas
3.	Search for themes: Collating codes into potential (candidate) themes	Collate codes into candidate themes -gather data into these potential themes examine and re-group and compare, group and re-group. Name themes and check codes match themes, collapse themes as necessary
4.	Review themes: Check if the themes work	Three main themes - check codes can be grouped into the themes and then create a thematic map, confirm names - examine if the whole data set can be mapped within the themes and subthemes and answers the research question

Step	Action
5. Define and name themes	Confirm specifics of each theme, generate clear definitions and names for each theme, check if themes reflect the Elders perspectives of the participating in the physical activity program, and tell the overall story of their experiences within the program. Lead researcher MG review themes and overall final thematic map, input from JFC and AMH. MG and MK discuss and confirm final presentation of report
6. Produce final report	Select compelling exemplar quotes, final analysis to confirm that quotes and themes present a clear answer and can be contextualised in the literature regarding Elders' engaging in a physical activity program

Transcribing took a back-and-forth approach between the audio files and transcripts. Audio files of half the interviews were transcribed verbatim by the first researcher and the other half of interviews were transcribed professionally.

All data were initially checked by the first researcher (MJG) and corrections made where necessary which required listening to audio files a second time for confirmation. Early ideas about the data and reflection on coding were cross checked with entries from researcher's diary. Bracketing (as defined in Chapter 2, section 2.5.1) was important to use when conducting the interviews and during the analysis (41). In this process the preconceptions of the researcher even though she was a Noongar Wadjuk person, were placed to one side. The researcher was required to take a perspective that did not change the messages that Elders conveyed. This approach was chosen to ensure the themes were strongly linked to the data and were an accurate representation of the Elders' perspectives. All data were initially managed using NVivo, qualitative data analysis software (QSR International Pty Ltd. Version 12, 2018). Data were also sorted and reviewed by the first researcher using Microsoft Excel to gain a deeper understanding of each quote and how quotes and coding related to each other. Data were further explored taking an inductive approach and coded with visual identification used to identify major and minor codes. A second non-Aboriginal researcher (JFC) examined a selection of data and confirmed the coding process, then all data were coded systematically across the data set. Coded data were examined for patterns and then collated to form candidate themes. These themes were then represented using a thematic map. Both researchers examined the initial thematic map, and it was then reviewed by a third independent researcher on the team (AMH) who was not involved in data collection. This method triangulation aimed to enhance the internal validity of the study (42). All three researchers then finalised the thematic map and appropriate quotes were chosen to represent the findings. The final data set was presented to both Elders' groups (individually and in small groups) for member checking to ensure that Indigenous

views were privileged and presented with care (27). Finally, the completed dataset was examined by a senior WA Aboriginal researcher (MK) and discussed with the primary researcher (MJG). Final edits were completed by both researchers to confirm that the presentation of the research accurately reflected the views of the Aboriginal Elders in WA.

4.3 Results

There were 52 Elders who enrolled in the study at baseline and 23 Elders were still attending at 12 and 18 months. The Elders who enrolled were mainly from the Noongar nation, the remainder were Elders who had moved to Noongar Country from other nations in Australia. Nineteen of these Elders (ten from the metropolitan group and nine from the regional group) engaged in an interview. Participants' (n=17 female, n=2 male) mean age was 64.6 (±9.9) years, the median (IQR) number of medications taken was 4 (3-5) and two used a walking stick. Four Elders chose not to give an interview. All 19 participants were interviewed approximately 12 months after program commencement and six participants were asked to complete a follow-up interview at approximately 18 months after commencement (a total of 25 interviews). These participants were asked to complete a second interview as they had provided rich information about their perspectives. The follow up interviews were also used as a means of confirming data saturation, with no new themes being identified.

4.3.1 Connecting and Reconnecting to a Community With a Sense of Belonging *(Overarching Theme)*

The overarching message that Elders conveyed was that although they came from different cultural backgrounds, they shared a sense of belonging, a feeling of connectedness, and an identity with one another. Attending the program was perceived as having a strongly positive impact because, as they explained, it resulted in connecting and reconnecting with community. One Elder (P1) explained that, *"Yeah, it has. And when I see them [Indigenous Elders] in the shopping centre or walking or anything, yeah, we're always connecting and talking. It's very good."* Another Elder (P2) commented that, *"…because we all knew one another we all knew what one another was doing and helping one another out. We encouraged each other. It's all about connecting, isn't it?"* Yarning together was seen to be a way of socialising and learning but above all, connecting with culture. An Elder (P3) who is a leader in the metropolitan community stated that, *"Reconnecting with culture…connecting with other Indigenous people that was one thing…that was really the main thing."*

The sense of belonging and connectedness was felt to be enhanced by having a PA program just for Aboriginal peoples and was appreciated. One Elder (P4) said, *"I'm not discriminating on white fella's way's, but Aboriginal people are nyoorn (sorry), are looking for these things, now that we have got something you know."* The program was felt to be culturally appropriate and comfortable to attend, with one Elder (P5) stating *"Um, well I suppose it is because its only mainly Aboriginal people attending it um, I suppose I feel comfortable being here with Aboriginal people*", while another Elder (P6) said that: *"…I think it is culturally appropriate."* An Elder (P4) from the metropolitan group spoke about the feeling of being welcome:

> *"…everybody makes you feel welcome, cause the nature of the people that go there,…they've got that good supportive welcome to you and understand and respect you there, that you just can't get anywhere else…".*

Another Elder (P7) from the regional group also explained how she felt welcome in the group:

> *"… because when I am here with the …. women here we are one big mob and that makes a hell of a difference in how you manage to work together, laugh together and exercise together it, there's no um there's no discrimination amongst us, we're all one."*

4.3.2 Major Benefits of the Program *(Main Themes)*

There were three main themes that described the benefits of the Ironbark program:

1. Positive mental and emotional changes.
2. Physical improvements.
3. Social benefits.

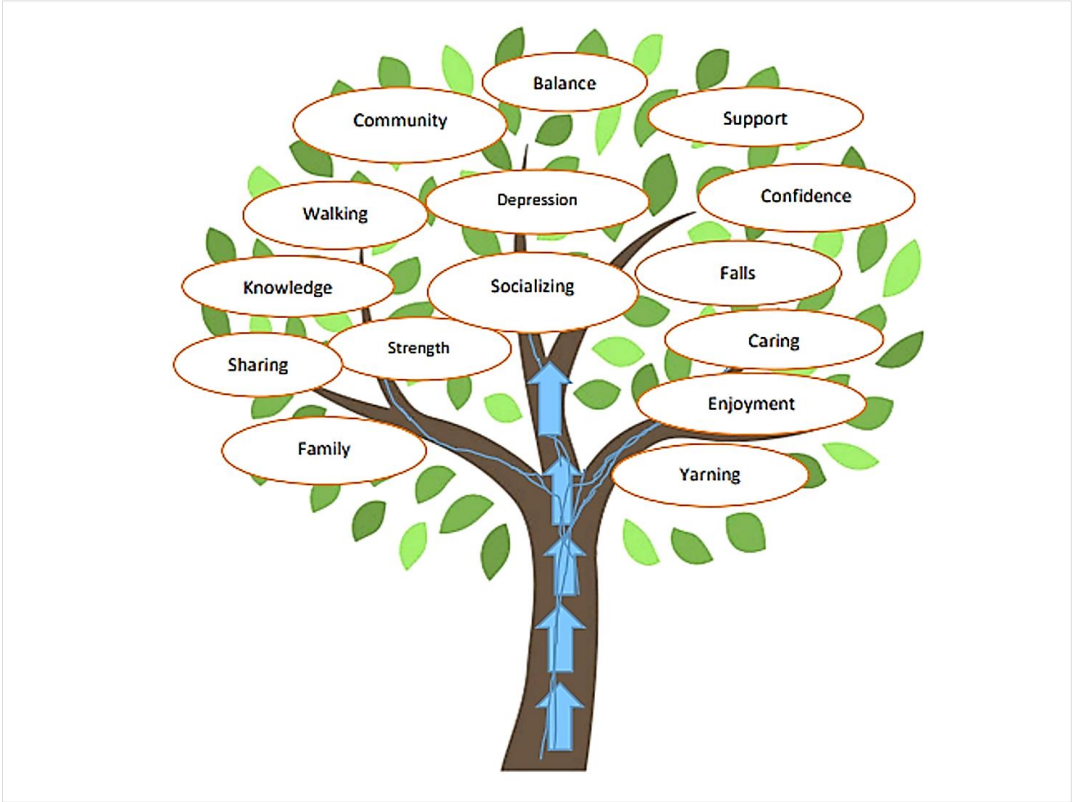
Subthemes of Elders' experiences (presented in Figure 4.1) were illustrated by an *Ironbark tree that symbolised the Ironbark program.* The tree (Ironbark program) provided nurturing experiences across a holistic spectrum and Elders described how these experiences led to growth and development of a strongly positive and encouraging outlook on life.

Subthemes (see Figure 4.1) were Knowledge, Enjoyment, Confidence and Depression; Balance, Walking, Strength and Falls; Socializing, Family, Yarning, Community, Sharing, Caring and Support. These themes were identified as being what motivated participants to return regularly to participate in the program and were also

viewed as benefits of participating in the program. Elders concurred that they started to feel the benefits and their family members noticed those benefits. The program was therefore found to facilitate behaviour change. This was evidenced by some Elders walking to the weekly group from their home, instead of being picked up by a relative or service provider (researcher diary).

Figure 4.1

The Ironbark Tree. Elders' perspectives about the benefits experienced from participation in the Ironbark program



1. Positive Mental and Emotional Changes

Subthemes – *Knowledge, Enjoyment, Confidence and Depression*

Elders were positive about the dual nature of the program, whereby they participated in exercises and then later in the yarning circle where they could discuss topics of interest. They described how this enhanced the appropriateness of the program as it was not only about exercise but had elements that encouraged learning and growth. One Elder (P10) stated, *"...A group getting together, having fun and yarning and sharing information as well as education on health topics."* Another Elder (P11) described her impression of the group as including *"...more information and more exercise, it's really (about) keeping healthy."*

Elders experienced a positive impact on their mental health, which they described as a reduction in anxiety, depression or stress. An Elder (P9) spoke about the loss of her son a short while before Ironbark commenced in her community, explaining that *"I had a lot of stress and tension…since I lost my son...It's all great, especially the socialising afterwards, I feel much better in myself".* She described that *"...since I discovered Ironbark Exercise Program back in 2018, I haven't looked back, I get feelings of depression every now and then but overall, my health is improving*." This Elder (P4) described how the group had strongly impacted on him from within and his comment captured this point, *"I think with the Ironbark it gives people some feeling."*

Elders referred to strength as being not just physical, but mental and emotional as well. They described that as they got stronger and their balance improved their mental and emotional health improved concurrently. One Elder (P12) stated: *"It just shows you that those sorts of things like the exercise makes you stronger physically and mentally."*

Another Elder (P4) commented that;

> *"well…it's given me, to me it gave strength to heal me up quicker with my leg, if I wasn't doing the exercises at Ironbark I, I would be lost, I'd, I'd be depressed and I would be lost as a person, but it gives me the strength as a person to do what I want to do, yeah".*

They desired to get out of bed in the morning and do something different, and this Elder (P9) said, "well I sort of get out to walk because of coming here and (since I) started doing Ironbark my sister and I goes walking, to all these places where we live, out in the field (local area)."

Several Elders talked about gaining confidence through the program and that confidence enabling them to participate in their community. One Elder (P13) explained that she did not feel confident initially, but with support from the group was able to grow in confidence. *"(I was) not feeling confident…When I felt comfortable with the ladies and I had a few sessions…I felt comfortable in doing the exercises because I'm a big person."*

Another example of developing confidence and motivation occurred in the regional group, with this group of Elders who attended the local swimming pool on another day of the week. (*Researcher diary, August 2020 – one female participant mentioned 'yesterday's exercises' at the local swimming pool*). The regional group were also eager to do more exercises outside of the Ironbark program and began to investigate doing bike riding or Zumba (aerobic dance exercise) on other occasions.

2. Physical Improvements

Subthemes – *Balance, Walking, Strength and Falls*

There were improvements gained from the physical activities that became more evident over time. Elders acknowledged that they were exercising more regularly, and they could see and feel the health benefits which they noted as improvements compared to their previous abilities. As this Elder (P14) said*, "I get arthritis in my right knee as well, so the exercise is good for that and it's also about the balance as well as you get old."* Elders walking, balance and strength began to improve. One Elder (P1) described her experiences in terms of where she had come from and how she felt her goals were being achieved, by saying *"Because I want to be fitter than what I am and able to play with the grandkids and great grandkids and there's – I feel useless when how my body was before I went there. I wasn't coping and I was losing balance a bit."*

Some Elders discussed how they had increased their home exercise. This Elder (P15) said, *"I'm feeling…better, since I've been bouncing on the machine for 50 minutes a day...I started off at 10 minutes then I thought I'll go 15. 25 minutes in and I love it…"*

Some Elders needed to gain confidence to join in with walking activities in the program because they feared tripping and falling over. One Elder (P9) described her walking: *"...I live not far from here and then afterwards I walk home, that's enough walking for me and I also do lots of walking in the Community and at home, I am very active when I am not at the Ironbark exercises."* Another Elder (P1) from the Metropolitan group stated, *"...my whole backyard. I start walking from that shed all around, all around and come back and then I'd count the steps, it's more than 600 steps when I do it, even four times walking, something like that, now I'm walking faster than normal and everything."*

There were Elders in both groups who felt confident enough to pack away their walking aids and wheelchairs because their mobility had improved to the point that they no longer needed equipment to help them safely move around. One Elder used to arrive in her electric wheelchair and had her walking frame on standby, because she had no confidence in her balance and strength to get out of her wheelchair and walk across the room. After regular attendance at Ironbark, she walks everywhere and enjoys the strength and balance that she has gained back in her life (*researcher diary*). In her own words this Elder (P16) told her story,

> *"My sister came there last week, one day, and I was sitting down on the lounge seat and I don't know what happened, but we had to get up and go outside and she said, come outside and have a look at a cow. I just bounced up out of my seat, she said hey, you got up there fast. It surprised me. She said you're even better than I am".*

Another Elder (P17) from the metropolitan group related, "I had a knee replacement and then I heard about the Ironbark Program and I thought wow this is for me, and I don't know what I'd have done without them, it's not quite a year that I had the operation, when I went to see my physio, cause I threw my crutches away, he was shocked to see I had no crutches, he said, "where's your crutches? Oh, I threw them away."

Improvement in the ability to get down on the floor and back up again unassisted, was a sign of improved balance and strength that Elders perceived allowed them to maintain their independence in their environment. One Elder (P1) described visiting her family:

> *"One little incident was I couldn't get up from the floor and the program was teaching me how to get up off the floor. I went to my kid's place and I went to sit down on the floor, and they started saying, "Oh don't go doing that and you won't be able to get up." And I said, "I will show you what I've been learning." And they say, "No you won't be able to get up mum." And I said, "I will. Just watch me." And I got up anyway, no problems at all and they said, "Oh, well it's doing you some good, mum."*

Elders shared how they felt their risk of falling was reduced as they could react in time to prevent themselves from falling over. One Elder (P9) was very proud to share a recent experience of almost falling over, *"My balance has improved remarkably... I was walking down some steps when I felt myself falling forward. I quickly assessed the situation...saying to myself, I'm not going to fall left or right, I'm just going to sit down, and down I went on my bottom. My quick thinking saved me from falling (down the steps)".*

3. Social Benefits

Subthemes – *Socializing, Family, Yarning, Community, Sharing, Caring and Support*

Prior to joining the Ironbark program some Elders did not go out into the community and were not linked to any social groups. Participants in both groups frequently expressed how the program formed a wonderful social opportunity whereby they met with other

Aboriginal Elders. Several Elders explained that the program was "family" and described how they felt comfortable and at home with one Elder (P8) stating, *"So we love it...this is a family thing so, I love it."* An Elder (P18) from the metropolitan group commented:

> *"First of all is socialising. I really love it, to getting all around my people and second, it is exercising and some fun and having songs and everything and third of all, getting get together in a group. So, it's really great."*

The experience of socialisation "before the program" compared to after commencement was frequently discussed and one Elder (P1) made this comment, *"Before when I sit alone I've got so many experiences (*of being*) alone, but now when I'm socialising with the group on Tuesdays, so it's really a great impact on socialising plus talking plus get together with the people".* Another Elder (P5) also used the before and after story to state:

> *"Um several reasons, um I wanted to get back into exercise um mainly because I put on a lot of weight um, the social side of it, getting me out of the house, um because I been becoming a bit of a hermit, as so this is good it gets me out of the house, um yeah and just mixing with some of the other ladies is good."*

Aboriginal Elders participating in the Ironbark physical activity program consistently made comments about how they enjoyed the yarning after they had completed their physical activities. One Elder (P18) expressed the enjoyment and emotional support obtained from the yarning, "*Well you can find out you know what…. any problems or find out if someone is sick…then you can find out about good things (*in the Yarning circle*)."*

The support was viewed as being part of a close community of Aboriginal Elders and these feelings were shared by many of the Elders with one Elder (P19) expressing, *"Well, company, other people, yarning, food and the exercise. It all works around it. Once you do the exercise you realise that strong confidence in yourself. So, it's good."* A sense of sharing and being with others made people feel included and confirmed a sense of belonging in the local community. One Elder (P16) summed up their feelings about being a part of the program by saying,

> *"…yeah yeah that's what I'm looking at, and I don't worry what is around me and what is being said, or you know it's there to be enjoyed and its company with people and to share in with what everyone is doing…"*

4.4 Discussion

This study explored the experiences of Aboriginal Elders in the South West of WA who attended a PA program (the Ironbark program) that was specifically designed by Aboriginal communities, Elders and researchers. Both groups described their experiences as positive, resulting in them connecting and reconnecting to their community, with a strong sense of sharing and belonging that was meaningful. They also expressed how this sense of belonging was both the key reason to attend the program and the major benefit of continued participation.

These findings are an important exemplar of how a PA program that is designed using an Indigenous research methodology which incorporates a decolonising approach (35), can result in strong benefits for Aboriginal Elders, as well as holistic improvements in health and wellbeing. Elders in WA concurred with Elders in NSW regarding the positive effect of the Ironbark program on their lives. Privileging Aboriginal ways of working and using strategies that are culturally appropriate to help the researchers engage successfully with the Elders groups is central to this approach (35). Elders felt a sense of safety by being in an appropriate environment, which also created a sense of enjoyment. They expressed how being with other Aboriginal Elders in this culturally safe and supportive environment facilitated their ability to *'reconnect to culture.'* These findings concurred with an earlier study conducted with American Indian and Native Alaskan older adults (3). Those Elders stated they strongly desired to be around people of similar identity, with culture and community being important motivators. Connecting to community was experienced by our participants as connecting to culture. Programs that are culturally safe, conducted in a comfortable and safe space and run by Indigenous people and communities have been found to have high participation rates and result in benefits for Elders who take part (5, 28). A recent systematic review that included 24 studies from four countries concluded programs that used a decolonising approach, were culturally appropriate and addressed socio economic determinants of health facilitated older Indigenous people's engagement in PA (45).

Elders described noticeable improvements in their mental, physical and social wellbeing. As confidence and self-esteem grew, some Elders reported that their anxiety and depression levels had reduced. Elders consistently reported improvements in their mental health, with comments regarding feelings and emotions being more positive. For example, many Elders reported increased confidence, motivation and more social engagement, all of which motivated them to want to do more. These findings concurred with the Ironbark program in NSW.[30] Although there is strong evidence that older adults'

mental health is positively impacted by exercise in non-Indigenous populations (46, 47) this study is one of the first to identify that Aboriginal Elders report mental benefits from engaging PA when there is an appropriately designed program.

Some Elders experienced major improvements in their physical ability, such as being able to get up off the floor independently. These findings support those of a systematic review that reported that PA programs improved fitness and health in Indigenous participants, although the included studies did not exclusively enrol older adults (26). The social aspect provided strong motivation to attend the program and doing the exercises and then being able to sit and share stories in the yarning circle was highly valued. It is known that older Indigenous people maintain continuous links, including through cultural ties, family kinship and local community networks (30, 35). Another study reported that participating in a PA program for Aboriginal people created a sense of community pride with a feeling of connectedness (48). Family and community support has been found to motivate Aboriginal Elders to achieve exercise success (5, 31).

Physical activity is recognised as critical to maintaining health and wellbeing and reducing the risk of chronic disease (1). Creating a space where Elders felt they belonged, enjoyed themselves doing exercises and were able to feel their voices were heard and listened to in a yarning circle was important to the success of the program. Therefore, working with Aboriginal Elders in this way is an approach that has potential to significantly improve older Aboriginal and Torres Strait Islander peoples' health and well-being. Other health services could be supportive of this decolonising approach as it appears to be the key to stopping the revolving door of health inequities (9). This study was designed and translated from an existing program in NSW (30), where Aboriginal and non-Indigenous researchers working together used a decolonising approach that enabled the expression of all the cultural identities involved (20, 24). A qualitative study that explored how Aboriginal and Torres Strait Islander Elders know about their chronic diseases found that these Elders had significant knowledge about how they could help to address their health and wellbeing (23). These Elders drew on their cultural knowledge and understanding of their own health concerns and desired to lead healthy ageing programs from within their own communities.

4.4.1 Strengths and Limitations of the Research

Strengths of the research included extensive community consultation. There were challenges and some barriers, but both groups were similar in that they sought to participate in PA within a culturally safe place that supported them, and this resulted in

strong benefits. This was evidenced by many Elders continuing to attend the group for over 18 months, even after the COVID-19 lockdown period. The lead researcher who conducted the interviews was a Noongar Wadjuk woman who understood ways of working together. The researcher sought to maintain professional boundaries while showing respect to everyone throughout the research. It is challenging to work closely with Aboriginal and Torres Strait Islander Elders and health workers, as each individual person has their own cultural identity. The lead researcher has also worked for many years within Aboriginal Communities and reflects that there is always a feeling of trepidation of 'have I done enough' what could I have done better? These questions that seek accountability and transparency are a key part of the research process and must be answered continuously throughout the research (34). The lead researcher was related to some Elders, hence it was easy to work with everyone treating them the same way, with trust and good relationship building techniques, in part by maintaining a professional and positive attitude. Relationship building is foundational to undertaking research with Indigenous peoples (34). The aim is to form strong connections with each Aboriginal Elder and local service providers to enable them to participate in the research. It is about communicating well through listening and observing in the beginning stages and actively joining in with parts of the conversation, particularly during yarning circles. Learning about how the Elders manage their lives outside of the PA program was all relevant to the data collection (32, 34).

During the interviews bracketing was used to strengthen the analysis and ensure the voices of Elders were heard (35, 41). The researcher found that she needed to continually reflect during and after interviews, and in her diary, to examine if she was taking her family role to make meaning rather than setting aside her views. However, her experiences and views also formed a strength of the research as it was valuable to understand what participants were meaning and to have good relationships with the Aboriginal Elders as that is central to the research. Sharing her own experiences was part of taking a 'ways of working' approach with older Aboriginal and Torres Strait Islander peoples. To be able to share similar experiences with older Aboriginal people and to share your stories with theirs helps to break down barriers. This was part of the relationship building, and, like an icebreaker, it was also an important part of building reciprocal understanding. The researcher shared similar histories and parallels her own life and this helped Elders to relax and openly share their own feelings and thoughts. Four Elders did not give interviews but still attended each week because they enjoyed the program. Storytelling and sharing knowledge by some Elders was a good way for the researcher to continue to collect further

information (23). The lead researcher checked the findings with the Elders and the Elders' feedback was reviewed by the first and second researcher and senior Aboriginal researcher prior to finalising the analysis. This member checking aimed to strengthen the credibility of the results (42). Researchers also created an audit trail and used researcher diary observations to aid in confirming the analysis (42).

Limitations of the research included that the program was cancelled for approximately six months in 2020 due to the first COVID-19 pandemic lockdown. This occurred after the 12-month final interviews were completed. During the lockdown period the Aboriginal research assistant and project officer in the metropolitan group made weekly contact with all Elders through phone calls and Facebook messages. Relationship building continued throughout the COVID-19 lockdown period with the researcher visiting Elders in both groups when possible. In the regional group the Aboriginal health service provided house visits and phone calls to the Elders to maintain connections and provide health services where required. When the program re-commenced in July 2020, there were some restrictions and changes due to requirements to adhere to public health safety guidelines. For example, registration on entry and social distancing was required each week. This meant that time was required to re-operationalise the program.

This study formed part of a program of research to evaluate the translation of the Ironbark program in Noongar Country in WA. Some Elders enjoyed attending the program at intervals but chose not to enrol in the study. Their decision not to give feedback or formally participate was respected by the research team. The Elders who chose to give interviews concurred strongly that the program was enjoyable and valuable and attested to strong positive benefits. In phase two, further evaluation of the program to measure changes in the Elders' health and well-being will be completed, to quantify the effect of the program on physical outcomes such as mobility and strength.

Indigenous Elders' groups from Nations around the world have different beliefs and perspectives, therefore findings from this study are not directly generalisable to other groups. However, these findings may be useful for communities and researchers that wish to commence PA programs with older Aboriginal and Torres Strait Islander peoples and First Nations peoples from other colonised countries. Findings can also inform future health planning. A review of PA programs that targeted Aboriginal and Torres Strait Islander groups found that while there were over 100 programs being conducted, their evaluations were underrepresented in academic literature. This review recommended that more programs disseminate their evaluations to identify gaps in services and share

information on components of programs that could benefit populations in other locations (49). Findings from this research also highlight the positive response to the Ironbark program, which concurs with previous findings about the program in NSW.

4.5 Conclusion

Racism and colonialism have been found to be significant barriers to older Indigenous people engaging in PA programs (7, 45). This research highlights that a PA program that is underpinned by an Indigenous methodology can result in positive experiences for older Indigenous peoples. The program has important principles that can inform research for Indigenous groups worldwide, including appropriate local leadership and local community consultation. Translation to Indigenous communities internationally could be successful if it suited the needs of those groups and sought their input from the beginning to end. Elders in the South West of WA reacted positively to the program and expressed a strong sense of connecting and belonging. This sense of inclusion was viewed as the most valuable aspect of joining the program. Elders experienced holistic benefits from their participation, describing improvements in physical, mental, emotional and social well-being. Descriptions of weekly experiences affirmed that Elders valued the decolonising approach of the program that privileged Elders' voices and established mutual respect and cultural integrity (35).

Older Aboriginal and Torres Strait Islander peoples have specific health needs and require access to appropriate PA programs that adopt a decolonising approach to address Indigenous health and wellbeing. There are few culturally appropriate PA programs for Elders and dedicated funding and adequate resources to expand these programs is required. Elders provided strong feedback through this research that when such programs are delivered, they lead to good health outcomes for the individuals who can access them.

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Chapter Five

5

Evaluating the Impact of the PA Program on Elders' Health Outcomes

Preface

This Chapter describes Study 3, which was conducted as part of the research for the thesis. The specific aim of this Chapter was to evaluate the impact of a PA program (the Ironbark program) on: i) physical function and; ii) functional mobility, cardiovascular risk factors (weight, waist circumference), falls self-efficacy and health related quality of life on Aboriginal Elders on Noongar Boodja in WA.

The Chapter is based on the published article: *Translating and Evaluating a Physical Activity Program for Aboriginal Elders on Noongar Boodja (Country) – A Longitudinal Study*

Publication 3 – Translating and Evaluating a Physical Activity Program for Aboriginal Elders on Noongar Boodja (Country) — A Longitudinal Study

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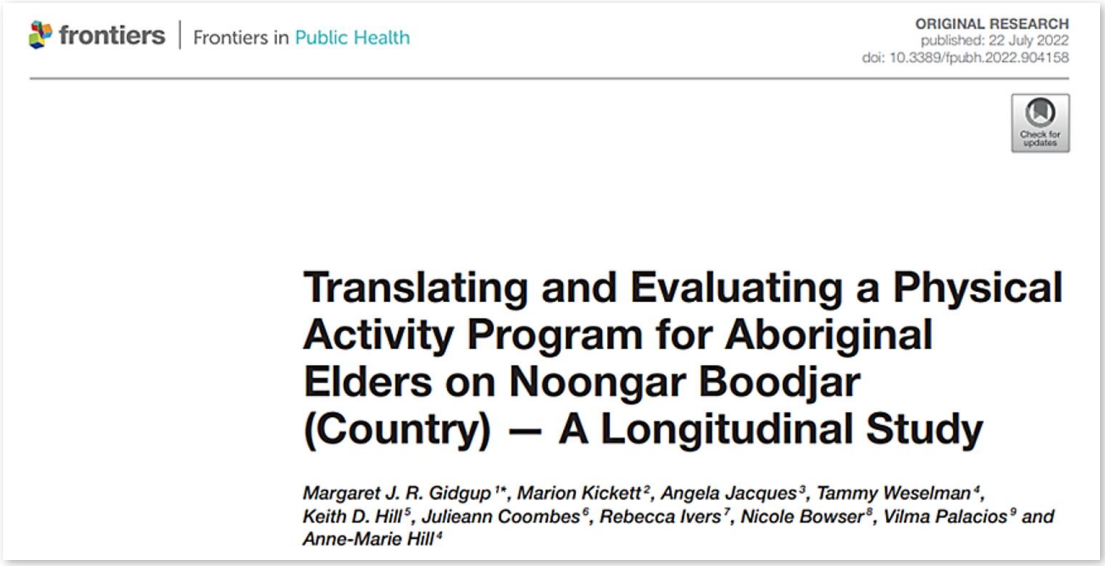

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The author's version of the manuscript is presented with modifications to suit the style and format of this thesis.

Abstract

Background: The primary aim of the study was to translate and evaluate the impact of a Physical Activity (PA) program on the physical function of older Aboriginal Elders on Noongar Boodja (Country).

Methods: A longitudinal design framed within an Indigenous methodology. Two groups, one metropolitan and one regional, of Aboriginal Elders, aged ≥45 years, participated in the Ironbark PA program. This comprised weekly strength and balance exercises followed by yarning circles. Physical function (primary outcome) and functional ability, cardiovascular risk factors (weight, waist circumference), falls efficacy and health-related quality of life were measured at baseline 6, 12 and 24 months. Data were analysed using generalised linear mixed effects modelling.

Results: Fifty-two Elders initially enrolled and of those, n= 23 (44.2%) Elders participated regularly for 24 months. There was a 6-month gap in program delivery due to the COVID-19 pandemic. Participants made significant improvement in physical function at 12 months compared to baseline: [short physical performance battery (SPPB) at baseline, 8.85 points (95% CI 8.10, 9.61); 12 months 10.28 (95% CI 9.44,11.13), p=0.001: gait speed at baseline 0.81 ms^{-1} (95% CI 0.60,0.93); 12 months 1.14 (95% CI 1.01,1.27), p<0.001]. Some sustained improvement compared to baseline was still evident at 24 months after the 6-month gap in attendance [SPPB 9.60 (8.59,10.60) p=0.14, gait speed 1.11 (0.95,1.26) p<0.001]. Cardiovascular risk factors showed a non-significant improvement at 12 and 24 months compared to baseline. All participants reported that they enjoyed the program, found it culturally appropriate and would recommend it to others.

Conclusions: Older Aboriginal people showed sustained improvements in physical function after engaging in a culturally appropriate PA program. Culturally appropriate PA programs provide safety, security and choice for older Aboriginal people to engage in evidence-based PA.

5.1 Introduction

Indigenous peoples worldwide have suffered through invasion and the impacts of colonisation (1, 2). It has resulted in the loss of languages, customs, and the freedom to hunt and gather on their traditional lands leading to changes in dietary intake and a sedentary lifestyle (3, 4). These consequences of colonisation have negatively impacted on the health status of Indigenous peoples (3), causing disparities between the Aboriginal and non-Aboriginal people and communities in Australia. This disparity must be addressed by hearing Indigenous voices and privileging Indigenous ways of working, rather than providing only Westernised health services (2, 4).

Physical activity (PA) guidelines recommend that older adults should be participating in at least 150 minutes of moderate-intensity physical activity per week (5). Physical activity improves older adults' strength, balance, functional ability, mental health, cardiovascular health and reduces the risk of falls and functional decline (5, 6). However, less than half of older adults in Australia, including 27% of Aboriginal and Torres Strait Islander older adults, meet PA guidelines (7, 8). Aboriginal and Torres Strait Islander older adults are disproportionately affected by physical disability, therefore may find it difficult to participate in moderate or high intensity levels of PA (9).

However, there have been few studies worldwide that have evaluated PA programs for older Indigenous peoples (10-14). While there are a broad range of PA programs designed or recommended for older populations (15, 16), very few programs are appropriately designed to attract and engage older Indigenous peoples (17-20). A recent systematic review that included 23 studies from four countries found that acknowledging social determinants of health, cultural safety and security and taking a decolonising approach was needed to encourage older Indigenous peoples' leadership and participation in PA programs (21). However, a review of physical activity programs focused targeting Aboriginal and Torres Strait Islander people in Australia found only 24 programs that operated in WA, and of these only one was specifically designed for older Aboriginal and Torres Strait Islander people (22). Programs that are not designed with these considerations are unlikely to succeed (21).

Taking a decolonising approach is to 'unpack' or 'undo' the privilege and power that 'whiteness' has always dominated with over other cultures that are different to theirs (23). It is also about trust, cultural competencies, respectfulness, recognition and acknowledgement of diversity among Aboriginal Elders, protecting Aboriginal Elders'

knowledge and information shared, importance of relationships and how that contributes to a whole of community happiness and good health (24). Coombes et al (2018) describes that using an Indigenous methodological approach can ensure that the First Nation people and communities' voices are heard (25). The Ironbark PA program followed this approach as it was designed by Aboriginal researchers partnering with Elders and their local community's leadership (10). The team leaders included senior Aboriginal researchers from WA (MK) and NSW (JC) who provided oversight and monitoring of the research. The senior Aboriginal researcher from WA (MK) also provided mentoring to the primary researcher (MG) who was a senior Noongar Wadjuk woman. A senior WA researcher on the team (AMH), who was not Aboriginal, worked closely with both WA Aboriginal researchers to take a stance of critical reflexivity that included letting go of certainties and working outside of one's own comfort zone (28, 29). The program sought to facilitate the engagement of older Aboriginal people in PA through exercise within a culturally secure setting. These settings provided a regular venue and ongoing weekly support for the group as part of their support for the local community. Elders made physical improvements from attending the program and the community response was highly positive (10). However, there were no similar programs provided for older Aboriginal people in WA. While the Ironbark PA program fitted the needs of the Aboriginal and Torres Strait Islander communities in NSW, the 'one size fits all' (17), cannot be applied to geographically and culturally disparate Aboriginal and Torres Strait Islander communities. Cultural differences may create barriers that prevent successful engagement and sustainability (18, 21). Therefore, to evaluate the Ironbark PA program in WA the program needed to be delivered with local protocols that were guided by leadership of local Aboriginal Elders. The first adaptation for undertaking the program in WA was time. The Ironbark program in NSW ran for 6 months, but in WA it was considered important to operate the program for a longer period, so that Aboriginal Elders could have time to build confidence and trust to engage in the program. This would allow the program to be evaluated for its impact over a sustained time. Therefore, the researchers aimed to operate the program for at least 18 months.

The objective of the study was to evaluate the impact of a PA program (the Ironbark program) on physical function of Aboriginal Elders on Noongar Country in WA. Secondary aims were to evaluate the impact of the program on functional mobility, cardiovascular risk factors (weight, waist circumference), falls self-efficacy and health related quality of life. Participants' feedback about the program was also sought to understand whether Aboriginal Elders enjoyed the program and felt it could be translated widely among older Aboriginal peoples in WA. This study was part of a larger project that sought to understand how the Ironbark program could be translated into WA.

5.2 Methods

5.2.1 Design

The study used a longitudinal design framed within an Indigenous methodology. This study formed part of a larger project which aimed to understand how to translate the Ironbark program into WA. Some findings of this larger project have been published previously (21, 26). The methodology followed key principles of working with Aboriginal and Torres Strait Islander peoples, including being based on relationships and privileging Aboriginal leadership (23, 27). Relationship building forms an integral part of how Aboriginal and Torres Strait Islander people prefer to interact with health professionals and if based on mutual respect then the communication and conversation will be fruitful (23). Regarding Aboriginal leadership, the research team included culturally competent, experienced and confident Aboriginal researchers and support workers to assist and support the delivery of the program. It involves shared learning and building a respectful relationship between Aboriginal researchers and non-Aboriginal team members. This stance recognised privileging Aboriginal ways of working within an Aboriginal and Torres Strait Islander ethics framework, and the importance of Aboriginal and Torres Strait Islander values and principles being central to the research. Both MK and AMH visited both groups at regular intervals to work with Elders and staff.

Aboriginal Elders living on Noongar Boodja (Country) have their own cultural practices and dialect although they engage in similar ways it is easy to make the mistake that they will work the same way, but this 'one size fits all' approach does not work. One Group accepted male participants, the other did not. One group included a welcome to Country, the other did not. The PA program ran according to the needs and expectations of the Elders who would at times correct the Aboriginal and non-Aboriginal staff on how they needed to meet and work together, while the student Researcher (MG) maintained a neutral position, that allowed for the voices and direction from the Elders collaborating with the Aboriginal health workers to develop their own terms (rules) for working successfully together. We were always mindful of not overstepping our boundaries as visiting researchers. This method of working with the Aboriginal Elders on Noongar Boodja was in accordance with their 'ways of working,' where could reinforce how they wanted the PA groups to operate. These relationships form part of Indigenous methodology that is essential to successfully deliver programs when working with Aboriginal and Torres Strait Islander peoples (30). The research was undertaken between February 2019 and July 2021. Ways of working commenced with building relationships,

leadership from Aboriginal researchers and community members and continued through to operating the program each week in a way that is comfortable and safe for each person that attended the groups (31).

Program interruption

After 12 months of operation there was a gap in program delivery of six months in 2020 due to the COVID-19 pandemic restrictions. The program resumed at 18 months and continued for another 6 months.

5.2.2 Ethics

Ethics approvals for the study were obtained from WA Aboriginal Health Ethics Committee (HE 842) and Curtin University (HE number 2018-0425). All participants provided written, informed consent prior to participating in the study.

5.2.3 Participants and Setting

Aboriginal Elders who resided on Noongar Boodja in the South West of WA were invited to participate. Inclusion criteria were: Being aged 45 years or older, able to attend the group and participate in exercises. Participants were Noongar Elders and Elders who lived on Noongar Country but came from other Nations in WA and other regions in Australia. Groups operated at local community centres. Participants were asked to obtain a medical clearance to attend the program. Two groups of Elders were recruited, one from a regional area and one from a metropolitan area. The metropolitan group collaborated with a government department and the regional group was conducted by the local Aboriginal Controlled Community Health Service (ACCHS). The government department had an Aboriginal program director and provided an Aboriginal project officer to support the metropolitan group. Both groups were supported by Aboriginal health workers and non-Aboriginal health workers (physiotherapist and exercise physiologist, program assistants, research assistants) as an operational team. Non-Aboriginal health workers who had undertaken previous work with the Aboriginal Elders were recruited to the team. These workers were guided by their own cultural competency training and worked closely with the Aboriginal team members, so they were mindful of awareness of ways of working with Aboriginal Elders.

The program was operated in local community centres which were culturally safe spaces. These centres were used by other local Aboriginal people for their cultural

activities and multi-cultural activities that the local Aboriginal Community participated in, so they felt comfortable in using these venues. Both venues were open and welcoming of the program, and offered use of suitable rooms. There was a regular traffic of Aboriginal faces coming in and out of both community centres. The project officer at the metropolitan group and the ACCHO in the regional setting, both in consultation with the Elders, discussed the venue and Elders provided confirmation that the venue was suitable after attending for several weeks.

5.2.4 Intervention

Ironbark means standing tall and strong like the Ironbark tree (32). The Ironbark program in NSW was named this as part of developing the program. After discussion, this name was retained for the project in WA, because WA has the same Ironbark tree with different coloured flowers. The Ironbark was a weekly program that included PA and yarning, along with morning tea. The research team adapted the original material from NSW Ironbark program to suit the preferences of Aboriginal Elders residing on Noongar Country and referenced a holistic, decolonising approach to implement it. This decolonising approach was about understanding the challenges and complexities of working with Aboriginal Elders on Noongar Country and recognising it is a positive strategy towards providing better supportive and stronger research practices that will benefit both the community and the researcher. Too often in the past research was done without the informing, the approval and consent of Aboriginal people and evaluations resulted in recommendations and decisions made about Aboriginal people by non-Aboriginal people which almost always failed (4). Decolonisation is also about understanding the relational aspects of communities that are important, respectfully understanding the diversity that exists within communities and groups, and always collaborating with them, enabling their voices to be heard, particularly in our research, the decision-making aspects of the weekly PA program (29, 33). Aboriginal health workers at both sites endeavoured to make the PA program as comfortable as possible for the Elders by providing group and individual support for all aspects of attendance and participation. They worked with each Elder to ensure that they were comfortable doing the exercises and this continued until they were confident to do them. While, the program focused on exercises that have been shown to be effective in reducing falls, namely exercises that have a strong balance and functional component (34), it was adapted to include other elements as described in Chapter 2 (see Sections 2.3 and 2.8) and briefly below. This one-hour exercise component was delivered alongside yarning circles (35). Yarning is a

respectful and culturally acceptable way to engage with Elders, for it helps to improve and build lasting relationships simply by honouring the Elders through actively listening (36). The exercises were led by the health professionals who provided the exercise training supported by Aboriginal health workers, in a space that was culturally safe and secure. Each session commenced with a warm-up, then included a variety of lifting light weights, ball activities, balance and strength exercises, as well as walking and occasional dancing (in modern, casual style) to music. Individual advice regarding exercise was provided as appropriate for participants by the attending health professional. A home exercise program (HEP) was prescribed based on the exercises done in the group. Participants were given handouts of the exercises and encouraged to complete their HEP twice weekly. Health educational topics relevant to fall prevention were discussed in the yarning circle using topics in the Ironbark manual (37). In the WA translation of the Ironbark program, participating Elders assisted to plan the schedule for yarning sessions and chose additional topics they felt were relevant to their needs, including those that focused on managing their health. Asthma, diabetes, heart disease and cancer were examples of popular topics for discussions. Yarning circles were facilitated each week by the Aboriginal project officer or Aboriginal health workers.

5.2.5 Outcomes

Health outcomes evaluated were:

1. *Physical function* - measured using the Short Physical Performance Battery (SPPB) (38). This is a hierarchical test of standing balance, participants' usual gait speed, and lower limb strength (standing five times from a seated position in a chair). Each test is scored on a 0-4 scale and summed for an overall score range of 0 to 12, with zero indicating the lowest physical performance, and 12 indicating the highest performance. Gait speed and lower limb strength were also evaluated as individual measures since both are measures of independent physical function in older adults (39).
2. *Functional mobility* - measured using the timed up and go (TUG) test that measures the time it takes in seconds for a person to stand from a chair and walk three meters, turn around, return to the chair, and sit down (40).
3. *Cardiovascular health* - measured by waist circumference (cm) which is an easy anthropometric measure that predicts cardiovascular disease (41). Weight (kgs) was also measured since exercise is known to be an effective means of reducing weight (42), which can in turn improve cardiovascular risk profiles (43).

4. *Falls self-efficacy* - measured participants' concern about falling using the Short Falls Efficacy Scale International (Short FES-1) (44), where a minimum score of 7 indicates no concern about falling, and a maximum score of 28 indicates severe concern. Since the Ironbark was designed as a fall prevention program it was felt that participants' concern about falling might be impacted by the program.
5. *Health related quality of life (HRQoL)* - measured using the Assessment of Quality of Life (AQoL-4) instrument (score range 12 to 48, lower score indicates better HRQoL) (45). This instrument has been validated and found to be reliable in Australian populations and has been tested in an Aboriginal and Torres Strait Islander population (46).

Participants' feedback about the program was undertaken using a questionnaire and 'yarning' to capture the cultural appropriateness of the PA program and how it could be improved. These types of feedback had previously been used by researchers to evaluate the pilot trial that was conducted in NSW (10). The questionnaire contained closed-ended and open-ended items. It aimed to seek participants' feedback about whether they found the program relevant, useful, and culturally appropriate and gather suggestions for any changes to the program. The feedback provided by participants through yarning about the PA program has been reported separately (26).

Demographic data gathered at baseline included age gender, language, education, number of health conditions, history of falls (defined as "an event which results in a person coming to rest inadvertently on the ground or floor or other lower level") (47), exercise in the past 12 months, and number of prescribed medications taken. The number of medications was considered a feasible measure to collect as a surrogate marker of chronic disease (48).

5.2.6 Procedure

The procedure is decribed in full in Chapter 2 (sections 2.1, 2.3 and 2.7). Briefly, the development of the research procedure was underpinned by the guidelines for ethical conduct for conducting research in Aboriginal and Torres Strait Islander Peoples and Communities (49). Consultation with WA Aboriginal communities occurred prior to program commencement. Initially researchers from NSW met in WA with Aboriginal led organisations and interested researchers, including senior Aboriginal researchers (MK and JC) from both NSW and WA. This was undertaken through local Aboriginal organisations in Perth and a number of Aboriginal Controlled Community Health Organisations

(ACCHO) in regional areas. These organisations include local Elders and, more broadly, community representation. The success of the Ironbark program in NSW and interest in having a similar program for Elders in WA was discussed and both groups sought more feedback from their communities. Meetings were flexible in time and frequency depending on questions that arose and communication occurred throughout these preparation phases. This included the senior WA researchers (one Aboriginal - MK, one non-Aboriginal - AMH) meeting with community Elders by meetings arranged through the two interested organisations. After approximately two years of formal and informal consultations it was agreed to form two groups that would evaluate the program. The final team, including one ACCHO, one WA government department that led Aboriginal public health strategy, the original NSW Ironbark researchers and WA researchers was formed and AMH and MK led applications for funding for the research. The student researcher (MG) led the project methodology and the planning and procedure of the research at both sites. When the program was operationalised each Elder's group developed their own terms of reference (see also Chapter 2, Section 2.7.1 and Appendix E). This described their values and expectations about how the program would be conducted to meet the needs of the community (21). Understanding that one's own cultural beliefs, values, attitudes and practices may vary considerably and being able to accept and be respectful of these differences was fundamental (18, 50). Having knowledge of the history of older Aboriginal and Torres Strait Islander peoples which includes trauma, loss and illness, means that steps can be taken towards mutual understanding and building partnerships for more respectful and meaningful communication, leading to successful outcomes (3, 4).

Health outcomes were measured at baseline, six, and 12 months and a final assessment was completed at 24 months at the conclusion of the program. Outcome measurement days were led by the Aboriginal student researcher (MG), who was experienced at leading data collection in communities, with the physical outcome assessments being supervised by the lead physiotherapist researcher (AMH). Participants were administered the feedback questionnaire at the 12 months timepoint, or if they were not available at the 12-month timepoint they were asked to answer the questionnaire at the 24-month timepoint. Data collection was supported by the Aboriginal health workers, the Aboriginal project officer and Aboriginal research assistants. Training for health workers and research team assistants to assist with the data collection was provided prior to program commencement and at intervals throughout the program. The Ironbark research team from NSW and WA completed training together prior to the PA program commencement in the South West of WA. This combined team was made up of an

Aboriginal researcher (JC) who was the former advisor of the original Ironbark training, the WA Aboriginal student researcher (MG) and the WA Aboriginal project officer and Aboriginal project officers and health workers who would be present at both Elders' groups during the two-year PA program.

5.2.7 Statistical Analysis

Analyses were completed using STATA version 17.1 (StataCorp. 2019, Stata Statistical Software: Release 17. College Station, TX: StataCorp LLC). All data from both regional and metropolitan groups were combined for analysis. All health outcomes data were summarised using descriptive statistics and presented using frequency distributions for categorical data and means and standard deviations or medians and interquartile ranges (IQR) for continuous data. Linear mixed models and mixed effects negative binomial models, with random subject effects, were used to examine longitudinal continuous and count outcomes over four timepoints (baseline, six, 12 and 24 months). Model results were summarised using marginal mean estimates and 95% confidence intervals. As mixed effects models use maximum likelihood estimation to estimate parameters based on assumed probability distributions, all available data points, regardless of missing timepoints, were included in analysis. Data obtained from the feedback questionnaire were summarised using descriptive statistics. Data from open-ended questions were coded and summarised using frequency and percentages.

5.2.8 Sample Size

For a within group repeated measures ANOVA over four timepoints a sample of n=12 has 90% power to detect an effect size f=0.41. Feedback from the community partners suggested that it would be reasonable to expect each group to consist of between 7 and 10 regular participants.

5.3 Results

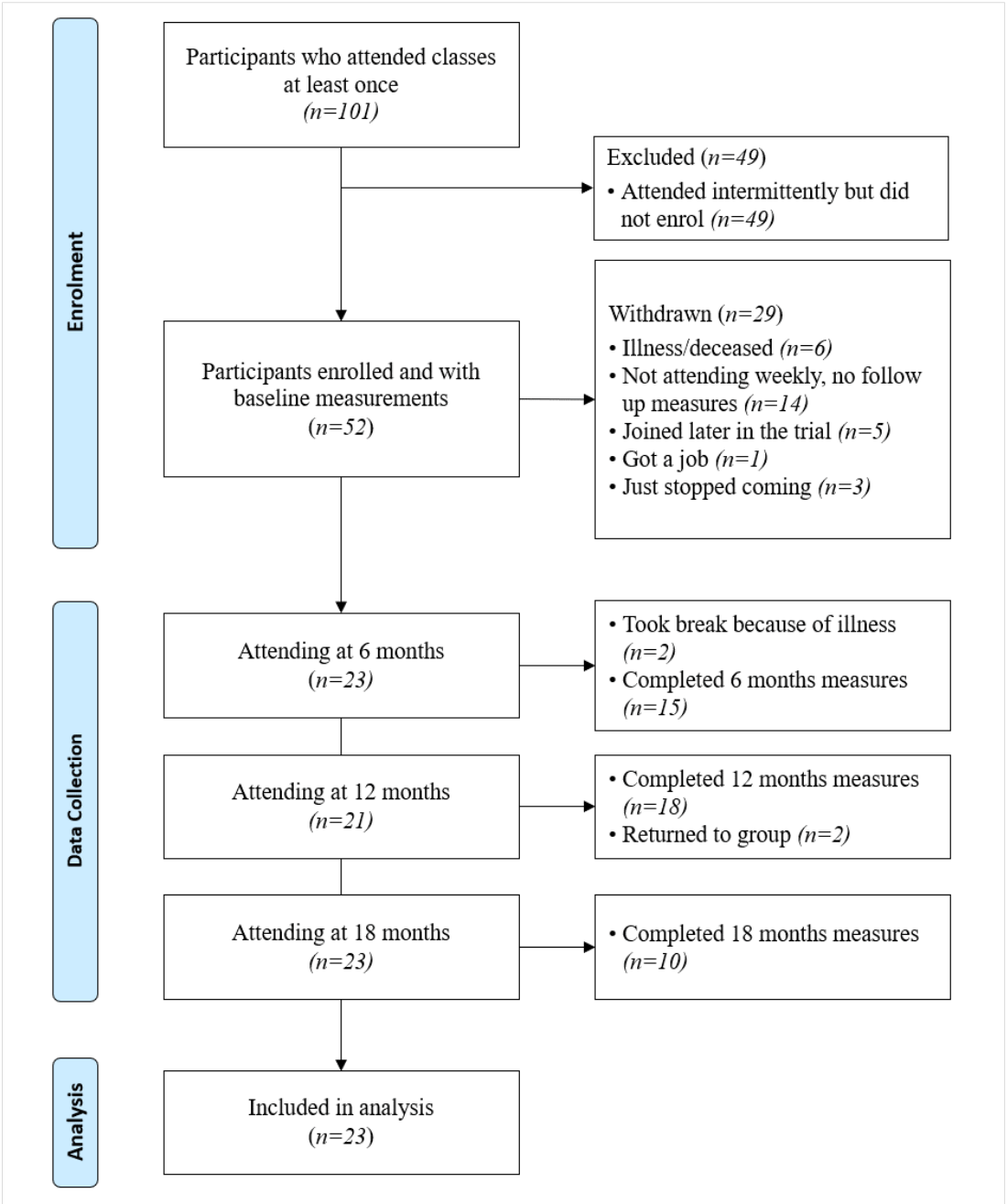
5.3.1 Program Delivery

There were 46 sessions delivered in year one of the program and 25 sessions in year two at the metropolitan site (36/31 in the regional site). Sessions were timed to fit into school terms with some gaps in school holidays and around public holidays. The reduction in sessions in year two was due to the COVID-19 pandemic lockdown.

5.3.2 Participant Flow Through the Study

The flow of participants through the study is presented in Figure 5.1. There were 52 older Aboriginal people who enrolled and undertook baseline measurements, of these 14 (26.9%) did not attend the groups regularly, 6 participants withdrew due to medical illness or died, while 3 stopped attending with no reason stated. There were 23 participants who regularly attended the two groups. Fourteen (60%) participants attended at least 50% of all weekly sessions over the two years and 9 (40%) attended between 30% and 40% of sessions.

Figure 5.1
Participant flow through the study



All available participant data were included in analyses. Participants' characteristics are presented in Table 5.1. Participants had a mean age of 62 (±10.8) years and 21 (91.3%) participants were female. Participants took a median (interquartile range) of four (3 to 5) medications.

Table 5.1
Participants' characteristics (n=23)

Characteristic	**N (%)**
Site n (%)	
Regional	13 (56.52)
Metropolitan	10 (43.48)
Age, mean (SD), years	62.5 (10.85)
Gender, female, n (%)	21 (91.3%)
Language, n (%)	
English spoken as first language	22 (95.65)
Education, n (%)	
Primary School	4 (17.39)
Completed Year 10	8 (34.78)
Completed Year 12	4 (17.39)
Completed Higher Education	7 (30.43)
Falls history, n (%)	
Falls in the last 12 months	7 (30.43)
Injury from fall, n %	4 (57.14)
Attended an exercise class in last 12 months,[a] n %	5 (21.73)
Medications	
Number of medications, median (IQR)	4 (3-5)
More than four medications, n (%)	10 (43.47)
Primary medical conditions,[b] n (%)	
Respiratory condition	3 (13)
Diabetes	6 (26)
Musculoskeletal (low back pain, gout arthritis)	3 (13.04)
Cardiovascular disease (including hypertension)	12 (52.17)
Other medical conditions[c]	13 (56.52)

[a] at least once per week in the last 3 months
[b] participants could have more than one health condition
[c] including cancer, renal disease, depression

5.4 Health Outcomes Measurements

Predicted marginal means for physical function (SPPB, gait speed, lower limb strength), functional mobility (TUG test), cardiovascular health (waist circumference, weight), falls self-efficacy (Short FES-1) and HRQoL (AQOL-4D) at time points of six, 12 and 24 months compared to baseline are presented in Table 5.2.

5.4.1 Physical Function

Physical function measures are summarised in Figure 5.2, with comparisons between baseline and follow-up periods presented in Table 5.2. Physical function (as measured by the SPPB) significantly improved at 12 months compared to baseline. Scores were also improved at 24 months compared to baseline, but the improvement was not significant. Gait speed showed significant improvement at 12 and 24 months compared to baseline. Lower limb strength (chair stand test) was significantly improved at 6 and 12 months compared to baseline. Functional mobility showed significant improvement at 12 months compared to baseline.

5.4.2 Cardiovascular Risk Factors

Cardiovascular risk factors are summarised in Figure 5.3, with comparisons between baseline and follow-up periods presented in Table 5.2. There were improvements in cardiovascular risk factors (waist circumference and weight) at 6, 12 and 24 months compared to baseline, but these changes were not significant.

5.4.3 Falls Self-efficacy and Health-related Quality of Life

Falls self-efficacy and HRQoL are summarised in Figure 5.4, with comparisons between baseline and follow-up periods presented in Table 5.2. Falls self-efficacy significantly declined at 12 months compared to baseline. Further analysis of this outcome was conducted by using linear mixed models with random subject effects to examine FES scores at 24 months compared to 12 months as compared to baseline. Results demonstrated that falls self- efficacy scores at 24 months significantly improved compared to 12 months [mean score at 24 months: 7.90 (95% CI 4.65,11.14) compared to 12 months: 11.89 (95% CI 9.84,13.93): p=0.03], with participants' scores returning to less than baseline levels. HRQoL was significantly declined at 12 months compared to baseline, but not at 24 months.

5.5 Participants' Feedback Regarding the PA Program

Participant feedback regarding the program is presented in Table 5.3. Eighteen participants provided feedback at the 12-month timepoint and five at 24 months. All participants enjoyed the program and agreed that it was culturally appropriate. Some participants [n=14, (82.6%)] were willing to pay a fee to continue engaging in the program, while four participants were not. Most participants suggested they would be willing to pay a fee of $5, with four participants suggesting one dollar and one participant suggesting $10. Almost all participants suggested at least one improvement that could be enacted in the program. Improvements that were suggested were more outdoor activity [n=12, (52.2%)], more exercises (n=6), a different venue (n=5) and a larger group (n=4). Participants who reported improvements in their health (n=19, (82.6%)] reported improved balance, confidence and a renewed desire to walk more, particularly in public places. Some participants (n=7) responded that they found it difficult to complete their home program. Reasons for not completing home program were: not liking to walk alone, not liking walking at all, lack of motivation or doing other exercises outside of home and family commitments.

Table 5.2

Predicted marginal mean health outcomes over four timepoints (n=23)

	Margins	95% CI Lower	95% CI Upper	P value*
Short Physical Performance Battery (SPPB score range 0 to 12)[#]				
baseline	8.85	8.10	9.61	
6m	9.55	8.69	10.41	0.110
12m	10.28	9.44	11.13	<0.001
24m	9.60	8.59	10.60	0.140
Gait Speed (meters/second)[&]				
baseline	0.81	0.69	0.93	
6m	0.75	0.61	0.88	0.340
12m	1.14	1.01	1.27	<0.001
24m	1.11	0.95	1.26	<0.001
Chair Stand test (seconds)[$]				
baseline	17.13	14.93	19.33	
6m	13.11	10.84	15.38	0.006
12m	13.53	11.40	15.67	0.008
24m	14.42	11.66	17.18	0.100
Timed Up and Go test, (seconds)[$]				
baseline	11.62	9.40	13.84	
6m	10.46	8.11	12.81	0.330
12m	8.79	6.77	10.82	0.010
24m	10.63	7.89	13.38	0.490
Waist circumference (cm)				
baseline	111.36	102.93	119.79	
6m	107.19	98.42	115.95	0.060
12m	109.02	100.30	117.73	0.270
24m	107.97	98.86	117.08	0.180
Weight (kg)				
baseline	82.94	73.12	92.75	
6m	81.17	71.11	91.23	0.320
12m	82.24	72.33	92.15	0.640
24m	80.65	70.49	90.81	0.230
Falls self-efficacy (FES-1, score range 7 to 28)[±]				
baseline (ref)	8.77	6.87	10.67	
6m	10.81	8.42	13.21	0.170
12m	11.89	9.84	13.93	0.020
24m	7.90	4.65	11.14	0.640
Health-related quality of life, (AQOL-4D score range 12 to 48)[€]				
baseline	16.48	14.57	18.38	
6m	16.94	14.83	19.05	0.580
12m	17.95	15.98	19.93	0.030
24m	17.24	14.68	19.79	0.480

[*] mean comparison from baseline

[#] SPPB score range 0 to 12, higher score indicates better mobility

[&] faster speed indicates better mobility

[$] faster time indicates better mobility

[±] FES-1 score range 7 to 28, low score indicates no concern, maximum score of 28 indicates severe concern about falling

[€] AQOL-4D score range 12 to 48, lower score indicates better HRQoL

Figure 5.2

Physical function outcomes over four timepoints (n=23)

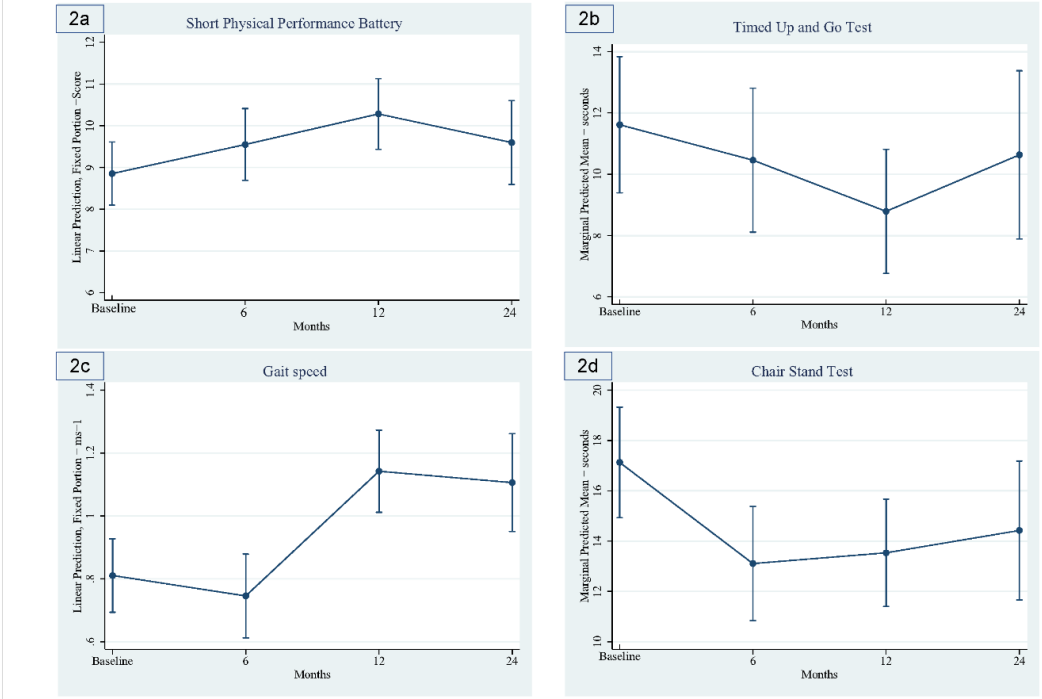


Figure 5.3

Cardiovascular outcomes over four timepoints (n=23)

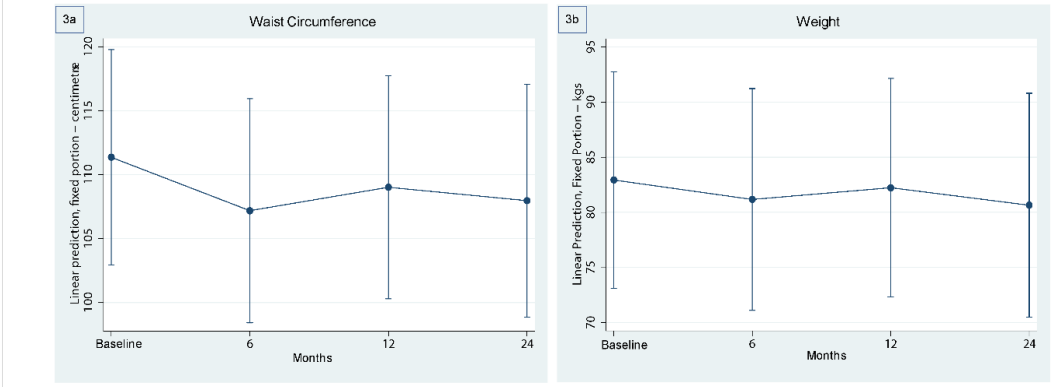
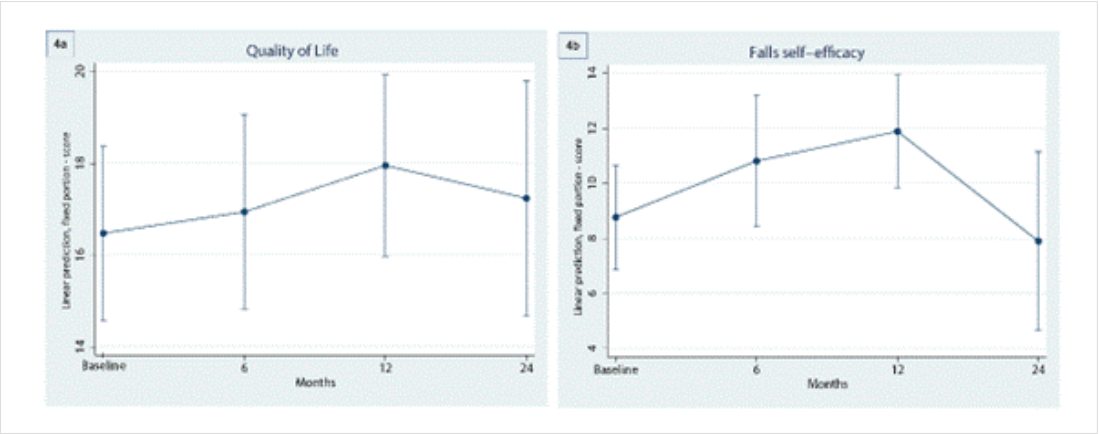


Figure 5.4
Quality of life outcomes over four timepoints (n=23)



5.6 Discussion

Aboriginal Elders on Noongar Boodja (Country) who participated in a two-year PA program made significant improvements in physical function. Participants showed significant improvement in gait speed, lower limb strength and functional mobility at 12 months. These changes were reflected in the improvement in the SPPB (a composite measure of physical ability) with scores increasing from 8.8 at baseline to 10.28 at 12 months. Since a score lower than 10 is predictive of all-cause mortality, these changes demonstrate how the program was of positive benefit to participants' health (51). Mean gait speed significantly improved up to 24 months (1.11m/s) compared to baseline (0.81m/s) showing the program led to some sustained physical improvements. Baseline gait speed was below normative values for age-matched older adults' community walking speed but speed at both 12 and 24 months aligned with normative community values (52). Gait speed is predictive of functional ability and general wellbeing (53). In the delivery of the NSW Ironbark program gait speed improved to 0.94m/second (10). However, the NSW program ran for 6 months whereas our program continued for 24 months. Our findings suggest that with resources to run the program for longer, older Aboriginal and Torres Strait Islander adults may make even greater improvement. There was some decrease in physical function overall at 24 months compared to 12 months including the SPPB, TUG test and chair stand test. This corresponded with the closure of the program during the COVID-19 pandemic. However, after participants returned to the program improvement was still observable at 24 months compared to baseline in most measures. Our results concur with other studies that have evaluated PA programs for older Indigenous peoples (10, 11, 14, 54).

Cardiovascular risk factors (both waist circumference and weight) improved throughout the trial, even after the gap in program delivery in the second year, although not significantly. In the NSW Ironbark program participants showed a significant improvement in BMI. The WA program ran over two years and there were some sessions on nutrition, similar to the NSW program (10). Our program may have benefited from additional nutrition-focused interventions to increase impact on cardiovascular risk factors, since diet is known to impact on cardiovascular health (42). We also found that HRQoL showed a small but significant decline at 12 months compared to baseline. While HRQoL then improved over time, it was still declined at 24 months compared to baseline measures. This could have been due to the COVID-19 pandemic as the social restrictions and program closure occurred at around the 12- month to 18-month time period of the program. COVID-19 pandemic impacts on communities are known to have caused adverse effects on mental health for populations internationally (55).

5.6.1 Elders' Feedback and Program Translation

Elders' feedback regarding the program was highly positive. Participants stated the program was excellent and culturally appropriate and they reported feelings of confidence that developed from the program. This was important as Aboriginal and Torres Strait Islander people are not likely to attend health services that are not provided in a culturally appropriate manner (18, 56). Previous research has found that Indigenous peoples know what their health burdens are and there needs to be a partnership approach to addressing existing barriers that prevent Indigenous participation in PA programs (18, 25, 56). Researchers should seek to actively listen to the voices of Indigenous people when building meaningful, culturally appropriate service provision and delivery for Indigenous populations (18, 25). PA programs should be designed using an Indigenous perspective, that ensures a decolonising approach is taken. This will include elements of appropriate engagement, building leadership qualities, giving and receiving respect and providing a safe place for 'yarning' as part of its conception. These qualities help improve communication and address the social determinants of health for disadvantaged people and communities, making the program more likely to succeed (18, 21, 56). Planning programs that take account of cultural identities is fundamental to ongoing program success (57, 58). Our findings are supported by other research that has found that PA programs designed with a decolonising approach have successful outcomes among Indigenous peoples (11, 12, 18, 19). We noted the Elders commented on cost, and future translation needs to continue to address subsidising the cost of PA programs. Effects of colonisation have caused ongoing negative effects on social determinants of health, including education,

employment and access to health services (3). A recent Australian national report summarises that social determinants of health strongly impact on Aboriginal and Torres Strait Islander peoples' health. Aboriginal and Torres Strait Islanders who are more advantaged across social and economic measure have better health (59).

The success of the translation of the Ironbark program was that it was developed with the fundamentals of Aboriginal research methodology (24, 30). This research is the first to our knowledge to translate a culturally appropriate PA program for Aboriginal peoples in the South West of WA. Our PA program (the Ironbark program) was able to be successfully tailored for older Aboriginal people in WA because it took a working together approach, which included recognising cultural identities. In order to provide better solutions for Indigenous communities, there needs to be an incorporation of 'ways of working' from an Indigenous perspective that acknowledges language and customs and provides strong development of a culturally safe space (2, 4).

5.6.2 Strengths and Limitations of the Research

Strengths of the program were the culturally appropriate design which led to Elders attending regularly, with feedback showing that 22 of the 23 Elders thought it was culturally appropriate and wanted to keep attending the program. The physical outcomes were measured at regular timepoints by trained Aboriginal health workers assisted by health professionals, using validated and reliable measures of physical function (38). Hence evidence for physical improvement was robust. A major strength of the study is to the authors' knowledge it is the first study to evaluate the effect of a culturally appropriate PA intervention on the physical function of Aboriginal Elders living on Noongar Boodja (Country).

A major strength of the Ironbark PA program in the South West of WA was that the majority of the program team were Aboriginal people who partnered with non-Aboriginal team members to implement and facilitate the exercise and yarning circles. The program was a unique opportunity that enabled older Aboriginal people to take part in PA, because it was culturally acceptable. We delivered the program using an Indigenous 'ways of working' approach, that was relevant to the two communities. Maintaining strong relationships throughout the research was fundamental to its success. The research was only undertaken after an extensive two-year community consultation that enabled Aboriginal and non-Aboriginal researchers to work closely together in a manner that privileged Aboriginal people's worldviews (27). Extensive consultation with Aboriginal community groups is an important requisite to being able to honour ways of being, knowing and doing (56).

There was a major disruption to program delivery due to the COVID-19 pandemic in 2020. The main social restrictions period of over four months prevented program delivery, with subsequent delay in recommencement due to new program requirements that needed to be operationalised. The research team provided support by telephone and text messages, with the aim of providing mental health support and encouraging Elders to continue their home exercises and managing their health. Elders provided Facebook support to each other through these difficult times, which was felt to contribute to participants resuming regular attendance when the program recommenced. A limitation of the research was that we did not collect data that measured the amount of home exercise that participants completed. Another limitation was that we did not re-assess participants when they returned to the program at 18 months after a six month pause in the program. Requirements related to COVID-19 restrictions were perceived as causing significant increased procedural burden to both staff and participants and it was felt important to recommence the program with as few barriers as possible. To avoid participants and staff burden in future programs, it could be useful to undertake a single, simple weekly assessment that rates improvement, rather than multiple assessments. Elders who enrolled were always not able to attend weekly due to medical appointments, family commitments or community relationships. More flexibility in the program delivery might assist with these barriers. Our study was limited to providing one class per week. Additionally, not all Elders attended the program and it could be because they were not favourably disposed to the program. Also, not all Elders chose to enrol in the study or provide feedback about the Ironbark program even though they intermittently attended and participated. It would be valuable for future translation of the program, to gain these Elders' perspectives about how the program could be improved or tailored to increase regular attendance.

The research did not use an experimental design. Since the benefits of exercise for older adults are well established (5). The Ironbark project in WA, of which this study formed a component, took an implementation science approach which asks how can established evidence be translated into clinical practice (60). No control group is a limitation as Elders may have made improvements without attending the program, although very few of the Elders reported engaging in other PA programs prior to or during our program. Elders provided valuable perspectives on the Ironbark program. It is also important to consider the views of the communities and key stakeholders about what they saw and felt was relevant to the success of the program (26, 56, 61). A future study to explore these perspectives is planned.

Table 5.3

Participants' feedback about the program (n=23)

No	Question	Response	n (%)
1	Is the program relevant to your needs?	Very relevant	18 (78.26)
		Somewhat relevant	5 (21.74)
2	Was the group discussion useful?	Very useful	17 (73.92)
		Somewhat useful	6 (26.08)
3	How much did you know about falls prevention before the program?	Had some idea	11 (47.83)
		Already knew a lot	5 (21.74)
		Not much or nothing at all	7 (30.43)
4	How much do you know about falls prevention now the program has finished?	A lot	22 (95.65)
		Nothing at all	1 (4.35)
5	Was the venue suitable?	Very suitable	21 (91.30)
		Somewhat / not at all	2 (8.70)
6	Was the program culturally appropriate?	Yes	22 (95.65)
		Somewhat	1 (4.35)
7	Did you have time to come to every session?	Yes	20 (86.95)
		No	3 (13.05)
8	Would you like to continue being involved in the program?#	Yes	22 (95.65)
9*	Would you be willing to pay a small fee to keep the program running?&	Yes	19 (82.60)
		Not sure	2 (8.69)
10	Was transport to the program a problem for you at any stage? &	No	20 (86.95)
		Yes	1 (4.34)
11	Has this program improved your confidence with walking?#	Yes	20 (86.95)
		Unsure	2 (8.69)
12*	Do you feel your health has improved since attending the program?#	Yes	19 (82.60)
		No	1 (4.34)
		Not sure	2 (8.69)
13*	Were you able to complete your home exercises?	Yes	16 (69.56)
		No	5 (21.73)
14	Would you recommend this program to others?#	Yes	22 (95.65)

*Participants could also provide an open-ended response to this item; #Missing data n=1; &Missing data n =2

5.7 Conclusion

Few PA programs are designed specifically for older Aboriginal and Torres Strait Islander peoples. Westernised health care delivery has not addressed and acknowledged the impacts of colonisation which has created exclusion, and exposure to inequalities of health service delivery (2, 3, 4). Translating the Ironbark PA Program into the South West of WA with two older Aboriginal communities was successful because there was Aboriginal leadership and strong relationship building. The program provided a unique opportunity not previously available for older Aboriginal people. Participants demonstrated positive changes in their health and well-being, including significant improvements in physical function. The groups' success highlighted that having a culturally appropriate PA program that is flexible and designed with a decolonising approach can attract and retain older Aboriginal people who are seeking to improve their health and well-being. The learnings from translating this PA program could be of assistance to other communities and researchers who are seeking to promote PA with older Aboriginal and Torres Strait Islander peoples. The Ironbark PA program was a positive step towards breaking down barriers and building strategies towards closing the gap in health disparities for Indigenous peoples worldwide. Encouraging leadership by the Elders throughout the program was part of the decolonising approach of the program that led to its success. Further research that partners with Aboriginal and Torres Strait Islanders Elders and communities to expand culturally appropriate PA programs is required.

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Chapter Six

6

Stakeholders' Perspectives About the PA Program

Preface

This Chapter describes Study 4, which was conducted as part of the research for the thesis. The specific aim of this Chapter was to explore the barriers and enablers to Ironbark program success and provide feedback about how a culturally appropriate, decolonising physical activity program for older Aboriginal people could be successfully implemented on Noongar Boodja with Aboriginal communities on Noongar Boodja in WA.

The Chapter is Based on a submitted manuscript: *'Nih Waangkiny Kaadatjiny' - Listening Learning and Knowing.' Stakeholders' Perspectives About Barriers and Enablers to Delivering a Physical Activity Program for Older Aboriginal People.*

SUBMITTED MANUSCRIPT – 'NIH WAANGKINY KAADATJINY - LISTENING LEARNING AND KNOWING.' STAKEHOLDERS' PERSPECTIVES ABOUT BARRIERS AND ENABLERS TO DELIVERING A PHYSICAL ACTIVITY PROGRAM FOR OLDER ABORIGINAL PEOPLE.

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The author's version of the submitted manuscript is presented with modifications to suit the style and format of this thesis.

Abstract

There is limited evidence about how physical activity (PA) programs should be provided for older Aboriginal and Torres Strait Islander peoples. Recently two groups of Aboriginal Elders on Noongar Boodja (Country) in Western Australia participated in the Ironbark PA program.

Background: The objective of this study was to explore the views of key stakeholders about the barriers and enablers to program success and provide feedback for future program delivery.

Methods: The research took a Nih (listening) Waangkiny (learning) Kaadatjiny (knowing) approach. The primary researcher, a Noongar Wadjuk woman, conducted semi-structured interviews (n=17) with key stakeholders: Aboriginal and non-Aboriginal health and research workers who assisted to deliver the program, and family and local members of the communities. Data were analysed thematically.

Results: The overarching theme highlighted that stakeholders felt a sense of building a PA program that was culturally appropriate. They reflected that the program attracted older Aboriginal people because it was designed to make them feel welcomed, with a sense of belonging. Five major themes were identified: *Relationships*, *Belonging*, *Program structure*, *Benefits of the program* and *Future planning.* Positive changes observed in Elders' health and well-being were a source of inspiration for team workers.

Conclusions: The program success identified that older Aboriginal people desire tailored and flexible programs that will address their needs.

6.1 Introduction

Physical activity (PA) is vital to maintain health and wellbeing (1, 2, 3, 4). However, PA programs are most often developed within a Western gaze, without reference to those who are different to the dominant perspective (5). Ignoring the need for culturally appropriate services perpetuates marginalisation of vulnerable groups such as older Aboriginal and Torres Strait Islander peoples when they seek to access suitable PA programs (5, 6). There is an urgent need for older Indigenous people worldwide to become more involved in local community PA programs at all stages of development, to ensure that local Indigenous populations lead the development of suitable programs (7, 8). Such PA programs give Indigenous people options to maintain and sustain a physically active lifestyle that can lead to improved health and wellbeing (4, 9, 10).

However, when needing health care older Aboriginal and Torres Strait Islander people are reluctant to engage with mainstream health services, which are designed using a Westernised care model (5, 6, 11). Instead, they feel safer seeking out culturally appropriate health services where they are not made to feel uncomfortable and subjected to ignorance and racism, which is often a humiliating, and sometimes deeply traumatising, experience (6, 11, 12, 13). Distrust in government agencies caused by discriminatory policies has resulted in multiple barriers that prevent access to good health care (14). Lack of access is compounded by social determinants of health which are known to be the root cause of much poorer health among Aboriginal and Torres Strait Islander people compared to Australia's non-Aboriginal populations (15, 16) and older Aboriginal and Torres Strait Islander people have a higher prevalence of chronic illnesses (17).

Loss of family connections, institutionalisation and exclusion from society are some of the impacts of colonisation and unaddressed, it forms a pattern of ongoing intergenerational trauma (8, 6, 18). This history of trauma includes those older Aboriginal and Torres Strait Islander people who form part of the stolen generations (19). Previous work emphasises that health programs that seek to work with older Indigenous peoples should be implemented within a culturally safe and secure framework that takes into consideration this traumatic history, alongside the values and ethics that are required to work with Elders and their communities (5, 20).

We recently translated the Ironbark PA program into Noongar Boodja (Boodja means Country) in Western Australia (WA). The Ironbark PA program was designed by Aboriginal communities and researchers in New South Wales (NSW) and showed positive

benefits for older Aboriginal people in NSW (21). The program delivered in WA consisted of one hour of functional exercises that included strength and balance components, followed by a yarning circle (22). Yarning is a way of communicating that allows sharing of information to be shared in a culturally safe manner with Aboriginal and Torres Strait Islander peoples (23). The program demonstrated holistic benefits, with Elders reporting improvements in physical, mental, and social outcomes and improvements in functional mobility (22, 24). Understanding the Elders' perspectives about the PA program was vital, but it was equally important to explore the views of the wider community and program stakeholders, to gain a holistic understanding of how to break down any barriers and build up enablers to expanding the Ironbark program or other culturally appropriate PA programs in local Aboriginal communities in WA. This type of evaluation allows organisations to respond to local context, explore the processes and mechanisms, and adapt the original program to achieve best fit with different settings (25). Going out into the community to speak to Aboriginal and non-Aboriginal stakeholders was part of a holistic approach that considered the community perspectives. Being healthy and happy as a community is what defines the meaning of good health for Aboriginal and Torres Strait Islander peoples. It is centered around mental, emotional, and spiritual wellbeing and that of their family and is not focused only on the fitness of the individual but rather the fitness of the whole community (5, 26).

This research aimed to explore the perceptions and understandings of communities and service providers and subsequently share our learnings from the project. Barriers and enablers to Ironbark program success were identified to provide feedback about how a culturally appropriate, decolonising PA program for older Aboriginal people could be successfully implemented on Noongar Boodja with Aboriginal communities in the South West of WA.

6.2 Methods

6.2.1 Design

An implementation science approach was taken to identify the factors (both barriers and enablers) that influence the uptake of effective interventions into clinical practice (25, 27). To understand these influences on the Ironbark program and throughout this research we refer in Noongar language to 'Nih Waangkiny Kaadatjiny' which means 'Listening, Learning and Understanding.' This is the Noongar way of learning that begins with respecting diversity in the many voices of the people talking, as key to learning and

understanding more. It is a process that is embedded in building of relationships built over time. This way of working can be summarised as learning from our Elders, active listening and respecting cultural identities, practices, and beliefs today that have been re-created from the impacts of history (28, 29, 30).

6.2.2 Ethical Considerations

The WA Aboriginal health ethics committee (HE 842) and Curtin University ethics committee (HE number 2018-0425) approved the study. Participants provided written, informed consent to participate. The study design and procedures were underpinned by the National Health and Medical Research Council (NHMRC) of Australia guidelines for conducting research with Aboriginal and Torres Strait Islander communities (30).

6.2.3 Researcher Standpoint

The lead researcher (MJRG) is a doctoral thesis candidate, undertaking research training through her University (with a Bachelor of Aboriginal Health), and is well known in her community and accepted as being of Noongar Wadjak descent by her peers. She has built relationships in the community over many years. The researcher's personal experience and her position in the community could be a source of bias if she allowed her own views to influence the interviews or the analysis, rather than those of the stakeholders, As a senior woman in her community and a researcher she had to set aside her own pre-conceptions and ensure that the voices of stakeholders came through in the analysis. This setting aside process, known as bracketing (defined in Chapter 2. Section 2.5.1), was done during and after interviews and through researcher journal reflections but was also a process of continually taking accountability for the research and ensuring the results truly represented the voices of community (as described in Chapter 2, section 2.10). Stakeholders who were interviewed had developed relationships with the Elders and the research team over the project life of some three years and may have felt hesitant to offer a negative perspective about the program. However, the researcher undertook interviews in a confidential manner, asking open ended questions to minimise this potential bias and triangulated the interview data with program data that had been recorded on a weekly basis by Aboriginal health workers. This aimed to improve the credibility of the results. Engagement with each stakeholder during the collection of data was centered around the Yarning model of engagement (23). Interviews varied from half an hour to one hour and were about building a relationship to connect easily with the stakeholders to talk, listen and learn, and understand as much as possible. Each interview was treated like an ordinary

non-threatening yarn that you might have anywhere with anyone, except it had areas of focus on specific questions about the Ironbark program. At times the yarning would stray away from this topic, but the researcher sought to respectfully revisit unanswered questions in another way when necessary. This was to ensure that she gained a true and rich understanding of the reflections that the stakeholders presented. This approach was underpinned by being confident in her position as a senior female Aboriginal researcher who understood her need for transparency and accountability to the community (31, 32, 33). She took a respectful approach to the procedure, including using time to plan for each interview and including reciprocity as key elements to successful interviews. Reciprocity was about providing the cost of a lunch or a cup of tea or coffee at a place where the interview could be confidential and comfortable.

6.2.4 Participants and Setting

Participants were individuals from the two communities on Noongar Boodja that had been the setting for the Ironbark PA program. A purposive sample was drawn from program stakeholders. Aboriginal and non-Aboriginal health service providers, health workers and research workers who assisted to deliver the program were invited to contribute their feedback. Local community members who did not attend the program regularly, especially any older Aboriginal people in the community, were invited to give feedback about the program. Family members of Elders who participated in the program were also invited to give feedback.

6.2.5 Data Collection Procedure

Data were collected from multiple sources to understand how the program operated in the communities and to explore the barriers and enablers to program success. Collecting data from multiple sources was a form of method triangulation that enabled meaningful understanding of how the program worked and in what contexts (25, 34). Firstly, a qualitative interview was undertaken with the purposeful sample of stakeholders who were associated with the program. All interviews were undertaken by the lead researcher interviewing each stakeholder alone. Interviews lasted approximately 45 to 60 minutes. She took a respectful approach to the procedure, including asking participants by phone or email if they would like to do an interview, using time to plan for each interview, with location being decided by each participant (quiet, private setting such as in their home, a small room in a community centre or their workplace). Secondly, data were collected from weekly feedback forms. These forms were completed by the Aboriginal research workers

after each program session. The forms provided a short summary about feedback from participants and the research workers completed a short reflection about the session. Thirdly, the program was interrupted by the COVID-19 pandemic lockdown and research assistants completed short reflections about communications they had with the Elders during phone calls made to participants during the lockdown period. Finally, the lead researcher kept a diary throughout the research which contained her thoughts and reflections about the procedure and the program.

6.2.6 Interview Guide

A short qualitative questionnaire containing open-ended questions was developed and used as a guide for the semi-structured interviews. Questions were designed to explore participants' perspectives of the program, including identifying barriers or enablers to how the program was operationalised and how it could be improved for future delivery.

6.2.7 Data Analysis

Data analysis was completed using a qualitative thematic process that was led by the primary researcher (MJRG). She was able to draw on her experiences working with Aboriginal people over many years, and her knowledge of her own community to gain a true understanding about what the community was really saying about the program. As described in section 6.2.3 (and further described in Chapter 2. Section 2.5.1) it was important not to allow this prior knowledge to influence the data collection and subsequent analysis. Data were presented in a way that authentically reflected the experiences of the community and the participants. In this way the findings would recognise the strengths that the communities and participants brought to the results (35). (See also Chapter 2, (section 2.11) for how qualitative data were analysed by privileging Aboriginal viewpoints).

Interviews were continued until theoretical saturation was confirmed. All interviews were audio-recorded. Half of the interviews were transcribed by the lead researcher (MG) and the other half were transcribed by a professional service. The researcher listened to all interviews and re-read all transcripts several times to familiarise herself with the data. Two researchers (MJRG and AMH) reviewed the interviews, transcribed data from the interviews, the lead researcher's diary and notes taken from conversations within the local community and reached consensus that all the main variations of themes were recurring, and no new themes were being identified (34). Half of the interviews were transcribed by the primary researcher (MJRG) and the other half were transcribed by a professional service.

Data from all sources (interviews, lead researcher diary and field notes) were combined using Microsoft Excel (Microsoft Excel, Office 365) and were analysed using thematic analysis (36) which took a deductive approach to examine the data for barriers and enablers. The lead researcher and second non-Aboriginal researcher (JU) then started identifying all the codes. Coding was based on an implementation framework, which seeks to identify and understand what barriers prevent a program from being successfully implemented and what facilitators support its delivery (25). The overarching codes were "barriers" and "enablers" to Ironbark PA program success. Data were searched for words that described stakeholder participants' experiences as a barrier or an enabler, such as enjoyment, challenge, safety, outcomes, feelings. Data that were not able to be mapped to these pre-identified codes were added to the dataset as new codes. A third non-Aboriginal researcher (AMH) viewed a selection of the coded data to confirm coding before the analysis progressed. These coded data were then grouped into categories, and these categories were then grouped into candidate themes. After this the three researchers met and conferred to finalise the themes and create an overall matrix. Further review of the initial analysis was undertaken by all authors, led by senior Aboriginal researchers (JC, MK).

The results including the overall thematic matrix was presented to a group of local Aboriginal stakeholders (Elders, community and family members) at a meeting, that included Aboriginal health and research workers who participated in the interviews. They were asked if the results provided an accurate representation of the feedback and participated in a discussion about the themes and whether they represented the overall data accurately. This conferral with community assisted the researcher to present the findings in a manner that privileged Aboriginal voices (31). The researchers then confirmed the final analysis.

6.3 Results

Seventeen interviews with key stakeholders, including local community members were completed. The characteristics of the sample are presented in Table 6.1. Of those interviewed 12 were Aboriginal community members, and of these, six were older Aboriginal people. Aboriginal and non-Aboriginal research and health workers included participants who were part of an Aboriginal Community Controlled Health Organisation (ACCHO) and health service providers from each of the program sites (metropolitan and regional). Two community members were approached and declined because they were not available in the required time.

Table 6.1
Characteristics of the sample

	Participant	Role	Time in program	Site
1	Health professional – non-Aboriginal	Program delivery	1 to 2 years	Metro
2	Research worker - Aboriginal	Program delivery	> 2 years	Metro
3	Health worker – non-Aboriginal	Program delivery	> 2 years	Metro
4	Health worker - Aboriginal	Program delivery	1 to 2 years	Metro
5	Community member-Aboriginal	Family member of participant	> 2 years	Metro
6	Community member - Aboriginal	Family member of participant	> 2 years	Metro
7	Older Community member - Aboriginal	Previous participant in program and family member of both staff and participants	> 2 years	Metro
8	Health services manager – non-Aboriginal	Program organisation and organises other Aboriginal community programs	> 2 years	Regional
9	Health professional– non-Aboriginal	Program delivery and assists with other community programs	> 2 years	Regional
10	Health worker - Aboriginal	Program delivery	1 to 2 years	Regional
11	Health worker - Aboriginal	Program delivery	1 to 2 years	Regional
12	Program manager and older community member - Aboriginal	Organises other Aboriginal community programs	Long term involvement in community	Regional
13	Research worker – Aboriginal, older community member	Program delivery	> 2 years	Both
14	Older Community member - Aboriginal	Participates in and assists to organise other Aboriginal community programs	Long term involvement in community	Both
15	Older Community member-Aboriginal	Participates in and assists to organise other Aboriginal community programs	Long term involvement in community	Both
16	Older Community member - Aboriginal	Participates in and assists to organise other Aboriginal community programs	Long term involvement in community	Both
17	Health professional – non-Aboriginal	Program delivery and state-based health service provider	> 2 years	Both

6.3.1 Overarching Theme – Building a Culturally Appropriate PA Program

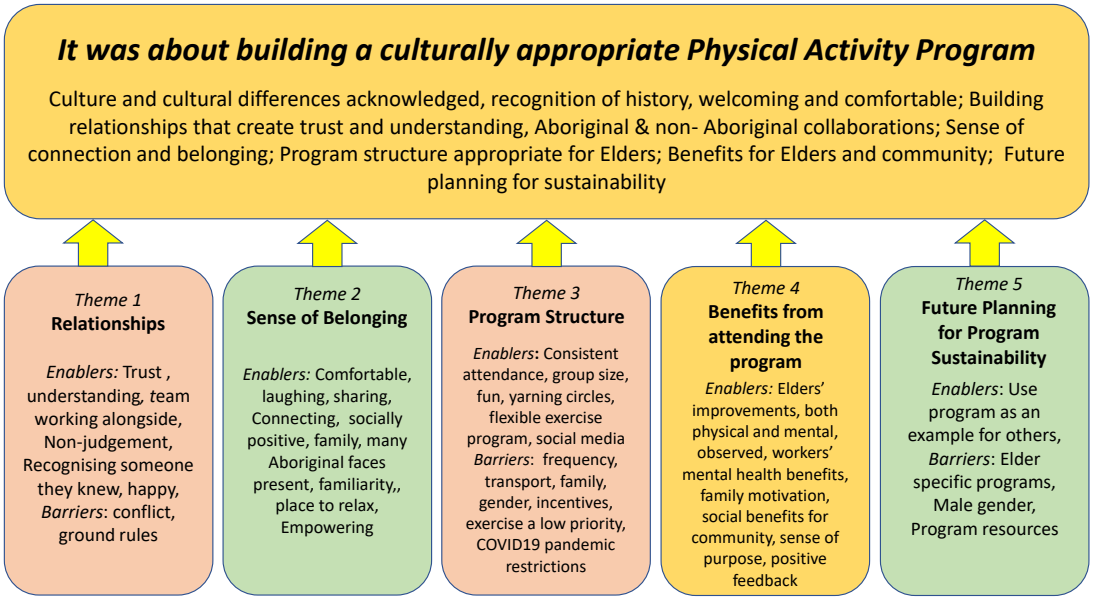
Themes and their relationships are summarised in Figure 6.1. The overarching theme describes how stakeholders experienced the Ironbark PA program to be positive and successful. Stakeholder experiences and their observations of the Ironbark program led them to concur that it was culturally safe and secure. They observed that Elders wanted to engage in the program because it offered a comfortable and stress-free place to be. Stakeholders observed the Elders' regular attendance and how they connected easily to the weekly PA activities. "*Ten ladies attended today. It was a rainy day, so we started going across the room with indoor warm-up exercises, had laughs doing something different* …" (Aboriginal health worker – weekly feedback form, regional). Yarning and socialising were generally positive with one worker recording: "*There was lots of laughter. This was followed by everyone making suggestions…"* (Aboriginal health worker, weekly feedback form, regional). There was an overall sense that the program and the team of workers was supportive and sensitive to the needs of the older Aboriginal people on Noongar Boodja. Stakeholders observed that the program attracted older Aboriginal people to attend because it was designed to make Elders feel comfortable and consequently created a sense of belonging.

> *"They needed to feel belonging. They needed to connect; they found a place. They found themselves. It was a chance for them to feel as if they belonged, they connected, and they also were empowered…"* (P8, Aboriginal research worker, metropolitan).

Stakeholders observed that the program appropriately filled a known gap in services for older Aboriginal people in their local community. "*Participants gave positive feedback such as liking the fact that the exercises were suitable for their age groups and found it easy to join in knowing that they could do it...*" (Aboriginal health worker – weekly feedback form, metropolitan). Stakeholders strongly concurred that the program was relevant and important to the needs of the Elders and the community. A health worker reflected that *"People have been coming together where they haven't necessarily had a space to do that before…"* (P5 Non-Aboriginal health service provider, regional). One participant whose father participated in the program stated that: "… *this needs to be more and needs to be ongoing, this is our Elders, this is our future, this is our history, this is our walking library…"* (P15, Aboriginal community member, metropolitan).

Figure 6.1

Nih Waangkiny Kaadatjiny 'Listening Learning Knowing'. A 'ways of working' framework for working with Aboriginal Elders in South West of WA



Themes that could either act as barriers or enablers to program success were identified, including a theme of planning for future PA programs. These five themes *(Relationships, A sense of belonging, Program structure, Benefits from attending the program and Future planning)* identified and explained stakeholders' experiences and their perspectives about why the program worked well and what changes could be made for the future.

6.3.2 Theme 1 - Relationships

Relationships that developed as part of the program were exemplified as very important to the Elders, with trust and understanding created in safe spaces, where the Elders could feel supported. A research worker at the metropolitan site was a former local community member and was recognised and embraced by several Elders who were happy to see someone they knew. *"We met (Aboriginal research worker) who mum knew quite well from when she was a lot younger and that made it really fun for Mum to be able to see someone she recognised…"* (P3, Aboriginal community member, metropolitan). These perspectives highlighted the trusting relationship that Elders look for. One Aboriginal health worker reflected that both workers and Elders built relationships as they did the exercises together: *"because… it gets um trusting, they're able to build a trusting relationship with you so you, you're not sitting back and they might think that your judging them more and feeling maybe feeling that you know you - your maybe - you not too good*

to do the exercises…" (P13 Aboriginal health worker, regional). Non-Aboriginal team members were closely supported by the Aboriginal team members to work together successfully. *"If you do have a non-Aboriginal there attending the group you might have someone like myself, they know that I am part of the team of Aboriginal people…"* (P16 Non-Aboriginal health service provider, both).

While *'Relationships'* in most cases were a positive, conversely, in other situations, they could form a barrier. Relationships amongst program participants were sometimes identified as a cause for concern due to historical family conflict or cultural gender differences and staff noticed that some participants did not attend regularly for those reasons. It was a challenge for some health service providers to manage shaky relationships between the Elders and the service provider. There were disagreements that needed to be resolved and past experiences in the community that were not positive, both of which led to some Elders initially attending but not returning to the program and some inconsistent attendances. *"Overall, it was a trying session, and it would be good to remind the group of the group rules regarding respect and to be positive and encouraging…"* (Aboriginal health worker, weekly feedback form, regional).

6.3.3 Theme 2 – A Sense of Belonging

On reflection health workers, researchers and local community members were confident that the Elders felt that they "belonged." This was confirmed by several Aboriginal and non-Aboriginal stakeholders. For example, one worker commented that*"…we have so many diverse backgrounds about where we all come from, but at the end of the day I feel that we really feel the connection that we have as a group…everyone feels like they belong…"* (P2 Aboriginal research worker, metropolitan).

It was also important to the whole team that the Aboriginal team members considered the program was a workplace that was safe to attend; that it was a place where Aboriginal workers were comfortable working alongside fellow Aboriginal and non-Aboriginal team members. This understanding about creating a safe space was expressed by one non-Aboriginal health worker who had experience working with Aboriginal clients. *"For the Aboriginal community I think it's really beneficial they have a safe secure environment that they feel non-judgement… I've worked with Aboriginal people before I've gone to a school with predominantly Aboriginal people going to that school and I'm not unfamiliar with that sort of aspect…"* (P6 Non-Aboriginal health service provider, regional).

6.3.4 Theme 3 – Program Structure

The Ironbark program structure (design and delivery) was considered appropriate and was accepted by all stakeholders. Feedback from key stakeholders was strongly positive. There were generally between eight to 12 people participating weekly at each site and both Aboriginal and non-Aboriginal health and research workers concurred that the group was just the right size to provide required support. Comments suggested that if the group was any larger, the Elders' needs might not have been adequately addressed. One stakeholder reflected that the *"group was not too large and overwhelming…It was a nice size group. There wasn't too many…"* (P3 Aboriginal community member, metropolitan). The use of a yarning circle, was viewed as enabling, being observed to be a positive and welcome part of the program that the participants looked forward to. *"With my observation …and what the elders have shared is the exercise group itself would not have the same value or benefit as combining it with the yarning…"* (P1 non-Aboriginal research worker, metropolitan). A local community member reflected that *"Yarning when people tell what's been going on in their life. That was a good part…. when people would come out with either a positive or something. The sharing told something about their life…"* (P3 community member, metropolitan).

A barrier to program attendance for some participants was the need to travel to city hospitals (from regional areas in particular) for medical treatments and ongoing health issues. One health worker reported that*: "I know the week a couple weeks before that we only had three (participants) …the main thing I know there has been a couple of deaths and just some health appointments that clients attend…"* (P7 Aboriginal health worker, regional).

Another community reason for non-attendance was deaths in families. This affected the attendance rate of those family members. *"One of our group members is going through a bit of a tough time with family and other issues the group has shown so much support for her and we wish her all the best…" (*Aboriginal health worker, weekly feedback form, metropolitan). Transport was available for participants attending the regional group, which enabled attendance as one worker explained *"…it is easy to get people to come because we provide transport to help get them* there…" (P5 Aboriginal health worker, regional). Employment commitments prevented some Elders from participating consistently and in the winter, cold weather was a cause for non-attendance as some Elders chased the warmer weather in distant tropical regions.

Caring for grandchildren or relatives was another barrier to regular attendances. *"Often, they were unable to come because they were caring for someone who is unwell or caring for a grandchild because the mother or father of the child was not there …"* (P16 Health service provider, both).

Some Aboriginal and Non-Aboriginal health service providers, workers and local community members identified the need for separate men's and women's groups, because they felt that having men join women in the same group was culturally inappropriate.

> *"…Only because women's business, men's business. Yeah. And um, you hear… what all girls talk about, at Ironbark, you know, and I feel like if men were there, then some of them might feel a little bit too uncomfortable…I think that there should be an iron bark for men, …"* (P9 Aboriginal health worker, regional).

Men and women participating in PA together was not identified as a barrier in the metropolitan group possibly because the Elders were a diverse group of Aboriginal peoples, some of whom were not traditionally connected to the area or because they were established as Elders who had many years of experience in meeting in mixed gender forums. *"For being in the metro of Perth, I actually thought that we would witness a lot of barriers to having mixed genders groups...and I was very surprised that we didn't. We are working with established groups who are used to mixing so it's not a problem…"* (P17 Aboriginal research worker, metropolitan).

Men not attending the program was also explained by one older community member as being part of a larger ongoing issue in the community namely; it was difficult to attract men to groups. This participant commented that: *"our men's group have, um, incentives, you know, um, like, um, food vouchers and all that, they turn up for that, but you know, any other things like…health and all that sort of thing, they won't turn up…"*(P9 Older male Aboriginal health service provider, and community member, regional).

COVID-19 specific barriers and enablers to the program

A major barrier for ongoing program sustainability was the COVID-19 pandemic in 2020, that caused the discontinuation of the weekly PA program for a period of approximately six months. After restrictions were lifted some Elders found it difficult to re-engage with the program, particularly those who had chronic health conditions, with concurrent depression. *"We saw the impact…* (during COVID-19 lockdown) *we saw the*

health conditions. We saw... them battling to come back and to get back…" (P8 Aboriginal research worker, metropolitan). A family member stated that *"…since we haven't been going to Ironbark, we haven't really been doing much exercise, which is unfortunate…her lower body part has become quite weak again because we haven't been doing the sit to stand…"* (P3 Aboriginal community member, daughter of participant, metropolitan).

However, weekly feedback from research workers during this period also indicated that even though the group closed for an extended time, the team and Elders found strength in the relationships that developed within the group using social media. *"Elders are always full of info and it's great that the Facebook page that one of the Elders has created…with everyone getting on board and sharing so much its lovely to see so many posts…"* (Aboriginal health worker, weekly feedback form, metropolitan site).

6.3.5 Theme 4 – Benefits from Attending the Program

All stakeholders concurred that Elders experienced both physical and psychosocial benefits from attending the program. Positive changes observed in some of the Elders, who began walking to the program venue and home again, were a source of inspiration for the team members. Comments included *"…great improvements in them being able to do more than what they have originally been doing…"* (P7 Aboriginal health worker, regional)

Some health workers experienced personal mental health benefits, with one commenting that *"…being a part of a program that makes such a difference to so many people's lives give me so much joy and I love making a small difference in this small group that I am involved in…"* (P2 Aboriginal research worker, metropolitan).

Family also noticed positive changes and were keen to bring their family member to the group every week. "*I could see a big difference in mum being able to get around a lot easier because she was doing the exercises, like opening, getting into the car"* (P3 Aboriginal family member of a participant, metropolitan). Non-Aboriginal participants also commented on the purpose that the group appeared to promote in the community. *"No one wants to be at home doing nothing, ... people want to have a purpose and they want to be able to contribute to their community…"* (P6 Non-Aboriginal health service provider, regional).

Social occasions initiated outside the weekly program became a sustained major benefit for group as they continued to maintain the connections that they made with one another. *"And the thing is every time I see him now, cause I was at a funeral last week and*

all that, now that I've met him, me and him have good Yarns now…" (P9 Aboriginal community member, metropolitan). This extended towards staff in the metropolitan group gaining positive, ongoing connections with Elders.

"I do feel that as a group everyone has general concern about how everyone's life is going and as such, we have a really tight group that really have a great time on the whole and everyone gets results each and every week showing improvement…" (Aboriginal health worker weekly feedback form, metropolitan).

6.3.6 Theme 5 – Future Planning for Program Sustainability

Stakeholders' comments regarding the program's future were influenced by their strongly held views that the Ironbark program had led to significant benefits in their communities. Three subthemes (*Expansion, Attendance, Sustainability*) identified how changes could strengthen the program and what it could look like in the future.

Program expansion

The program was viewed very positively as being successful, despite known difficulties of engaging older Aboriginal people in such programs. One Aboriginal health worker reflected that *"…I actually didn't think that there would be the numbers that are actually there. I thought it would be very less, um, obviously because of, situations and stuff, but, um…yes, I'm very surprised…"* (P13 Aboriginal health worker, regional). A community member reflected that future PA programs needed to learn from the program that ground rules (terms of references) are required to make it work *"You gotta start from right at the beginning…and you have to have it up on the wall…This is the rules and you gotta understand"*. (P9 Aboriginal health service provider and community member, regional).

Stakeholders who were experienced in delivering health services expressed strong feedback, suggesting that more health programs like the Ironbark program needed to be co-designed with Aboriginal people to better meet their needs. A health professional who assisted to manage the program commented that *"... We don't necessarily have a lot of programs that look after our Elders... and is specific to our Elders' health…"* (P5 Non-Aboriginal health service provider, regional).

Program attendance

Some Elders attended one or two sessions but did not join in the group. While some did not give reasons for non-attendance, Aboriginal health and research workers perceived that Elders were not used to undertaking physical activity through engagement in formal exercise classes. *"There is a plethora of reasons why exercise isn't a priority for our people, it's not a normal practice…"* and *"Grandcarers that are looking after their grandchildren, so they may not be of the age where they're going to school yet, or it might be school holidays and there's going to be a problem…"* (P17 Aboriginal Health Service provider, metropolitan).

There was awareness in both communities that more programs were needed for older Aboriginal men. A community member commented on the need for programs that targeted men, suggesting a positive link with sport could be used. "*All our people, most of the time, they all played sports. When they get to that age, 35, 40 whatever…and then they work, they don't have anything in between then"* (P9 Aboriginal community member, both areas).

Program sustainability

The program did not continue beyond two years due to inability of community services to provide sustainable program support when research funding ceased. Participants who were consistently participating in the program expressed their sadness when the research ended, with one Elder commenting *"…our Ironbark PA came to an end, we don't know why it had to end, but it was disappointing"* (Aboriginal participant comment, researcher's diary).

Overall, all stakeholders expressed the view that funding to continue to operate was the main barrier to sustainability: *"…it was a good program (Ironbark PA). But it gets back to funding. That's the biggest question, it's a good program…"* (P9 Aboriginal health service provider, regional).

6.4 Discussion

This study sought to understand stakeholder's experiences of the Ironbark program delivery on Noongar Boodja. It provides insights into the positive aspects of one PA program and the challenges and enablers observed when working and engaging with older Aboriginal people. Stakeholders strongly concurred that the Ironbark PA program was very successful. Feedback identified that this was because it was a culturally appropriate program that created a sense of belonging. Limited studies have evaluated the design and

impact of PA programs for older Indigenous peoples (20, 37, 38). Stakeholders reflected that the success of the program was evidenced by its positive effects on Elders' health. These reflections are supported by findings that Elders in the two communities who attended the program made significant holistic health improvements including improved functional ability, physical fitness and mental health (22, 24). Other programs that have successfully engaged and worked with Aboriginal older people also describe the shared understanding of team members, together with the Aboriginal community, building a culturally safe space for the Elders (9, 39, 40). Aboriginal and non-Aboriginal team members worked together consistently engaging with the Elders which has also been described in other programs (6, 39) to make the PA program a success.

There were challenges to delivering a PA program to the participants in our group who were living with chronic illness, which resulted in frequent medical appointments, hospitalisation, depression, and needing to move away from the PA program location with variations in health from week to week. Family commitments such as babysitting, lack of transport (in the metropolitan group) and relationships were also intermittent challenges. Programs need to have sufficient funding to offer flexible choice and options for Elders living with chronic diseases (5, 9, 22, 37). Even though the PA was paused during the COVID-19 pandemic it was important the program was funded to continue to support the Elders. The Elders demonstrated resilience to maintain their relationships and support for each other and it was important that the program facilitated this community leadership.

Listening to local community members and service providers perspectives, indicate that there are some similar perceptions worldwide of barriers and enablers that need resolving if older members of Indigenous communities are to be able to increase their regular participation in PA (7, 20). More promotion was viewed as important and men were mentioned as needing to be engaged. Stakeholders suggested that men would need other male leaders to encourage attendance and other research has noted that men participated less than women in a local physical activity program (40). One Aboriginal team member identified that many Elders were just not used to the idea of doing any formal exercise program at all. Our findings about barriers and enablers to successful program sustainability are like other studies that have recognised and highlighted common elements of success (2, 9, 41). However, Westernised health care services historically do not deliver appropriate services for Indigenous populations (5, 13). It is essential to have culturally appropriate service delivery that will provide for single or mixed gender groups and that will address the needs of local Elders, some of whom may have experienced trauma as a child from being forcibly removed from their families, and throughout their lives have

been unable to access suitable healthcare supports when needed or experienced racism when they do seek healthcare (5, 19, 26, 42).

6.4.1 Strengths and Limitations of the Research

A strength of this study was that the lead researcher was a senior Aboriginal woman of Noongar Wadjuk descent, who was able to explore feedback from Aboriginal stakeholders in a respectful and culturally appropriate manner. Findings were consistent with themes identified in a recent systematic review (20) that synthesised evidence worldwide about barriers and enablers to PA programs with colonised Indigenous communities. Team collaboration ensured both Aboriginal and non-Aboriginal health and research workers took a decolonising approach that enabled the program to be delivered successfully and stakeholders' perspectives understood (31, 35). The reporting of the study was strengthened by using the COnsolidated criteria for REporting Qualitative research (COREQ) checklist (43) (see Appendix H). Generalisations cannot be made about the two participating groups of Elders on Noongar Boodja as they do not represent all the vast Noongar cultural identities living on Noongar Boodja, that have existed for centuries. Barriers and enablers may not be directly applied to other programs because 'one size does not fit all' (44). However, our learnings can inform healthcare providers worldwide about understanding the importance of cultural safety, valuing community views and working closely with older Indigenous people when delivering a PA program. Acknowledgement of the Elders and understanding and respecting the diversity of culture in the two groups was an advantage towards building strong relationships. Limitations of the study included the disruption caused by the COVID-19 pandemic which meant we could not interview everyone, including some stakeholders who ceased involvement. Changes in teams over time meant that some workers were no longer available to give feedback and we were not able to interview senior staff at the ACCHO that was the regional partner.

Unfortunately, at the end of the two-year program, neither of the service providers had capacity to incorporate the program into their own health service delivery. However, at the time of analysing these results some recent team engagement has led to discussion with other service providers about how the program could continue. For future programs, identified barriers would to be addressed so that the program can be delivered more flexibly in a way that supports Elders who have frequent medical appointments and family obligations.

6.5 Conclusion

This study was a collaborative effort between Aboriginal and non-Aboriginal health professionals that has provided insight into the barriers and enablers that exist for older Aboriginal people living on Noongar Boodja who are seeking to engage in PA programs. The Ironbark PA program was confirmed by all stakeholders as being culturally appropriate because it embedded cultural safety and security into the design and delivery, making it a place of 'Nih Waangkiny Kaadatjiny', shared listening, learning and knowing. Voices of the local community members, and Aboriginal and non-Aboriginal stakeholders strongly concurred that the Ironbark program created a sense of belonging for Elders and led to positive benefits for both participants and staff. Feedback confirmed that PA programs were needed within the community and that further promotion of the program, particularly for older Aboriginal men, was required. Sufficient, ongoing funding is required to provide culturally appropriate PA programs. With adequate resources, minor barriers can be resolved in partnership with the community.

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Chapter Seven

7

Synthesis and Conclusion

Preface

This chapter synthesises the results of the research conducted for this thesis. The Ironbark PA program evaluation found that older Aboriginal people showed improved health outcomes after engagement in the program. Importantly, the evaluation provided new knowledge about how PA programs can be translated successfully for older Aboriginal and Torres Strait Islander people. Strengths and limitations of the research are summarised, and research and practice recommendations are presented.

7.1 Summary of Background to the Research

Physical activity is a key health strategy for promoting healthy ageing, including being a key preventive strategy for improving functional ability, reducing older people's risk of diabetes, and being a modifiable risk factor for heart disease (1, 2, 3, 4). Older Aboriginal and Torres Strait Islander peoples have a strong understanding of health as being a holistic concept that encompasses family, community, and country (5). However older Aboriginal and Torres Strait Islander people's leadership of health within their communities has been restricted since colonisation, leading to a sedentary lifestyle. Therefore, older Aboriginal and Torres Strait Islander people could benefit significantly from engaging in PA (4, 6). Older people who participate in PA have been found to have significantly improved physical and functional health outcomes, including mental health outcomes (7). Even regular, light exercise can improve a person's future risk of disability and delay the onset of chronic health conditions and early death (4, 6). Older Aboriginal and Torres Strait Islander people are known to face substantial barriers to engaging in physical activity including cultural, historical, geographical, and socioeconomic factors (8). This research commenced through having discussions with two groups of Elders and communities on Noongar Boodja (in Bunbury and Mirrabooka) about a PA program. Elders and service providers from these two areas gave feedback that there were no PA programs that were suitable for older Aboriginal people. These discussions formed the foundation of my research as the team of Noongar communities, researchers from WA and NSW, and government and non -government organisations obtained funding to commence a PA program. Funding obtained was used to translate the Ironbark PA program from NSW into WA.

7.2 Aims of the Research - Summary

Briefly, the aims of the research, previously presented in Chapter 2, were to:

1. Synthesise all available evidence regarding the enablers and barriers to older Indigenous people engaging in physical activity.
2. Explore how engaging in an Aboriginal-specific PA program (the Ironbark program) impacted on the lived experiences of Elders in the South West of WA.
3. Evaluate the impact of the Ironbark program on: i) physical function and ii) functional mobility, cardiovascular risk factors (weight, waist circumference), falls self-efficacy and health related quality of life on Aboriginal Elders on Noongar Boodja in the South West of WA.

4. Explore the barriers and enablers to Ironbark program success and provide feedback about how a culturally appropriate, decolonising physical activity program for older Aboriginal people could be successfully implemented on Noongar Boodja with Aboriginal communities in the South West of WA.

7.3 Synthesis of Research Findings

7.3.1 Summary of Findings

Overall, in Study 1, (the systematic review, Chapter 3), it was found that limited studies worldwide have evaluated the barriers and enablers of older Indigenous peoples' participation in PA programs. The search and screening of articles showed not all the studies focused on older Indigenous people and their participation in PA; there were some younger people included in some studies. Therefore, the objective was to identify and include studies that focused on older Indigenous people to find the strongest evidence about PA programs relating to older Indigenous people. Findings from the systematic review revealed that very few PA programs designed specifically for older Indigenous people exist in Australia and worldwide. These findings formed a compelling reason for me to focus on working with older Aboriginal people in the South West of WA. Summarising the results of the systematic review, there were 23 studies and one report included that reported barriers and enablers to PA for older Indigenous peoples. Nineteen of those studies stated that community protocols were followed, but only two studies were found to be of a high standard when rated using both Indigenous and Western critical appraisal tools (9, 10, 11). Other researchers have highlighted that studies that use and privilege local Indigenous community protocols and leadership are destined to succeed (12). Overall, results of the review summarised that decolonisation of programs, addressing social determinants of health and providing cultural safety and security were key factors that were enablers of PA program delivery for older Indigenous peoples. It was important to note that these enablers could also be barriers to program success. For example, family supports and responsibilities were an enabler to participation but could also be a barrier, such as when an older Indigenous person was trying to find a balance between being able to engage in the PA program successfully and consistently and their family commitments and priorities.

In Study 2 (Chapter 4), qualitative research was undertaken. Elders who were regularly attending the program participated in interviews on Noongar Boodja. Elders provided in-depth responses about their participation in the program. They strongly concurred that the program made them feel like they were part of a community that they

belonged to, and they reflected that they noticed positive mental, social, and physical improvements from their participation. Elders shared how they enjoyed the program and discussed their feelings, including how they developed confidence and motivation, throughout their participation, to undertake other activities in their communities.

In Study 3 (Chapter 5), a longitudinal study design was applied to evaluate the effect of participation in the PA program on key functional outcomes. Physical function, functional mobility, cardiovascular risk factors, HRQoL and falls self-efficacy were evaluated. Participants also completed a questionnaire and provided feedback in the yarning circles to understand their perspectives about the cultural appropriateness of the program. Health outcomes evaluation indicated that physical function (measured using SPPB) (13), and functional mobility (measured using the TUG Test) (14), showed significant improvements. Waist circumference and weight also showed improvements, although this was not statistically significant. As discussed in Chapter 5 (section 5.6), it could be that adding dietary advice or further dietary focus in the program could be beneficial alongside the PA to encourage healthy weight control. While Elders showed some decline in their physical improvement when the COVID-19 pandemic restrictions caused a pause in the program, there was still sustained improvement at 18 months compared to the baseline. After participants returned to the program, improvement was still observable at 24 months compared to baseline in most measures.

Studies 2 and 3 findings demonstrate that older Aboriginal people on Noongar Boodja who engaged in the PA program made substantial mental, emotional, physical, and social improvements. These results highlighted that a PA program underpinned by an Indigenous methodology can result in positive experiences and outcomes for older Aboriginal and Torres Strait Islander people. The outcomes were important because the improvements made in aspects of health, including physical function and social gains are predictors of improved life expectancy, reduction in the development of chronic disease, as well as reduction of fall risk and improved HRQoL (1,2,3). The program attracted and retained older Aboriginal people who were seeking to improve their health and well-being.

Finally, Study 4 (Chapter 6) findings identified that stakeholders concurred with Elders' feedback (Chapter 4) that the PA program was culturally appropriate and that it attracted older Aboriginal people because it was designed to suit them and was flexible in the way it met their needs. The results from this study presented many voices - community Elders, family members, local service providers and Aboriginal and non-Aboriginal health workers, research workers and support workers. These participants confirmed Elders'

positive feedback about the program and gave feedback about how older Aboriginal people can better access suitable PA programs on Noongar Boodja.

7.3.2 Synthesis of Key Results from the Research

Reflecting on the results of all the studies, their findings demonstrated that the PA program was appropriately designed and delivered. The program was viewed as positive by the Elders, who reaffirmed this by consistently attending to engage in PA, without being prompted to do so. It was confirming to the researcher and the research team that the Indigenous methodological approach that was applied was appropriate. This approach takes into consideration how colonisation has negatively impacted older Aboriginal and Torres Strait Islander people. The Ironbark PA program was successfully implemented with older Aboriginal people in NSW (15), prior to us translating it into the South West of WA. It was then important to deliver the program so that it met the Elders' requirements on Noongar Boodja. Experienced health professionals who had cultural training and experience working with Aboriginal people in WA, were able to share their knowledge and wisdom regarding PA and how that would best fit for Aboriginal communities on Noongar Boodja, because as has been stated by other researchers, Indigenous research should not take, "a one size fits all", approach (16). Seeking Elders' feedback each week and being responsive to that feedback was important, for example playing music if they desired and gradually increasing simple circuit exercises in a manner that the Elders felt comfortable with. Having this flexibility and patience allowed Elders, without overwhelming them, to take their time to ease into new exercises. For example, the team respectfully allowed participants to make their own decision on when they wanted to walk or commence the circuit sessions. This respect allowed the Elders to take leadership of the program (17, 18) and was instrumental in gaining their trust and commitment. This 'ways of working' in our setting meant that it varied from a few weeks to a few months before some Elders felt confident, especially without shame, that they could do all the exercises (16, 18, 19).

Careful planning and being focused on weekly commitment and consistency for the Elders during the program was important. The staff needed to take a decolonising approach. This meant the need to acknowledge, honour, accept, respect, encourage, reciprocate, be transparent, be honest, clarify, consent, be patient, be flexible, be supportive and above all give feedback to the Elders on a regular basis. The decolonising process of the PA program was about respecting the ways that you need to apply your work, with a diverse range of cultural heritage within Indigenous community groups. It

was important to support each group to develop their own yarning and exercise routine that would benefit them all. This process is called the Terms of Reference (20, 21), which reflects that Elders expect to be received with accountability, transparency, trust, empathy, understanding, reciprocity, respect, patience, acknowledgement, sharing, caring, and sense of belonging. We supported both Elders' groups to implement their own ways of working. Although both groups did the same program, there were local flavours. For example, the regional group liked to take an outside walk, they did not accept men in the program and did not accept the procedure of commencing every session with a Welcome to Country. The metropolitan group however, liked to walk inside the room only, they accepted men as part of the program, and they enjoyed hearing the Welcome to Country and Acknowledgements.

Colonisation has subjected Aboriginal and Torres Strait Islanders to an ongoing system of oppression through the development of health care services that do not recognise Indigenous peoples' knowledge, values, and ways of working (22). Western health care systems continue to show lack of understanding about how to successfully engage in culturally appropriate ways with Aboriginal and Torres Strait Islander peoples (9, 10, 15). This study ensured that the principles of conducting research with Aboriginal and Torres Strait Islander people underpinned all research activity, through consultation with local Aboriginal people and communities, in partnership with non-Aboriginal researchers. Two senior non-Indigenous researchers (AMH and RI) worked closely with the student researcher (MJRG) and Aboriginal researchers MK and JC. All research was reviewed and any queries were referred to WAAHEC for ethical advice. (See Appendix B). Several community meetings at the pre-planning phase of the program were held with Elders who were also included in the design, and they had the choice to engage in PA with health professionals.

Building strong relationships can result in a culturally appropriate PA program that is flexible and designed within an Indigenous framework. Prior to commencing the Ironbark PA Program in the South West of WA, cultural safety and security was a central focus of the research. Understanding existing power imbalances that could impact on service delivery had to be managed sensitively by researchers, with Elders being fully supported to enjoy their participation, as well as build up their confidence and motivation to continue attending the program (23, 24). Cultural safety and security were led by the senior team members, including the student researcher, the Aboriginal senior researchers on the team, and the Aboriginal project officer. These team members consistently provided support for non-Aboriginal team members. These team members had undertaken training in cultural awareness.

Acknowledging and understanding past and present social determinants of health meant several strategies were implemented, including covering the costs of the program, providing a healthy meal that was valued by the Elders and providing transport to the program (in the regional group).

Throughout the six-month period of COVID-19 pandemic restrictions, the researchers needed to reflect and flexibly change direction. Strategies were formulated that became part of the decolonising approach. This ensured that the program continued to be implemented according to the needs of the Elders and their communities. Successful communication and engagement strategies such as the Facebook online group in the metropolitan group, allowed Elders to take ownership of the program and continue to lead. Ensuring that they did not lose faith, confidence, motivation, and commitment to engaging in the program was a risk. Therefore, putting a support plan in place to keep spirits and morale high throughout the lockdown period was integral to success. The regional support workers undertook a home visit through the regional Aboriginal controlled organisation to provide small "support" parcels containing items such as hand sanitisers. In the metropolitan group, phone calls, even Zoom meetings and Facebook texts were options used to ensure consistent communication and support were maintained.

7.4 Strengths of the Research

Findings from this research can inform research worldwide of important principles that should be applied to successfully engage with older Aboriginal people, regarding their health care. This includes privileging local leadership and local community consultation. Overall, a key strength of the research was that it used an Indigenous 'ways of working' framework that took into consideration the impacts of a colonising history and social determinants of health (19, 25, 26). The research procedure recognised the need for flexibility and for change when necessary, therefore it was not rigid or formal. This approach was steadily maintained throughout the two-year program. Yarning circles were complementary to the PA and were an appropriate way to recognise diversity, respecting and listening to the different voices.

Working from a personal ethical basis, the student researcher developed, a strong ethical framework (see Chapter 2, Figure 2.2) to follow, that was based on the national ethical framework for conducting research with Aboriginal and Torres Strait Islander people (20). This was supported by the student researcher's diary which was kept throughout the research. The diary created an audit trail which aimed to strengthen credibility and assisted the researcher to take a reflexive approach (27, 28).

Relationships were the most important aspect of the research (26, 29, 30). The student researcher built strong relationships through her connections to the community and respected and honoured all the Elders as community leaders. The student recognised the importance of listening and learning from each Elder as they spoke to gather the rich data that could inform the results of the research. These relationships underpinned the research from start to completion.

Applying a decolonising approach throughout the research was fundamental to the success of the program. This commenced with timely and respectful communication and engagement with each Elder on Noongar Boodja (19, 31). Using a strengths-based approach to privilege local Aboriginal knowledge and ways of working rather than western knowledge and constructs (25) was foundational to this approach (see Chapter 2, Fig 2.2). This was exemplified by debriefing after local community events. Allowing Elders to voice their perspectives was an integral part of the research. Being able to acknowledge each Elder's contribution to the research through reciprocity was another important part of the PA program and this was applied during interviews with each Elder. During the COVID lockdown period each Elder was provided with a voucher to support their time and travel and provided with morning tea, light lunch or coffee depending on the interview time and location.

In the systematic review (Chapter 3) a strength of the research was using the QAT (11), which is a tool that uses an Indigenous lens to evaluate the quality of the research. For example, the QAT appraised whether the study included community engagement and Indigenous leadership. Indigenous perspectives of barriers and enablers were identified and synthesised rather than Western perspectives of barriers and enablers to PA.

For the qualitative research (Chapters 4 and 6) a bracketing process was applied that enabled the Elders voices to be heard and not over-clouded by the student researcher's preconceptions (see section 2.5.1) (27, 32). Data collection and analysis used diverse points for credibility, such as collection of data from qualitative interviews from Elders and key stakeholders, diary notes, weekly feedback forms, and feedback in the yarning circles. The student researcher led the analysis with the aim of ensuring that an Aboriginal perspective was primary to the analysis, and senior Aboriginal researchers were asked to confirm codes and themes. For the quantitative research (Chapter 5) validated assessment tools were chosen to evaluate health outcomes. Building relationships within the team was important (29, 30). Mentorship and supervision by MK, JC, AMH for the student researcher was provided throughout the challenging aspects of the research with the

Elders. This support enabled the student to continue to build relationships that were strong and remained intact.

A final strength of the research was the development of a strategy that aimed to ensure the survival of the PA program during and after the COVID-19 pandemic restrictions. It was important to encourage and support the Elders to return to the PA program after some had reported bouts of depression, illness, and long-term hospitalisations. Elders were eager to return and get involved in the PA, as evidenced by their participation in the 24-month evaluation because they experienced a range of holistic benefits.

7.5 Limitations and Challenges of the Research

In the systematic review (Chapter 3), we found that studies in Australia did not always focus on older Aboriginal and Torres Strait Islander people. More broadly Indigenous studies worldwide that were included in the review were not often led by Indigenous researchers. Therefore, because there were limited evaluations about PA programs for older Indigenous people the findings had some limitations. The Ironbark PA program (designed and first delivered in NSW) was chosen to be translated into WA for older Aboriginal people living on Noongar Boodja. More programs would be helpful to provide more choice for Elders and communities in WA and in Australia about what type of programs could be useful and there needs to be more evaluation to compare these PA programs There were very few men who participated in the Ironbark PA program, as discussed in Chapter 6 (see section 6.3.6). It was a limitation to the findings and throughout the project it was a challenge to encourage men to be involved in the program.

COVID-19 Pandemic

There were setbacks to the consistency of the PA program when the COVID-19 pandemic caused restrictions, and in some cases, severe social restrictions, meaning the program could not be delivered for approximately six months. New public health safety regulations were in place after the COVID-19 lockdown was lifted. Some Elders did not return to the program after this lockdown period, either because they had passed on, developed severe depression, or lost motivation.

We were unable to collect data that measured the amount of home exercises that Elders completed. It could be that moderate levels of physical activity if measured may have shown changes. The weekly program focused more on strength and balance and the Elders were encouraged to do other moderate PA, such as walking, at home. The researchers had limited capacity to support the Elders to record all their activity or wear

an activity device, such as a smart watch, that could record activity. However, Elders reported that they did exercises at home and were very positive about having a HEP to complete (see Chapter 4). We did not re-assess Elders when they returned to the program at the 18 months stage (see Chapter 5), to determine what functional decline may have occurred. This was because we tried to recommence the program with the Elders with as few barriers and challenges as possible.

A few Elders did not want to formally enrol in the program or provide feedback, but they continued to attend the program from time to time. It would have been valuable to have been able to measure the changes they made from participation and receive their perspectives, but we respected their and privacy and their decisions. Respect for the Elders meant we also needed to be supportive and understanding about circumstances that prevented some Elders from engaging consistently in the program.

Finally, there were frequent changes to the team of workers in both sites throughout the trial, and those who left were not available to give their feedback during Study 4 (Chapter 6). While this was a limitation it was also a strength because some of these staff went onto other jobs, which was due in part to the experience gained by working with our team. Therefore, some key members of the team who assisted during the initial stages through the first 12 to 18 months of the program were not available to be interviewed. These changes are to be expected within Aboriginal health service delivery due to pressures of community needs and limited capacity to support multiple programs that exist. Skilled workforce and resources are stretched to their limits and programs may be inadequately resourced. Unfortunately, this meant that the capacity to incorporate the PA program into the two health care providers' service delivery ceased. However valuable conversations and further opportunities have emerged, and the research team continue to work to sustain the program in the communities.

7.6 Recommendations of the Research

This research was a valuable opportunity to gain wisdom from the older Aboriginal people and communities, (including staff on the research team), who engaged in the Ironbark PA program. There were noteworthy recommendations that can inform future research and should be shared to benefit others seeking to design or offer a PA program within Indigenous populations. While each Boodja will be different, some principles can be a source of learning for other communities. Working with older Aboriginal and Torres Strait Islander people to deliver a PA program is not just about PA. It is about the Elders'

life experiences, their family relationships, their communities and most importantly co-creation of a program that gives them a sense of belonging and ownership. Although there are many PA programs worldwide these recommendations below are my learnings from working with Elders about what is needed to create an environment for older Indigenous people to engage in PA programs.

- *Indigenous methodology* means to be able to work with knowledge and understanding about social determinants of health and negative effects of a colonising history on older Aboriginal and Torres Strait Islander peoples. It is critical to understand that many of the Elders are coming from a *traumatic background* where colonisation has meant the systemic introduction of discriminatory Acts that perpetuate racism and family trauma. One example is the 1905 Act, that created the 'Stolen Generations' of which many Elders today, including some of the participants in my research have survived (33).
- *Undertaking community and service provider consultations* with key people and groups can take several years. We found that it is not easy to get an Elders' group together. A working partnership is required, that will address the needs of the Elders' group, and this involves building relationships with the communities.
- *Creating a sense of inclusiveness* comes from an environment that is welcoming and comfortable. This will be successfully achieved if it combines two key recommendations – applying an Indigenous methodology and making the program suitable to the needs of the Elders by listening to their voices.
- Creating a *terms of reference* that will allow all Elders to work side by side with each other and with the researchers and health professionals – this means simple "house rules" that the Elders all agree to work with.
- The PA program being *tailor-made* to suit requirements of Elders. In our research this included incorporating music chosen by Elders, being able to provide individual advice to participant about their exercises and general health when necessary, choosing small components of the PA program to begin with and slowly adding other exercises when participants felt more confident.
- *Local leadership*. We respected Elders' leadership by providing opportunities to be involved in leading yarning circle discussions and doing a Welcome or Acknowledgement to Country when commencing program sessions (depending on if they were from the Boodja where the PA program was being conducted). We also respected the Elders' wishes if they choose not to do this. We always asked each Elder to introduce themselves and asked weekly if there was any topic they might want discussed during the yarning circles.

7.6.1 Implications for Policy and Practice

Decolonising methods included listening to Aboriginal and Torres Strait Islander voices and supporting the Aboriginal and Torres Strait Islander leadership. Understanding the importance of privileging Indigenous ways of working and ensuring cultural safety and security were the foundations from which this PA program and my research was built (19, 26, 29). Our research recommends this approach be used by all health service providers who work with older Aboriginal and Torres Strait Islander people.

Although the size of two Elder's groups was relatively small compared to large public PA programs (such as local park walking), it was appropriate for the Elders who participated in the program. Elders felt less intimidated and were able to receive more personal and tailored assistance as they engaged in the PA program. Older Aboriginal and Torres Strait Islander people have specific needs to manage their health in a culturally safe and supportive setting. Small groups may take more resources, but Elders can then make good improvements, and, in our program, they kept attending.

Adequate funding and other resources are needed when unexpected challenges arise when working with older Aboriginal and Torres Strait Islander people. Examples of challenges during our PA program were ill-health, family deaths, hospitalisations, dialysis treatments, transport, costs, needing healthy food and feuding. At these times, extra resources, are required to be able to provide adequate support for staff and participants. One difficult challenge arose when the COVID-19 pandemic lockdown happened in 2020. This affected all Elders who had to self-isolate at home for six months and were unable to attend the PA program. Extra resources were needed to support the Elders at home, including resources to keep the Elders motivated and committed to home exercises and looking after their health. Providing enough resources and funding to adequately build partnerships that can consistently sustain unexpected challenges and complexities of working with older Aboriginal and Torres Strait Islander people, is critical to promote sustainability.

This gap is also evident in hospital settings and non-Aboriginal medical centres. There is strong evidence in Australia and other colonised countries that Indigenous people are often ignored, not consulted about the design of health services, are not able to access appropriate health care services and are subjected to racism (22, 34, 35, 36). Acknowledgement of cultural differences provides a path to open and transparent service delivery and understanding the importance of affirming Aboriginal Elders' voices, is a positive step towards a foundation built from respect, trust, and cultural integrity (20). The

lessons learned from this research are valuable to inform future development of PA programs with older Indigenous peoples worldwide. Each Indigenous Elder's group will be different but, knowing and understanding this way of working will succeed in diverse groups of Indigenous Elders if the content suits the needs of the community and is built around the cultural heritage of the Elders involved.

An important finding of this thesis highlights that programs for older Aboriginal men need to be prioritised. Existing health care and health promotion programs should include separate focus on older Aboriginal men, to provide suitable programs that they feel comfortable to attend. Additionally, findings showed that Elders need small groups and close support to engage in PA. There are many existing PA programs for older people in WA and nationally, but these may not be programs that Elders feel comfortable to attend.

7.6.2 Implications for Future Research

Ongoing disparities in health within older Aboriginal and Torres Strait Islander communities and other Indigenous communities worldwide are perpetuated by scant access to suitable PA programs (37, 38). Therefore, this area of health research needs to be further advanced to better articulate and understand the 'ways of working' frameworks and develop decolonised models of engagement, to work with older Aboriginal and Torres Strait Islander people to become more active.

Senior Aboriginal researchers who have cultural knowledge of 'ways of working' with Elders and academic understanding can provide mentorship and impart wisdom to assist early career researchers through difficult stages of research. Mentorship and wisdom were provided to the student researcher from MK and JC (on the research team), and this knowledge and support assisted the student researcher to navigate through the research.

Further research is required to understand how to decolonise research practice such that Aboriginal and Torres Strait Islander communities can lead and direct research and benefit from any research that they undertake. Decolonising methods of research that apply the local 'ways of working' with older Indigenous people needs to be further explored, and more researchers need to learn how to take this approach. This is the only way to guarantee success. This should be applied to PA research. The benefits of PA for all age groups, including older adults, is well established (2,3), therefore more resources and focus on decolonisation of this area of research is needed.

Future research should focus on using a holistic approach. Although the Elders improved markedly in the physical function, Aboriginal people have a holistic perspective

about health. Therefore programs could be designed to include PA, dietary programs, mental health interventions, trauma support and accommodate a broader range of chronic conditions. A ‘one stop shop” where Elders can meet for this type of program could significantly improve Elders’ health and well-being. This would also have a positive impact on Elders’ communities.

Adequate funding is needed to scale up culturally appropriate PA programs, for example by offering more than one day a week of PA, to enable Elders to have a choice of two days rather than miss out because of hospital appointments. Strategies to engage men in PA would require more resources. This includes financial support as well as male health workers’ involvement to encourage men to engage in PA.

Further training programs focussed on yarning circles and impacts of history on older generations to help increase the number of Aboriginal health workers to deliver these programs is required. Service providers were not willing to continue delivering the Ironbark PA program unless funding was provided to them to do so. While this was a disappointing outcome, Aboriginal Health organisations have funding limitations as in all areas of health. Therefore, more funding should be dedicated to providing Elders with ongoing PA programs after the research has been completed. Finally, transportation and low cost of delivering a PA program to Aboriginal Elders should be a part of the dedicated funding into the future. This would encourage more Elders to become a part of a PA program and to adopt healthy behaviours if they can continue on with PA.

7.7 Conclusion

My research, which focused on translating and evaluating the Ironbark PA program, was delivered on Noongar Boodja by Aboriginal people for Aboriginal people. It was an Aboriginal led PA program, supported by non-Aboriginal researchers. It is well understood that regularly engaging in physical activities will maintain and improve your health and well-being, particularly as you age. Barriers and enablers were addressed throughout the program to allow successful engagement with a culturally diverse group of Aboriginal Elders living on Noongar Boodja at the time. Through the lens of the participants, we were fortunate to see a clear picture of how a PA program can be successfully delivered.

Decolonising concepts of PA are part of enabling success to build sustainable, culturally appropriate PA programs. Continuing this work is a priority to increase the availability of suitable PA programs for older Aboriginal and Torres Strait Islander

peoples. Successful PA programs for older Aboriginal and Torres Strait Islander people prioritise building relationships. Working closely with Elders and their communities and accepting leadership from the Elders, helps researchers and health professionals to build stronger relationships and develop more culturally appropriate PA programs. Including Elders in the planning of the Ironbark PA program led to sustained engagement in the program, which then had a positive impact on their health and well-being.

This research was a collaborative effort that provided the researcher with a deep perspective of the challenges and benefits that presented throughout the program. Overcoming barriers to PA leads to far-reaching benefits, because the holistic changes that the Elders made continue to impact on them in positive ways today.

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APPENDICES

Appendix A Signed Acknowledgements of Co-Author Contributions

A.1 Publication 1 (Chapter 3)

Reference

Gidgup, M.J.R., Kickett, M., Weselman, T., Hill, K., Coombes, J., Ivers, R., Bowser, N., Palacios, V., Hill, A-M. (2022)
Barriers and enablers to Older Indigenous People Engaging in Physical Activity – A Qualitative Systematic Review. Journal of Aging and Physical Activity. 2022;30(2):340-352.
https://doi.org/10.1123/japa.2020-0465

Contributor Acknowledgements

	Conception and design	Acquisition of data and method	Analysis & statistical method	Interpretation & discussion	Final approval
Gidgup, M.J.R.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Kickett, M.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Weselman, T.	-	x	-	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Hill, K.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Coombes, J.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Ivers, R.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Bowser, N.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Palacios, V.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Hill, A.-M.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	

A.2 Publication 2 (Chapter 4)

Reference

Gidgup, M.J.R., Kickett, M., Hill, K., Francis-Coad, J., Weselman, T., Coombes, J., Ivers, R., Bowser, N., Palacios, V., Hill, A-M. (2022) Connecting and reconnecting to a community, with a sense of belonging – Exploring Aboriginal Elders' perspectives of engaging in a physical activity program. Health Promotion Journal of Australia. 2022;33:138-149. https://doi.org/10.1002/hpja.582

Contributor Acknowledgements

	Conception and design	Acquisition of data and method	Analysis & statistical method	Interpretation & discussion	Final approval
Gidgup, M.J.R.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Kickett, M.	-	-	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Hill, K.	x	-	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Francis-Coad, J.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Weselman, T.	-	x	-	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Coombes, J.	x	-	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Ivers, R.	x	-	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Bowser, N.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Palacios, V.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Hill, A.-M.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	

A.3 Publication 3 (Chapter 5)

Reference

Gidgup, M.J.R., Kickett, M., Jacques, A., Weselman, T., Hill, K. Coombes, J., Ivers, R., Bowser, N., Palacios, V and Hill, A-M. (2022) Translating and Evaluating a Physical Activity Program for Aboriginal Elders on Noongar Boodja (Country) - A Longitudinal Study. Frontiers in Public Health. 2022;10:904158. Doi: 10.3389/fpubh.2022.904158

Contributor Acknowledgements

	Conception and design	Acquisition of data and method	Analysis & statistical method	Interpretation & discussion	Final approval
Gidgup, M.J.R.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Kickett, M.	-	-	-	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Jacques, A.	-	-	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Weselman, T.	-	-	-	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Hill, K.	-	-	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Coombes, J.	x	-	-	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Ivers, R.	x	-	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Bowser, N.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Palacios, V.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Hill, A.-M.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	

A.4 Submitted Article (Chapter 6)

Reference

Gidgup, M.J.R., Kickett, M., Francis-Coad, J., Hill, K., Umbella, J., Coombes, J., Ivers, R., Bowser, N., Palacios, V and Hill, A-M. (2022) 'Nih Waangkiny Kaadatjiny – Listening learning and knowing'. Stakeholders' perspectives about barriers and enablers to delivering a physical activity program for older Aboriginal people. *Under review at journal.*

Contributor Acknowledgements

	Conception and design	Acquisition of data and method	Analysis & statistical method	Interpretation & discussion	Final approval
Gidgup, M.J.R.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Kickett, M.	-	-	-	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Francis-Coad, J.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Hill, K.	x	-	-	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Umbella, J.	-	-	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Coombes, J.	x	-	-	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Ivers, R.	-	-	-	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Bowser, N.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Palacios, V.	-	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	
Hill, A.-M.	x	x	x	x	x
I acknowledge that these represent my contribution to the above research output.			Signed:	Signature Redacted	

Appendix B WAAHEC HREC 842 Approval

23rd May, 2018

Dear Ann-Marie,

HREC Reference number: 842

Project title: The Ironbark Program: Older Aboriginal People Standing Tall and Strong

Thank you for submitting the above research project which was considered by the WAAHEC at the meeting held on 22nd May, 2018. I am pleased to advise that the WAAHEC has reviewed and approved the following documents for use in this project:

Document(s):

- WAAHEC Application Form
- Study Protocol Version 1.0
- Appendix 1 – Values and Ethics Statement
- Appendix 2 – Outcome Measures
- Participant Feedback Questionnaire
- Assessment of Quality of Life
- Timed up and Go
- Appendix 3 – Home Exercises and Fall Diary
- Appendix 4 – Topics Guide Participants
- Appendix 5 – Topics Guide Stakeholder
- Appendix 6 – Recruitment Poster
- Appendix 7 – Participant Information Statement
- Appendix 8 – Participant Informed Consent Form
- Appendix 9 – Ironbark Program Exercise Manual
- Letter of support, Derbarl Yerrigan Health Service
- Letter of support, North Metro
- Letter of support, SWAMS
- Letter of support, Public Health Ambulatory Care

The WAAHEC has granted approval of this research project from date of the meeting held, pending your agreement of the following conditions:

450 Beaufort Street, Highgate WA 6003 / PO BOX 8493, Stirling Street, Perth WA 6849
Phone: (08) 9227 1631 Fax: (08) 9228 1088 Email: ethics@ahcwa.org Web: www.ahcwa.org
ABN: 48 114 220 478 ACN: 114 220 478

1. **Conditions**

   The WAAHEC will be notified, giving reasons, if the project is discontinued before the expected date of completion.

- The coordinating Investigator will provide a Progress Report every 30th June each year in the specified format. This form can be found on the AHCWA website (www.ahcwa.org).
- The approval for studies is for three years and the research should be commenced and completed within that period of time. Projects must be resubmitted if an extension of time is required.
- Publications that arise from this research are to be provided to the WAAHEC for review prior to submission for dissemination.
- That the Aboriginal and Torres Strait Islander community are formally acknowledged for their contribution to this research project.

Amendments

- If there is an event requiring amendments to be submitted you should immediately contact ethics@ahcwa.org for advice.

Should you have any queries about the WAAHEC's consideration of your project please contact ethics@ahcwa.org.

The WAAHEC wishes you every success in your research.

Kind regards

Signature Redacted

Tara Rowe
For, Vicki O'Donnell
Chair, WAAHEC

450 Beaufort Street, Highgate WA 6003 / PO BOX 8493, Stirling Street, Perth WA 6849
Phone: (08) 9227 1631 **Fax:** (08) 9228 1088 **Email:** ethics@ahcwa.org **Web:** www.ahcwa.org
ABN: 48 114 220 478 ACN: 114 220 478

Appendix C Curtin HREC Reciprocal Approval

Office of Research and Development

GPO Box U1987
Perth Western Australia 6845

Telephone +61 8 9266 7863
Facsimile +61 8 9266 3793
Web research.curtin.edu.au

05-Jul-2018

Name: Anne-Marie Hill
Department/School: School of Physiotherapy and Exercise Science
Email: Anne-Marie.Hill@curtin.edu.au

Dear Anne-Marie Hill

RE: Reciprocal ethics approval
Approval number: HRE2018-0425

Thank you for your application submitted to the Human Research Ethics Office for the project The Ironbark Program: Older Aboriginal People Standing Tall and Strong.

Your application has been approved by the Curtin University Human Research Ethics Committee (HREC) through a reciprocal approval process with the lead HREC.

The lead HREC for this project has been identified as Western Australian Aboriginal Health Ethics Committee.

Approval number from the lead HREC is noted as Reference Number 842.

The Curtin University Human Research Ethics Office approval number for this project is **HRE2018-0425**. Please use this number in all correspondence with the Curtin University Ethics Office regarding this project.

Approval is granted for a period of one year from **05-Jul-2018** to **22-May-2021**. Continuation of approval will be granted on an annual basis following submission of an annual report.

Personnel authorised to work on this project:

Name	Role
Hill, Anne-Marie	CI
Kickett, Marion	Co-Inv
De Jong, Lex	Co-Inv
Hill, Keith	Co-Inv

You must comply with the lead HREC's reporting requirements and conditions of approval. You must also:

- Keep the Curtin University Ethics Office informed of submissions to the lead HREC, and of the review outcomes for those submissions
- Conduct your research according to the approved proposal

- Report to the lead HREC anything that might warrant review of the ethics approval for the project
- Submit an annual progress report to the Curtin University Ethics Office on or before the anniversary of approval, and a completion report on completion of the project. These can be the same reports submitted to the lead HREC.
- Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
- Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
- Data and primary materials must be managed in accordance with the Western Australian University Sector Disposal Authority (WAUSDA) and the Curtin University Research Data and Primary Materials policy
- Where practicable, results of the research should be made available to the research participants in a timely and clear manner
- The Curtin University Ethics Office may conduct audits on a portion of approved projects.

This letter constitutes ethical approval only. This project may not proceed until you have met all of the Curtin University research governance requirements.

Should you have any queries regarding consideration of your project, please contact the Ethics Support Officer for your faculty or the Ethics Office at hrec@curtin.edu.au or on 9266 2784.

Yours sincerely

Catherine Gangell
Manager, Research Integrity

Appendix D Researcher Diary Pages

Note:

Interviews of Elders/Bunbury

Some of the Interviews were not easy to achieve.

Finding the time during the whole 2 hour Ironbark Session was sometimes difficult to navigate through with a final 15-20 mins to be interviewed.

Reasons for this are:

1. Not wanting to miss out on YC discussions
2. Guest Speakers
3. Having to rush off early before YC is completed thus preventing Researcher from conducting their interview

Other reasons are:

1. The Health Service Provider host for the IB/Bunbury felt that Interviews should not be conducted during YC's, but at the end.
2. Not enough time allocated to Interviews - in hindsight IB/B + M/IB sessions could have been better planned 2 hrs for exercise + YC + half hour for interviews

Researcher felt that the Health Service Provider/B could have assisted supported the data collection more - but this was not a process that was thought about properly or appropriately at the beginning of the IB in Bunbury - A year into the Exercise Group Sessions barriers got in the way of holding successful YCs. Without giving too much away Blame for not having proper/successful YCs were pointed at the Uni + especially towards the Phd Researcher who is an Aboriginal person. Some of the reasons that the YCs were not easy to do for the SWAMS/health service providers staff was due to:

1. Inexperiences
2. Lack of Understanding of YCs
3. Younger AHWs + Non aboriginal AHWs, not too knowledgible re: YCs etc.
4. Disempowerment of AHWs - YCs Elders Group was lead by a non-aboriginal Coordinator - who had very little

2

K - I attended at Mirrabooka / instead of Bunbury today!

Jasmin - student was here today - she spent more time talking to Vanessa - she did exercise routines with Elders - stretching, lay down + shake + getting up. Jasmin joined in with the whole exercise routine she didn't stay for the YC.? Is Jasmin one of the students (Akari).

Shannon, KL + KW + Josephine (NMHS)

Elders: Elaine, Natasha, Barbara T, Dawn Gildchrist

me in just as YC commenced.

she has managed to lose weight / due to very high blood pressure is now 87 kilos) she hasn't really done a diet.
e is still doing her walking + bouncy exercises at home.
, looked very fit + active - she left early for a meeting Nadyla Centre

who owned everyone about a (Walk for Jess) coming up
with Vilma (NMHS) about the Walk info for Centre Elders.

People want to feel more up and at it, people may not feel like going out

MG: Yeah there's so many different reasons I guess, there's a

Nicole: whole range - you've got some pretty good answers here for that Q, I had to put that Q in there because it kept coming up

Nicole: I can't think of any others, so that's all they've been told

MG: And I think that's also what Elders have been telling me when

"Here's Q 1 - Why is IB important for Elders in Bunbury?

Janine:

I've interviewed them, some of the reasons, they haven't come all the time, they've had to go to Perth, um Drs treatments appointments or someone's passed away and they're had to travel and a lot of other things happening on Tuesdays as well,

Nicole: Yeah I think there's a bit of

MG: They don't always have the choice they have to go to somethy else on a Tues.

Nicole: There's an Elders Meeting once a month on Tues, that has kept people from coming, but to be honest the other month Wed at the Bethanie Centre, the Crew meet up and there's a few people who didn't do that as well, so Mon + Tues didn't do good Thurs, like the Men's Group meet like all there's a workshop, the art gallery, you know there's quite a few

MG: Lots of things going on, that's great

Nicole: so there's lots happening but it sometimes means that Tues is the best day and at the end of the day Fri is no good um for Cultural Reasons and then we ask for Mel . she is spread across the clinic and we have outreach clinics on multiple days, you know we have Outreach Clinic Mon-Fri in Town, some a couple of days travel and Tues is the quietest day at the Clinic, but

MG: So that's why

Nicole - but at the end of day it's not to waste [illegible]

Appendix E Group Rules and Agenda (Chapter 2)

TERMS of REFERENCE – Ironbark group rules

Ironbark - Agenda

10.00am	Introductions
10:05am	Walk around the block (10 mins)
10.15am	Exercise session (35 mins)
10.50am	Light snack and refreshments
11.10am	Yarning session
12.00pm	Close of session

Ironbark Group - Terms of Reference

1. Respect for each other, staff and guests
2. Mobile phones are on silent, leave the room if you need to talk on the phone
3. Participate in the exercise session, wear appropriate footwear and clothing
4. Participate in yarning circle, only one person talking at a time and be respectful
5. Ironbark is not a time for discussions about SWAMS. If you have any feedback about SWAMS please ask staff for a feedback form.

South West AMS Aboriginal Medical Service
Our Health, Our Way

Curtin University

Appendix F Mirrabooka Newsletter

Curtin University

Healthway Ironbark Update December 2019

Healthway Ironbark Program Newsletter

Mirrabooka

Government of Western Australia
North Metropolitan Health Service
Mental Health, Public Health and Dental Services

South West AMS

Kiya, Wundoo Wundoo (Hello and Welcome)

We would like to acknowledge Wajak Noongar Country that we are standing on and pay our respects to our leaders Past, Present and Emerging

In the South West of Western Australia there have been few physical activity programs for Aboriginal Elders. The **Healthway Ironbark Project** being conducted at two different sites, Bunbury and Mirrabooka, with Male and Female Elders from those areas has reached the **1 year milestone**. The program has been very successful and we are all noticing wonderful improvements and changes. ***Congratulations*** **to ALL of our program participants for their hard work and leadership**! Ironbark Mirrabooka is very grateful for the support and leadership of its Advisory Group members, Carolyn Lewis, Sharon Kenney, Cheryl Smith, Mark Griffin, Anne Garlett, Jane Jones, David Burns-Wallace, Danika Eades and Karen Roberts, as well as our partners: WADJAK Aboriginal Community Centre and the City of Stirling: Herb Graham Recreation Centre in particular.

Summary Report The program has been operating for 1 year in Mirrabooka –starting at the Wadjak Northside and then moving to Herb Graham Centre as we grew. All participants have made noticeable improvements in their physical ability. The team physiotherapist has noted that participants' walking has improved, their strength is also improving and the group has even improved their balance so much they are able to undertake some dance moves! Importantly many participants report that the two biggest successes of the program are they are able to get out of the house more and have increased social activites. This has been very positive as participants have reported that they feel a sense of inclusiveness and connectedness developing within the group and the community. **Anne-Marie Hill (Curtin Physiotherapist)**

- There were 35 participants who attended the Mirrabooka program for 2019
- Each class had an average of 7 people
- Overall we had over 290 attendances!
- About 1/4 of our participants attended 13 or more sessions
- The average age of our participants is 64 years
- Participants at 6 months reporting they enjoyed the program and found it culturally appropriate =100%
- Participants reporting an increase in their knowledge about falls = 100%

"It looks hard to do but it's not"

"My balance has improved remarkably. A couple of months ago, I was walking down some steps when I felt myself falling forward. I quickly assessed the situation inside of my head, saying to myself, I'm not going to fall left or right, I'm just going to sit down, and down I went on my bottom. My quick thinking saved me from falling"

"Yeah, sure, because I definitely see people coming together more, I think I see people feeling a bit more confident, a bit more empowered too, to take care of all of their health which is a good thing" (Health Worker)

6 Month Report

Seven participants have now completed their full 6 month evaluation and have significantly improved their ability:
Timed up and go test – standing walking from chair and turning = all improved
Chair stand test – getting out of chair with no arms = all improved
Examples - Participant 1: taking 29 seconds to stand up 5 times - after 6 months = 12 seconds
Participant 2: taking 19 seconds to walk and turn 3 meters – after 6 months = 8 seconds
We look forward to more strong results like these. ***Congratulations*** *to all our Elders!*

Healthway Ironbark Project – who are we? Partners: In December 2018 we commenced a project that is implementing and evaluating a physical activity program for Aboriginal Elders – The Healthway Ironbark project funded by a grant from Healthway. We are excited to reach our 1 year milestone! The Ironbark Program is a culturally safe and appropriate physical activity program developed with extensive consultation with NSW Elders and their Communities. Our project team consists of Curtin University (Centre for Aboriginal Studies and School of Physiotherapy and Exercise Science), South West Aboriginal Medical Service, North Metropolitan Public Health Unit, The George Institute for Global Health, Western Australian Department of Health, and Injury Matters. The aim of this research is to evaluate the effect of providing the Ironbark program on the health and well-being of older Aboriginal people in WA.

Meet some of our Healthway Ironbark Team ☺

Ms Karen Williams *Project Officer* Curtin University. Karen is a key member of the Ironbark team helping to bring everyone together and making them feel welcome. Karen has lots of experience working with communities and brings this to Ironbark in the yarning circles.
Ms Vilma Palacios *Co-ordination of* Public Health North Metropolitan Health Services.
Mrs Stephanie Fullarton *Senior Physiotherapist* Curtin University. Steph is a physiotherapist with high levels of experience in leading group exercise. With passion and enthusiasm she leads the team on their fitness journey.
Professor Marion Kickett *Director* Centre for Aboriginal Studies, Curtin University
Professor Anne-Marie Hill *Research Physiotherapist* Curtin University
Ms Karen Levit *Project Officer* Curtin University. Karen is an important member of the Ironbark team, providing catering, venue preparation as well as lots of work behind the scenes working with the research data.

PhD Student Report Hi I'm **Margaret** the PhD student and researcher for the Ironbark Program. I am a mother, grandmother and great grandmother with 23 grand and great grandchildren. Yet you might ask why have I left study opportunities until I am 60? Good question, it is because all of my concerns and worries for my family have now settled down to a point where I can now focus on me and my needs and I always wanted to go back and study. I completed a Bachelor of Applied Science in Community Health in 2008 here at Curtin University. All of the work roles that I have had in the past were about Aboriginal people and their health. Since November 2018 I have been travelling down to Bunbury Ironbark Elders' Group and to Mirrabooka Elders' Group. Success is noticeable and very visible, with some of the Elders being able to walk more confidently. Not only has their confidence in walking improved, but their faces are glowing and that is visible to all who see them. I have commenced interviewing Elders to gain their feedback about the program and have been doing this at both sites. As well as completing interviews I am in the middle of completing my own Literature Review Protocol for the Ironbark Research Project so it is very busy times right now, but it is absolutely awesome.

Appendix G Supplementary Files (Chapter 3)

List of Supplementary Tables

Table s1

Search Strategy Medline February 2021

▼ Search History (8)

# ▲	Searches	Results	Type
1	Indigenous Peoples/	398	Advanced
2	Oceanic Ancestry group/	10658	Advanced
3	exp American Native Continental Ancestry Group/	21804	Advanced
4	Indians, North American/ or Indigenous Peoples/ or Canada/	108372	Advanced
5	1 or 2 or 3 or 4	125111	Advanced
6	exp Exercise/	205039	Advanced
7	5 and 6	1484	Advanced
8	limit 7 to (("middle age (45 to 64 years)" or "middle aged (45 plus years)" or "all aged (65 and over)") and english)	625	Advanced

Table s2

List of excluded studies (after reading full text)

1	Akande, V., Ruiter, R. A. C., Kremers, S. P. J. (2019). Environmental and motivational determinants of physical activity among Canadian Inuit in the Artic. *International Journal of Environmental Research and Public Health* 16:2437 doi:10.3390/ijerph16132437 **No barriers and enablers**
2	Beckett, M., Firestone, M. A., McKnight, C. D., Smylie, J., Rotondi, M. A. (2018). A cross-sectional analysis of the relationship between diabetes and health access barriers in an urban First Nations population in Canada. *British Medical Journal Open* 8:e018272 doi:10.1136/bmjopen-2017-018272 **Not about physical activity**
3	Brunet, S., Plotnikoff, R. C., Raine, K., Courneya, K. (2005). Physical activity of Aboriginals with type 2 diabetes: An explanatory study. *Ethnicity and Disease* 15(2):256-266 **No barriers and enablers**
4	Canuto, K., Cargo, M., Li, M., D'Onise, K., Esterman, A., McDermott, R. (2012). Pragmatic randomised trial of a 12-week exercise and nutrition program for Aboriginal and Torres Strait Islander women: Clinical results immediate post and 3 months follow-up. *BMC Public Health* 12(1):933. doi:10.1186/1471-2458-12-933 **No barriers and enablers**
5	Canuto, K. J., Spagnoletti, B., McDermott, R. A., & Cargo, M. (2013). Factors influencing attendance in a structured physical activity program for Aboriginal and Torres Strait Islander women in an urban setting: A mixed methods process evaluation. *International Journal for Equity in Health* 12(1):11 doi:10.1186/1475-9276-12-11 **Unable to extract data for older participants**
6	Coble, J. D., Rhodes, R. E., Higgins, J. W. (2009). Physical activity behaviors and motivations in an adult First Nation population: A pilot study. *Ethnicity and Disease* 19:42-48 **Unable to extract data for older participants**
7	Deverall, E., Kvizhinadze, G., Pega, F., Blakely, T., Wilson, N. (2019). Exercise programmes to prevent falls among older adults: modelling health gain, cost-utility and equity impacts. *Injury Prevention* 25:258–263 doi:10.1136/injuryprev-2016-04230 **No barriers and enablers**
8	Eyler, A. A., Brownson, R. C., Donatelle, R. J., King, A. C., Brown, D., Sallis, J .F. (1999). Physical activity social support and middle and older aged minority women: Results from a US survey. *Social Science & Medicine* 49:781-789 **No barriers and enablers**
9	Foulds, H. J. A., Bredin, S. S. D., Warburton, D. E. R. (2011). The effectiveness of community based physical activity interventions with Aboriginal peoples. *Preventive Medicine* 53(6):411-416 doi:10.1016/j.ypmed.2011.09.008 **No barriers and enablers**
10	Grunseit, A. C., Bohn-Goldbaum, E., Crane, M., Milat, A., Cashmore, A., Fonua, R., Gow, A., Havrlant, R., Reid, K., Hennessey, K., Firth, W., & Bauman, A. (2019). Participant profile and impacts of an Aboriginal healthy lifestyle and weight loss challenge over four years 2012-2015. *Australian and New Zealand Journal of Public Health* 43(4):328-333 doi:10.1111/1753-6405.12914 **Unable to extract data for older participants**

11	Hamilton, S., Mills, B., McRae, S., Thompson, S. (2018). Evidence to service gap: Cardiac rehabilitation and secondary prevention in rural and remote Western Australia. *BMC Health Services Research* 18:64 doi:10.1186/s12913-018-2873-8 **Not indigenous focused**
12	Held, M. B. E. (2019). Decolonizing research paradigms in the context of settler colonialism: An unsettling, mutual, and collaborative effort. *International Journal of Qualitative Methods* 18: 1–16 doi:10.1177/1609406918821574 **Not about physical activity**
13	Ho, L., Gittelsohn, J., Sharma, S., Cao, X., Treuth, M., Rimal, R., Ford, E., Harris, S. (2008). Food-related behavior, physical activity, and dietary intake in First Nations: A population at high risk for diabetes. *Ethnicity & Health* 13(4):335-349 doi:10.1080/13557850701882936 **No barriers and enablers**
14	Hu, J., Basit, T., Nelson, A., Bartlett, A. (2019). Changes in exercise capacity and anthropometric measures after Work It Out – A holistic chronic disease self-management program for urban Aboriginal and Torres Strait Islander people. *Public Health* 174:49-55 doi:10.1016/j.puhe.2019.05.035 **No barriers and enablers**
15	Jahns, L., McDonald, L. R., Wadsworth, A., Morin, C., Liu, Y. (2014). Barriers and facilitators to being physically active on a rural US northern plains American Indian reservation. *International Journal of Environmental Research and Public Health* 11:12053-12063 doi:10.3390/ijerph111112053 **Unable to extract data for older participants**
16	Koch, T. (1998). Story telling: Is it really research? *Journal of Advanced Nursing* 28(6):1182-1190 **Not about physical activity**
17	Kochevar, A. J., Smith, K. L., Bernard, M. A. (2001). Effects of a community-based intervention to increase activity in American Indian Elders. *Journal Oklahoma State Medical Association* 94:455-460 **No barriers and enablers**
18	Macdonald, D., Abbott, R., Jenkins, D. (2012). Physical activity of remote Indigenous Australian women: A postcolonial analysis of lifestyle. *Leisure Sciences* 34(1):39-54 doi:10.1080/01490400.2012.633854 **Unable to extract data for older participants**
19	Macniven, R., Richards, J., Gubhaju, L., Joshy, G., Bauman, A., Banks, E., Eades, S. (2016). Physical activity, healthy lifestyle behaviors, neighborhood environment characteristics and social support among Australian Aboriginal and non-Aboriginal adults. *Preventive Medicine Reports* 3:203–210 doi:10.1016/j.pmedr.2016.01.006 **No barriers and enablers**
20	McPhee, J. S., French, D. P., Jackson, D., Nazroo, J., Pendleton, N., Degens, H. (2016). Physical activity in older age: perspectives for healthy ageing and frailty. *Biogerontology* 17:567–580 doi:10.1007/s10522-016-9641-0 **Not specific to Indigenous people**
21	Murdoch-Flowers, J., Tremblay, M. C., Hovey, R., Delormier, T., Gray-Donald, K., Delaronde, E., Macaulay, A. C. (2017). Understanding how Indigenous culturally-based interventions can improve participants' health in Canada. *Health Promotion International* 34:154–165 doi:10.1093/heapro/dax059 **No barriers and enablers**

22	Ross, J., Hamlin, M. (2007). Māori physical activity: a review of an Indigenous population's participation. *Health Promotion Journal of Australia* 18(1):73-76 doi:10.1071/he07073 **Unable to extract data for older participants**
23	Sawchuk, C. N., Charles, S., Wen, Y., Goldberg, J., Forquera R., Roy-Byrne, P., Buchwald, D. (2008). A randomised trial to increase physical activity among native elders. *Preventive Medicine* 47:89-94 **No barriers and enablers**
24	Smith, B. J., Thomas, M., Batras, D. (2016). Overcoming disparities in organized physical activity: findings from Australian community strategies. *Health Promotion International* 31(3):572-581 doi:10.1093/heapro/dav042 **Not specific to Indigenous people**
25	Sukala, W. R., Lonsdale, C., Page, R., Rowlands, D. S., Krebs, J., Lys, I., Leikis, M., Pearce, J., Cheema, B. S. (2013). Exercise improves quality of life in indigenous Polynesian peoples with type 2 diabetes and visceral obesity. *Journal of Physical Activity & Health* 10.1123/jpah.10.5.699. **No barriers and enablers**
26	Sushames, A., Engelberg, T., Gebel, K. (2017). Perceived barriers and enablers to participation in a community-tailored physical activity program with Indigenous Australians in a regional and rural setting: A qualitative study. *International Journal for Equity in Health* 16(1):172-172 doi:10.1186/s12939-017-0664-1 **Unable to extract data for older participants**
27	Thompson, S. J., Gifford, S. M., & Thorpe, L. (2000). The social and cultural context of risk and prevention: food and physical activity in an urban Aboriginal community. *Health Education and Behavior* 27(6):725-743 doi:10.1177/109019810002700608 **No barriers and enablers**
28	Thurber, K. A., Joshy, G., Korda, R., Eades, S. J., Wade, V., Bambrick, H., Liu, B., Banks, E. (2018). Obesity and its association with sociodemographic factors, health behaviours and health status among Aboriginal and non-Aboriginal adults in New South Wales, Australia. *Journal of Epidemiology and Community Health* 72:491–498 doi:10.1136/jech-2017-210064 **No barriers and enablers**
29	Tudor-Locke, C., Henderson, K. A., Wilcox, S., Cooper, R. C., Durstine, J. L., Ainsworth, B. E. (2003). In their own voices: Definitions and interpretations of physical activity. *Women's Health Issues* 13:194–199 doi:10.1016/S1049-3867(03)00038-0 **Unable to separate out Indigenous peoples data**
30	Turner Goins, R., Innes, K., Dong, L. (2012). Lower body functioning prevalence and correlates among older American Indians in a Southeastern Tribe: The Native Elder Care Study. *Journal of the American Geriatrics Society* 60(3):577-582 doi:10.1111/j.1532-5415.2011.03869.x **No barriers and enablers**
31	Wilson, H. J., Leonard, W. R., Tarskaia, L. A., Klimova, T. M., Krivoshapkin, V. G., Snodgrass, J. J. (2015). Do Physical Activity and Sedentary Behavior Relate to Cardio-Metabolic Risk Factor Clustering in Indigenous Siberian Adults? *American Journal of Human Biology* 27:149-156 doi:10.1002/ajhb.22625 **No barriers and enablers**

Table s3

Characteristics of Included Studies

Author, year / Community / Country	Aims	Methods / Target Group	Intervention	Barriers – coding	Enablers -coding	Who gave the information?	Who obtained the information?	Who were the researchers?
Belza et al, 2004/ American Indian, Alaska Native, African American, Filipino, Chinese, Latino, Korean, and Vietnamese / United States	Examine barriers and enablers to physical activity	Qualitative: focus groups using discussion interview guide **(n = 32)** Men and women Ages: 52 – 85, mean 71.6 *Data extracted for American Indian and Alaskan Native participants only*	None - qualitative study	Disconnected; Isolated from other AI/ANs; Out of place; Not fitting in; Uncomfortable around non-AI/ANs; Cost; Program availability; Transportation; Weather	Living with chronic conditions - aware need of active / healthy lifestyle; People of similar identity; Culture; Community	American Indian Elders participated in the study	Facilitators were from the four partnership agencies who delivered health services to the American Indian Elders, they were all CALD trained	Colorado School of Public Health / University of Colorado Anschutz Medical Campus
Brooks-Cleator & Giles, 2016 / Communities in the North West Territories / Canada	Examine if intervention is culturally relevant	Qualitative: semi-structured interviews **(n = 9)** with program leaders and staff Program for men and women ages: 65+	Exercise program, using audio-visual equipment, in groups or at home	Exercise; Traditional activities; Consultation with Elders; Community ownership; Funding; Focus on wellness	Community; Local places; Cultural music; Language	Indigenous program leaders and staff were interviewed	Two non-Aboriginal researchers	Research leaders non-Aboriginal - team included Indigenous community members
Brooks-Cleator & Lewis, 2019 / Norton Sound Region, The Bering Strait region. Including Inupiat, Central Yup'ik, and Siberian Yupik cultural groups / United States	Understand how Alaska Native Elders perceive the role of physical activity	Qualitative: semi-structured interviews **(n = 41)** Men and women Ages: 60 - 89 years	None - qualitative study	Physical; Community; Elders; Exercise	Subsistence activities; Exercise; Elder; Active; Leader; Teacher; Community; Independent; Capability	Community-nominated / respected Elders participated in the study	Two non-First Nations researchers with close links and experience working with communities	Two non-First Nations researchers working closely with an Elder Advisory committee over multiple years

Author, year / Community / Country	Aims	Methods / Target Group	Intervention	Barriers – coding	Enablers -coding	Who gave the information?	Who obtained the information?	Who were the researchers?
Bruner & Chad, 2013 / Cree Woodland Community / Canada	Characterise physical activity practices and explore attitudes and beliefs	Mixed methods. Quantitative: survey Qualitative: interviews **(n=12 >40 years)** Women and girls Ages: 15 years to 55+, mean age 37.6 ± 16.9 *Qualitative Data extracted for older participants only*	None – survey and interview	Time; Childcare; Laziness; Encourage; Environment; Safety	Small community; Walking; Fun; Meet people; Feel better; Busy	Members of Woodland Cree community participated in the study	Interviews by lead non-Aboriginal researcher, supported by local community assistant	Non-Aboriginal researchers – analysis supported by external consultant experienced in working with First Nation communities
Carr et al, 2019[a] /Aboriginal communities of the Groote Eylandt Archipelago, Umbakumba and Amakalyakba (Bickerton Island), Queensland / Australia	Explore lived experiences regarding MJD (spinocerebellar ataxia 3), what is important and works best to keep doing physical activity	Qualitative: semi-structured in-depth interviews with people with MJD **(n = 8)** and their families **(n = 4)** Men and women Ages: 30 - 49 years	None - qualitative study	Exercise; Shame	Community; Exercise; Active lifestyle; Family; Country	Individuals and families with MJD participated in the study	Interviews led by community workers on the research team and a non-Aboriginal researcher	Aboriginal researchers including community members, non-Aboriginal lead researcher, supporting Indigenous organisations
Conte et al, 2016 / American Indian tribe in rural Oregon / United States	Identify beliefs about health, arthritis, and physical activity	Qualitative: focus group **(n = 6)** and interviews **(n = 18)** Men and women Ages: 48 - 82 years	None – qualitative study	Illness; Environment; Opportunities; Physical activity; Motivation; Transport; Unsafe; Cost; Facilities; Locations; Group fitness;	Exercise; Motivation; Negative outcomes; Family; Group; Transport; Incentives; Leaders; Success stories	American Indian people participated in the study	Non- Indigenous researchers	Non-Indigenous Researchers with experience working with Indigenous communities
Coppell et al, 2009[b] / East Coast (North of Gisborne), predominantly Ngati Porou (tribe) / New Zealand	Two-year results from community-wide diabetes prevention intervention	Quasi-experimental plus process evaluation: surveys **(n = 235)** Men and women	Community health promotion program with education	Employment; Men	Involve local people; Community resources; Early collaboration; Focus on local radio and health promotions	Māori primary health care provider gave registrar of clients to be surveyed	Led by Māori primary health care researcher	Researchers from University also affiliated with Māori owned health care setting

Author, year / Community / Country	Aims	Methods / Target Group	Intervention	Barriers – coding	Enablers -coding	Who gave the information?	Who obtained the information?	Who were the researchers?
		Ages: two groups of participants aged 25 to 49 and 50+ years (n=100+ participants) *Data age adjusted for older participants*						
Elliott T, 2002 / Aboriginal residents of a Community, Retirement Village, New South Wales / Australia	To reduce the rate of injury for older Aboriginal people	Report: Community program for Elders (8 to 10 older people attended each session) Gender not stated Ages: 65 years and older	10 week falls prevention program	Transport; Suitability of facility; Cost; Cultural factors – gender; Personal factors – fear / safety	Cultural needs; Safety precautions; Easy; Warm water	Aboriginal Elders participated in the study	Led by Project Officer in partnership with Illawarra Aboriginal Area Health support	Shoalhaven Aboriginal Injury Prevention Project. Partnerships in health region with Aboriginal controlled organisations
Heesch et al, 2000 / African American, Hispanic, Native American, Native Alaskan Caucasian women / United States	Determine whether barriers to exercise differ among racial/ethnic groups	Cross-sectional: Survey and interviews **(n = 738)** Women Ages: 40 – 60+, mean 54 *Data extracted for American Indian and Alaskan Native participants only*	None – survey and interview	Energy; Tired	None	Native American / Native Alaskan people participated in the study	Non-Native American PhD Candidate researcher	The University of Texas-Houston, CHRPD, School of Public Health

Author, year / Community / Country	Aims	Methods / Target Group	Intervention	Barriers – coding	Enablers -coding	Who gave the information?	Who obtained the information?	Who were the researchers?
Henderson & Ainsworth, 2000 / African American; American Indian women from the Pueblos and Navajo Nation in New Mexico / United States	Examine barriers and enablers to walking as physical activity	Qualitative: secondary analysis of data collected by in-depth interviews **(n = 26)** Women Ages: 40 – 80+ *Data extracted for American Indian participants only*	None - qualitative study	Unsafe at night; Fear	Classroom / playground; Looking after children; Animals; Walking cheaper than driving	American Indian women from Pueblos and Navajo Nation in New Mexico participated in the interviews	Indigenous interviewers were paid to conduct the interviews	Researchers stated they were not women of colour. An advisory committee was formed in South Carolina and New Mexico consisting primarily of individuals of the races being studied
Henderson & Ainsworth, 2003 / African American; American Indian women from the Pueblos and Navajo Nation in New Mexico / United States	Identify minority women's perceptions of physical activity	Qualitative: secondary analysis of data collected by in-depth interviews **(n = 26)** Women Ages: 40 – 89, mean 57 *Data extracted for American Indian participants*	None - qualitative study	Willpower; Energy; No-one to walk with; Weather; Interest in walking	None	American Indian women from Pueblos and Navajo Nation in New Mexico participated in the interviews	Indigenous interviewers were paid to conduct the interviews	Researchers stated they were not women of colour. University of South Carolina, the University of New Mexico, and the Indian Health Service: Albuquerque Area Office
Hunt et al, 2008[c] / Aboriginal and Torres Strait Islanders in urban Queensland /Australia	Explore physical activity: meanings, barriers and strategies	Qualitative: focus groups **(n = 96)** Men and women Ages: n = 31 over 45 years; n = 55 between 30 and 50 years	None - qualitative study	Children; Domestic duties; Car; Judged; Feeling safe; Injury; Illness; Disability; Cost; Sustainable	Exercise group; Fun; Families; Being active; Role models; Access local; Sport	Aboriginal and Torres Strait Islanders in an urban community participated in the study	Indigenous health promotion officer and Indigenous research student	Indigenous and non-Indigenous researchers

Author, year / Community / Country	Aims	Methods / Target Group	Intervention	Barriers – coding	Enablers -coding	Who gave the information?	Who obtained the information?	Who were the researchers?
Lukaszyk et al, 2018 / Aboriginal and Torres Strait Islanders from six communities New South Wales / Australia	Evaluate implementation of physical activity program	Quasi-experimental Mixed methods. Quantitative: physical function/ BMI. Qualitative: Semi-structured interviews **(n = 77)** Men and women Ages: 40 - 90, mean 64	Weekly group program at community centres including exercise, education and yarning circle	None	Aboriginal; Culturally safe; Health / wellbeing; Yarning circles; Share thoughts; Stories	Aboriginal participants gave exit interview	Aboriginal project officer	One Aboriginal researcher and one non-Aboriginal researcher analysed data
Maxwell et al, 2019 / Indigenous people from urban and rural settings in New South Wales / Australia	Explore how digital health technologies contribute to increased participation in physical activity in leisure settings	Mixed methods. Quantitative: tracker recordings. Qualitative: yarning circles. **(n = 8)** Women Ages: 18 to >50 *Data extracted for older participants only*	Participants tracked their activity level for 8 weeks using a digital tracker and individualised exercise plan	Time; Family; Work; Lazy; Technology; Friends; Exercise	Physical activity; Mental health; Family / friends; Physically active	Indigenous women who attended a college participated in the study	Researchers – not specified if research team members were Indigenous	Indigenous and non-Indigenous researchers on the team
Moy et al, 2010 / Native Hawaiian and Pacific Islanders in San Diego / United States	Examine correlates of physical activity	Cross sectional: Questionnaire **(n = 100)** Men and women Ages: 40 – 59, mean 46.9	None - qualitative study	Interest; Energy; Time	Family / friends; Physical activity; Walk places	Hawaiian and Pacific Islander adults recruited by Indigenous community leader	Surveys administered by researchers	Not stated if any of the research team were Indigenous
Passmore et al, 2017[d] / Aboriginal people from across New South Wales / Australia	Evaluate if intervention is effective in promoting healthy lifestyle and addressing risk factors for chronic disease	Quasi-experimental Mixed methods. Quantitative: Qualitative: survey **(n = 568)** Men and women Ages: 18 - 82, mean age 39 *Data age adjusted for older participants*	12 week weight loss challenge for overweight or obese people using a structured exercise and diet program	Community; Men; Male only	Aboriginal communities; Local contexts **;** Benefits; Self-esteem	Aboriginal participants through phone interviews	Interviews by team leaders and state wide implementation team	Not stated if any of the research team were Indigenous

Author, year / Community / Country	Aims	Methods / Target Group	Intervention	Barriers – coding	Enablers -coding	Who gave the information?	Who obtained the information?	Who were the researchers?
Péloquin et al, 2017 / Non-Indigenous and Indigenous people from regional Queensland / Australia	Describe factors that promote or inhibit physical activity	Qualitative: structured interviews **(n = 24)** Men and women Age: 18 – 35 (n = 12) and 36 – 55 (n = 12) *Data extracted for older participants only* *Data extracted for Indigenous participants only*	None - qualitative study	Social supports; Time; Financial; Family; Sick; Elders; Neighbourhood; Fitness levels; Judgements	Affordability; Family; Peer supports; Role models; Access; Activities; Walking; Running	Indigenous people who were members of a local basketball team participated in the study	Lead researcher who was non Indigenous	Lead researcher non indigenous – Indigenous researcher assisted with analysis
Ryan et al, 2018 / Métis people / Canada	Investigate the correlates of leisure-time physical activity and walking	Cross-sectional. Data from larger survey, analysed the correlates of physical activity **(n = 5,810)** Men and women Ages: 20–64. 40.4% between 35 and 49 years, 25.4% 50–64 years *Data extracted for older participants only*	None – analysis of a larger data set	Older age; smoking	Cultural; Spiritual; Health; Income; Male	Quantitative data from national survey of Métis people	Survey developed in collaboration with the Métis National Council	Not stated if any of the research team were Indigenous
Sawchuk et al, 2011 / American Indian Elders / United States	Examine barriers and facilitators to walking and physical activity	Cross-sectional: survey Men and women Ages: 50 - 74	None - survey	Willpower; No-one to walk with; Social influence; Resources; No benches in parks; Interest in walking	Building social support; Finding walking partners; Better health; More energy; Good weather	American Indian elders participated in the study	Not clear if researcher was American Indian person	Psychiatry & Psychology and Mayo Clinic and University of Washington

Author, year / Community / Country	Aims	Methods / Target Group	Intervention	Barriers – coding	Enablers -coding	Who gave the information?	Who obtained the information?	Who were the researchers?
Sawchuk et al, 2017 / American Indian Elders living within a 2-hour driving radius of the Seattle Indian Health Board / United States	Compare barriers to physical activity between participants in two groups	Quasi-experimental: Randomised pilot study **(n = 36)** Men and women Mean age: 61 (SD 8.9)	Pedometer monitored step counts compared to Pedometer monitored step counts plus goal setting	Willpower; Time; Social influence; Energy; Fear of injury; Skill level; Facilities / equipment	None	American Indian Elders participated in the study	Not stated if any of the researchers were of Indian American or Alaskan Native backgrounds	Psychiatry & Psychology and Mayo Clinic and University of Washington
Son & Hutchinson, 2009 / Four tribal organisations in North-western Nevada. Northern Pauite, Shoshone, and Washoe / United States	Explore the possible role of leisure - elders' views of health and self-care	Qualitative: focus groups **(n = 19)** Men and women Ages: 56 - 87	None - qualitative study	Activities; Transportation; Land; Health; Family support; Activities; Older people	Leisure activities; Exercise; Health; Active; Social aspects; Connection; Culture; Family supports	Native American Elders (three from an urban two from a rural setting) participated in the study	Principal researcher facilitated focus groups with well-respected leaders from each tribal organisation	Two researchers stated they were not from the culture
Stronach et al, 2016[e] / Gadigal people from Redfern, New South Wales. Tasmanian Aboriginal people from Flinders Island / Australia	Understand the place of sport in a cultural context	Qualitative: interviews **(n = 22)** Women Ages: 18 - 74 *Data extracted for older participants*	None - qualitative study	Family; Kids; Gender; Transport; Racism	Social bonds; Cultural activities; Women; Kids; Role model	Local indigenous women through interviews	Indigenous Researcher	Lead Indigenous researcher, other researchers non Indigenous, one with experience working with Indigenous men
Warbrick et al, 2016[f] / Men from a variety of Iwi (Māori tribes), living in Ōtaki or Palmerston North in the southern part of the North Island / New Zealand	Understand past and current patterns of physical activity	Qualitative: focus group **(n=18)** Men Ages: 28 – 72, mean 38.7 *Data extracted for older participants*	12-week culturally-enhanced exercise program	Family; Work; Injury; Relationship; Financial; Culture	Collective; Peer support; Camaraderie; Competition; Healthy; Teacher; Learn	Māori men participated in the study	Māori male researcher facilitated focus groups	A Māori lead researcher and two co-authors
Ziabakhsh et al, 2016 / Women representing different First Nations and tribes in Canada, including Coast Salish, Haida, and Cree / Canada	Investigate the outcomes and processes of intervention	Quasi-experimental Mixed methods **(n=8)** Quantitative: questionnaire Qualitative: talking circle	Weekly group, two hour sessions for 8 weeks, Includes a Talking Circle and education on heart health	Welcome segment; Paperwork; Telling others	Cultural elements; Talking circles; Indigenous philosophy	Indigenous female leaders working in community as health advocates	Non-Indigenous researcher who was an evaluation specialist	Non-Indigenous research leader, Indigenous Elder provided support for the project

Author, year / Community / Country	Aims	Methods / Target Group	Intervention	Barriers – coding	Enablers -coding	Who gave the information?	Who obtained the information?	Who were the researchers?
		Women Ages: 47 – 71, mean 58						

[a] enrolled a large proportion of older participants with high levels of chronic diseases related to ageing and included strong voices of older Indigenous adults, they enrolled 12 participants (n=5 aged 30 to 40 years; n=7 over 40 years)

[b] surveyed adults with chronic disease and enrolled two groups of participants aged 25 to 49 and 50+ years (n=100+ participants) findings were specifically analysed with age adjustments

[c] enrolled a large proportion of older participants with high levels of chronic diseases related to ageing and included strong voices of older Indigenous adults, they enrolled two groups (n=31 participants over 45 years; n=55 participants between 30 and 50 years)

[d] surveyed adults with chronic disease; older adults were strongly represented (mean age 39 years, range 18 to 82 years), 41% of participants treated for health condition, findings were specifically analysed with age adjustments

[e] did not report participant ages but reported an age ranges between 18 and 74. Their findings were applied to all ages with specific data for older adults extracted where possible.

[f] did not report participant ages but reported an age ranges between 18 and 72 years respectively. Their findings were applied to all ages with specific data for older adults extracted where possible.

Table s4

Critical Appraisal of Qualitative Studies

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Belza et al, 2004	U	Y	Y	Y	Y	U	N	Y	Y	Y
Brooks-Cleator & Giles, 2016	Y	Y	Y	Y	U	U	U	U	Y	Y
Brooks-Cleator & Lewis, 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bruner & Chad, 2013	Y	Y	Y	Y	Y	N	N	U	Y	Y
Carr et al, 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Conte et al, 2016	Y	Y	Y	Y	U	N	N	Y	Y	Y
Henderson & Ainsworth, 2000	Y	U	Y	Y	Y	Y	Y	Y	Y	Y
Henderson & Ainsworth, 2003	U	U	Y	Y	Y	Y	U	Y	Y	Y
Hunt et al, 2008	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Maxwell et al, 2019	Y	Y	Y	Y	Y	N	N	Y	Y	Y
Péloquin et al, 2017	Y	Y	Y	Y	Y	N	N	Y	Y	U
Son & Hutchinson, 2009	U	Y	Y	U	Y	N	N	U	Y	Y
Stronach et al, 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Warbrick et al, 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Y = yes, N = no, U = unclear, N/A = not applicable.

Q1. Is there congruity between the stated philosophical perspective and the research methodology?
Q2. Is there congruity between the research methodology and the research question or objectives?
Q3. Is there congruity between the research methodology and the methods used to collect data?
Q4. Is there congruity between the research methodology and the representation and analysis of data?
Q5. Is there congruity between the research methodology and the interpretation of results?
Q6. Is there a statement locating the researcher culturally or theoretically?
Q7. Is the influence of the researcher on the research, and vice- versa, addressed?
Q8. Are participants, and their voices, adequately represented?
Q9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?
Q10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

Table s5

Critical Appraisal of Quasi Experimental Studies

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Coppell et al, 2009	U	Y	U	N	U	Y	Y	Y	Y
Lukaszyk et al, 2017	Y	Y	N/A	N	Y	Y	Y	Y	Y
Passmore et al, 2017	Y	Y	Y	N/A	Y	Y	Y	Y	Y
Sawchuk et al, 2017	U	Y	U	N	Y	N	Y	Y	U
Ziabakhsh et al, 2016	Y	Y	U	N	N	Y	N	N	Y

Y = yes, N = no, U = unclear, N/A = not applicable

Q1. Is it clear in the study what is the "cause" and what is the "effect" (i.e. there is no confusion about which variable comes first)?
Q2. Were the participants included in any comparisons similar?
Q3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?
Q4. Was there a control group?
Q5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?
Q6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analysed?
Q7. Were the outcomes of participants included in any comparisons measured in the same way?
Q8. Were outcomes measured in a reliable way?
Q9. Was appropriate statistical analysis used?

Table s6

Critical Appraisal of Analytical Cross-Sectional Studies

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Heesch et al, 2000	Y	Y	Y	Y	N/A	N/A	Y	Y
Moy et al, 2010	Y	Y	Y	Y	Y	U	Y	Y
Ryan et al, 2018	Y	Y	Y	Y	Y	Y	Y	Y
Sawchuk et al, 2011	Y	Y	Y	Y	Y	Y	Y	Y

Y = yes, N = no, U = unclear, N/A = not applicable

Q1. Were the criteria for inclusion in the sample clearly defined?
Q2. Were the study subjects and the setting described in detail?
Q3. Was the exposure measured in a valid and reliable way?
Q4. Were objective standard criteria used for the measurement of the condition?
Q5. Were confounding factors identified?
Q6. Were strategies to deal with confounding factors stated?
Q7. Were outcomes measured in a valid and reliable way?
Q8. Was appropriate statistical analysis used?

Table s7

Quality Appraisal Tool to assess quality of health research from an Aboriginal and Torres Strait Islander perspective

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Belza et al, 2004*	Y	Y	Y	Y	Y	U	U	Y	Y	Y	Y	U	Y	Y
Brooks-Cleator & Giles, 2016*	U	N	Y	N	N	N	N	P	P	P	P	P	P	N
Brooks-Cleator & Lewis, 2019*	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	Y	Y	Y
Bruner & Chad, 2013*	Y	Y	U	Y	Y	Y	U	U	Y	Y	Y	Y	Y	U
Carr et al, 2019	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	Y	Y	Y	Y
Coppell et al, 2009*	U	Y	Y	Y	Y	U	U	Y	Y	Y	Y	Y	Y	Y
Conte et al, 2016*	Y	Y	P	Y	Y	U	U	P	P	Y	Y	Y	Y	Y
Heesch et al, 2000*	N	N	U	N	N	U	N	Y	N	U	U	Y	Y	U
Henderson & Ainsworth, 2000*	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	U	Y	Y	Y
Henderson & Ainsworth, 2003*	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	U	Y	Y	Y
Hunt et al, 2008	N	Y	Y	Y	Y	Y	Y	N	Y	P	P	P	P	Y
Lukaszyk et al, 2017	Y	Y	Y	Y	Y	Y	U	U	Y	Y	Y	Y	Y	Y
Maxwell et al, 2019	Y	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	Y	Y
Moy et al, 2010*	Y	Y	N	P	N	N	N	N	N	N	Y	Y	U	U
Péloquin et al, 2017	Y	Y	Y	Y	Y	U	U	U	N	Y	Y	Y	Y	Y
Passmore et al, 2017	Y	Y	U	Y	U	U	U	U	U	N	Y	Y	Y	Y
Ryan et al, 2018*	N	N	N	Y	Y	N	N	U	Y	N	N	N	N	N
Sawchuk et al, 2011*	U	Y	Y	Y	Y	U	U	Y	Y	Y	U	Y	Y	Y

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Sawchuk et al, 2017*	U	Y	Y	Y	Y	U	U	Y	Y	Y	U	Y	Y	Y
Son & Hutchinson, 2009*	Y	Y	N	N	Y	Y	U	N	N	N	Y	N	Y	Y
Stronach et al, 2016	Y	Y	Y	Y	Y	Y	U	U	Y	Y	Y	Y	Y	Y
Warbrick et al, 2016*	N	N	Y	N	Y	U	U	N	Y	Y	Y	Y	Y	Y
Ziabakhsh et al, 2016*	Y	Y	Y	N	Y	Y	N	U	Y	Y	Y	Y	Y	Y

* For studies that did not enroll Aboriginal and Torres Strait Islander participants, questions applied using italicised key points
Y = yes, P = partially, N = no, U = unclear

Q1. Did the research respond to a need or priority determined by the community?
Q2. Was community consultation and engagement appropriately inclusive?
Q3. Did the research have Aboriginal and Torres Strait Islander leadership?
Q4. Did the research have Aboriginal and Torres Strait Islander governance?
Q5. Were local community protocols respected and followed?
Q6. Did the researchers negotiate agreements in regards to rights of access to Aboriginal and Torres Strait Islander peoples' existing intellectual and cultural property?
Q7. Did the researchers negotiate agreements to protect Aboriginal and Torres Strait Islander peoples' ownership of intellectual and cultural property created through the research?
Q8. Did Aboriginal and Torres Strait Islander peoples and communities have control over the collection and management of research materials?
Q9. Was the research guided by an Indigenous research paradigm?
Q10. Does the research take a strengths-based approach, acknowledging and moving beyond practices that have harmed Aboriginal and Torres Strait peoples in the past?
Q11. Did the researchers plan and translate the findings into sustainable changes in policy and / or practice?
Q12. Did the research benefit the participants and Aboriginal and Torres Strait Islander communities?
Q13. Did the research demonstrate capacity strengthening for Aboriginal and Torres Strait Islander individuals?
Q14. Did everyone involved in the research have opportunities to learn from each other?

Appendix H Consolidated Criteria for Reporting Qualitative Studies (COREQ): 32-item Checklist (Chapter 6)

Item Number	Guide questions/description	Reported in Section
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the interview or focus group?	6.2.5
2. Credentials	What were the researcher's credentials? *e.g. PhD, MD*	6.2.3
3. Occupation	What was their occupation at the time of the study?	6.2.3
4. Gender	Was the researcher male or female?	6.2.3
5. Experience and training	What experience or training did the researcher have?	6.2.3
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	6.2.3
7. Participant knowledge of the interviewer	What did the participants know about the researcher? *e.g. personal goals, reasons for doing the research*	6.2.3
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? *e.g. bias, assumptions, reasons and interests in the research topic*	6.2.3 6.4.1

Item Number	Guide questions/description	Reported in Section
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis*	6.2.1
Participant selection		
10. Sampling	How were participants selected? *e.g. purposive, convenience, consecutive, snowball*	6.2.4 *Purposive sampling*
11. Method of approach	How were participants approached? *e.g. face-to-face, telephone, mail, email*	6.2.5
12. Sample size	How many participants were in the study?	6.3
13. Non-participation	How many people refused to participate or dropped out? Reasons?	6.3
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	6.2.5
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	6.2.5
16. Description of sample	What are the important characteristics of the sample? *e.g. demographic data, date*	Table 6.1
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	6.2.6
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	n/a
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	6.2.7
20. Field notes	Were field notes made during and/or after the interview or focus group?	6.2.3
21. Duration	What was the duration of the interviews or focus group?	6.2.5
22. Data saturation	Was data saturation discussed?	6.2.7
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	6.2.7 *No, but community meeting held as appropriate for Indigenous methodology*

Item Number	Guide questions/description	Reported in Section
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	6.2.7 *(3 coders)*
25. Description of the coding	Did authors provide a description of the coding?	6.2.7, Figure 1 *contains coding examples*
26. Derivation of themes	Were themes identified in advance or derived from the data?	6.2.7 *During data analysis*
27. Software	What software, if applicable, was used to manage the data?	6.2.7 *Microsoft Excel Office 365*
28. Participant checking	Did participants provide feedback on the findings?	6.2.7
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? *e.g. participant number*	6.3
30. Data and findings consistent	Was there consistency between the data presented and the findings?	6.3, 6.4
31. Clarity of major themes	Were major themes clearly presented in the findings?	6.3 *Yes*
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	6.3 *See results section – headings showing barriers and enablers*