Curtin School of Allied Health
Faculty of Health Sciences

Benefits, Barriers and Outcomes of Older Adults Undertaking a Facility-Based Transition Care Program

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This thesis is presented for the Degree of
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Author's Declaration

To my best of knowledge and belief, I declare that this thesis is composed of my original work and contains no material previously published or written by another person except where due acknowledgement has been made in the text. 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).

I have clearly stated the contribution of others to my thesis, including statistical design, study design, data analysis, design of semi-structured interview questions, professional editorial advice and any other original research work used in my thesis. The content of my thesis is the result of work I have completed since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted to qualify for the award of any other degree, diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis if any, have been submitted for another award.

Human ethics

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007) – updated March 2014. The proposed research study was conducted in phases and was approved by Curtin University Human Research Ethics Committee (EC00262) (Approval Numbers HRE2019-0021, HRE2020-0075-01 and HRE2020-0506).

Jo-Aine Hang

21st October 2021

Abstract

Background

Transition Care Programs (TCP) provide older adults with short-term, goal-oriented care after hospitalisation to assist them to regain their functional independence. The purpose of the research was to evaluate the impact of TCP on older adults' health and wellbeing by determining the health-related outcomes and the benefits, barriers and enablers for older adults undertaking TCP in a transition care (TC) facility in Western Australia (WA).

Methods

A two-phased mixed method design was conducted at a 47 bed TC facility. In phase one, a systematic review and meta-analysis synthesised evidence for the effectiveness of TCP on older adults' health outcomes. Concurrently, a retrospective study identified the association between the characteristics of older adults undertaking TCP and their health-related outcomes. In phase two, a qualitative study, utilising a descriptive phenomenological approach, explored older adults' lived experience whilst undertaking TCP. Semi-structured interviews were undertaken with participants both face-to-face and online (due to Covid19 visitor restrictions). Subsequently, a prospective observational study followed older adults undertaking TCP to comprehensively evaluate a range of health-related outcomes measuring physical, cognitive, emotional and social domains of function.

Results

In study one, meta-analysis (n=21 studies) demonstrated that 80% of older adults were discharged home from TCP. However, this proportion varied widely between countries. The retrospective audit (n=169 older adults) identified that completing activities of daily living (ADL) independently at admission [adjusted odds ratio (AOR) 2.47, (95% confidence interval (95%CI) 1.00-6.06)] and having good cognition [AOR 2.45, (95%CI 1.07-5.61)] were significantly associated with discharge home. In phase two, older adults (n=16) predominantly viewed their TC experiences through a negative emotional lens, expressing fear of losing independence and uncertainty about their discharge destination. Family members (n=4) and staff (n=13) confirmed these experiences. The prospective study (n=47) utilised a comprehensive geriatric assessment (CGA) and demonstrated that 55.3% (n=26) of older adults were discharged home compared with 29.8% (n=14) to residential aged care (RAC). Participants' functional

mobility [de Morton Mobility Index (DEMMI) admission [33.5 (14.9) points, discharge 44.5 (13.9), p<0.001] and health related quality of life [EQ-5D-5L admission 0.6 (0.5), discharge 0.6 (0.4), p=0.005] significantly improved. Instrumental ADL performance [Lawton's scale admission 6.0 (3.0), discharge 5.0 (4.0), p<0.001] significantly declined. Participants discharged home showed significantly greater improvement in functional mobility [DEMMI 13.6, (95%CI 9.8-17.4)] compared with participants discharged to RAC [DEMMI 6.9, (95%CI 1.7-12.0)] (interaction p-value = 0.04).

Conclusion

Facility-based TCP outcomes vary internationally. Holistic evaluation using CGA identified that facility-based TCP improved older adults' health outcomes across a number of functional domains. However, some deficits in functional ability persisted. More information and education about what TCP can provide and more emotional support while undertaking TCP would improve older adults' TC experience. Investigating using CGA in multiple TC facilities to evaluate and tailor TCP could assist to determine how these programs can better benefit older adults.

Keywords

aged; continuity of patient care; intermediate care facilities; length of stay; rehabilitation, outcome assessment (health care); residential facilities

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Abbreviations

ADL	Activities of Daily Living
AOR	Adjusted Odds Ratio
CGA	Comprehensive Geriatric Assessment
DEMMI	de Morton Mobility Index
GRADE	Grading of Recommendations, Assessment, Development and Evaluation
HRQoL	Health-Related Quality of Life
IADL	Instrumental Activities of Daily Living
IQR	Interquartile Range
IRSAD	Index of Relative Socio-Economic Advantage and Disadvantage
JBI	The Joanna Briggs Institute
LOS	Length of Stay
MBI	Modified Barthel Index
MCID	Minimal Clinically Important Difference
MDT	Multi-Disciplinary Teams
MeSH	Medical Subject Headings
MMSE	Mini Mental State Examination
MoCA	Montreal Cognitive Assessment
NZ	New Zealand
OR	Odds Ratio
PROM	Patient Reported Outcome Measures
PHQ-9	Patient Health Questionnaire-9
PIM	Potentially Inappropriate Medicines
PIP	Potentially Inappropriate Prescription
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RAC	Residential Aged Care
RCT	Randomised Controlled Trial
SD	Standard Deviations
STROBE	Strengthening the reporting of observational studies in epidemiology
TC	Transition Care
TCP	Transition Care Programs
TUG	Time Up and Go
UK	United Kingdom
USA	United States of America
WA	Western Australia
95% CI	95% Confidence Intervals

Publications, Presentations and Awards

Works by the author during candidacy included in the thesis

Published works

Paper 1 *Contributing to Chapter 3*	**Hang, J. A.**, Francis-Coad, J., Naseri, C., Waldron, N., & Hill, A. M. (2020). Effects of facility-based transition care programs on health-related outcomes in older adults: A systematic review protocol. *JBI Evidence Synthesis, 18*(11), 2425-2434. doi:10.11124/JBISRIR-D-19-00240
Paper 2 *Contributing to Chapter 4*	**Hang, J. A.**, Naseri, C., Francis-Coad, J., Jacques, A., Waldron, N., Knuckey, R., & Hill, A. M. (2021). Effectiveness of facility-based transition care on health-related outcomes for older adults: A systematic review and meta-analysis. *International Journal of Older People Nursing*, 00, e12408. doi:10.1111/opn/12408
Paper 3 *Contributing to Chapter 5*	**Hang, J. A.**, Francis-Coad, J., Naseri, C., Jacques, A., Waldron, N., Purslowe, K., & Hill, A. M. (2021). Identifying the association between older adults' characteristics and their health-related outcomes in a transition care setting: A retrospective audit. *Frontiers in Public Health, 9*, 688640. doi:10.3389/fpubh.2021.688640
Paper 4 *Contributing to Chapter 6*	**Hang, J. A.**, Francis-Coad, J., Ho, P., Waldron, N., Purslowe, K., & Hill, A. M. (2022). "Is my journey destination home?' Exploring the experiences of older adults who undertake a transition care programme: A qualitative study. *Ageing & Society*, 1-16. doi:10.1017/S0144686X22000253.

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Supplementary Paper *Feasibility Study to Chapter 7*	Wong, Y. G., **Hang, J. A.**, Francis-Coad, J., & Hill, A. M. (2021). *Using comprehensive geriatric assessment for older adults undertaking a facility-based transition care program to evaluate health outcomes: A feasibility study.* Manuscript submitted for publication and under peer review.

Other published works by the author during candidacy not included in the thesis

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Conference podium (oral) presentations and ePosters by author during candidacy period

2019	*National*	**Hang, J. A.**, Naseri, C., Francis-Coad, J., Jacques, A., Waldron, N., Knuckey, R., & Hill, A. M. Evaluation of health-related outcomes in a transition care program facility: Retrospective study. *3rd GrassRoots Falls Festival Conference 2019.* September 2019. **Fremantle,** Australia (*podium presentation*).
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	National	**Hang, J. A.**, Naseri, C., Francis-Coad, J., Jacques, A., Waldron, N., Knuckey, R., & Hill, A. M. Effectiveness of facility-based transition care on health-related outcomes for older adults: A systematic review and meta-analysis. *Australian Physiotherapy Association Thrive Conference*. **Brisbane,** Australia (*Accepted for ePoster presentation - conference postponed to October 2023*).
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		Hang, J. A., Francis-Coad, J., Ho, P., Waldron, N., & Purslowe, K., & Hill, A. M. "Is my journey destination home?" Experiences of older adults who undertake a transition care program in a facility setting. *Emerging Researchers in Ageing (virtual).* November 2021. Australia (*oral presentation*).
	International	**Hang, J. A.**, Francis-Coad, J., Jacques, A., Waldron, N., Purslowe, K., & Hill, A. M. Health-related outcomes of older adults undertaking a transition care program: A prospective cohort study. *9th Biennial Australian and New Zealand Falls Prevention Conference (virtual).* December 2021. New Zealand (*oral video 5X5 presentation*).

Candidate awards

2018	Awarded Australian Government Research Training Program (RTP) Stipend ($27,500 per annum tax-free for the duration of the three and a half years of doctoral study).

Statement of Contributions

Contributions to jointly authored works

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

Paper 1 (contributing to Chapter 3)

Hang, J. **A.**, Francis-Coad, J., Naseri, C., Waldron, N., & Hill, A. M. (2020). Effects of facility-based transition care programs on health-related outcomes in older adults: A systematic review protocol. *JBI Evidence Synthesis, 18*(11), 2425-2434. doi:10.11124/JBISRIR-D-19-00240

Author contributions:

JAH led the drafting of the manuscript with assistance from AMH and JFC. AMH, JAH, JFC and NW were the principal contributors to conceptualisation of the systematic review protocol manuscript. CN provided guidance to the methodology and drafting of the methods including the statistical analysis. NW assisted to conceptualise the overall project and provided clinical expertise to the design. All authors provided critical evaluation to the submitted manuscript.

Paper 2 (contributing to Chapter 4)

Hang, J. **A.**, Naseri, C., Francis-Coad, J., Jacques, A., Waldron, N., Knuckey, R., & Hill, A. M. (2021). Effectiveness of facility-based transition care on health-related outcomes for older adults: A systematic review and meta-analysis. *International Journal of Older People Nursing,* 00, e12408. doi:10.1111/opn.12408

Author contributions:

JAH led the drafting of the manuscript with support from CN, JFC, NW and AMH. AMH and JAH led the research design with support from JFC, NW and RK. JAH and JFC screened the articles to be included in the systematic review. CN and JAH critically appraised all included articles and extracted the data. AMH and AJ provided guidance and assisted JAH on data synthesis and analysis. All authors provided critical evaluation of the manuscript. All authors read and approved the final submitted manuscript.

Paper 3 (contributing to Chapter 5)

Hang, J. **A.**, Francis-Coad, J., Naseri, C., Jacques, A., Waldron, N., Purslowe, K., & Hill, A. M. (2021). Identifying the association between older adults' characteristics and their health-related outcomes in a transition care setting: A retrospective audit. *Frontiers in Public Health, 9,* 688640. doi:10.3389/fpubh.2021.688640

Author contributions:

JAH led the drafting of the manuscript with support from CN, AMH and JFC. AMH, JAH and JFC led the research design with support from KP and NW, and assisted with monitoring the research. AMH and JAH led the research procedure with support from JFC and NW. JAH collected data at the designated site and KP led management of the research at the facility. AJ and CN contributed to statistical analysis. All authors provided critical evaluation and approval of the final submitted manuscript.

Paper 4 (contributing to Chapter 6)

Hang, J. A., Francis-Coad, J., Ho, P., Waldron, N., Purslowe, K., & Hill, A. M. (2022). "Is my journey destination home?" Exploring the experiences of older adults who undertake a transition care programme: A qualitative study. *Ageing & Society,* 1-16. doi:10.1017/S0144686X22000253.

Author contributions:

JAH led the drafting of the manuscript. AMH, JAH and JFC led the research design and assisted with monitoring the research. AMH and JAH led the research procedure with support from JFC and NW. JAH conducted the interviews and KP led management of the research at the facility. NW contributed to recruitment of hospital staff and provided expert clinical input to the research design and interview guides. JAH, JFC and PH contributed to data analysis. All authors provided critical evaluation and approval of the final submitted manuscript.

Paper 5 (contributing to Chapter 7)

Hang, J. A., Francis-Coad, J., Jacques, A., Waldron, N., Purslowe, K., & Hill, A. M. (2021). *Health-related outcomes of older adults undertaking a transition care program: A prospective cohort study.* Manuscript submitted for publication and under peer review.

Author contributions:

JAH led the drafting of the manuscript. AMH, JAH, JFC and NW conceptualised the design and assisted with monitoring the research. AMH and JAH led the research procedure with support from JFC and KP. JAH collected the data with assistance from JFC, and KP led management of the research at the facility. NW provided expert clinical input to the research design and selection of outcome measures. AJ provided guidance and contributed to statistical analysis. All authors provided critical evaluation and approval of the final submitted manuscript.

Supplementary Paper (Feasibility Study to Chapter 7)

Wong, Y. G., **Hang, J. A.**, Francis-Coad, J., & Hill, A. M. (2021). *Using comprehensive geriatric assessment for older adults undertaking a facility-based transition care program to evaluate health outcomes: A feasibility study*. Manuscript submitted for publication and under peer review.

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WYG led the drafting of the manuscript. JAH, AMH, JFC and YGW led the research design and assisted with monitoring the research. JAH and AMH led the research procedure with support from JFC and YGW. JAH collected the data with assistance from JFC. AMH, JAH, JFC and WYG contributed to statistical analysis. All authors provided critical evaluation and approval of the final submitted manuscript. WYG undertook this research as part of his Honours Project for Bachelor of Science (Physiotherapy).

Contributions to thesis as a whole

Professor Anne-Marie Hill was the principal supervisor who conceptualised the research. Professor Hill provided major guidance and assistance with the drafting and editing of all manuscripts and thesis, scrutinising iterative drafts and the final document.

Dr. Jacqueline Francis-Coad was co-supervisor who contributed to the design and methods of the research project. Dr. Francis-Coad provided guidance and assistance with drafting and editing of all manuscripts and thesis, scrutinising iterative drafts and the final document.

Dr. Nicholas Waldron was co-supervisor who contributed clinical expertise for the research project. Dr. Waldron assisted with editing the manuscripts and thesis, scrutinising iterative drafts and the final document.

Ms. Angela Jacques, biostatistician, contributed to the statistical analysis of the systematic review and all quantitative findings in the research project. Ms. Jacques assisted with editing the methods and results of the quantitative manuscript, scrutinising drafts and the final document.

Mrs. Robyn Knuckey commenced as site lead project manager and representative liaison for Amana Living Inc. Mrs. Knuckey coordinated project approval from the clinical governance committee and provided clinical input for the research project.

Mrs. Kate Purslowe replaced Mrs. Knuckey (following retirement) as site lead project manager and representative liaison for Amana Living Inc. Mrs. Purslowe provided clinical input for the remainder of the research project.

Dr. Chiara Naseri was co-author of the systematic review and retrospective studies, assisting with methodology and statistical analyses. Dr. Naseri also assisted with editing both studies' manuscripts, scrutinising iterative drafts and the final documents.

Dr. Portia Ho was co-author of the qualitative study contributing to transcription of participant interviews and thematic analysis. Dr. Ho also assisted with editing the results of the qualitative manuscript, scrutinising iterative drafts and the final document.

Mr. Ying-Git Wong was the Honours student and first author of the feasibility study contributing to this thesis. Mr. Wong drafted the manuscript and performed data analysis with assistance from Ms. Jo-Aine Hang, Professor Anne-Marie Hill and Dr. Jacqueline Francis-Coad as part of Ms. Hang's doctoral thesis.

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"A challenging yet rewarding journey – one that cannot be missed"

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Chapter One

1

Introduction and Outline

1.1 Introduction to the Research

Approximately 42% of all hospital admissions in Australia comprise older adults (Australian Institute of Health and Welfare, 2018, 2021). Over one third of older adults experience functional decline after an episode of hospitalisation and many are unable to return to independent living (Hoogerduijn et al., 2012; Sager et al., 1996; Yoo, Kim, Oh, Hwang, & Lee, 2019). These older adults are at risk of hospital readmissions, further functional decline, falls, and premature admission to residential aged care (RAC) (DePalma et al., 2013; Naseri et al., 2020). In response to this population's health care needs, the Federal and State Governments of Australia have jointly funded Transition Care Programs (TCP) which commenced in 2005 (Australian Government Department of Health, 2019). TCP are defined as goal-oriented, short-term care programs that provide older adults with a continuum of care after hospital discharge to facilitate functional independence and prevent unplanned hospital readmissions and premature admission to RAC (Australian Government Department of Health, 2021a). Australian TCP have a similar structure and elements compared to transitional care services in other countries such as "intermediate care" in the United Kingdom (UK), "skilled nursing" in the United States of America (USA) and "slow stream rehabilitation" in Canada (Leung et al., 2016; Medicare.gov, n.d.; Young, Gladman, Forsyth, & Holditch, 2015). In 2019-2020, 24,775 older adults undertook TCP in Australia (Australian Government Department of Health, 2021b). Depending on the country, TCP may be delivered in either a transition care (TC) facility (often co-located in a RAC setting), an older adult's home (community-based) or occasionally in a hospital ward (Australian Government Department of Health, 2019; Medicare.gov, n.d.; Young et al., 2005; Young et al., 2015).

Although TCP are provided for older adults who are functionally deconditioned, home-based TCP require older adults to be functionally more capable and able to undertake TCP safely in the home setting as no 24-hour care is provided (Australian Government Department of Health, 2021a). *Home-based TCP* can be considered as step-down rehabilitation for older adults to better engage independently in the community (Australian Government Department of Health, 2021a). Step-down rehabilitation is interim care that is provided to older adults who can safely manage at home after hospital discharge without requiring 24-hour nursing care. These older adults may require some services at home to assist them with either personal care, IADL or rehabilitation to improve functional capabilities but are able to return to community living with support from services, family and friends (Australian Government Department of Health, 2021a). *Facility-based TCP* deliver low-intensity rehabilitation to older adults who are functionally deconditioned and require more assistance for activities of daily living (ADL) and

instrumental activities of daily living (IADL) (Australian Government Department of Health, 2021a). They provide therapy, personal care assistance and nursing care as required, and assist older adults to plan for long term discharge support (Australian Government Department of Health, 2019, 2021a). There are significant differences between the rehabilitation environments, mode of service delivery and staffing associated in facility-based compared to community-based (home) TCP (King, Parsons, & Robinson, 2012; Mallinson et al., 2014; Young et al., 2015). TCP may also differ between countries. For example, older adults with higher levels of physical ability and planned discharge to home were selected to undertake TCP in facility settings in Norway (Abrahamsen, Haugland, Nilsen, & Ranhoff, 2014). This contrasts with Australia, where older adults who are either waiting for a fracture to heal or are functionally deconditioned are considered ideal candidates to undertake TCP in a facility setting (Australian Government Department of Health, 2019, 2021a). TCP in Norway is also of shorter duration compared to Australia and USA (Abrahamsen et al., 2014, 2016; Australian Government Department of Health, 2019; Medicare.gov, n.d.).

Evidence for the effectiveness of TCP for improving health outcomes is limited and inconsistent. Previous observational studies have found that older adults who have completed facility-based TCP demonstrated improvements in functional mobility and performance of ADL (Abrahamsen et al., 2014; Lenze et al., 2019). Undertaking TCP in hospital wards and facility-based settings has also been found to assist older adults to transition from hospital back to the community whilst decreasing unplanned hospital readmissions (Australian Government Department of Health, 2015; Young et al., 2015). A systematic review that included six studies was not able to pool studies in meta-analysis and found limited evidence that facility-based TCP improved performance of ADL or reduced rates of hospitalisation compared to usual discharge care (Toles, Colón-Emeric, Naylor, Barroso, & Anderson, 2016). In this review, outcomes evaluating cognitive ability, functional mobility or health-related quality of life (HRQoL) were not reported. A recent national audit in Australia found that older adults who were female, younger, and less frail, had a shorter length of stay (LOS) in hospital, lower performance of ADL at admission to TCP, and a longer LOS in TCP were more likely to return home. However, this audit only reported performance of ADL and discharge destination (Cations et al., 2021). Changes in other health-related outcomes that might influence older adults' ability to return to independent community living after completing a TCP, such as mobility and cognition, were not evaluated.

1.1.1 Research Problem

Overall, prior to the research conducted as part of this thesis, investigations of facility-based TCP that evaluated older adults' short-term or long-term health outcomes were limited.

Observational studies conducted in TC facilities in multiple countries primarily focussed on older adults' discharge destination and LOS (Gustavson, Falvey, Forster, & Stevens-Lapsley, 2019; Leung et al., 2016; Mallinson et al., 2014). Outcomes such as emotional wellbeing and gait speed, have been infrequently measured in facility-based TCP (Lenze et al., 2019; Leung et al., 2016). Two small randomised controlled trials (RCTs) in Australia that evaluated providing additional physiotherapy treatments in two TC facilities found that this intervention did not significantly improve older adults' HRQoL and functional mobility compared to standardised care alone (Lawler, Shields, & Taylor, 2019; Parker, Hill, Cobden, Davidson, & McBurney, 2015). No RCT conducted to date had evaluated the effect of undertaking TCP in facility settings compared to home-based TCP or in-hospital rehabilitation. Additionally no systematic reviews had been conducted to evaluate the effectiveness of facility-based TCP on the health-related outcomes of older adults. Therefore, there was no level I evidence regarding older adults' health outcomes in facility-based TCP (The National Health and Medical Research Council, 2009). Since there were limited appropriately designed trials that provided high quality evidence regarding the effect of TCP on older adults' health outcomes, this meant more research was required. Appropriate evidence allows strong recommendations about treatments to be made, which can in turn assist in clinical decision making (Burns, Rohrich, & Chung, 2011; The National Health and Medical Research Council, 2009).

National audits of services providing TCP in both Australia and the UK reported that older adults' performance of ADL was the only health outcome routinely reported (Australian Government Department of Health, 2019; Young et al., 2015). Performance of ADL only provides insight into an older adult's self-care ability without giving a complete understanding of the individual's physical ability such as cardiovascular endurance, strength, balance and gait speed (Wang, Yao, Zirek, Reijnierse, & Maier, 2020). Additionally, assessment of ADL does not provide an insight into other health issues affecting older adults' ability to live independently in the community and maintain participation in their life activities, such as level of cognitive ability, other physical abilities, emotional and social wellbeing (Abdi, Spann, Borilovic, de Witte, & Hawley, 2019; Ahlqvist, Nyfors, & Suhonen, 2015). Since the population of older adults entering TC pathways are becoming frailer and have more complex needs, including psychosocial needs and social issues, it has been suggested that a more holistic approach of understanding and evaluating these older adults' health is required (Australian Government Department of Health, 2019, p.40). Additionally, only scant research had sought to understand older adults' feedback about participation in TCP and their perspective about its impact on their lives. In summary, it was unclear exactly how facility-based TCP impacted on older adults' health outcomes and if it prepared them effectively for discharge home.

1.1.2 Research Purpose

There is limited evidence about the effectiveness of undertaking facility-based TCP on older adults' health-related outcomes. There is also scant research reporting older adults' experiences undertaking TCP. It is important to evaluate whether facility-based TCP are an effective means of improving older adults' health outcomes after a hospital admission and whether they successfully facilitate older adults to return to independent community living. Continuous evaluation of TCP is also important as they shape the rehabilitation journey. TCP operate as a transition or bridge between the hospital and the home. They assist to identify and address the levels and types of services required in preparing this population to return to independent community living and delay admission to permanent RAC. Therefore, the purpose of this research was to evaluate the impact of a TCP on older adults' health and wellbeing by determining the health-related outcomes and the benefits, barriers and enablers for older adults undertaking TCP in a TC facility in Western Australia (WA).

1.2 Organisation of Thesis Chapters

Chapter 2

Chapter two describes the mixed methods design utilised to address the research aims, which included both quantitative and qualitative phases.

Chapter 3

Chapter three describes a systematic review protocol utilised to synthesise the best available evidence for the effectiveness of TCP on health-related outcomes for older adults admitted to a TC facility after hospitalisation. This chapter is based on a published article.

Hang, J. A., Francis-Coad, J., Naseri, C., Waldron, N., & Hill, A. M. (2020). Effects of facility-based transition care programs on health-related outcomes in older adults: A systematic review protocol. *JBI Evidence Synthesis, 18*(11), 2425-2434. doi:10.11124/JBISRIR-D-19-00240

Chapter 4

Chapter four is a systematic review and meta-analysis that evaluated the best available evidence for the effectiveness of TCP on health-related outcomes for older adults admitted to a TC facility after hospitalisation. This chapter is based on a published article.

Hang, J. A., Naseri, C., Francis-Coad, J., Jacques, A., Waldron, N., Knuckey, R., & Hill, A. M. (2021). Effectiveness of facility-based transition care on health-related outcomes for older adults: A systematic review and meta-analysis. *International Journal of Older People Nursing*, 00, e12408. doi:10.1111/opn.12408

Chapter 5

Chapter five is a retrospective cohort study that audited a transition care service to identify the association between the characteristics of older adults undertaking a facility-based TCP and i) discharge destination and ii) functional improvement. This chapter is based on a published article.

Hang, J. A., Francis-Coad, J., Naseri, C., Jacques, A., Waldron, N., Purslowe, K., & Hill, A. M. (2021). Identifying the association between older adults' characteristics and their health-related outcomes in a transition care setting: A retrospective audit. *Frontiers in Public Health, 9,* 688640. doi:10.3389/fpubh.2021.688640

Chapter 6

Chapter six is a qualitative study that explored the lived experience of older adults undertaking a TCP at a TC facility in WA. Family members and staff also participated in this study. This chapter is based on a manuscript that has been accepted for publication.

Hang, J. A., Francis-Coad, J., Ho, P., Waldron, N., Purslowe, K., & Hill, A. M. (2022). "Is my journey destination home?" Exploring the experiences of older adults who undertake a transition care programme: A qualitative study. *Ageing & Society,* 1-16. doi:10.1017/S0144686X22000253.

Chapter 7

Chapter seven is a prospective single-centre cohort study that aimed to: i) comprehensively evaluate older adults' health-related outcomes when undertaking a facility-based TCP, and ii) compare health-related outcomes between participants discharged home and those discharged to RAC. A feasibility study was conducted first (Wong et al., 2021, see Appendix B), which formed part of an undergraduate student's Honours research project, submitted for publication (under peer review) where Ms. Hang was the second author. This chapter is based on a manuscript that is currently under review at a journal.

Hang, J. A., Francis-Coad, J., Jacques, A., Waldron, N., Purslowe, K., & Hill, A. M. (2021). *Health-related outcomes of older adults undertaking a transition care program: A prospective cohort study.* Manuscript submitted for publication and under peer review.

Chapter 8

Chapter eight discusses and synthesises the key findings of the research within the clinical context of TCP. The strengths and limitations of the research are summarised. Finally, implications for policy and practice that arise from the research and recommendations for future research are presented.

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Chapter Two

2

Research Methods

2.1 Introduction

Chapter 2 describes the methods used in the research conducted as part of the thesis. An overview of the methods is provided in this chapter, and the specific methods for each study are described in detail in the relevant chapters.

2.2 Research Aims

The purpose of this research was to evaluate the impact of TCP on older adults' health and wellbeing by determining the health-related outcomes and the benefits, barriers and enablers for older adults undertaking TCP in a TC facility in WA.

The specific research aims were:

1. To synthesise the best available evidence for the effectiveness of TCP on health-related outcomes for older adults admitted to a TC facility after hospitalisation (Study 1 – Chapters 3 and 4);
2. To audit a transition care service to identify the association between the characteristics of older adults undertaking a facility-based TCP and i) discharge destination and ii) functional improvement (Study 2 – Chapter 5);
3. To explore the lived experience of older adults undertaking a TCP at a TC facility in Western Australia (Study 3 – Chapter 6); and
4. To:
    i) comprehensively evaluate older adults' health-related outcomes when undertaking a facility-based TCP and
    ii) compare health-related outcomes between participants discharged home and those discharged to residential aged care (Study 4 – Chapter 7).

2.3 Research Structure

An overview of the research structure is presented in Figure 2.1.

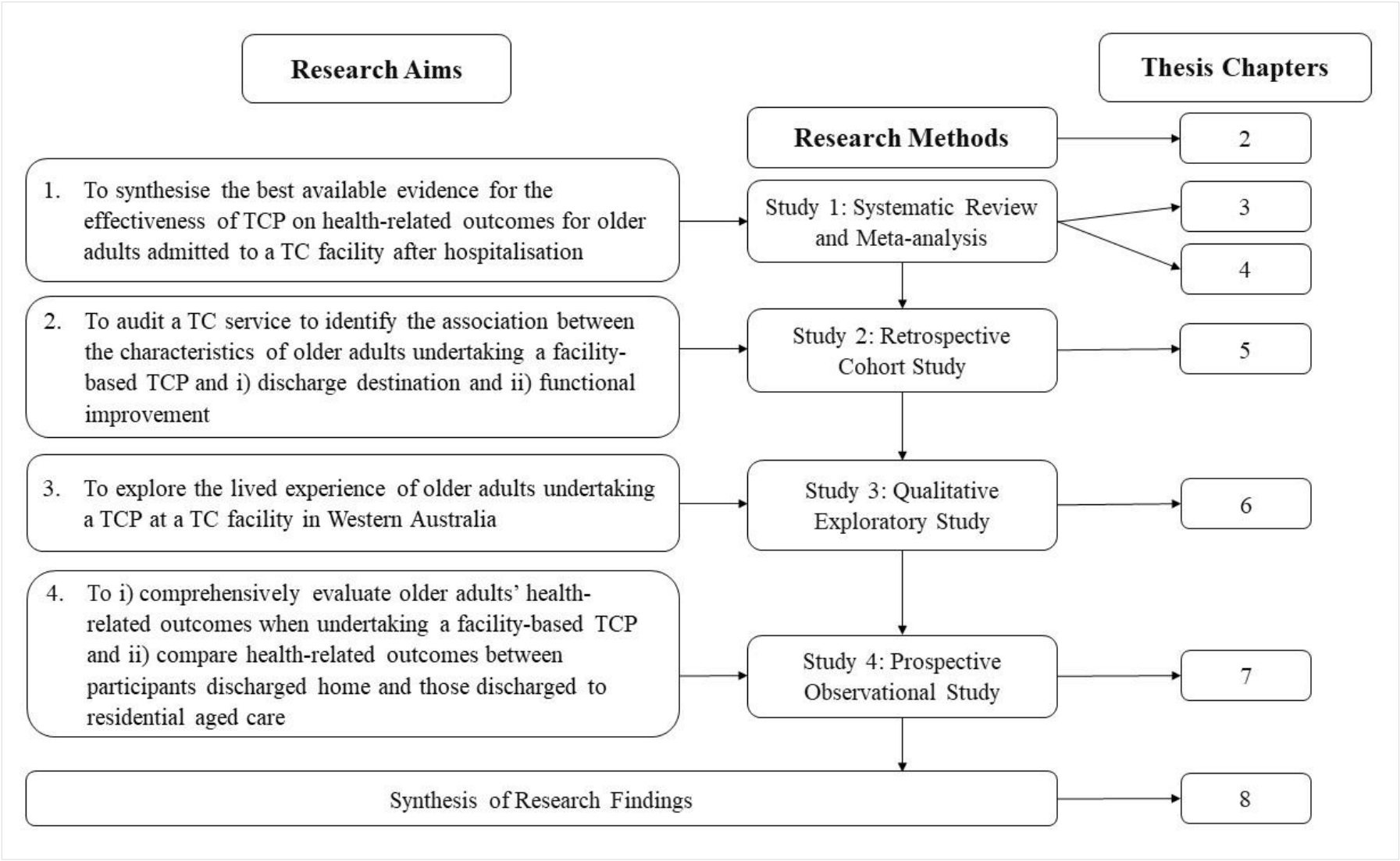

Figure 2.1 Overview of research structure

2.4 Research Design

The research utilised a two-phased mixed method design with concurrent and sequential data collection (Creswell & Plano Clark, 2017). Figure 2.2 represents an overview of the research design. A mixed method design was selected as it allowed qualitative and quantitative data collection from a variety of sources, permitting triangulation of the results (Creswell & Plano Clark, 2017). This design allowed the strengths of quantitative research to make up for the weaknesses of qualitative research and vice versa (Creswell & Plano Clark, 2017, p.12). Synthesis of the findings from the phases of the research assisted in providing a more comprehensive answer to the primary research question than using one method alone (Creswell & Plano Clark, 2017).

In phase one, a systematic review (Study 1) was completed concurrently with a retrospective cohort study of a facility-based TCP population (Study 2). Findings from this phase of the research enabled the researcher to determine which health-related outcomes would be the most applicable and relevant to use in phase two of the research.

In phase two, an exploratory qualitative study (Study 3) was conducted to gain insight into older adults' experiences when undertaking facility-based TCP. A descriptive phenomenological approach was selected for Study 3 because there was limited published research that explored the lived experiences of older adults undertaking TCP in a facility setting (Beck, 2019; Matua & Van Der Wal, 2015). Subsequently, a prospective observational study (Study 4) was conducted to evaluate the health-related outcomes of older adults undertaking TCP in a facility setting and compare the health-related outcomes of those who were discharged home compared to those discharged to RAC. Prior to the commencement of the prospective observational study, a feasibility study was conducted to determine the feasibility of using a comprehensive geriatric assessment (CGA) in a facility-based TCP to evaluate changes in older adults' health-related outcomes (Wong et al., 2021, see Appendix B).

Synthesis of findings from all four studies enabled the researcher to develop clinical recommendations to the TC provider and provide research recommendations for future investigations regarding TCP. Recommendations are discussed further in Chapter 8.

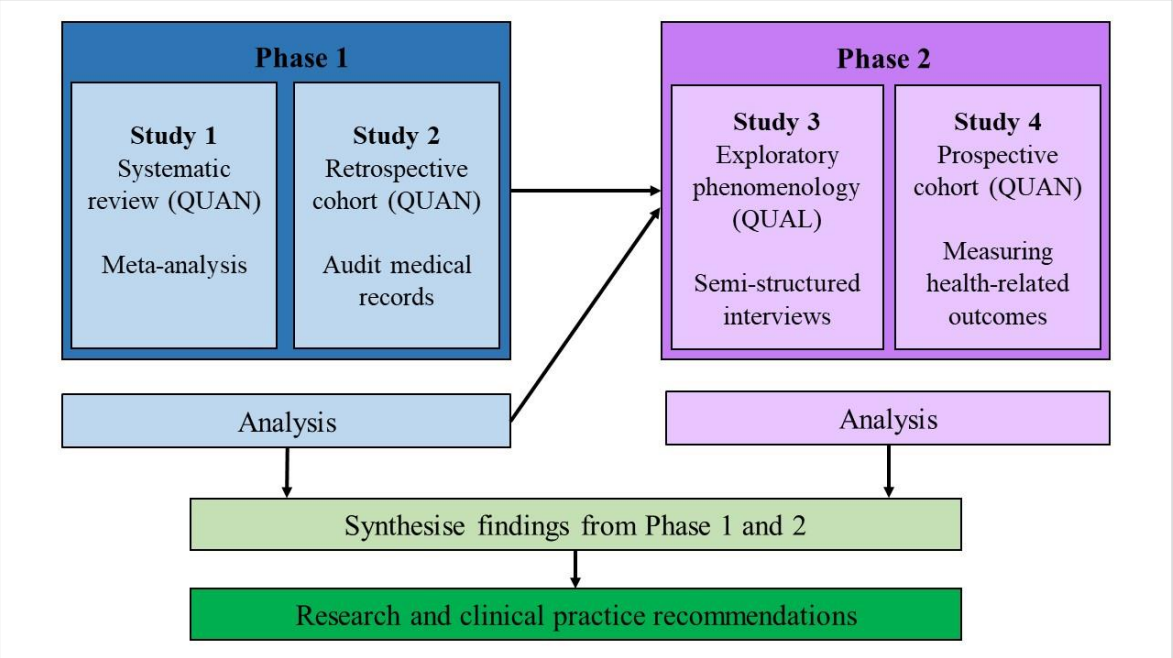

Figure 2.2 Overview of the research design (two-phased mixed method)

2.5 Ethical Considerations

The research conformed to the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research 2007 (The National Health and Medical Research Council, the Australian Research Council and Universities Australia, 2018). Ethical approvals were obtained from Curtin University Human Research Ethics Committees and Amana Living Inc. Clinical Governance Committee for Study 2 (HRE2019-0021), Study 3 (HRE2020-0075-01) and Study 4 (HRE2020-0506) (see Appendix C and Appendix D). All participants were provided with written and verbal information regarding the studies and subsequently provided written informed consent. Written informed consent was provided by the next-of-kin or a legal guardian for participants who did not have the capacity to provide consent.

2.6 Participants and Setting

Three of the four studies (Studies 2, 3, & 4) were conducted at the 47-bed single-storey TC facility in metropolitan Perth, WA. The facility comprised communal rehabilitation rooms, dining, lounge and outdoor garden areas. The TCP included physiotherapy for functional and mobility training (seated group classes six days a week with additional one-to-one hands-on therapy if appropriate), occupational therapy for cognitive activities, meal preparation activities and home visits, and social work for discharge planning, mental health support and care support at home. The facility also provided social programs such as one-to-one sessions with an

occupational therapy assistant for emotional and social support (particularly during Covid19 visitors' restriction period) and bus trips. Health professional staffing included a manager, registered nurses, a physiotherapist, two social workers who shared the workload and an occupational therapist who worked two days a week. A general practitioner, speech pathologist, nutritionist, podiatrist, clinical psychiatrist and geriatrician visited as required. Care assistant staff also assisted older adults with daily personal care.

The structure and staffing levels of the TC facility was similar to other facilities in WA. Although TCP guidelines (updated July 2021) provided a definition for low therapy rehabilitation, it did not specify the duration and types of therapy involved (individual or group) (Australian Government Department of Health, 2021a). There are no published data to date that report this. According to the national TCP review conducted, TCP in WA differed from other states as most of the TCP are facility-based and our TCP accept older adults with delirium and non-weight bearing fractures (Australian Government Department of Health, 2019). Additionally, TCP in WA enrolled a higher number of older adults who were waiting for permanent RAC (Australian Government Department of Health, 2019). This concurred with an editorial published in 2010 stating that there is a variation in the implementation of TCP according to the needs of the region such as some provides rehabilitation, and some provides interim care while waiting for permanent RAC (Cameron et al., 2010).

Participants included in the studies were older adults aged 60 years and over, who were admitted to the facility to undertake a TCP. Family members, TC staff and off-site hospital health professionals were also included in Study 3. Studies 3 and 4 were conducted with participants face-to-face on site, but during Covid19 visitors' restriction period some Study 3 interviews were conducted via online or telephone. Participants' recruitment is presented in detail in each chapter. Independent samples of older adults were recruited for Study 3 and 4 to increase representation, meaning that each study design had a sufficient and appropriately drawn sample size (Creswell & Plano Clark, 2017). The intent was to analyse the quantitative and qualitative datasets separately, then synthesise the findings in the final section of the thesis (Creswell & Plano Clark, 2017). This would provide a rich and integrated set of findings to comprehensively assist in answering the research objective.

2.7 Data Collection Procedure

As part of the mixed method design, data from phase one of the research were collected and analysed to inform phase two. Table 2.1 summarises the data collected in each study and identified rationale for each chapter.

Table 2.1
Study data collection

Study	Data collection	Rationale	Chapter
Phase one			
1	Systematic review *(Quantitative)*	The systematic review addressed a well-defined query with clear study inclusion criteria and comprehensive methods that aimed to evaluate and summarise the effectiveness of TCP in facility settings on older adults' health-related outcomes. This ensured a detailed analysis and synthesis of the types of health-related outcomes measured in the area of facility-based TCP and whether TCP were effective in assisting older adults to improve their health-related outcomes, particularly to be discharged to home and improve their functional capabilities.	3, 4
2	Retrospective study *(Quantitative)*	A retrospective cohort study was conducted to determine characteristics of older adults admitted to the TC facility. This enabled researchers to identify any associations with functional improvement and successful discharge home. Findings aimed to inform which older adults might benefit from TCP and assist the future allocation of scarce health resources. Gaps in comprehensively measuring older adults' health-related outcomes were identified and reviewed together with the findings from the systematic review (Study 1).	5
Phase two			
3	Exploratory study (semi-structured interviews) *(Qualitative)*	A qualitative exploratory study was conducted using a descriptive phenomenological approach to explore participants' lived experience while undertaking TCP in facility-based setting (Matua & Van der Wal, 2015). Using this approach enabled researchers to gain rich and in-depth information from multiple perspectives while retaining the authenticity of the participants' lived experience (Liamputtong, 2013). Semi-structured interviews gathered specific data on topics of interest and identified key themes that had not been previously reported. Findings from the research aimed to inform the design and development of patient education materials that could assist older adults and their families preparing to undertake and navigate TCP.	6
4	Prospective observational study *(Quantitative)*	A prospective observational study was undertaken to evaluate changes in older adults' health-related outcomes in TCP. Prior to the commencement of this study ten assessment tools, measuring outcomes across four health domains, were piloted to determine feasibility of usage (Wong et al., 2021, see Appendix B). The outcomes were selected to comprehensively assess function across physical, cognitive, emotional and social domains, and were based on principles of CGA. No research to date had holistically measured older adults' health outcomes using a CGA in a TC setting. This enabled researchers to evaluate whether older adults undertaking facility-based TCP demonstrated improved health outcomes, other than self-care.	7

2.8 Data Analysis

All data are presented in detail in text, figures and tables in the corresponding chapters. Data analyses are also described in full in each chapter. Briefly, the systematic review in Study 1 used the Joanna Briggs Institute (JBI) critical appraisal tools to examine the quality of the studies that were included in the review (Tufanaru, Munn, Aromataris, Campbell, & Hopp, 2020). Meta-analyses were conducted using the Metaprop command in STATA version 16.1 (StataCorp. 2019. Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC), and forest plots were produced to present the proportions of older adults discharged home from TCP (Nyaga, 2021). Study 2 utilised logistic regression to determine older adults' characteristics that were predictors of being discharged home. Linear mixed modelling was used to determine predictors of functional ability improvements during older adults' stay in TCP in Study 2 and Study 4. Additionally, Study 4 used negative binomial regression to analyse changes in gait speed and time taken to complete Time Up and Go (TUG) (seconds) between admission and discharge. Study 3 (Qualitative) utilised an inductive thematic analysis to generate themes from the "bottom up" and identified patterns which were linked to the interview data collected (Braun & Clarke, 2013).

2.9 Conclusion

This chapter described the two-phased mixed method research design, and the application of the study aims from Chapter 1 to the research structure. This structure forms the framework for the subsequent thesis chapters.

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Chapter Three

3

Effects of Facility-Based Transition Care Programs on Health-Related Outcomes in Older Adults: A Systematic Review Protocol

Preface

This chapter describes a study protocol for a systematic review that was conducted during phase one of the research. The objective of the review was to synthesise the best available evidence for the effectiveness of TCP on health-related outcomes for older adults admitted to a TC facility.

This chapter is based on the following published article.

PAPER 1

Title:	Effects of facility-based transition care programs on health-related outcomes in older adults: A systematic review protocol.
Reference:	Hang, J. A., Francis-Coad, J., Naseri, C., Waldron, N., & Hill, A. M. (2020). Effects of facility-based transition care programs on health-related outcomes in older adults: A systematic review protocol. *JBI Evidence Synthesis, 18*(11), 2425-2434.
Online:	http://dx.doi.org/10.11124/JBISRIR-D-19-00240

The author's version of the manuscript is presented with modifications to suit the style and format of this thesis. A reprint of the published article's cover page is shown in Appendix E.

Abstract

Introduction

Approximately 30% of older adults admitted to hospital experience functional decline after hospital discharge. To enable older adults to return to independent community living after hospitalisation, TCP that focus on promoting safe recovery and maximising older adults' functional ability were established. Limited studies have examined whether undertaking TCP after hospitalisation results in improved health related outcomes for older adults compared to usual discharge care. Findings from these studies regarding the effect of TCP on health-related outcomes are conflicting, including whether TCP are an effective means of improving older adults' functional ability and enabling their return to independent community living. The objective of the review is to synthesise the best available evidence for the effectiveness of TCP on health-related outcomes for older adults admitted to a TC facility.

Inclusion criteria

Studies that include participants 65 years of age or older, deliver TCP in a facility-based setting and report health-related outcomes will be included. Randomised and quasi-controlled study designs as well as observational cohort designs with pre-post outcomes will be included.

Methods

A three-step search strategy will be utilised. Databases that will be searched PubMed, CINAHL (EBSCO), AMED (Ovid), PsycINFO, and Embase (Ovid) and studies published after 2000 will be included. Results of the search strategy will be presented using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram. Data extracted will include population characteristics, study design, duration and intensity of the TCP and health-related outcomes significant to the review question, including the discharge destination from TCP (independent community living, RAC or hospital). Quantitative data, where possible, will be pooled in statistical meta-analysis.

3.1 Introduction

Older adults who have been recently hospitalised are at high risk of functional decline and re-hospitalisation (Franchi et al., 2013). There is strong evidence that approximately 30% of older adults have reduced ability to perform one or more ADL after hospital discharge compared to pre-admission (Covinsky et al., 2003; Sager et al., 1996). Many older adults who require hospital admission are frail and have multiple comorbidities (Covinsky et al., 2003; Sager et al., 1996). Hospital-caused functional decline superimposed on existing comorbidities may prevent older adults from returning to live independently in the community, result in hospital readmissions, which in turn can lead to further functional decline, and may also subsequently lead to admission into RAC (Covinsky et al., 2003; Franchi et al., 2013; Hoogerduijn et al., 2012; Kleinpell, 2008; Sager et al., 1996). Additionally, although older adults comprised 42% of all hospital admissions in Australia in 2016-17, 90% of these admissions were episodes of acute care and only 7% were episodes of care for rehabilitation (Australian Institute of Health and Welfare, 2018). These data indicate that most older patients do not receive rehabilitation care following an episode of acute care, but are discharged directly home regardless of possible functional decline. A national Australian report (2008-2009) found that approximately 4.4% (47,000) of older adults discharged from hospital either completed TCP (1.0%), were transferred to respite care in RAC (1.2%), or entered RAC permanently (2.2%) (Australian Institute of Health and Welfare, 2012, 2013). Hence, it is vital to assist older adults to regain their pre-morbid functional ability and overall health to prevent unnecessary hospital readmissions or premature RAC admission (Fong, Mitchell, & Koh, 2015).

Multiple national health care services have established rehabilitation programs, including TCP, to provide rehabilitation for older adults after hospitalisation (Australian Government Department of Health, 2015, 2021a; Griffiths, Edwards, Forbes, Harris, & Ritchie, 2007; Jacobs, Baird, Parsons, & Sheridan, 2011; Leung et al., 2016; Morita et al., 2018; Nakanishi, Shindo, & Niimura, 2016; Parsons et al., 2012; Senior et al., 2014; Toles, Colón-Emeric, Asafu-Adjei, Moreton, & Hanson, 2016; Young, Gladman, Forsyth, & Holditch, 2015). TCP and similar programs, such as rehabilitation in the home, aim to enable older adults to regain the functional level required to successfully transition from hospital back to independent community living (Australian Government Department of Health, 2015, 2021a; Griffiths et al., 2007; Jacobs et al., 2011; Leung et al., 2016; Morita et al., 2018; Nakanishi et al., 2016; Parsons et al., 2012; Senior et al., 2014; Toles et al., 2016; Young et al., 2015). TCP were established in Australia in 2004, while an equivalent service known as “intermediate care” was established in the UK in 2001, to provide older people with a continuum of care after hospital discharge

(Australian Government Department of Health, 2015, 2021a; Griffiths et al., 2007; Young et al., 2015). TCP aim to facilitate safe recovery after an acute episode of care in hospital, while maximising older adults' functional independence prior to returning home to the community (Australian Government Department of Health, 2015, 2021a; Griffiths et al., 2007; Young et al., 2015). TCP are also known as "skilled nursing facility care" in the USA, intermediate care (delivered in a TC facility) or "restorative care" (delivered at home in the community) in New Zealand (NZ), "slow stream rehabilitation" in Canada and "geriatric intermediate care" in Japan (Griffiths et al., 2007; Jacobs et al., 2011; Leung et al., 2016; Morita et al., 2018; Nakanishi et al., 2016; Parsons et al., 2012; Senior et al., 2014; Toles et al., 2016; Young et al., 2015). Programs in these countries also aim to assist older adults to regain functional ability in order to return home (Griffiths et al., 2007; Jacobs et al., 2011; Leung et al., 2016; Morita et al., 2018; Nakanishi et al., 2016; Parsons et al., 2012; Senior et al., 2014; Toles et al., 2016; Young et al., 2015). Skilled nursing facility care in USA provides rehabilitation programs that are similar to TCP except that Medicare in USA only provides financial assistance for older adults undertaking TCP for up to 100 days (Australian Government Department of Health, 2021a; Griffiths et al., 2007; Toles et al., 2016). Slow-stream rehabilitation in Canada consists of low intensity therapy of 20 minutes initially for three times per week for a maximum duration of 120 days (Leung et al., 2016). Both the USA and Canadian TCP are provided in either home or facility settings (Leung et al., 2016; Toles et al., 2016). The key difference between intermediate or restorative care in NZ and TCP delivered in Australia is that in NZ designated caregivers are assigned to eligible older adults for up to 12 weeks (Jacobs et al., 2011; Parsons et al., 2012; Senior et al., 2014). The NZ intermediate care programs are delivered in facilities rather than at home, and the rehabilitation specialist/geriatrician leads the development of a suitable rehabilitation program (Jacobs et al., 2011; Parsons et al., 2012; Senior et al., 2014). Similarly to TCP in Australia, geriatric intermediate care facilities in Japan also provide facility-based rehabilitation for older adults for up to 3 months to facilitate discharge home. Programs in Japan also promote rehabilitation that addresses challenging behaviours and physical comorbidities in older adults diagnosed with dementia (Morita et al., 2018; Nakanishi et al., 2016).

Older adults are eligible for between six to 12 weeks of rehabilitation through TCP in Australia and up to 6 weeks in the UK either in hospital, in a TC facility or in the older adult's home (Australian Government Department of Health, 2021a; Griffiths et al., 2007; Parker, Hill, Cobden, Davidson, & McBurney, 2015; Young et al., 2015). Eligibility criteria include the patient requiring increased levels of independence to undertake personal or instrumental ADL, assistance to address psychological problems or increased social support (Australian Government Department of Health, 2021a; Government of Western Australia Department of

Health, 2019; Lawler, Shields, & Taylor, 2019). Rehabilitation delivered via TCP broadly comprise case management by an allied health team either at the patient's home or in a facility (Australian Government Department of Health, 2021a; Government of Western Australia Department of Health, 2019). Therapy provided by the team usually consists of physiotherapy, occupational therapy and/or speech pathology. Therapy is individually tailored for each patient and aims to improve physical, cognitive and psychosocial function to enable successful return to independent community living (Australian Government Department of Health, 2021a, 2021b; Government of Western Australia Department of Health, 2019). Medical services including medication review are provided by a general practitioner, as well as nursing support and personal care (Australian Government Department of Health, 2021a, 2021b). Additional therapy is provided by social workers, speech pathologists, dieticians or podiatrists as required (Australian Government Department of Health, 2021a, 2021b; Parker et al., 2015). Case management also includes establishing community supports and services for the older adult's planned discharge back to the community, as well as organising RAC options if required (Australian Government Department of Health, 2015, 2021a, 2021b).

Over 25,000 older adults in Australia undertook TCP either in the community or at a TC facility with an average LOS of 60 days during 2017-2018 (Australian Government Department of Health, 2019, 2021a). Although an episode of care in a TC facility is less costly compared to in-patient hospital care, there is limited evidence that it is more effective than a hospital episode of care in enabling older adults to successfully return to independent community living. Few studies have evaluated the health-related outcomes of older adults undertaking TCP. A prospective observational cohort study of older adults (n=557, median age 86 years) in Norway demonstrated that better levels of mobility and cognitive function after completing TCP predicted successful discharge home (Abrahamsen, Haugland, Nilsen, & Ranhoff, 2014). Another prospective observational study (n=299) which evaluated the effect of TCP on health-related outcomes also found that TCP improved older adults' levels of cognition and physical independence (Fiorini et al., 2013). However, a recent RCT in Australia found that four extra episodes of functional exercise completed daily, in addition to standardised physiotherapy treatment, did not improve health-related outcomes or function among the 28 participants compared to the 32 participants who participated standardised physiotherapy treatment in a TC facility (Parker et al., 2015). Another pilot RCT (n=35) conducted in a TC facility in Australia evaluated whether having additional therapy assisted by a family member compared to having standardised physiotherapy improved falls-related self-efficacy and other health-related outcomes (Lawler et al., 2019). This trial found that there were no between-group differences for falls-related self-efficacy or quality of life and

concluded that that it was unclear if TCP improved health-related outcomes for older adults (Lawler et al., 2019). Additionally, formal evaluation of TCP throughout Australia has been limited to reporting one health-related outcome: performance of ADL, as measured by the Modified Barthel Index (MBI) (Australian Government Department of Health, 2015, 2019; Quinn, McArthur, Ellis, & Stott, 2011). In summary, there is uncertainty about whether TCP are an effective means of improving functional ability of older adults or increasing the likelihood of their successful discharge back to independent community living compared to usual discharge care. Hence, there is a gap in evidence for guiding best practice for delivery of TCP, which suggests that a systematic review is required.

A previous systematic review evaluated the evidence for the efficacy of interventions that aim to enable older adults to transition between health settings safely (Mansah, Fernandez, Griffiths, & Chang, 2009). This review found that there was weak evidence that a comprehensive care plan that delivered multifaceted interventions and was undertaken by health professionals reduced adverse events during the transition from hospital to home (Mansah et al., 2009). However, the review did not specifically examine whether TCP improved the rate of successful transitions from hospital to home compared to usual discharge care, improved the health of older adults who undertook such programs or increased the proportion of older patients who were successfully discharged home compared to being admitted to residential care (Mansah et al., 2009). Another systematic review (which synthesised evidence from 12 RCTs) found that some types of TCP (discharge plans undertaken by an advanced practice nurse, self-management and transition coaching, discharge case management by a nurse, inpatient geriatric evaluation and management) reduced rehospitalisation rates compared to usual discharge care (Allen, Hutchinson, Brown, & Livingston, 2014). However, the review found there was limited evidence about the effect of these TCP on patient and carers' experiences or patients' symptom management and no other findings on health-related outcomes were reported (Allen et al., 2014). Additionally, the studies included TCP undertaken in different settings, namely in hospital or at home, and other types of transitional care interventions, such as telephone follow-up, rather than being specific to TCP being conducted in a facility setting (Allen et al., 2014). A recent systematic review synthesised the evidence for the efficacy of TCP on health service utilisation in community dwelling older adults in six (USA, Canada, Sweden, Germany, Switzerland and Hong Kong) countries (Weeks et al., 2018). This review found that TCP reduces hospital readmission rates, with the largest effect demonstrated at 30 days, however the review did not examine the effect of TCP on other health-related outcomes, such as whether participants were successfully discharged home rather than being admitted to RAC (Weeks et al., 2018). A scoping review in Canada examined the

characteristics of slow-stream rehabilitation funded by government or quasi-government organisations (Maximos, Seng-iad, Tang, Stratford, & Bello-Haas, 2019). This review explored studies worldwide to determine which rehabilitation models provided by the Canadian Health Care System were effective, whether these impacted health-related outcomes, and the discharge destination of the participants (Maximos et al., 2019). Findings demonstrated that participants who received rehabilitation through a TCP regained functional ability. However, this review did not specifically compare TCP with other models of rehabilitation (Maximos et al., 2019). Another systematic review (which synthesised evidence from 2 RCTs, 2 non-RCTs, 2 pre-post observational cohort studies) found limited evidence for whether TCP improve clinical outcomes for older adults, as there were few health-related outcomes reported in the studies that met the inclusion criteria (Toles et al., 2016). Since systematic reviews conducted to date have not specifically examined the effect of providing TCP in facility settings on health-related outcomes, this review will contribute to the current evidence by identifying the best available evidence for the effectiveness of providing TCP for older adults in a facility setting.

A preliminary search of the Cochrane Database of Systematic Reviews, JBI Database of Systematic Reviews and Implementation Reports, PubMed, and CINAHL (EBSCO) found no recent systematic reviews on this topic that are underway. A recent systematic review registered in PROSPERO aims to evaluate the effectiveness of transitional or intermediate care interventions undertaken by older adults in any kind of setting (home, TC facility within RAC, hospital-based, outpatient clinical settings, or tele-health) on health-related outcomes, resource use and costs involved (Sezgin et al., 2020). Two other systematic reviews protocols have been published and these two reviews are presently being conducted (Høy & Ludvigsen, 2018; Ludvigsen & Hoy, 2018). The first is a qualitative systematic review exploring older adults' experiences when undertaking transitional care (Høy & Ludvigsen, 2018). The second is a scoping review that seeks to evaluate the level of patient engagement in planning and delivering interventions in TCP (Ludvigsen & Hoy, 2018). Neither of these reviews plans to examine physical, mental and social health-related outcomes of older adults who undertake TCP. Therefore, there is a gap in evidence about whether TCP delivered in a facility setting are an effective means of improving health-related outcomes for older adults compared to usual hospital discharge care or delivering TCP at home. Older adults have been found to consistently value being able to live independently in the community (van Leeuwen et al., 2019). However, older adults who are hospitalised are at significantly increased risk of functional decline and admission to RAC (Covinsky et al., 2003; Franchi et al., 2013; Hoogerduijn et al., 2012; Kleinpell, 2008; Sager et al., 1996). Hence, it is important to synthesise the best available evidence for programs that improve functional outcome, avoid hospital readmissions and lead

to successful discharge home to the community. The review will seek to determine if health-related outcomes for older adults undertaking TCP in facility settings differ significantly to providing usual discharge care or delivering TCP in the home.

The objective of the review is to synthesise the best available evidence for the effectiveness of TC rehabilitation programs on health-related outcomes for older adults admitted to a TC facility.

3.2 Review Question

In older adults (aged 65 years and older) who have been discharged from hospital, what are the effects of undertaking a TCP in a TC facility on health-related outcomes, including functional ability and discharge to independent community living, compared to usual discharge care or other rehabilitation programs?

3.3 Inclusion Criteria

3.3.1 Participants

This review will consider studies that include older adults (aged 65 years or older) undertaking a TCP. Studies that enrol participants less than 65 years will be excluded unless the mean age of participants is 65 years or older, or data are presented separately for participants 65 years or older. Studies where the population consists of participants with a range of medical or surgical conditions including fractures, cardiorespiratory problems, mental health problems, dementia or cognitive impairment will be eligible for inclusion. Studies will be excluded if they enrol participants receiving palliative care, or who are not undergoing rehabilitation, unless data from rehabilitation participants can be extracted separately for analysis. It has been reported that the characteristics of palliative care patients differ from those undertaking TCP because palliative care focuses on symptom management, with the aim of maximising personal comfort to improve patients' and families' quality of life until death (Kanach, Brown, & Campbell, 2014; Runacres, Gregory, & Ugalde, 2016).

3.3.2 Interventions

For the purpose of the review, a TCP is defined as a program that provides goal-oriented care and rehabilitation in a designated TC facility for older adults admitted directly from hospital (Australian Government Department of Health, 2021a; Government of Western Australia Department of Health, 2019). Studies will be excluded if they provide TCP for older adults in their own home (in the community) or in an outpatient setting (King, Parsons, Robinson, &

Jörgensen, 2012). This is due to differences between the rehabilitation environments, mode of delivery and staffing associated with TCP delivered in a facility compared to those TCP delivered in the older adult's home (Australian Government Department of Health, 2021a; King et al., 2012; Young et al., 2015). Studies will also be excluded if they enrol only participants who have been admitted to a TC facility to wait for RAC placement rather than undertaking a TCP. Where studies enrol both participants who are undertaking rehabilitation (TCP) and those waiting for RAC placement, they will be included if the outcomes for the rehabilitation participants can be extracted and analysed separately.

3.3.3 Comparators

The current review will consider studies that have no comparison group, comparing TCP to usual care, or comparing TCP to any other rehabilitation program. Usual discharge care is defined as standard care received by older adults after discharge from hospital, such as general practitioner follow-up with or without support services at home (Health Direct, 2019) while other rehabilitation programs are defined as any programs other than TCP delivered in a facility that provides services to improve the functional capability of an older adult after hospital discharge, such as TCP delivered in the home or other forms of rehabilitation (Australian Government, n.d.). Studies will be considered for inclusion if they compare how the TCP is delivered within the facility (such as a group setting compared to individually). Studies will also be considered for inclusion if they compare the effect of duration of the TCP, or an additional intervention to the standard TCP received in a TC facility, on health-related outcomes, such as comparing family-assisted therapy from a family member in addition to the standard TCP received in the facility (Lawler et al., 2019). For example, TCP in UK are usually undertaken for up to six weeks, whereas TCP in Australia are undertaken from between six weeks to 12 weeks (Australian Government Department of Health, 2021a; Young et al., 2015).

3.3.4 Outcomes

Studies will only be included in this review if they investigate health-related outcomes in older adults who complete a TCP in a facility. Health-related outcomes will be categorised according to four domains namely, physical, cognitive, emotional, and social (Quinn et al., 2011; Rubenstein, Wieland, & Bernabei, 1995; Ward & Reuben, 2020). For example, if a study evaluates older adults' physical function at admission and again at discharge from a TCP using a quantitative measure such as the MBI (measures ability to complete ADL), this will be included (Abrahamsen et al., 2014; Australian Government Department of Health, 2015, 2019).

The primary outcome of this review will be the health-related outcome (social) of discharge destination (independent community living, permanent RAC, readmission to hospital or death). This outcome is frequently used in rehabilitation settings as a measure of the older adult's recovery and of the effectiveness of the rehabilitation setting (Abrahamsen et al., 2014; Lawler et al., 2019; Morita et al., 2018; Parker et al., 2015). Secondary outcomes will be as follows: physical domain including independence in ADL, measured using the MBI; physical outcomes (e.g. walking speed measured in metres per second); functional mobility measured using de Morton Mobility Index (DEMMI) or the TUG Test; balance, measured using Berg Balance Scale; emotional outcomes (e.g. depression, measured using Geriatric Depression Scale); HRQoL, measured using EQ-5D; and cognitive ability, measured using the Mini Mental Examination Scale (Abrahamsen et al., 2014; Australian Government Department of Health, 2015, 2019; Creavin et al., 2016; de Morton, Davidson, & Keating, 2008; Dennis, Kadri, & Coffey, 2012; Fiorini et al., 2013; Fiser et al., 2010; Lawler et al., 2019; León-Salas et al., 2015; Parker et al., 2015; Steffen, Hacker, & Mollinger, 2002). If studies that have evaluated other health-related outcomes using validated instruments are identified, these outcomes will be included in the review. Adverse events outcomes, if measured, will be included, such as falls prevalence or incidence which may include rate of falls (expressed as the number of falls per 1000 person-days) or mortality.

3.3.5 Types of Studies

This review will consider both experimental and quasi-experimental study designs, including RCTs, non-randomised trials, and observational pre-post designs. Prospective and retrospective cohort studies will be included if repeated measures are used that measure a health-related outcome before and after a TCP is delivered. This review will exclude case-control studies and single-case studies. Studies conducted in TC facilities that examine health-related outcomes using qualitative methods will not be included. Mixed-method studies will be considered for inclusion if the relevant quantitative data can be extracted and analysed separately.

Only studies published in English between January 1, 2000, to April 30, 2020, will be included as TCP services commenced in 2000 in the UK and in 2004 in Australia.

3.4 Methods

The proposed systematic review will be conducted in accordance with the JBI methodology for systematic reviews of effectiveness evidence as outlined in the Joanna Briggs Reviewer's Manual (Chapter 3) (Tufanaru, Munn, Aromataris, Campbell, & Hopp, 2020). This protocol has been registered with PROSPERO: CRD42020177623 (Appendix F).

3.4.1 Search Strategy

The search strategy aims to find both published and unpublished studies. A three-step search strategy will be utilised in this review. First, an initial search of CINAHL (EBSCO) and MEDLINE (Ovid) will be undertaken using a set of key words (transition* care, rehabilitation, length of stay and quality of life) and relevant studies will be retrieved. These studies will be reviewed and analysed for additional keywords using their titles and abstracts and/or Medical Subject Headings (MeSH) terms to be used for the second extended search. The search strategy, including all identified keywords and index terms, will be adapted for each included information source in the databases shown below. A proposed search strategy from the second step search for PubMed (up to April 20, 2020) is detailed in Table 3.1. In the third step, the reference lists of all studies retrieved from the second stage will be hand searched for additional relevant studies not identified in steps one or two.

Table 3.1
Search strategy for PubMed

1.	Transition care program*	5,848
2.	Transitional Care/	4,550
3.	Intermediate Care Facilit*	1,899
4.	"Slow-stream rehabilitation"	24
5.	Restorative care	21,532
6.	Skilled Nursing Facilit*	10,598
7.	Patient outcome assessment*	264,928
8.	"Quality of Life"/	371,204
9.	"Length of Stay"/	126,918
10.	Rehabilitation/	603,522
11.	Accidental Fall*/	30,624
12.	Fall*.mp.	261,832
13.	1 or 2 or 3 or 4 or 5 or 6	42,678
14.	7 or 8 or 9 or 10 or 11 or 12	1,469,224
15.	13 and 14	11,357
16.	limit 15 to (yr="2000 -Current" and "all aged (65 and over)" and “English”)	2,973

3.4.2 Information Sources

The databases to be searched for this review include PubMed, CINAHL Plus with full text (EBSCO), AMED (Ovid), PsycINFO (Ovid), and Embase (Ovid).

Trial registry databases that will be searched are Current Controlled Trials and ClinicalTrials.gov. Mednar, Trove (theses only) and ProQuest dissertations and Theses databases will be searched for unpublished studies, which will also be considered for inclusion.

3.4.3 Study Selection

Following the search, all identified citations will be collated and uploaded into bibliographic software EndNote X8.2 (Clarivate Analytics, PA, USA) or Microsoft Excel (2013) spreadsheet (Redmond, Washington, USA) and duplicates will be removed. Titles and abstracts will then be screened by two independent reviewers to identify studies that meet the inclusion criteria for review. Relevant studies that potentially meet the criteria will be retrieved in full and their citation details will be imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI; JBI, Adelaide, Australia). All full text articles retrieved will be assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of the full text studies that do not meet the inclusion criteria will be recorded and reported in the systematic review. Any disagreements between the two reviewers will be arbitrated by the third independent reviewer, if necessary. The full results of the search will be reported in the final systematic review, and both inclusion and exclusion process will be presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009).

3.4.4 Assessment of Methodological Quality

All eligible studies selected for retrieval will be assessed for methodological quality by two independent reviewers before inclusion in this review using standardised JBI critical appraisal checklist for RCTs, quasi-experimental studies and cohort studies, as appropriate (The Joanna Briggs Institute, 2020; Tufanaru et al., 2020). Any disagreements between the two reviewers will be resolved through discussions. If resolution is not reached, the third reviewer will be asked to mediate until mutual agreement is reached. The results of critical appraisal for methodological quality will be reported in narrative form and in a table.

Following critical appraisal, all studies regardless of methodological quality will undergo extraction and synthesis (where possible) (Bown & Sutton, 2010; Tufanaru et al., 2020). This aims to ensure that the best available evidence is included in the review.

3.4.5 Data Extraction

Data extraction will be performed on all included studies independently by two reviewers using the standardised JBI data extraction tool (Tufanaru et al., 2020). Data extracted will include details about participants and setting (including the country of the study), study design, sample size and health outcomes measured, with data gathered for both intervention and control groups. The extraction tool will be modified to include items that describe the duration of the TCP (length of program in days), the scope of health, and medical services provided as part of the TCP, such as the frequency and nature of therapy provided (ie, daily, weekly, number of hours, amount, and type of health professional care and full-time equivalent position is used). Any disagreement that arises between two independent reviewers will be resolved through discussions before arbitration by the third reviewer. Authors of articles will be contacted to request missing or additional data for clarification, where required.

3.4.6 Data Synthesis

Quantitative data, where possible, will be pooled in statistical meta-analysis using Stata version 14 (Stata Corp, LLC, Texas, USA). All data will be subjected to double data entry by two independent reviewers and if discrepancies occur, the third reviewer will be asked to resolve the issue. Effect sizes will be expressed either as odds ratios (OR) (for categorical data), weighted mean differences (for continuous data) or standardised mean difference (for continuous data) with 95% confidence intervals (95% CI) calculated for analysis, depending on the outcome measures used in the studies (Tufanaru et al., 2020). Odds ratios for the primary outcome will be examined to determine if there is a significant proportion (number) of older adults discharged home compared to other settings (RAC, hospital) by undertaking a TCP in a facility setting. Where meta-analysis is possible, data will be pooled, and where there are sufficient data, sub-group analyses will be conducted to assess whether the frequency and intensity of the TCP impact on the outcomes (Tufanaru et al., 2020). Heterogeneity will be assessed using standard Chi-squared and I^2 tests (Tufanaru et al., 2020). The choice of statistical model (random or fixed effects) for meta-analysis will be based on the criteria outlined previously by Tufanaru, Munn, Stephenson, and Aromataris (2015). Sensitivity analyses will be conducted to determine whether studies that have different designs (such as randomised vs non-randomised) contribute to heterogeneity or affect the pooled outcomes (Tufanaru et al., 2020). Where pooling is not possible, data will be presented in a narrative form (tables and figures) to assist in data presentation.

A funnel plot will be generated using RevMan V5.3 (Copenhagen: The Nordic Cochrane Centre, Cochrane) to assess publication bias if there are 10 or more studies included in a meta-analysis. Statistical tests for funnel plot asymmetry will be performed where appropriate.

3.4.7 Assessing Certainty in the Findings

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach will be used for grading the certainty of evidence, and a Summary of Findings (SoF) will be created using GRADEpro (McMaster University, ON, Canada) (Schünemann, Brożek, Guyatt, & Oxman, 2013). The SoF will present the following information where appropriate: absolute risks for the treatment and control, estimates of relative risk, and a ranking of the quality of the evidence based on the risk of bias, directness, heterogeneity, precision, and risk of publication bias of the review results. The following outcomes will be included in the SoF: outcomes related to successful discharge (such as discharge destination or rehospitalisation rate), and health-related outcomes of older adults undertaking TCP, including physical, emotional, HRQoL and cognition.

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Chapter Four

4

Effects of Facility-Based Transition Care on Health-Related Outcomes for Older Adults: A Systematic Review and Meta-Analysis

Preface

This chapter describes phase one (Study 1) of the research that synthesised the best available evidence for the effectiveness of TCP on health-related outcomes for older adults admitted to a TC facility after hospitalisation.

This chapter is based on the following published article.

PAPER 2

Title:	Effectiveness of facility-based transition care on health-related outcomes for older adults: A systematic review and meta-analysis.
Reference:	Hang, J. A., Naseri, C., Francis-Coad, J., Jacques, A., Waldron, N., Knuckey, R., & Hill, A. M. (2021). Effectiveness of facility-based transition care on health-related outcomes for older adults: A systematic review and meta-analysis. *International Journal of Older People Nursing*, 00, e12408.
Online:	http://dx.doi.org/10.1111/opn.12408

The author's version of the manuscript is presented with modifications to suit the style and format of this thesis. A reprint of the published article's cover page is shown in Appendix G.

Abstract

Introduction

Although TCP are designed to assist older adults to regain functional ability after hospitalisation, it is unclear whether TCP improve older adults' health-related outcomes. The objective of the review was to synthesise the best available evidence for the effectiveness of TCP on health-related outcomes for older adults admitted to a TC facility after hospitalisation.

Methods

Searches were conducted using the databases PubMed, AMED (Ovid), Embase (Ovid), PscyINFO (Ovid) and CINAHL (Full text) and grey literature from January 2000 to May 2020 in English only. Studies that reported health-related outcomes of older adults (aged 65 and above) who received TCP in a facility setting were deemed eligible for inclusion following critical appraisal by two reviewers. Data were pooled in meta-analysis where possible, or reported narratively.

Results

A total of 21 studies from seven countries [(n=5 RCT, n=16 observational cohort studies) participants' mean age 80.2 (±8.3)] were included. Pooled analysis (2069 participants, 7 studies) demonstrated that 80% of older adults undertaking TCP were discharged home [95%CI (0.78-0.82, p<0.001), I^2 = 21.99%, very low GRADE evidence]. Proportions of older adults discharged home varied widely between countries (33.3%-86.4%). There was a significant improvement in ability to perform ADL (2001 participants, 7 studies) as measured by the MBI [17.65 points (95%CI 5.68-29.62, p=0.004), I^2=0.00%, very low GRADE evidence].

Conclusion

The proportion of older adults discharged home from TCP compared to other discharge destinations differs between countries. This could be due to the intensity of the rehabilitation delivered and the maximum LOS allowed prior to discharge. Future studies that comprehensively evaluate the efficacy of TCP on health-related outcomes including HRQoL are required. Further investigation is required to identify which aspects of TCP affect successful discharge home.

4.1 Introduction

Older adults who are admitted to hospital are often frail and have multiple comorbidities, placing them at risk of functional decline (Covinsky et al., 2003; Hoogerduijn et al., 2012; Kleinpell, 2008; Mahoney, Sager, Dunham, & Johnson, 1994). Research has shown that following hospital discharge approximately 30% of older adults experience functional decline in performing ADL, which consequently may result in unplanned admission to RAC or hospital readmission (Covinsky et al., 2003; Franchi et al., 2013; Hoogerduijn et al., 2012). Therefore, post hospital rehabilitation is important to assist older adults to regain pre-morbid functional ability and overall health enabling them to return to independent community living.

Transition care also termed "intermediate care" in the UK (Griffiths, Edwards, Forbes, Harris, & Ritchie, 2007) and "skilled nursing" in the USA (Chen, Heinemann, Granger, & Linn, 2002; Dejong et al., 2009; Hong et al., 2019; Mallinson et al., 2014), was introduced to assist older adults in bridging the gap between hospital discharge and safely returning home. Although TC services differ between countries, they have similar elements such as being provided post hospitalisation in a step-down rehabilitation setting, and being targeted towards older adults that do not require acute medical care but require low intensity therapy to improve functional ability (Australian Government Department of Health, 2019; Medicare.gov, n.d.). TCP in Australia are not designed to replace inpatient rehabilitation programs such as subacute care. TCP provide low intensity therapy as an additional option for older adults to regain functional ability post hospitalisation (Australian Government Department of Health, 2019, 2021). Intermediate care and skilled nursing are considered subacute care, as these programs also provide a continuum of care to older adults who require services post hospitalisation (Chen, Heinemann, Granger, & Linn, 2002; Griffiths, Edwards, Forbes, Harris, & Ritchie, 2007; Mallinson et al., 2014). TCP in Australia provide time-limited (2-12 weeks) goal-oriented rehabilitation and long-term planning of supports required to return home (Gustavson, Falvey, Forster, & Stevens-Lapsley, 2019; Lenze et al., 2019; Leung et al., 2016; Parker, Hill, Cobden, Davidson, & McBurney, 2015). Compared to an episode (either acute or rehabilitation) of inpatient hospital care, an episode of care in TCP is less costly (Australian Government Department of Health, 2019; Independent Hospital Pricing Authority, 2017) but there is limited evidence regarding whether TCP are more effective than an episode of care in hospital in assisting older adults to successfully return to independent community living or avoid admission to RAC.

Prospective observational studies (Abrahamsen, Haugland, Nilsen, & Ranhoff, 2014, 2016; Fiorini et al., 2013; Galizia et al., 2018; Mallinson et al., 2014) have reported that older adults who completed a TCP in a TC facility demonstrated improved functional mobility, self-care

ability or cognitive function. Additionally, two retrospective studies have also reported that older adults who received a TCP in a facility-setting required fewer additional support services after discharge home compared to those who received rehabilitation in an inpatient-rehabilitation facility (Hong et al., 2019; Mallinson et al., 2014). However overall, studies conducted in TC facilities have presented conflicting findings about the effectiveness of TCP in improving older adults' functional ability or other health-related outcomes. While previous systematic reviews have examined the effect of TCP on older adults' hospital readmissions and service utilisation, few have included a comprehensive range of health-related outcomes (Griffiths, Edwards, Forbes, & Harris, 2005; Griffiths et al., 2007; Maximos, Seng-iad, Tang, Stratford, & Bello-Haas, 2019; Toles, Colón-Emeric, Asafu-Adjei, Moreton, & Hanson, 2016; Weeks et al., 2018). Two of these reviews reported there was limited evidence regarding whether TCP improved older adults' functional ability at discharge as only a few studies were included (Maximos et al., 2019; Toles et al., 2016). Some reviews have selected specific populations or conditions such as TCP conducted in the older adult's home (Mora, Dorrejo, Carreon, & Butt, 2017), older adults with a diagnosis of heart failure (Feltner et al., 2014; Van Spall et al., 2017) or another interim package delivered in hospital and continued in the home setting to assist older adults returning home safely (Allen, Hutchinson, Brown, & Livingston, 2014; Rennke et al., 2013). However, no reviews to date specifically examined the effectiveness of facility-based TCP on a range of health-related outcomes, as the setting can impact the mode of program delivery and staffing associated with delivery (King, Parsons, Robinson, & Jörgensen, 2012; Mallinson et al., 2014; Young, Gladman, Forsyth, & Holditch, 2015). Therefore, the objective of this review was to evaluate the effectiveness of facility-based TCP on older adults' health-related outcomes. The primary outcome was discharge destination (social domain) with secondary outcomes being independence in ADL, mobility or balance performance (physical domain), mental capacity (cognitive domain), presence of depression (emotional domain) and HRQoL (social domain).

4.2 Methods

The review was undertaken according to a published protocol (Hang et al., 2020) (see Chapter 3) and reported in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009).

4.2.1 Data Sources and Searches

The review utilised a three-step search strategy (Tufanaru, Munn, Aromataris, Campbell, & Hopp, 2020) to identify both published and grey literature written in English. The full search

strategy using PubMed as an exemplar is presented in Table 4.1. All searches were performed from 1st January 2000 to 30th January 2020, and updated on 30th May 2020.

Table 4.1
Full search strategy performed on PubMed

Updated 30th May 2020)

1.	Transition care program*	5,616
2.	Transitional Care/	4,087
3.	Intermediate Care Facilit*	1,566
4.	"Slow-stream rehabilitation"	25
5.	Restorative care	19,261
6.	Skilled Nursing Facilit*	9,404
7.	Patient outcome assessment*	78,712
8.	"Quality of Life"/	381,502
9.	"Length of Stay"/	130,424
10.	Rehabilitation/	624,247
11.	Accidental Fall*/	23,967
12.	Fall*.mp.	259,884
13.	1 or 2 or 3 or 4 or 5 or 6	38,254
14.	7 or 8 or 9 or 10 or 11 or 12	1,359,642
15.	13 and 14	11,357
16.	limit 15 to (yr="2000 -Current" and "all aged (65 and over)" and "English")	2,429

Five electronic databases were searched: PubMed, CINAHL Plus with full text (EBSCO), AMED (Ovid), PsycINFO (Ovid) and Embase (Ovid) from January 1 2000 to May 30 2020 as TCP services commenced internationally from this period (Australian Government Department of Health, 2019; Government of Western Australia Department of Health, 2017, 2017; Hancock, 2003; Neno, 2005). Unpublished studies were sought by conducting a search of trial registry databases and other platforms: Current Controlled Trials (http://www.isrctn.com) and the National Institute of Health Clinical Database (http://www.clinicaltrials.gov); and unpublished studies platform of Mednar, Trove (theses only) and ProQuest dissertations and theses databases.

4.2.2 Study Selection

Titles and abstracts of relevant studies were screened by two reviewers (JAH, JFC), and relevant articles retrieved. A TCP was defined as a service that admitted older adults

discharged from hospital for rehabilitation in a facility-based setting, including intermediate care, skilled nursing care, TCP or slow stream rehabilitation program depending on the country. Studies that enrolled participants who were admitted to a TC facility directly from hospital, were community-dwelling prior to hospital admission (Australian Government Department of Health, 2019; Parker et al., 2015), and where the mean age was 65 years or older were included. Exclusion criteria were enrolling participants receiving palliative care or providing TCP in home (King et al., 2012) or outpatient settings. RCTs, quasi-experimental, observational designs that used repeated measures to measure a health-related TCP outcome were considered. Health-related outcomes of interest were those that influenced functional ability and these were categorised within the physical, cognitive, emotional and social domains (Rubenstein, Wieland, & Bernabei, 1995).

4.2.3 Data Extraction and Quality Assessment

Information was extracted from the selected studies using the standardised extraction tool from the JBI reviewers' manual (Tufanaru et al., 2020). Data extracted included: participants baseline characteristics, study setting, study methodology, health-related outcomes impacting functional ability, LOS in TCP and intensity of therapy or therapy duration (Hang et al., 2020). Adverse events defined as hospital re-admissions, death, a fall, potentially inappropriate medicines (PIM) and potentially inappropriate prescription (PIP) were also recorded. Two independent reviewers (CN, JAH) extracted the data, checking data entry for accuracy, and completed risk of bias assessments for each study using the JBI Critical Appraisal Tools (The Joanna Briggs Institute, 2020; Tufanaru et al., 2020). Any disagreement was resolved through consensus following review by a third researcher (AMH). Three corresponding authors were contacted for additional information regarding their studies (Lawler, Shields, & Taylor, 2019; Morita et al., 2018; Parker et al., 2015).

4.2.4 Data Synthesis and Analysis

Studies with similar outcomes measures were pooled using STATA version 16.1 (StataCorp. 2019. Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC), using the Metaprop and Metan command, and forest plots were produced. Metaprop implements procedures that are specific to binomial data and computes 95% CI using the score statistic and exact binomial method (Miller, 1978; Nyaga, Arbyn, & Aerts, 2014; Schwarzer, Chemaitelly, Abu-Raddad, & Rücker, 2019) while Metan can implement either fixed-or random-effects meta-analysis models for either binary or continuous data (Harris et al., 2008; Palmer & Sterne, 2015). Sub-group analyses were conducted according to the country in which the study was conducted

and the duration of the therapy. Meta-regression was undertaken using the Metapreg command in Stata. Metapreg extends the functionality of Metaprop by allowing one or more covariates into the model to explain heterogeneity in the proportions. Forest plots were produced to present the proportions (95% CI) of older adults discharged home from TCP by country and by therapy duration (Nyaga, 2019). Heterogeneity was assessed using a combination of the I^2 statistic and visual inspection of forest plots, and rated as low (25%), medium (50%) or high (75%) (Higgins, Thompson, Deeks, & Altman, 2003). A random-effect model was used to calculate the observed estimates of treatment effect (Great Britain Department of Health, 2000; Tufanaru, Munn, Stephenson, & Aromataris, 2015). Where heterogeneity was high, sensitivity analyses were conducted based on the methodological variation of the studies' design. The certainty of the evidence presented in each of the studies included in the meta-analyses of the primary and secondary outcomes were assessed using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) (Schünemann, Brożek, Guyatt, & Oxman, 2013). Where studies could not be pooled, results were reported narratively using tables. Studies that only reported data on gait speed as median and interquartile ranges were converted to approximate means with pooled standard deviations (SD) using a SD conservative estimate similar to a power calculation (Greco, 2015).

4.3 Results

Note: See Appendix H for characteristics of all included studies and Appendix I for Figure I.1 and Table I.1 to Table I.6.

4.3.1 Study Selection

The search identified 7205 studies (see Figure 4.1). A total of 21 studies enrolling 1,206,769 participants were included (Abrahamsen et al., 2014; Abrahamsen et al., 2016; Chen et al., 2002; Dejong et al., 2009; Fiorini et al., 2013; Galizia et al., 2018; Gustavson et al., 2019; Herfjord et al., 2014; Hong et al., 2019; Jette et al., 2004; Jung, Trivedi, Grabowski, & Mor, 2016; Lawler et al., 2019; Lenze et al., 2012; Lenze et al., 2019; Leung et al., 2016; Mallinson et al., 2014; Millar, Hughes, & Ryan, 2017; Morita et al., 2018; O'Brien & Zhang, 2018; Parker et al., 2015; Zhang et al., 2019). Characteristics of included studies are summarised in Appendix H. For excluded studies and reasons for exclusion see Appendix I (Table I.1).

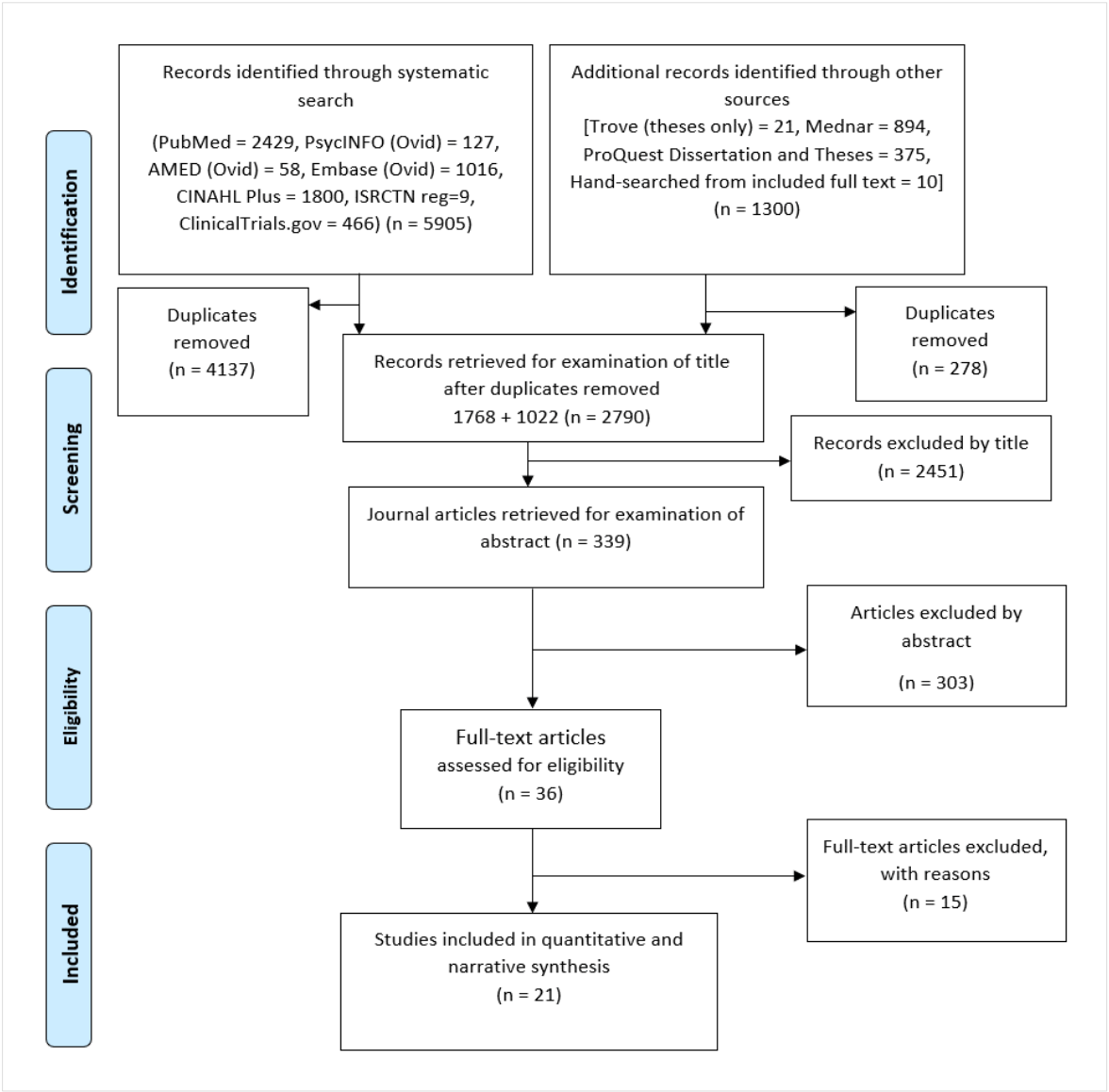

Figure 4.1 Flow of studies through the review

4.3.2 Study Characteristics

Of the 21 studies included, five were RCTs and 16 were observational cohort studies (see Appendix H for study characteristics). Eleven studies were conducted in the USA, two in Australia, three in Norway, two in Italy, and the remainder were conducted in Canada, Japan and Northern Ireland (see Appendix H for study characteristics). Interventions evaluated in the five RCTs are described in Appendix H.

4.3.3 Adverse Events

Hospital readmissions and deaths reported are presented in Table 4.2. Overall, hospital readmission ranged from 2.7% to 38% and mortality reported ranged from 0% to 6.7%. One

RCT (Lawler et al., 2019) reported that two of the 16 participants (12.5%) who received family-assisted therapy in addition to usual TCP sustained a fall compared with six of the 18 participants (33.3%) in the control group [Risk Ratio (RR) 0.38 (95%CI 0.09-1.6), p=0.19]. A prospective study (Millar et al., 2017) that reported potentially inappropriate prescribing as an adverse outcome found no significant difference for prevalence of potentially inappropriate medicines at admission [median 1.5 (interquartile range (IQR) 3.0)] and at discharge [median 2.0 (IQR 3.0)], and no difference for prevalence of potentially prescribing omissions at admission [median 2.0 (IQR 3.0)] and discharge [median 0.5 (IQR 2.0)].

Table 4.2
Hospital readmissions and mortality while undertaking TCP

Study	Length of stay in TCP (days)	Hospital readmissions n (%)	Death n (%)
Abrahamsen et al. 2014[a]	N/R[b]	21 (3.8)	0 (0)
Abrahamsen et al. 2016[a]	14 (2-33)[c]	26 (2.7)	2 (0.2)
Galizia et al. 2018[a]	N/R	3 (6.8)	0 (0)
Gustavson et al. 2019[a]	17.0 (10.8)[d]	16 (11.4)	N/R
Herfjord et al. 2014[e]	17.3 (1-34)[f]	N/R	2 (1.1)
Jung et al. 2016[g]	32.6 (22.2)[d]	49637 (10.3)	N/R
Lawler et al. 2019[e]	64.5 (33.5)[d]	6 (33.3)	0 (0)
Lenze et al. 2019[e]	23.4 (11.7)[d]	N/R	3 (2.7)
Leung et al. 2016[a]	82.5 (26.4)[d]	14 (13.5)	0 (0)
Mallinson et al. 2016[a]	27.7 (13.8)[d]	0 (0)	0 (0)
Millar et al. 2017[a]	22.0 (10.9)[d]	5 (13.2)	0 (0)
Morita et al. 2018[g]	N/R	72047 (38.0)	12659 (6.7)
O'Brien and Zhang 2018[g]	39.5 (26.9)[d]	61334 (22.1)	11208 (4.0)
Parker et al. 2015[e]	63.7 (32.5)[d]	3 (9.4)	0 (0)

Notes:
N/R = Not reported, TCP = Transition Care Programs
[a]Prospective observational cohort
[b]Although Abrahamsen et al. 2014 did not report mean length of stay, the method stated older adults who admitted into Transition Care Facility were only allowed to stay for 2-3 weeks
[c]Median (Range)
[d]Mean (SD)
[e]Only control group of randomised controlled trials (RCT) is included, except for Herfjord et al. 2014 where TCP was an intervention in this RCT and this study reported proportion discharged to other institutions and hospital as a cohort [n=11 (5.9%)]
[f]Mean (Range)
[g]Retrospective observational cohort

4.3.4 Study Quality Assessment

Critical appraisal of methodological quality for all studies was completed (see Appendix I for critical appraisal details; Table I.2 and Table I.3). All five RCTs had completed follow-up, analysed participants in the groups they were randomised to, measured outcomes in the same way for treatment groups and used appropriate statistical analysis. Four RCTs were either unclear or did not state whether they blinded participants to treatment assignment (Herfjord et al., 2014; Lawler et al., 2019; Lenze et al., 2012; Parker et al., 2015). Of the 16 observational cohort studies, three studies were either unclear or did not report on the strategies to deal with confounding factors (Gustavson et al., 2019; Morita et al., 2018; O'Brien & Zhang, 2018). It was unclear if two studies measured outcomes in a valid and reliable way (Chen et al., 2002; O'Brien & Zhang, 2018). In all 16 studies, participants who incurred the event (going home) and those that did not had similar characteristics at baseline and were recruited from the same population. Nine studies had strategies to address incomplete follow-up (Abrahamsen et al., 2014, 2016; Fiorini et al., 2013; Galizia et al., 2018; Jung et al., 2016; Leung et al., 2016; Millar et al., 2017; Morita et al., 2018; Zhang et al., 2019).

4.3.5 Review Findings

Three RCTs that evaluated the effect of providing additional therapy compared to standardised TCPs on discharge destination were pooled in meta-analysis (fixed-effects model) (Lawler et al., 2019; Lenze et al., 2019; Parker et al., 2015). Data from the control groups only from four RCTs were pooled with data from observational trials to evaluate the proportion of older adults discharged home compared to other discharge destinations (Herfjord, Heggestad, & Ersland, 2014; Lawler et al., 2019; Lenze et al., 2019; Parker et al., 2015). Thirteen studies that presented results for health-related outcomes other than discharge destination or functional abilities, that could not be pooled were reported narratively (Chen et al., 2002; Dejong et al., 2009; Fiorini et al., 2013; Galizia et al., 2018; Gustavson et al., 2019; Hong et al., 2019; Jette, Warren, & Wirtalla, 2004; Lawler et al., 2019; Lenze et al., 2012; Lenze et al., 2019; Leung et al., 2016; Mallinson et al., 2014; Parker et al., 2015) (see Appendix I; Table I.4).

The 95% CI were used to convert one observational study's (Jette et al., 2004) age variable to include the standard deviation using the methodology outlined in the Cochrane Handbook for Systematic Reviews of Interventions (version 5.1.0) (Schünemann et al., 2013). Another two observational studies' median and interquartile range for age and scores for the performance of ADL were converted to mean and SD using a validated formula in an Excel spreadsheet

(Abrahamsen et al., 2014, Abrahamsen et al., 2016), in order for the results to be pooled with other studies using the same outcome measure (Hozo, Djulbegovic, & Hozo, 2005).

4.3.5.1 Primary Outcome - Discharge Destination (Social Domain)

The primary outcome of discharge destination (proportion of older adults discharged home from TCP compared to other settings) is presented in Table 4.3. This primary outcome was reported in four RCTs (Herfjord et al., 2014; Lawler et al., 2019; Lenze et al., 2019; Parker et al., 2015) and 11 observational cohort studies (Abrahamsen et al., 2014, 2016; Galizia et al., 2018; Gustavson et al., 2019; Jung et al., 2016; Leung et al., 2016; Mallinson et al., 2014; Millar et al., 2017; Morita et al., 2018; O'Brien & Zhang, 2018; Zhang et al., 2019).

Table 4.3
Proportions of older adults discharged home compared to other destinations

Study	Length of stay in TCP (days)	Discharge home to community n (%)	Discharge to RAC n (%)	Hospital readmissions n (%)
Abrahamsen et al. 2014[a]	N/R	445 (79.9)	88 (15.8)	21 (3.8)[b]
Abrahamsen et al. 2016[a]	14 (2-33)[c]	785 (81.9)	146 (15.2)	26 (2.7)
Galizia et al. 2018[a]	N/R	39 (88.7)	2 (4.5)	3 (6.8)
Gustavson et al. 2019[a]	17 (10.8)[d]	120 (85.7)	1 (0.7)	16 (11.4)
Herfjord et al. 2014[e f]	N/R	144 (75.8)	33 (17.4)	11 (5.8)
Jung et al. 2016[g h]	32.6 (22.2)[d]	356,158 (73.9)	N/R	49,637 (10.3)[b]
Lawler et al. 2019[f]	64.50 (33.5)[d]	6 (33.3)	6 (33.3)	6 (33.3)
Lenze et al. 2019[f i]	23.4 (11.7)[d]	89 (79.5)	N/R	N/R
Leung et al. 2016[a]	82.5 (26.4)[d]	73 (70.2)	17 (16.3)	14 (13.5)
Mallinson et al. 2014[a j]	27.7 (13.8)[d]	55 (79.7)	11 (15.9)	0 (0)
Millar et al. 2014[a]	22 (10.9)[d]	21 (55.3)	12 (31.6)	5 (13.2)
Morita et al. 2018[g k]	N/R	65,210 (34.4)	34,879 (18.4)	72,047 (38.0)
O' Brien and Zhang 2018[g l]	39.5 (26.9)[d]	162,829 (58.6)	42,342 (15.2)	61,334 (22.1)
Parker et al. 2015[f m]	63.7 (32.5)[c]	20 (62.5)	4 (12.5)	3 (9.4)
Zhang et al. 2019[g]	N/R	11,042 (67.3)	N/R	N/R[b]

Notes:
N/R, not reported; RAC, residential aged care; TCP, transition care programs
[a]Prospective observational cohort
[b]Data without discharge destination reported: n=3, n=37,560, n=5366 respectively
[c]Median (IQR)
[d]Mean (SD)
[e]Herfjord et al., 2014 reported 1.1% (n=2) mortality
[f]RCT, only participants in the control group were included in the proportions of older adults who were discharged home compared to other discharge destinations. As for Herfjord et al., 2014, the intervention group which participated in TCP was included as the control group was in the hospital
[g]Retrospective observational cohort
[h]Jung et al., 2016 reported 8% (n=38553) were discharged to other facilities
[i]Lenze et al., 2019 reported 18.8% (n=21) of older adults were discharged to either another TCP, RAC or hospital as a whole cohort and 2.7% (n=3) mortality
[j]Mallinson et al., 2014 reported 4.3% (n=3) were discharged for further TCP
[k]Morita et al., 2018 reported 2.5% (n=4674) were discharged to other places and 6.7% (n=12,659) mortality
[l]O'Brien & Zhang, 2018 reported 4% (n=11,208) mortality
[m]Parker et al., 2015 reported 15.6% (n=5) were discharged to hostel

4.3.5.1.1 Discharge Home (Randomised Controlled Trials Only)

Three RCTs (315 participants) (Lawler et al., 2019; Lenze et al., 2019; Parker et al., 2015) that compared standardised TCP (control) with TCP that included additional therapy (intervention) were pooled in meta-analysis (see Figure 4.2).

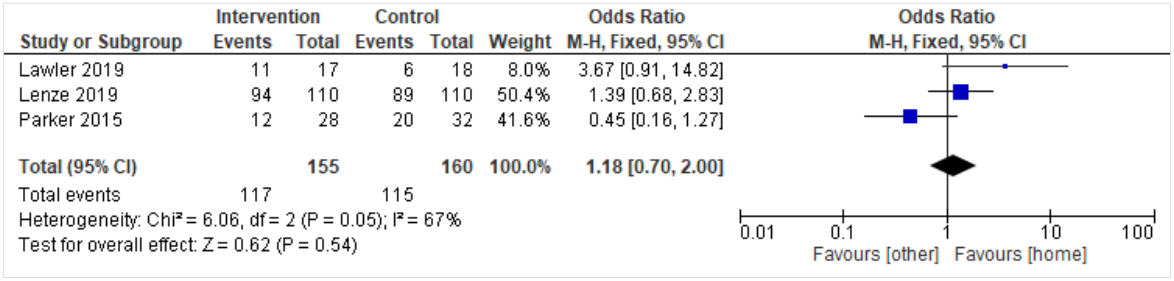

Figure 4.2 Proportions of older adults discharged home from standardised TCP compared to TCP with additional therapy (randomised controlled trials only)

Overall, there was no significant difference between the groups in the proportions of older adults discharged home with high heterogeneity evident between the included studies (I^2=67%, p=0.05). One RCT could not be pooled as it compared standardised TCP to hospital care, on the primary outcome of LOS at home post discharge (Herfjord et al., 2014). This study reported no difference in the proportions of older adults discharged home from facility-based TCP (75.8%) compared to those discharged from hospital (72.0%).

4.3.5.1.2 Discharge Home – Other Studies

Six prospective cohort studies (Abrahamsen et al., 2014, 2016; Galizia et al., 2018; Gustavson et al., 2019; Mallinson et al., 2014; Millar et al., 2017) and control group data from two RCTs (Herfjord et al., 2014; Lenze et al., 2019) were pooled for meta-analysis (see Figure 4.3). Pooled results (2107 participants) demonstrated that 78% (95%CI 0.75-0.82, p<0.001) of older adults were discharged home compared to other discharge destinations with high heterogeneity evident (I^2=63.31%, p=0.01).

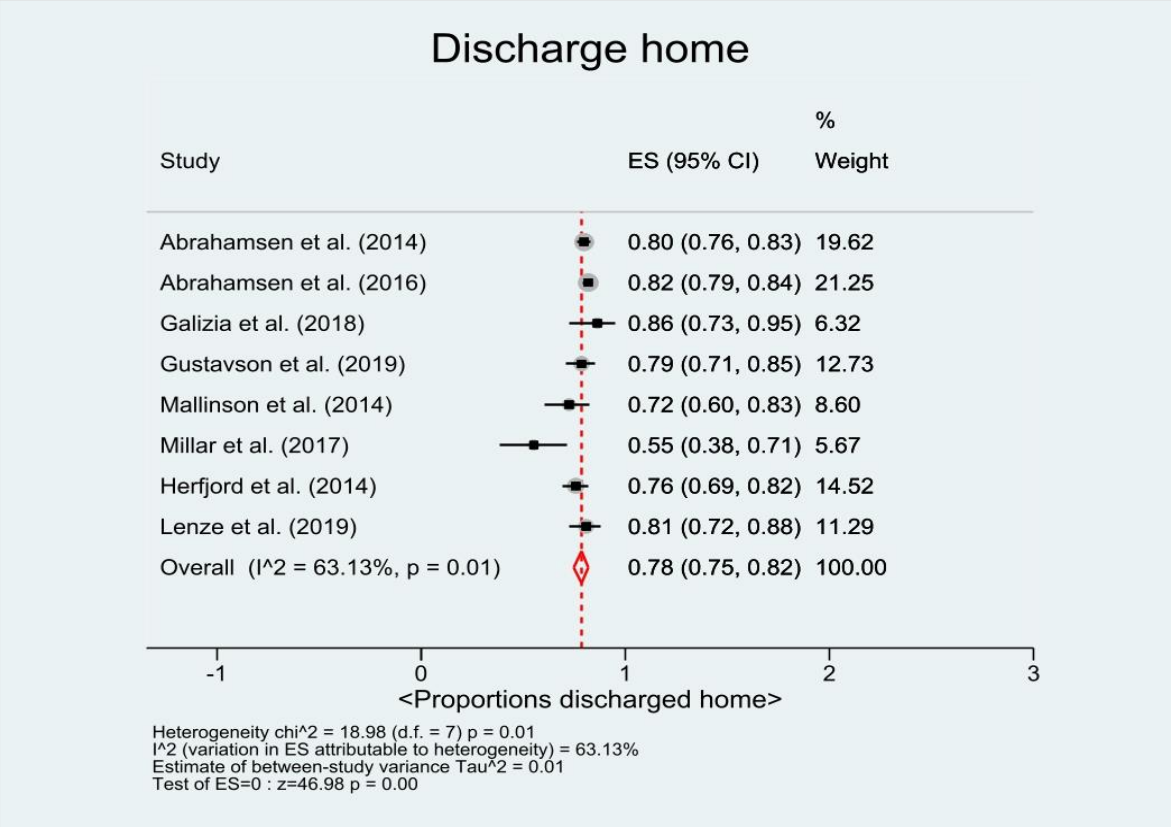

Figure 4.3 Proportions of older adults discharged home after completing TCP between 2 and 6 weeks

Due to this high heterogeneity, a sensitivity analysis was conducted. In this analysis, the Millar et al. (2017) study was removed as it was clinically heterogenous, being focussed on PIP rather than discharge destination. The sensitivity analysis demonstrated 80% (95% CI 0.78-0.82, p<0.001) of older adults were discharged home compared to other discharge destinations with low heterogeneity (I^2 = 21.99 %, p=0.26) (see Figure 4.4).

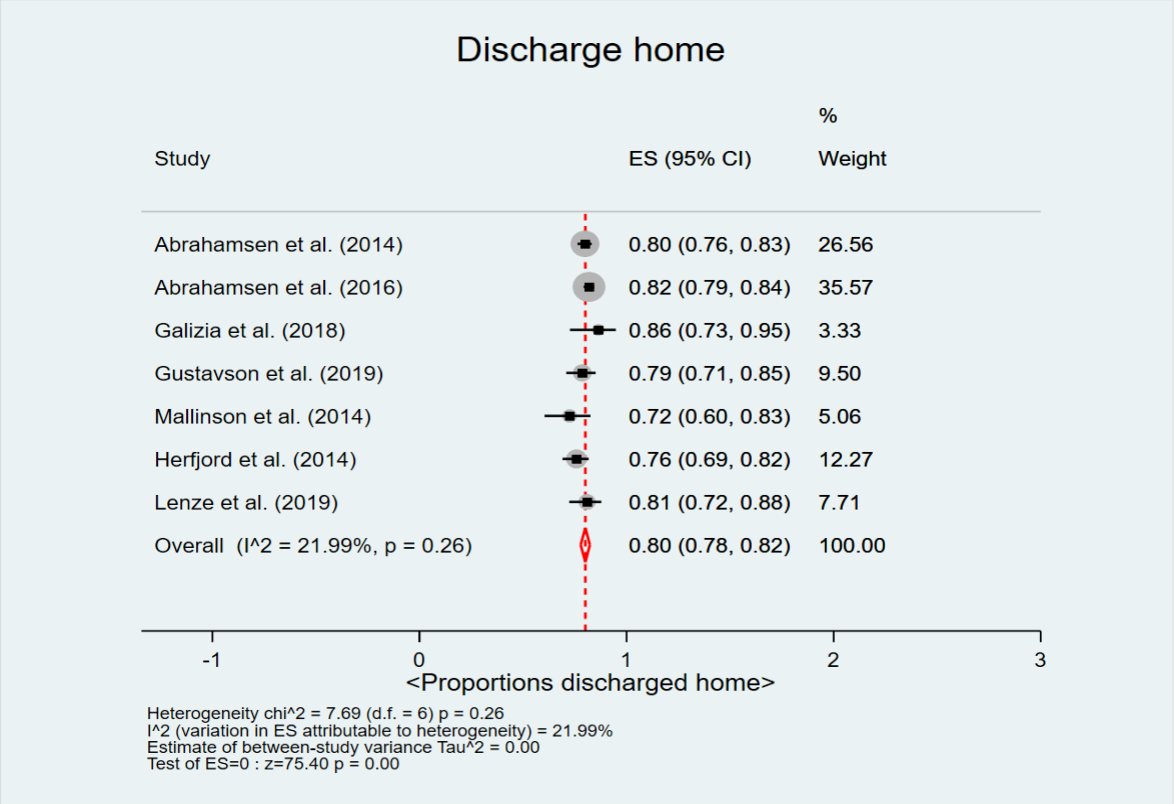

Figure 4.4 Sensitivity analysis of the proportions of older adults discharged home after completing TCP between 2 and 6 weeks

Results from three retrospective studies are presented narratively in Table 4.3 (Morita et al., 2018; O'Brien & Zhang, 2018; Zhang et al., 2019).

4.3.5.1.3 Subgroup Analysis - Discharge Home Based on Country in Which Study was Conducted

Studies that evaluated the outcome of discharge to home compared to other settings were further pooled according to the country where the studies were conducted (see Figure 4.5 and Table 4.4). A detailed description of meta-regression for subgroup analysis based on the country in which study was conducted and therapy duration is presented in Table 4.4.

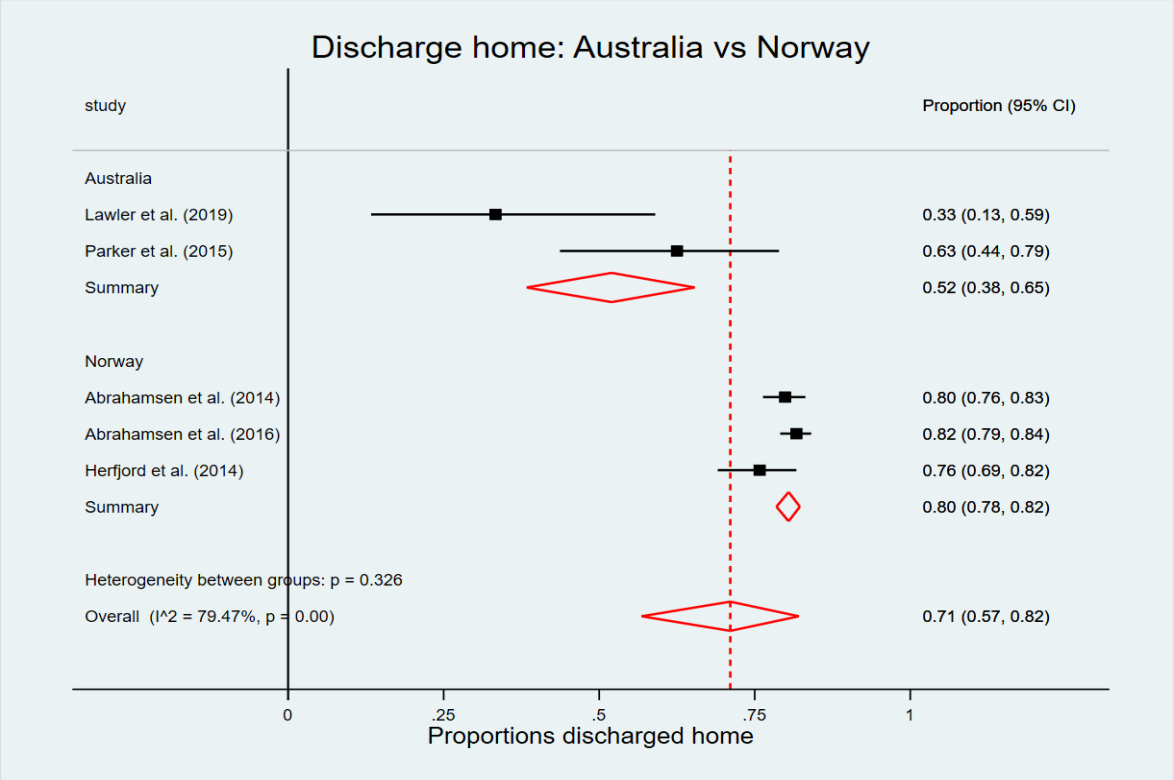

Figure 4.5 Meta-regression of the proportions of older adults discharged home according to country

Pooled results using meta-regression demonstrated that the proportion of participants discharged in Norway [80% (95% CI 0.78-0.82)] differed significantly from Australia [52%, (95% CI 0.38-0.65)]. The overall heterogeneity was high (I^2= 79.47%, p=0.00) while the heterogeneity between the subgroups was not significant (p=0.33) suggesting that the differences reflected individual study heterogeneity rather than the subgroup variable of country.

Table 4.4

Meta-regression of the proportions of older adults discharged home according to country and therapy duration

	Test of heterogeneity				
Variables	**RE-FE: LR Test statistic**	**Degrees of freedom**	**P-value**	I^{2a}	**Tau^2**
Country					
Australia		1	1.00	0.00	0.00
Norway		2	1.00	0.00	0.00
Overall	8.61	3	0.00	79.47	0.40
Therapy duration					
≥ 40 minutes	0.00	2	1.00	0.00	0.00
< 40 minutes	3.49	2	0.03	68.75	0.26
Overall	3.13	6	0.04	66.29	0.21

Notes:
CI, Confidence Intervals, RE-FE, Random-Effects-Fixed-Effects, LR- Likelihood Ratio
The variation in log odds attributable to between study heterogeneity

4.3.5.1.4 Subgroup Analysis - Discharge Home Based on Therapy Duration

Studies that evaluated the effect of therapy duration (minutes per day) on discharge home were pooled according to therapy duration (Table 4.4 and Figure 4.6). Pooled results using meta-regression demonstrated that the proportion of participants discharged home from TCPs that delivered 40 minutes or more therapy [79% (95%CI 0.75-0.83)] differed significantly from TCP where less than 40 minutes therapy was delivered [64% (95%CI 0.49-0.77)]. The overall heterogeneity was high (I^2= 66.29%, p=0.04) while the heterogeneity between the subgroups was not significant (p=0.67) suggesting that the differences reflected individual study heterogeneity (therapy ranged from physiotherapy and occupational therapy to multidisciplinary including psychology services) rather than the subgroup variable of therapy duration.

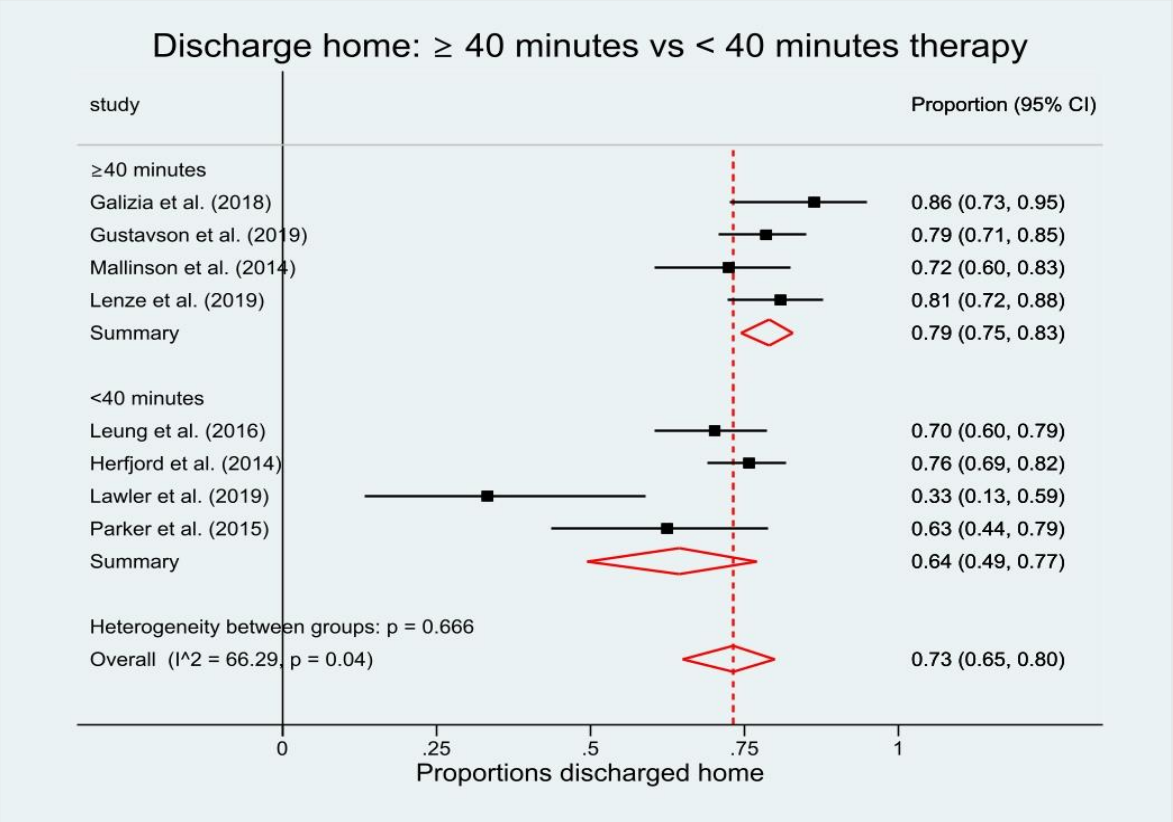

Figure 4.6 Meta-regression of the proportions of older adults discharged home according to therapy duration (<40 minutes compared to ≥40 minutes)

4.3.5.1.5 Discharge Home Based on Therapy – Narrative Review

Four retrospective cohort studies that were unable to be pooled for the impact of therapy duration on discharge destination home showed that higher proportions of older adults were discharged home in studies that delivered longer therapy duration (see Table 4.5) (Jette et al., 2004; Jung et al., 2016; O'Brien & Zhang, 2018; Zhang et al., 2019). One of these studies (Jette et al., 2004) that also investigated nursing care, found that residents in TC facilities with nursing care delivery of >3.5 hours per resident per day were more likely to be discharged home or to assisted living accommodation compared to facilities that provided lower hours of nursing care [(95% CI, 1.29-1.80), p<0.001, R2=0.28)].

Table 4.5
Impact of therapy duration on discharge home

Study	Therapy duration	Results	Additional comments
Jette et al. 2004[a]	1-1.5 / < 1 hour/day	OR 1.22 [(95%CI, 1.04-1.44), p<0.001]	Greater likelihood of discharge to community[b] for group with higher intensity more than an hour therapy a day
	>1.5 / <1 hour/day	OR 2.02 [(95%CI, 1.59-2.57), p<0.001]	Higher odds of discharging to community[b] compared to older adults who received less than an hour therapy a day
Jung et al. 2016[a]	64.3 (27.2)[c] mins/day	An additional hour per week is associated with 3.1 percentage point (95%CI, 3.0,3.1) greater likelihood of discharging to community[b]	
O'Brien and Zhang 2018[a]	68.0(6.7)[c] mins/day	63.5% discharged home	Cohort divided into four groups of therapy intensity according to the total minutes of physical therapy, occupational therapy and speech therapy received per day: high (>60min); medium-high (45-60min); medium-low (30-45min); and low (<30min)
	51.4 (3.8)[c]	52.9% discharged home	
	36.4 (4.3)[c]	45.1% discharged home	
	12.2 (12.7)[c]	27.4% discharged home	
Zhang et al. 2019[d]	13.3 (2.4)[c] / 6.3 (2.6)[c] hours/week	OR 1.20 [95%CI 1.12-1.28]	Greater likelihood of successful discharge to community[b] within 90 days compared to low intensity

Notes:
CI, confidence intervals; min, minutes; OR, odds ratio
[a]Retrospective observational cohort
[b]Community is defined as home or assisted living
[c]Mean (SD)
[d]Prospective observational cohort

Two prospective observational studies evaluated discharge home from settings that provided different therapy intensities (Appendix H) (Dejong et al., 2009; Mallinson et al., 2014). Both studies reported lower numbers of older adults were discharged home from hospital and similar numbers of older adults were discharged from inpatient rehabilitation facilities compared to TC facilities (see Appendix I; Table I.5). However, the mean LOS in the inpatient rehabilitation facilities was shorter.

4.3.5.1.6 Discharge to Residential Aged Care

Two RCTs that reported discharge to RAC comparing standardised TCP to TCP provided with additional therapy were narratively synthesised (see Appendix I; Table I.6) (Lawler et al.,

2019; Lenze et al., 2019). No significant differences between the groups were found for discharge to RAC. Four prospective cohort studies and control group data from one RCT that reported discharge to RAC were pooled in meta-analysis (see Appendix I; Figure I.1) (Abrahamsen et al., 2014; Abrahamsen et al., 2016; Galizia et al., 2018; Herfjord et al., 2014; Mallinson et al., 2014). Pooled results (1819 participants) demonstrated that 15% (95%CI 0.13-0.17, p<0.001) of older adults were discharged to RAC at the completion of TCP. Results from five observational cohort studies and control group data from two RCTs were synthesised narratively (see Table 4.3) (Gustavson et al., 2019; Lawler et al., 2019; Leung et al., 2016; Millar et al., 2017; Morita et al., 2018; O'Brien & Zhang, 2018; Parker et al., 2015).

4.3.5.2 Secondary Outcomes (Physical Domain)

4.3.5.2.1 Independence in Activities of Daily Living

Four prospective cohort studies (Abrahamsen et al., 2014; Abrahamsen et al., 2016; Fiorini et al., 2013; Galizia et al., 2018) and control group data from three RCTs (Lawler et al., 2019; Lenze et al., 2012; Lenze et al., 2019) that reported performance of ADL (physical function) as measured by MBI were pooled in meta-analysis (Figure 4.7).

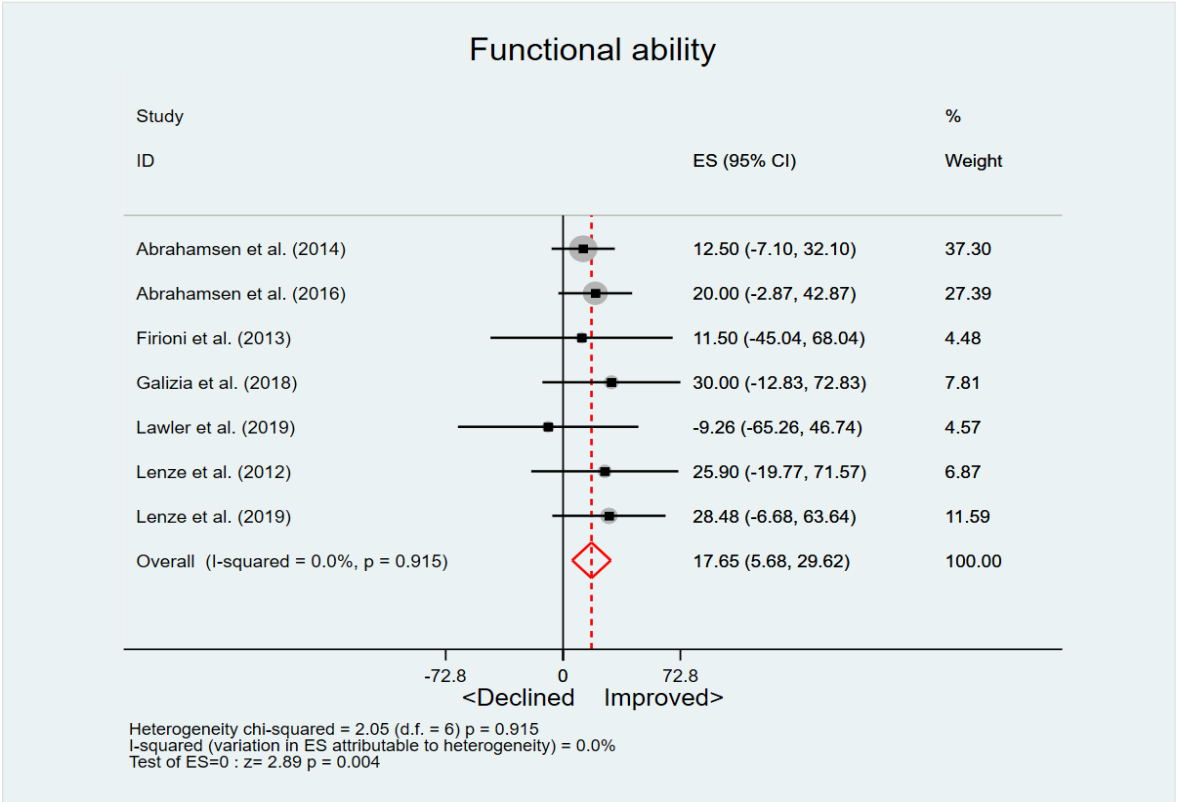

Figure 4.7 Changes in level of functional ability (measured using MBI) in older adults after completing TCP

Pooled results (2001 participants) showed an improvement in ADL [mean difference in MBI 17.65 points (95%CI 5.68-29.62), p=0.004] between admission and discharge with low heterogeneity evident (I^2=0.00%, p=0.915). Additionally, a pilot RCT that delivered additional family assisted therapy as an intervention found that the mean difference in MBI between intervention group and standardised TCP care was 21.5 (95%CI 0.8-42.2, p=0.04) (Lawler et al., 2019).

4.3.5.2.2 Gait Speed

Pooled results (334 participants) from three prospective cohort studies (Galizia et al., 2018; Gustavson et al., 2019; Leung et al., 2016) and control group from two RCTs (Lenze et al., 2012; Lenze et al., 2019) that evaluated gait speed demonstrated that TCP improved gait speed although not statistically significant by 0.20ms^{-1} (95%CI -0.00-0.40, p=0.052) with low heterogeneity between studies (I^2=0.00%, p=0.962) (Figure 4.8).

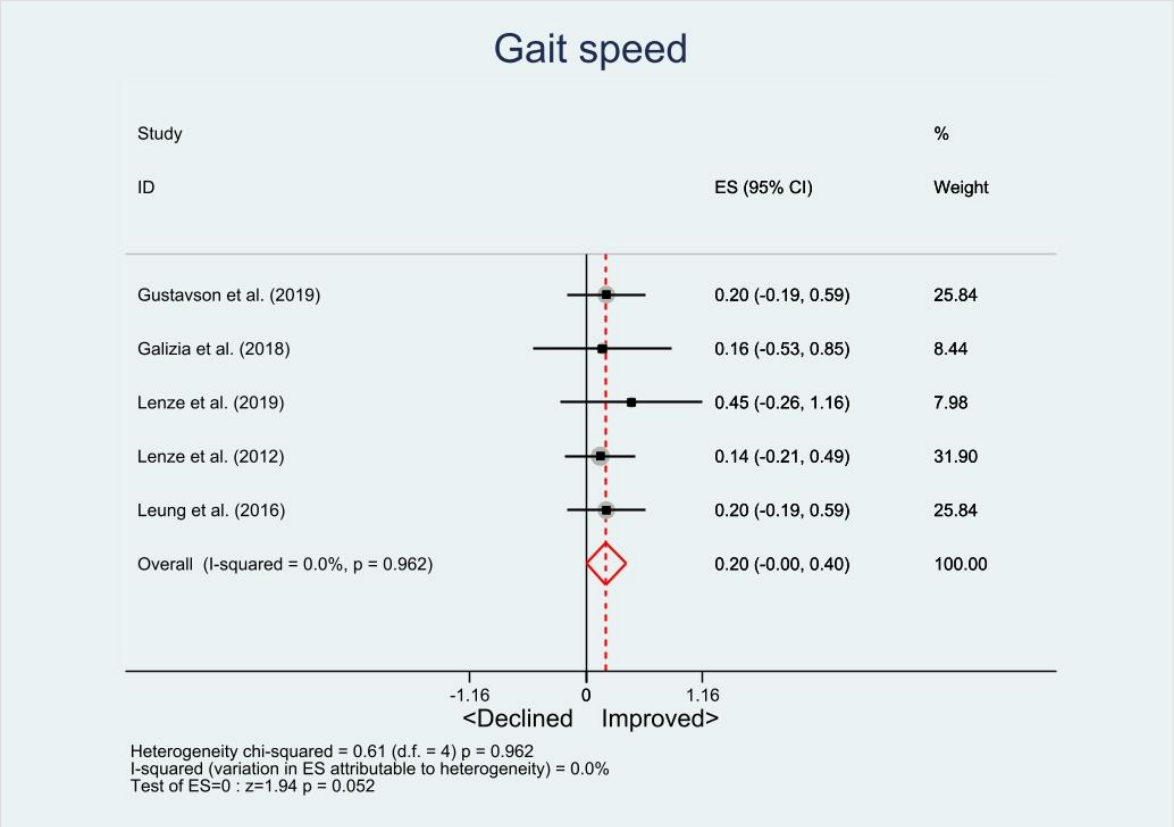

Figure 4.8 Changes in gait speed (ms^{-1}) in older adults after completing TCP

4.3.5.3 Other Secondary Outcomes

Thirteen studies reported other secondary outcomes (see Appendix I; Table I.4). One study found an improvement in overall balance measured by Berg Balance Scale at discharge from TCP compared to admission [mean difference of 10.4 points (SD10.9), p<0.001] (Leung et al., 2016). Three studies found older adults undertaking facility-based TCP made significant improvement in functional ability at discharge compared to admission (Jette et al., 2004; Leung et al., 2016; Mallison et al., 2014). However, one study found that older adults undertaking rehabilitation in an inpatient-rehabilitation facility made a mean improvement of at least two fold in functional ability compared to those undertaking TCP, even when adjusted for patient and clinical characteristics (Hong et al., 2019).

4.3.6 Recommendations Based on the Evidence

Summary of findings table using GRADE approach is presented in Table 4.6 (Schünemann et al, 2013).

Table 4.6
Summary of findings

Effectiveness of facility-based TCP on the health-related outcomes of older adults

Outcomes	Impact	Number of participants (studies)	Certainty of the evidence (GRADE)
Proportion of people discharged home (home vs not home) Assessed with: Reporting of discharge destination Follow up: range 9.5 months to 52 months	There were 80 per 100 participants discharged home (95%CI 78 to 82)	2069 (2 RCT[a] 5 observational studies)	⨁◯◯◯ VERY LOW [b,c,d,e]
Mean difference in performance of independent activities of daily living Assessed with: Modified Barthel Index (Scored 0 to 100) Follow up: range 12 months to 48 months	Mean improvement of 17.65 scored (95%CI 5.68 to 29.62)	2001 (3 RCT[a] 4 observational studies)	⨁◯◯◯ VERY LOW [b,f,g,h]

Notes:

GRADE Working Group grades of evidence

High certainty	We are very confident that the true effect lies close to that of the estimate of the effect.
Moderate certainty	We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low certainty	Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect.
Very low certainty	We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect.

Notes (cont):

CI, confidence interval; RCT, randomised controlled trial; TCP, transition care programs; VS, versus
[a]Control group data only
[b]Risk of bias: Low
[c]Inconsistency: Low heterogeneity evident (I^2 = 21.99 %) between 7 studies
[d]Indirectness: Variety of therapy intensity with two studies had a mean therapy intensity of 70 minutes per day, while another two studies had 40 minutes per day, one study provided three times per week therapy and two other studies had unknown therapy intensity
[e]Imprecision: Three studies (Mallinson et al., 2014, Herfjord et al., 2014 and Lenze et al., 2019) had wider CI compared to the rest of the studies
[f]Inconsistency: Low heterogeneity evident (I^2 = 0.00%) between 7 studies
[g]Indirectness: Various therapy intensity ranging from twice per week to mean therapy intensity of 40 minutes per day, with two studies having unknown therapy intensity and one study (Firioni et al., 2013) stating low intensity rehabilitation
[h]Imprecision: Although TCP has shown positive effect in achieving MCID of 9.25, the wide confidence intervals between the studies with most studies having the lower estimates below the estimate effect warrant a lower scoring

4.4 Discussion

This systematic review is the first to synthesise findings from studies that investigated health-related outcomes of older adults completing facility-based TCP. The overall evidence was of very low quality based on GRADE criteria, hence the results should be interpreted cautiously. Synthesised evidence of prevalence data (seven studies, 2069 participants) demonstrated that 80% of older adults were discharged home after a mean LOS of 6 weeks in TC facilities. This synthesis included studies in three countries (Norway, Italy and USA) (Abrahamsen et al., 2014, 2016; Galizia et al., 2018; Gustavson et al., 2019; Herfjord et al., 2014; Lenze et al., 2019; Mallinson et al., 2014). However, studies conducted in Australia and Japan reported lower proportions (approximately 34% to 52%) of older adults discharged home after a mean LOS of 9 weeks or longer (Lawler et al., 2019; Morita et al., 2018; Parker et al., 2015). Subgroup analyses of two countries demonstrated that this difference was likely due to within study heterogeneity, although the observational nature of subgroup analyses mean results do not infer causality (Baker et al, 2009). Differences in outcomes may be partly due to differences in admission criteria in the facilities where studies were conducted, as older adults admitted to Norway TC facilities had better baseline performance in ADL and shorter hospital LOS (Abrahamsen et al., 2014; Abrahamsen et al., 2016). Previous studies have suggested that older adults admitted to TC facilities are more likely to be discharged home if they are functionally more independent (Brusco et al., 2012; Griffiths et al., 2005). Conversely, older age, poor physical function upon admission to TC facility or hospital readmission during TCP are associated with being less likely to be discharged home (Burke et al., 2016; Gustavson et al., 2019; Morita et al., 2018).

Only five RCTs (of 21 studies) were found, and of these RCTs only one directly measured the efficacy of TCP by comparing it to hospital rehabilitation (Herfjord et al.,2014). However, the primary outcome of this study was LOS at home after discharge rather than proportions of

older adults discharged home. Synthesised findings from three RCTs (315 participants) demonstrated that delivering additional therapy in TCP did not improve the proportion of participants discharged home compared to participants who received usual TCP alone. However, these RCTs evaluated a specific therapy intervention (longer therapy) within facility-based TCP for its efficacy in promoting discharge rather than directly evaluating TCP as an intervention.

Sensitivity analyses demonstrated that longer therapy programs (minutes per day) resulted in only a 1% increase in the number of people discharged home (79%) compared to any therapy duration (78%). Pooled results from three RCTs that compared duration of therapy programs found no difference in the proportions of older adults discharged home and while four studies (Jette et al., 2004; Jung et al., 2016; O'Brien & Zhang, 2018; Zhang et al., 2019) showed more people were discharged home from TCP if they received longer therapy programs, these studies could not be pooled. A prospective cohort study of TCP in Australia conducted in multiple settings, also suggested that additional physiotherapy was associated with an increased likelihood of being discharged home (Brusco et al., 2012). Most studies included in the review provided data regarding therapy duration only. Additionally staffing ratios, LOS, therapy intensity and duration differed according to individual studies, therefore it was not possible to make a recommendation about which programs were most effective in facilitating older adults' discharge home.

Performance in ADL (measured by MBI) was the health outcome most often reported in studies included in the review. Findings demonstrated that TCP improved older adults' performance of ADL and the magnitude of improvement was greater than the minimal clinically important difference [MCID of 1.85 points for MBI scale of 0-20 points (95%CI 0.89-2.81)] reported for the MBI (Hsieh et al., 2007). These findings were similar to ADL improvements made in community-based TCP, but smaller than ADL improvements reported in a study that evaluated inpatient rehabilitation (Brusco et al., 2012; Hong et al., 2019). Improving performance of ADL is an important goal for programs that seek to improve older adults' transition from hospital to home, hence these secondary outcomes provide evidence for the effectiveness of facility TCP (Covinsky et al., 2011; Greysen et al., 2017; Young et al., 2015). However, MBI only measures performance of personal ADL.

Geriatric theoretical frameworks explain that functional ability to live independently is also comprised other domains including other elements of physical function such as balance and aerobic capacity, as well as instrumental ADL, cognition, emotional and social components (Covinsky et al., 2003; Rubenstein et al., 1995). For example, although previous research suggested gait speed as an important measure in comprehensive geriatric assessment (Nancye M. Peel, Kuys, & Klein, 2012; Peel, Navanathan, & Hubbard, 2014), only five studies in the

review used gait speed as an outcome (Galizia et al., 2018; Gustavson et al., 2019; Lenze et al., 2012; Lenze et al., 2019; Leung et al., 2016). Pooled results showed that older adults who underwent TCP achieved the minimally clinically important difference in gait speed (Bohannon & Glenney, 2014), comparing with previous studies that evaluated gait speed in stroke and community dwelling older populations (Bohannon & Glenney, 2014; Fulk et al., 2011; Goldberg & Schepens, 2011). Therefore, more studies with comprehensive reporting of health-related outcomes are required as it is unclear whether TCP improves older adults' cognition and quality of life. Even though this review demonstrated 80% of older adults were discharged home after completing a TCP, the findings did not specify whether older adults regained their pre-morbid levels of independence or whether they required increased community support. This forms a gap in the evidence regarding whether TCP assists older adults to achieve other clinically meaningful health-related outcomes that would contribute to return of pre-morbid independence, such as improvement in cognition and physical ability.

We pooled results from three RCTs but these have limited generalisability for TCP populations, as the intervention evaluated was a specific therapy program rather than TCP as an intervention. Eleven studies included in the primary analyses used an observational design that provided only level IId and IIIe evidence (The Joanna Briggs Institute, 2016). The overall evidence was of very low quality based on GRADE criteria which when interpreted means that the true effect is likely to be substantially different from the estimate of effect (Schünemann et al., 2013). While the risk of bias and inconsistency was rated as low, there were high levels of imprecision and indirectness which lowers confidence in the overall quality of the evidence. Regarding other health related (secondary) outcomes, most studies only measured performance of ADL. Future higher quality studies to evaluate whether undertaking facility-based TCP restores an older adult's pre-hospital level of function are required. These studies should measure other health-related outcomes in addition to discharge destination and ADL. Studies that directly compare TCP with inpatient rehabilitation or home-based services on health-related outcomes would also provide evidence about how admission criteria for TCP compared to home programs or hospital rehabilitation should be managed.

4.4.1 Strengths and Limitations

Strengths of this review included that it followed a published protocol (Hang et al., 2020). The search identified studies from multiple countries and 15 studies contributed data for the primary outcome of discharge destination. Sensitivity analyses were performed to account for the differences in programs. A limitation was that studies reported different measures and therefore not all studies were able to be pooled. Studies may have been missed as this review only included published and grey literature in English. Another limitation was that data were

pooled from different countries even though the programs were different. Although subgroup analyses were conducted using meta-regression, pooled effects are limited to observational association across studies and could be due to other confounders (Baker et al., 2009). All transitional services provide step-down rehabilitation to enable older adults to successfully transition from hospital to independent living at home (Australian Government Department of Health, 2019; Medicare.gov, n.d.; Young et al., 2015). They aim to improve functional recovery. However, transitional services differ between countries. For example, older adults in USA have a shorter hospital LOS prior to entering skilled nursing services compared to those entering TCP or intermediate care in Australia, the UK and Europe. Studies included in the review showed variation in types of therapy, LOS and admission criteria. The study heterogeneity suggests that there are also other unknown intrinsic differences between countries and more information about program elements are required to allow robust comparison between health services and identification of the most effective components of transition services.

4.5 Conclusion

There is very low GRADE evidence that approximately 80% of older adults are successfully discharged home from TC facilities, but this varies widely across different countries. This may be due to differences in admission criteria, therapy intensity or duration and the duration of the programs. There is also very low GRADE evidence that facility-based TCP improves older adults' functional ability at discharge compared to admission. However, other outcomes that impact on the ability to live independently in the community, such as cognition and the amount of support required at discharge, were not evaluated in most of the included studies. Findings suggest that multi-disciplinary teams (MDT) in TCP investigate whether more comprehensive assessments of health-related outcomes should be completed to facilitate effective functional rehabilitation. Further research recommendations will be discussed in Chapter 8.

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Chapter Five

5

Identifying the Association Between Older Adults' Characteristics and Their Health-Related Outcomes in a Transition Care Setting: A Retrospective Audit

Preface

This chapter describes phase one (Study 2) that conducted a retrospective audit to identify the association between older adult characteristics and i) discharge destination, and ii) functional improvement in a TC facility setting.

This chapter is based on the following published article.

PAPER 3

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BRIEF RESEARCH REPORT article

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Identifying the Association Between Older Adults' Characteristics and Their Health-Related Outcomes in a Transition Care Setting: A Retrospective Audit

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The author's version of the manuscript is presented with modifications to suit the style and format of this thesis. A reprint of the published article's cover page is shown in Appendix J.

Abstract

Introduction

Continued evaluation of TCP is essential to improving older adults' outcomes and can guide which older adults may benefit from undertaking TCP. The aim of this study was to audit a TC service to identify the association between the characteristics of older adults undertaking a facility-based TCP and i) discharge destination and ii) functional improvement.

Methods

An audit (n=169) of older adults aged 60 years and above who completed a facility-based TCP in Australia was conducted. Outcomes audited were performance of ADL measured using the MBI and discharge destination. Data were analysed using logistic regression and linear mixed modelling.

Results

Older adults [mean age 84.2 (±8.3) years] had a median TCP stay of 38 days. Fifty-four older adults (32.0%) were discharged home, 20 (11.8%) were readmitted to hospital and 93 (55%) were admitted to permanent RAC. Having good levels of cognition [Mini Mental State Examination (MMSE) >23/30] [OR=2.45 (95%CI 1.07-5.61)], having an orthopaedic diagnosis [OR=3.63 (95%CI 1.51-8.68)], being independent with ADL at admission [OR=2.47 (95%CI 1.00-6.06)] and a pre-planned team goal of home discharge [OR=24.98 (95%CI 5.47-114.15)] was significantly associated with discharge home. Cases discharged home showed greater improvement in functional ability [MBI 21.3 points (95%CI 17.0-25.6)] compared to cases discharged to other destinations [MBI 9.6 points (95%CI 6.5-12.7)].

Conclusion

Auditing a facility-based TCP identified that older adults who were independent in ADL and had good cognitive levels were more likely to be discharged home. Older adults with cognitive impairment also made clinically significant functional improvements.

5.1 Introduction

Older adults requiring an episode of hospitalisation are more susceptible to developing new functional deficits during their stay, in part due to prior decline in functional ability (Covinsky et al., 2003; Hoogerduijn et al., 2012). Thirty-five to 60% of older adults demonstrate functional decline at hospital discharge, making it challenging for them to successfully return home (Covinsky et al., 2003; Hoogerduijn et al., 2012). In order to bridge the gap between hospital and home and prevent premature admission into RAC, Australia established a step-down rehabilitation service known as "transition care" (Cations et al., 2020). Other countries also provide transitional programs for at risk patients, usually older adults, after hospital discharge known as "intermediate care" in UK (Social Care Institute for Excellence, 2017) and "skilled nursing" in USA (Medicare.gov, n.d.). The goal of providing TCP in either facility-based or community settings is to deliver ongoing multidisciplinary rehabilitation for older adults immediately after an acute hospital admission (Cations et al., 2020). TCP aim to rehabilitate older adults to regain their functional independence while enabling them and family members to plan for discharge home or transfer to RAC if required (Cations et al., 2020).

However, there is mixed evidence about whether older adults who complete TCP demonstrate improved physical or cognitive function (Abrahamsen, Haugland, Nilsen, & Ranhoff, 2014; Cations et al., 2020). A recent large national study in Australia found that only 38% of older adults who completed a TCP demonstrated improvement in functional independence (Cations et al., 2020). Proportions and predictors of discharge home from TCPs varies within and between countries, with approximately 50% of older adults in Australia being discharged home compared 80% in Norway (Abrahamsen et al., 2014; Cations et al., 2020). Characteristics associated with discharge home have been found to include absence of cognitive impairment, being younger, and having better performance of ADL (Abrahamsen et al., 2014; Cations et al., 2020). This variation is thought to be due in part to the differences in the setting, type and intensity of TCP provided and type of population admitted to each TCP, including older adults' functional ability at admission (Abrahamsen et al., 2014; Cations et al., 2020; Social Care Institute for Excellence, 2017; Morita et al., 2018). A key difference in program settings is that some TCP are delivered in the home using a re-ablement model while others are delivered in facilities (Cations et al., 2020; Social Care Institute for Excellence, 2017). Older adults requiring a higher level of care and those with less social support are often admitted to a facility-based TCP as there is 24 hour care support available. A national audit in Australia found that Western Australia provided TCP mainly in facility-based settings compared to other states (Cations et al., 2020). There is also wide variation between countries in health outcomes achieved from TCP (Cations et al., 2020;

Social Care Institute for Excellence, 2017), in particular the success of the program in reducing admission to RAC. Therefore, continued evaluation of TCP is essential to assist understanding what type of TCP improve older adults' outcomes, including functional ability and eventual discharge destination and allocating scarce health resources (Social Care Institute for Excellence, 2017). Program evaluation is also important to measure effectiveness and quality.

Audit and feedback enables clinical care staff and organisations to evaluate their program performance against evidence-based guidelines and to compare programs within and across services (Ivers et al., 2012). In WA one such organisation delivers TCP in both facility and home settings. This organisation decided to conduct an audit to use as a comparison with current TCP and with similar programs across the broader health setting. This aimed to form a foundation from which to improve TCP and inform future allocation of scarce health resources. The aim of the study was to conduct a retrospective audit to identify the association between older adult characteristics and i) discharge destination, and ii) functional improvement in a TC facility-based setting.

5.2 Methods

5.2.1 Design

We conducted a secondary data analysis of de-identified data from a cohort of older adults who had undertaken facility-based TC rehabilitation. Cases were identified from electronic medical records, and additional data collected by hand searching archived paper medical files.

5.2.2 Ethical Considerations

This study was approved by Curtin University Human Research Ethics Committee and Amana Living Inc. Clinical Governance Committee. A de-identified data base was supplied by the organisation.

5.2.3 Setting and Sample

All cases admitted to a 47 bed TC facility in metropolitan Perth, WA from January 1st to October 31st 2018 were reviewed. Criteria for admission into TCP at this TC facility were the same as other facilities in WA. The criteria were that the older adult had lived in the community prior to hospital admission, was admitted directly from the hospital to the TCP, and were assessed by the hospital's Aged Care Assessment Team. Cases consisted of older adults aged

60 years and above, who were admitted to the facility to undertake a TCP during the study period. Cases were excluded if the older adult was admitted for palliative care, or for less than two weeks duration.

The facility health professional staffing included a manager, registered nurse, physiotherapist, social worker and an occupational therapist. A general practitioner, speech pathologist, nutritionist and podiatrist visited as required. Care assistant staff also assisted clients with daily personal care. The TCP included physiotherapy for functional and mobility training, occupational therapy for cognitive activities and home visits, and social work for discharge planning and care support at home.

5.2.4 Variables

Data recorded for each case at time of TC admission were collected. These variables were age, gender, socioeconomic status measured using Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) 2016 (Australian Bureau of Statistics, 2018), LOS in hospital prior to admission to the TC facility, whether assistance for ADL or IADL was required prior to hospital admission, living situation prior to hospital admission (alone or with others), use of walking aid, primary diagnosis, number of medications on admission, falls history (prior to TC facility admission), presence of cognitive impairment, presence of depression, and malnourishment (see Table 5.1). The primary diagnosis for cases was categorised as neurological, cardiorespiratory, orthopedic, general medicine/surgical, or geriatric conditions. Where case notes recorded a diagnosis of a mental health condition by the psychiatric team in addition to the primary diagnosis, this was categorised as a separate independent variable. Receiving assistance prior to admission was categorised as receiving assistance with ADL using the Katz Index (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963) or IADL using the Lawton scale (Lawton & Brody, 1969).

Each case also had recorded a “pre-planned discharge destination,” which was defined as the participant’s expected discharge destination on completion of TCP and was pre-determined by the multidisciplinary team in the hospital prior to TC admission. This pre-planned discharge destination plan was provided to the TCP team at point of admission. The plans nominated the older adult to be discharged after completing their TCP to i) home or ii) RAC facility. Previous research suggests that older adults with limited social support, multiple hospital readmissions over the 12 months, high levels of care needs, and multiple medical comorbidities were the most likely candidates to have a pre-planned discharge to RAC (Morita et al., 2018).

5.2.5 Outcomes

The primary outcomes were:

1. discharge destination categorised as home, RAC facility or hospital readmission. For group comparisons, discharge was defined as home vs not home.
2. functional ability measured using:
    - the MBI which measures the older adult's ability to complete personal care tasks including showering and toileting (score 0 to 100 - higher scores indicating better ADL performance) (Mahoney & Barthel, 1965; Shah, Cooper, & Maas, 1992). This was measured at admission and discharge from TCP to determine changes in functional ability that occurred during TCP;
    - whether or not the older adult received carer assistance either for personal care tasks, such as showering or toileting (Katz ADL scale) (Katz, Downs, Cash, & Grotz, 1970; Katz et al., 1963) or for instrumental care tasks such as shopping or cleaning (Lawton's scale) (Lawton & Brody, 1969) prior to hospitalisation and when discharged home after TCP.

5.2.6 Statistical analysis

Data were summarised using descriptive statistics (frequency distributions for categorical data and means and standard deviations or medians and IQR for continuous data). Group comparisons between cases who were discharged home and those who were discharged elsewhere (RAC, hospital) were made using Chi squared or Fisher Exact tests, as appropriate, for categorical data and t tests or Mann-Whitney U tests for continuous data, depending on normality of the distribution. Logistic regression was used to determine case characteristics that were predictors of being discharged home. Univariable logistic regression was undertaken and all univariate variables with clinical significance were entered into a multivariable model. Linear mixed modelling was used to determine predictors of improvement in functional ability during their stay in TCP (measured by MBI) from admission to discharge. Analyses were completed using IBM SPSS version 24.0 (Armonk, NY) and STATA version 16.1 (StataCorp. 2019. Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC).

The sample size was determined based on the MCID that has been established for the MBI (Hsieh et al., 2007). It was determined that a sample of n=166 cases has 80% power (alpha=0.05) to detect a standardised mean difference (effect size dz) of 0.22 (based on mean±SD=1.85±8.5) in a matched pairs t-test to compare pre-post measures in a single group (using statistical power analysis program G*Power 3.1.9.2) (Faul, Erdfelder, Buchner, & Lang, 2009). The sample was drawn from all cases admitted to a 47 bed TC facility in metropolitan Perth, WA from January 1st to October 31st 2018.

5.3 Results

5.3.1 Case Characteristics

There were n=169 cases extracted consecutively from the database. All cases had a discharge destination and an admission MBI recorded and n=133 cases had a discharge MBI score. Baseline characteristics of cases are presented in Table 5.1. Approximately one third (n=56) of the cases had a primary orthopaedic diagnosis (this included cases having total hip replacement surgery after hip fracture).

Table 5.1
Case characteristics on admission to Transition Care facility

Characteristic	**Cases (n=169)** *n* (%)
Age, mean (SD)	84.2 (8.3)
Age 60-79 years	50 (29.6)
Age ≥80 years	119 (70.4)
Gender, female	103 (60.9)
Socioeconomic status, IRSAD[a]	
I	15 (8.9)
II	49 (29.0)
III	105 (62.1)
Hospital length of stay prior to TC admission (days), median (IQR)	33.0 (21.0-49.0)
TC length of stay (days), median (IQR)	38.0 (21.0-70.0)
Pre-hospital admission living situation	
Lived alone	97 (50.5)
With family	72 (49.5)
Uses walking aid	
Frame or walker	122 (72.2)
Walking stick or quad cane or elbow crutch	10 (5.9)
Non-ambulant	25 (14.8)
Primary medical diagnosis	
Neurological (includes dementia)	25 (14.8)
Cardiorespiratory	30 (17.8)
Orthopaedic (includes hip fracture)	56 (33.1)
General medicine and surgery	28 (16.6)
Geriatric related[b] (such as poor balance, or frailty)	30 (17.8)
Cognitive score at admission,[c] mean (SD)	21.4 (5.5)
Scored≤23/30 at admission[d]	73 (47.7)

Characteristic	Cases (n=169) *n* (%)
Mental health diagnosis[e]	34 (20.1)
Number of medications on admission	
Up to 6 medications	30 (18.1)
7 to 12 medications	81 (48.8)
13 or more medications	55 (33.1)
Falls history prior to TC admission	
No fall	28 (17.0)
1 fall	56 (33.9)
Multiple (two or more) falls	81 (49.1)
Presence of depressive symptoms[f]	61 (62.9)
Malnourishment[g]	98 (70.5)

Notes:
IQR, Interquartile Range; SD, Standard Deviation; TCP, Transition Care Programs; TC, Transition Care; All data are reported as n (%) unless otherwise stated. Where data not = 100% data are missing
[a]IRSAD = The Index of Relative Socio-Economic Advantage and Disadvantage 2016, where I = most disadvantaged socioeconomic area (decile 1 to 4) and III = most advantaged socio-economic area (decile 9 and 10)
[b]Includes poor balance, malnutrition, frailty, polypharmacy, incontinence, delirium and fall risk (Buurman et al., 2011)
[c]Measured using Mini Mental State Examination (MMSE), range 0-30, higher point indicates better cognitive function, score of 23 or below indicates presence of cognitive impairment (Creavin et al., 2016; Folstein, Folstein, & McHugh, 1975)
[d]Classified as having cognitive impairment
[e]Includes secondary diagnosis of depression, anxiety, suicidal ideation, post-traumatic stress disorder, low mood, adjustment disorder and paranoia
[f]Measured using Geriatric Depression Scale (GDS), range 0-15 points, higher points indicate presence of depression, score of 6 or more indicates presence of depression (Yesavage & Sheikh, 1986)
[g]Measured using Mini Nutritional Assessment Short-Form (MNA-SF), score range 0-14, high points indicate normal nutritional status, score of 11 or below indicates at risk of malnourishment or malnourishment (Kaiser et al., 2009)

5.3.2 Discharge Destination

There were 32.0% (n=54) cases discharged home, 55.0% (n=93) admitted to RAC, and 11.8% (n=20) readmitted to hospital. Cases who were discharged to their pre-planned discharge destination compared to their actual discharge destination are presented in Figure 5.1(A). Of those who had a pre-planned destination of home, 52.1% (n=49) went home and 34.0% (n=32) went to residential care while 81.3% (n=61) of those whose plan was for discharge to RAC were admitted to RAC. Percentages of cases categorised by level of cognitive impairment who were discharged home compared to other settings are presented in Figure 5.1(B). Of those who discharged home (n=54), there was a statistically significant increase in the number of older adults requiring assistance with ADL at discharge (n=32) compared to admission (n=14) (p=0.027). There was no statistical difference for the number of older adults requiring assistance with IADL at discharge (n=47) compared to admission (n=53) (p=0.130).

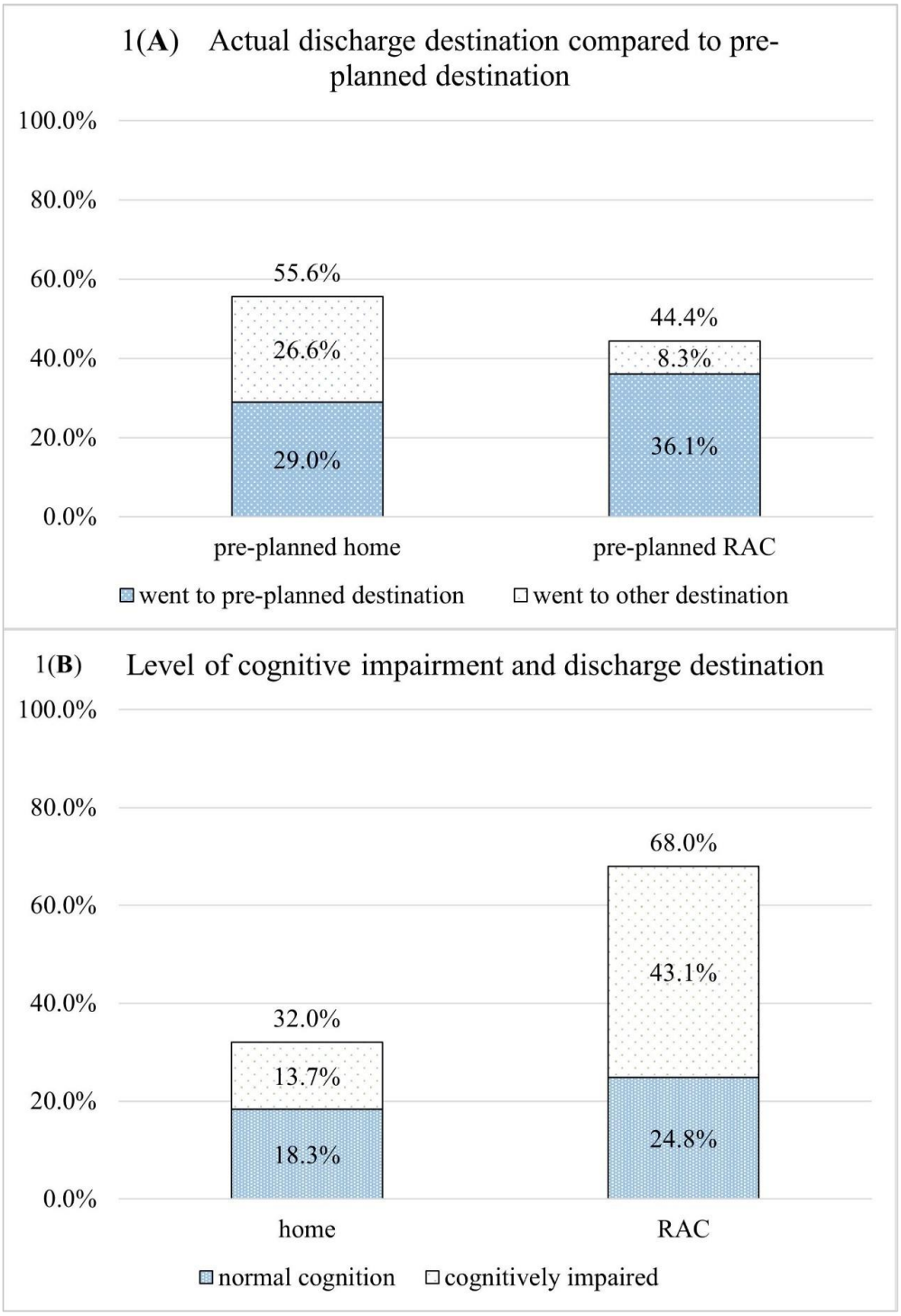

Figure 5.1 (A) Proportion of cases actual discharge destination compared to pre-planned discharge destination; (B) Number of cases discharged home compared to other discharge destinations, categorised by presence or absence of cognitive impairment

Characteristics of cases discharged home compared to other settings are presented in Table 5.2.

Table 5.2

Older adults' characteristics – group comparisons for cases discharged home compared to other discharge destination

	Discharge destination		
	Home (*n=54*[a])	**Other (*n=115*[a])**	
Cases characteristics	*n* (%)	*n* (%)	**p-value**
Age (mean, SD)	82.5 (7.8)	85.1 (8.4)	0.030*
Gender			
Female	31 (57.4)	72 (62.6)	0.518
Male	23 (42.6)	43 (37.4)	
Socioeconomic status, IRSAD[b]			
I	9 (16.7)	6 (5.22)	0.045*
II	13 (24.1)	36 (31.3)	
III	32 (59.2)	73 (63.5)	
Assistance with ADL			
Yes	14 (25.9)	49 (42.6)	0.036*
No	40 (74.1)	66 (57.4)	
Assistance with IADL			
Yes	47 (87.0)	100 (87.0)	0.988
No	7 (13.0)	15 (13.0)	
Uses walking frame			
Yes	37 (68.5)	85 (73.9)	0.466
No	17 (31.5)	30 (26.1)	
Living situation			
Alone	33 (61.1)	62 (53.9)	0.379
With others	21 (38.9)	53 (46.1)	
Hospital LOS (median, IQR)	31.5 (21.0-42.0)	34.0 (22.0-50.0)	0.419
Took ≥7 medications			
Yes	45 (86.5)	91 (79.8)	0.297
No	7 (13.5)	23 (20.2)	
Primary diagnoses			
Neurological	6 (11.1)	19 (16.5)	0.002*
Cardiorespiratory	3 (5.5)	27 (23.5)	
Orthopaedic	28 (51.9)	28 (24.3)	
General medicine/surgical	10 (18.5)	18 (15.7)	
Geriatric related[c]	7 (13.0)	23 (20.0)	
Mental health diagnosis[d]			
Yes	9 (16.7)	25 (21.7)	0.443
No	45 (83.3)	90 (78.3)	
History of falls			
Yes	50 (94.3)	87 (77.7)	0.008*
No	3 (5.7)	25 (22.3)	

	Discharge destination		
	Home (*n=54*[a])	**Other (*n=115*[a])**	
Cases characteristics	*n* (%)	*n* (%)	**p-value**
Presence of cognitive impairment[e]			
Yes	21 (42.9)	66 (63.5)	0.016*
No	28 (57.1)	38 (36.5)	
Incontinence			
Yes	29 (55.8)	73 (65.8)	0.219
No	23 (44.2)	38 (34.2)	
Presence of depressive symptoms[f]			
Yes	19 (61.3)	42 (63.6)	0.824
No	12 (38.7)	24 (36.4)	
Malnourished[g]			
Yes	30 (65.2)	68 (73.1)	0.336
No	16 (34.8)	25 (26.9)	
Discharged to pre-planned discharge destination			
Yes	50 (92.6)	61 (53.0)	<0.001*
No	4 (7.4)	54 (47.0)	

Notes:
ADL, activities of daily living; IADL, instrumental activities of daily living; IQR, interquartile range; LOS, length of stay
*p<0.05
[a]All data are reported as n (%) unless otherwise stated. Where data not = 100%, data are missing
[b]IRSAD = The Index of Relative Socio-Economic Advantage and Disadvantage 2016, where I = most disadvantaged socioeconomic area and III = most advantaged socio-economic area
[c]Includes poor balance, malnutrition, frailty, polypharmacy, incontinence, delirium and fall risk (Buurman et al., 2011)
[d]Co-morbidities, includes depression, anxiety, suicidal ideation, post-traumatic stress disorder, low mood, adjustment disorder and paranoia
[e]Measured using Mini Mental State Examination (MMSE), scored≤23/30 at admission (Creavin et al., 2016; Folstein et al., 1975)
[f]Measured using Geriatric Depression Scale, scored≥6 points indicating presence of depression (Yesavage & Sheikh, 1986)
[g]Measured using Mini Nutritional Assessment Short-Form (MNA-SF), scored ≤11 points indicating malnourishment (Kaiser et al., 2009)

Univariable analyses for the outcome of discharge home are presented in Table 5.3. Cases who were receiving assistance with ADL prior to hospitalisation, had cognitive impairment or had a diagnosis of a cardiorespiratory condition were significantly less likely to be discharged home. Cases who had a history of falls prior to hospital admission or had a pre-planned discharge destination home were more likely to be discharged home. Adjusted multivariable modelling for the outcome of discharge home is presented in Table 5.3. Older adults were significantly more likely to be discharged home if they did not require ADL support at home prior to hospitalisation, had an orthopaedic diagnosis, had no cognitive impairment and had an initial team plan that aimed for discharge home.

Table 5.3

Univariable and multivariable analysis for Outcome = Discharge home

Independent variable	Univariable - Association with discharge home			Multivariable - Association with discharge home		
	OR	95% CI	P value[a]	Adjusted OR	95% CI	P value
Age	0.96	0.93 – 1.00	0.061			
Gender	0.80	0.42 – 1.56	0.518			
Socioeconomic status, IRSAD[b]	0.63	0.30-1.31	0.214			
No assistance received with						
ADL	2.12	1.04 – 4.32	0.038*	2.47	1.00 – 6.06	0.049
IADL	1.00	0.38 – 2.64	0.988			
Used of walking frame	0.97	0.53 – 1.79	0.934			
Lived alone	0.74	0.39 – 1.44	0.380			
Hospital LOS	0.99	0.98 – 1.00	0.169			
Performance of ADL	1.01	0.998 – 1.03	0.082			
7+ medications	1.62	0.65 – 4.07	0.300			
Primary diagnoses						
Neurological	0.63	0.24 – 1.68	0.359			
Cardiorespiratory	0.19	0.06 – 0.66	0.009*	0.26	0.63-1.08	0.065
Orthopaedic	3.35	1.69 – 6.62	0.001*	3.63	1.51 - 8.68	0.004
General medicine/surgical	1.22	0.52 – 2.87	0.641			
Geriatric	0.60	0.24 – 1.49	0.268			
Mental health diagnosis[c]	0.72	0.31 – 1.67	0.444			
History of falls	4.79	1.37– 16.67	0.014*	3.77	0.84-16.90	0.083

Independent variable	Univariable - Association with discharge home			Multivariable - Association with discharge home		
	OR	95% CI	P value[a]	Adjusted OR	95% CI	P value
Presence of cognitive impairment[d]	2.32	1.16 – 4.63	0.017*	2.45	1.07 – 5.61	0.033
Incontinence	0.66	0.33 – 1.29	0.220			
Presence of depressive symptoms[e]	0.90	0.37 – 2.18	0.824			
Malnourished[f]	1.45	0.68 – 3.10	0.338			
Discharged to pre-planned discharge destination	5.51	2.68 – 11.32	<0.001*	24.98	5.47 - 114.15	<0.001

Notes:

ADL, activities of daily living; CI, confidence interval; IADL, instrumental activities of daily living; LOS, length of stay; OR, odds ratio

[a]Independent variables that demonstrated statistical significance were entered into the multivariate model. All variables that remained statistically significant in the final model were retained

[b]IRSAD = The Index of Relative Socio-Economic Advantage and Disadvantage 2016, where I = most disadvantaged socioeconomic area and III = most advantaged socio-economic area

[c]Co-morbidities, includes depression, anxiety, suicidal ideation, post-traumatic stress disorder, low mood, adjustment disorder and paranoia

[d]Measured using Mini Mental State Examination (MMSE), scored>23/30 at admission (Creavin et al., 2016; Folstein et al., 1975)

[e]Measured using Geriatric Depression Scale, scored≥6 points indicating presence of depression (Yesavage & Sheikh, 1986)

[f]Measured using Mini Nutritional Assessment Short-Form (MNA-SF), scored ≤11 points indicating malnourishment (Kaiser et al., 2009)

5.3.3 Functional Ability

There was a significant mean difference of 13.7 points (95%CI 11.0-16.4, p<0.001) between cases' functional ability at admission [MBI 48.8 points (95%CI 45.4-52.2)] and discharge [MBI 62.5 points (95%CI 58.9-66.1)]. Cases who were discharged home had a mean improvement in functional ability (MBI) 21.3 points (95%CI 17.0-25.6, p<0.001) compared to cases who were discharged to other destinations who made a mean improvement of (MBI) 9.6 points (95%CI 6.5-12.7, p<0.001).

Comparisons of improvements in functional ability by age and presence or absence of cognitive impairment are presented in Table 5.4 (see also Figure 5.2). There was no significant difference between the improvement made by the four groups [coefficient 7.4 (95% CI -5.603-20.496) (p=0.263)]. However, there were significant within-group improvements made between admission and discharge.

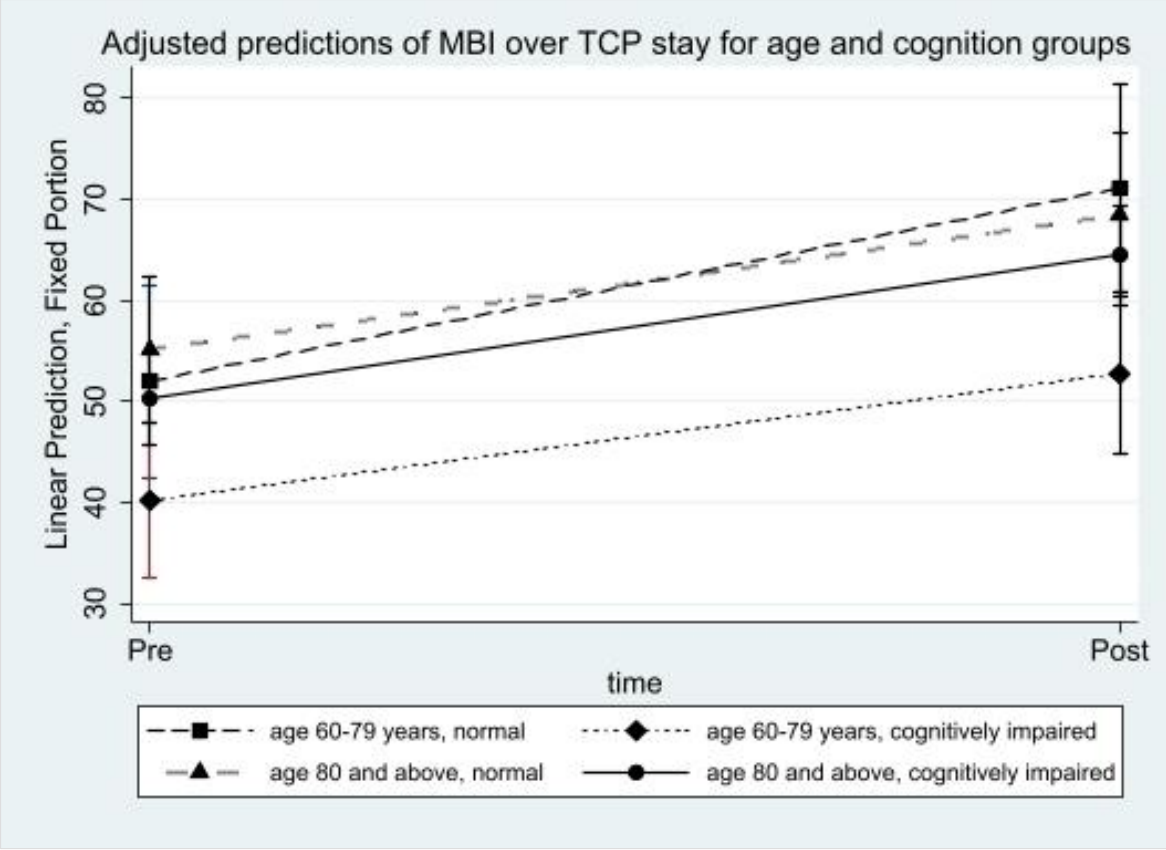

Figure 5.2 Adjusted predictions of MBI for cases according to age group and cognitive group

Table 5.4

Age and cognition in predicting functional improvement

Age group (years)	Presence of cognitive impairment[a]	MBI[b] pre	95%CI	MBI post	95%CI	Mean difference	95%CI	P-value
60-79[c]	No	52.0	42.5-61.5	71.1	60.9-81.3	19.1	10.9-27.4	<0.001
	Yes	40.2	32.5-47.8	52.8	44.7-60.8	12.6	6.11-19.1	<0.001
≥80[c]	No	55.1	47.9-62.4	68.5	60.3-76.6	13.3	6.63-20.0	<0.001
	Yes	50.3	45.6-54.9	64.5	59.6-69.4	14.2	10.3-18.1	<0.001

Notes:

CI, confidence intervals; MBI, Modified Barthel Index

[a]Measured using Mini Mental State Examination (MMSE), scored≤23/30 at admission (Creavin et al., 2016; Folstein et al., 1975)

[b]Measured performance of activities of daily living (ADL), range 0-100, higher score indicates greater level of independence (Mahoney & Barthel, 1965; Shah et al., 1992)

[c]Analysed using linear mixed modelling to estimate the effect of variability in age and cognition on functional improvement

5.4 Discussion

In this Australian cohort of older adults who completed a facility-based TCP, 32% were discharged home. Being independent with ADL at home prior to hospitalisation, having an orthopaedic diagnosis, having no cognitive impairment and a pre-planned goal of discharge home were significantly associated with returning home. Higher levels of independence with ADL at admission to TC facilities have previously been found to predict discharge home in participants with various diagnoses including stroke (Abrahamsen et al., 2014; Vluggen et al., 2020). A RCT conducted in Norway found no difference between the proportions of older adults discharged home from an IC facility compared to those who stayed in hospital, but found that more older adults who were discharged from an IC facility lived independently without home health care services (Herfjord, Heggestad, & Ersland, 2014). In contrast, a national study in Australia found that older adults who completed TCP in a facility-based setting were more likely to be discharged to RAC and less likely to improve their functional abilities compared to those who completed TCP in community-based settings (Cations et al., 2020). Since the goal of TCP is to promote discharge home and avoid RAC admissions, these differences between countries suggest that further evaluation of TCP is required to understand what programs are most effective. Approximately 60% of the older adults who were discharged to RAC had cognitive impairment which accords with other studies that found cognitive impairment significantly reduced the likelihood of older adults returning home (Abrahamsen et al., 2014; Cations et al., 2020; Clancy, Brown, Alio, Wardle, & Pendleton, 2018). Orthopaedic diagnosis was also seen as a predictor of discharge home in one study (Abrahamsen et al., 2014). This could be due to the recovery from a fracture may leave less residual disability than other diagnoses such as a stroke.

In this TC setting, a health professional team from the discharging hospitals provided a discharge plan, based on assessment of the older adult prior to their transfer to the TC facility. However, only 64% of these discharge plans were accurate predictors of the actual discharge destination achieved by older adults following TCP. This finding concurs with another Australian retrospective study that reported only 60% of these types of predictive discharge plans were accurate (Iddagoda, Inderjeeth, Chan, & Raymond, 2020). Other studies have suggested that having a pre-determined plan influences TCP staff and older adults' motivation and behaviour to engage in rehabilitation (Iddagoda et al., 2020; Michie, van Stralen, & West, 2011). Hence, a pre-determined discharge plan may negatively impact on older adults' eventual discharge destination if it is pre-emptively determined as being likely to be admission to RAC.

The cohort's levels of independence in ADL (measured with MBI) significantly improved and the amount of change was greater than the MCID for MBI through undertaking facility-based TCP. Improvement in ADL has been shown to vary across TC facilities with a range of between -9.26 points to 28 points (Abrahamsen et al., 2014; Lawler, Shields, & Taylor, 2019; Lenze et al., 2019). This could be due to differences in therapy duration, type of rehabilitation provided or the number of rehabilitation staff available, as suggested by a previous study that reported higher staff ratios were a significant predictor of functional improvement (Brusco et al., 2012). There was no significant difference in the amount of improvement in functional ability based on age and cognitive impairment. However, adults in an older age range (80 years and over) with cognitive impairment had a lower functional level on admission. Some older adults discharged home were provided with extra personal and social support compared to admission, indicating that recovery to pre-admission levels might not have occurred. Additionally, older adults with cognitive impairment are at increased risk of experiencing adverse effects of hospitalisation, such as functional decline, and are less likely to recover to their previous functional ability (Fogg, Griffiths, Meredith, & Bridges, 2018).

Findings from this audit suggest that TCP rehabilitation may need to be more tailored for older adults with cognitive impairment (McFarlane, Isbel, & Jamieson, 2017; Toba et al., 2014) or more comprehensive home support services are required after discharge from TCP (Seitz et al., 2016). Investigation into whether programs are effectively targeted to older adults with cognitive impairment is important as many older adults, including those with dementia, want to remain in their own home and currently only 5% lived in shared accommodation (Australian Institute of Health and Welfare, 2017). Since motivation may affect engagement in rehabilitation, facility-based TCP should also consider a policy of engaging all older adults in their family to aim for discharge home as a first option rather than pre-plan for discharge to RAC.

5.4.1 Strengths and Limitations

Our audit was strengthened by being conducted by the researchers in collaboration with the organisation, as it is known that audits conducted by people who want change are more likely to result in change (Gould et al., 2014). A further audit of home-based TCP in the organisation would be of value to compare patients' health outcomes and use of resources. The audit provided a detailed summary of a cohort of older adults that attended a facility-based TCP, evaluating what proportion were successfully discharged home, together with comparison of levels of functional improvement. There were n=169 cases available and extracted consecutively from the database. This was 3 cases more than the required sample size, however all cases were retained as some cases had missing data for some outcomes. Case notes were able to be examined in

detail as well as electronic records. Although this audit was conducted at one facility it provides useful information on the characteristics of older adults undertaking facility-based TCP in Australia. While admission criteria for all Australian TCP, whether community or facility-based, are similar, heterogeneity between settings is likely to be present. There are limited studies that have specifically examined facility-based TCP. These findings may be useful as a comparison for other facility-based TC services. However, this was a retrospective study using medical case files and there were limited outcome measures available for retrieval. The audit also identified that there was a gap in measuring other health outcomes that would be helpful to evaluate during rehabilitation such as mental and emotional wellbeing. Other research has also suggested that more comprehensive assessments should be completed in TCP to understand changes in older adults' health and wellbeing (Cations et al., 2020). Further prospective studies that evaluate a broad range of functional outcomes such as in a comprehensive geriatric assessment are required to assist in evaluating the effectiveness of TCP. A recent study suggested that older adults who completed home-based TCP demonstrated better health outcomes compared to those who completed facility-based TCP (Cations et al., 2020). As only one setting was examined, further studies are required to investigate differences between settings and countries to determine how to make best use of scarce resources for older adults who require TC after hospital discharge.

5.5 Conclusion

An audit identified that older adults admitted to a TC facility to undertake TCP were significantly more likely to be discharged home if they were independent with ADL at admission, had an orthopaedic diagnosis, had good levels of cognition, and had a pre-planned team goal to be discharged home. Those cases discharged home, made significantly more improvement in performance of ADL than those discharged elsewhere. Older adults with cognitive impairment had lower levels of functional ability on TC admission, however there were no significant differences in the magnitude of improvement in functional ability between these older adults and those without cognitive impairment. Older adults with cognitive impairment were significantly more likely to be discharged to RAC. Future research recommendations regarding these findings will be discussed in Chapter 8.

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Chapter Six

6

"Is My Journey Destination Home?" Exploring The Experiences of Older Adults Who Undertake a Transition Care Program: A Qualitative Study

Preface

This chapter describes phase two (Study 3) of the research that explored the lived experience of older adults undertaking a TCP at a TC facility in WA. A descriptive phenomenological approach was taken as an appropriate research design that would allow the researchers to gain a true understanding of older adults' experiences of facility-based TCP.

This chapter is based on the following article.

PAPER 4

Title:	"Is my journey destination home?" Exploring the experiences of older adults who undertake a transition care programme: A qualitative study.
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The author's version of the manuscript is presented with modifications to suit the style and format of this thesis. A reprint of the published article's cover page is shown in Appendix K.

Abstract

Introduction

TCP provide older adults with goal-oriented rehabilitation after hospitalisation. However, limited research has focused on understanding older adults' experiences when undertaking TCP. The aim of the study was to explore the lived experience of older adults undertaking a TCP at a TC facility in WA.

Methods

A descriptive phenomenological approach was utilised. A purposive sample [n=33 participants (16 older adults, 4 family members, 13 staff)] was recruited. Semi-structured interviews were undertaken at three time points during admission. Data were thematically analysed taking an inductive approach.

Results

Older adults reflected on their TCP experiences through an emotional lens through which they deliberated, 'is my destination home?' Fear of losing independence and uncertainty about their discharge destination strongly influenced older adults' perspectives regarding their TCP experience. Emotional responses, both positive and negative, were influenced by expectations prior to admission, level of family support, and staff behaviour. Staff and family concurred that many older adults were confused about their admission to the facility and initially were unprepared to engage in the rehabilitation provided.

Conclusion

Older adults experienced TCP as a time of great uncertainty and feared the unknown when discharged from hospital to TC. They expressed grief at the loss of existing life roles and anxiety about the possibility of being unable to return home. Health professionals need to inform and tailor rehabilitation for older adults to better support this transient time of life.

6.1 Introduction

Rehabilitation programs for older adults who are discharged from hospital now include short-term goal-orientated programs to facilitate successful transition from hospital to home, such as TCP and intermediate care (Australian Government Department of Health, 2019; Sezgin et al., 2020; Young, Gladman, Forsyth, & Holditch, 2015). TCP aim to maximise older adults' independence and improve the likelihood of discharge home so they can return to independent living in the community, prevent hospital readmissions and, where appropriate, provide rehabilitation prior to the older adult entering residential care.

A recent review of TCP (both community and facility-based settings in the UK) suggested that programs improved older adults' functional ability and reduced hospital admissions, but found limited evidence about whether these programs reduced institutionalisation and improved quality of life (Sezgin et al., 2020). Rehabilitation principles identify that it is important for patients to be actively engaged in their rehabilitation. Establishing two-way communication with patients to understand their perspective and take their preferences into account can assist to create collaborative and effective rehabilitation (Bernhardsson, Samsson, Johansson, Öberg, & Larsson, 2019; Lequerica, Donnell, & Tate, 2008). Older adults are more likely to engage in rehabilitation if it is meaningful to them and they understand its benefits, as the level of functional recovery they achieve can significantly impact their discharge destination (Jette, Grover, & Keck, 2003; Lequerica et al., 2008).

Limited research has explored older adults' experiences when undertaking TCP. Qualitative research in the US suggests that lack of clear information and understanding of the services offered, previous negative experiences, rushed decision making and not knowing where to get assistance may mean older adults and their families feel unwilling or unprepared to undertake TCP (Sefcik et al., 2017; Topaz et al., 2015). A study in two IC units in Denmark explored the experiences of older adults who were admitted to IC prior to being prepared for discharge home (Martinsen, Harder, & Norlyk, 2015). These older adults generally reported positive experiences including feeling that staff interactions were supportive and the IC environment was enabling (Martinsen et al., 2015). However, a national review of IC services in the UK identified that aspects of some older adults' experiences were less than adequate, including their involvement in goal planning and decision-making (Young et al., 2015). Older adults' experience of health care services was thus identified as an area for improvement (Young et al., 2015). Understanding older adults' perspectives has potential to increase the effectiveness of the rehabilitation provided and consequently improve outcomes.

The objective of the study was to explore the lived experience of older adults undertaking a TCP at a TC facility in WA. Findings from the study aimed to inform the design and development of patient education materials that could assist older adults and their families preparing to undertake and navigate TC.

6.2 Methods

6.2.1 Ethical Considerations

Ethical approvals were obtained from Curtin University Human Research Ethics Committees and from the aged care organisation providing the TCP (Amana Living Inc.). All participants either provided written, informed consent or written informed consent was provided by the next-of-kin or legal guardian for participants who did not have the capacity to provide consent.

6.2.2 Design

The study took a descriptive phenomenological approach to explore and understand the lived experiences of older adults undertaking a TCP (Liamputtong, 2013; Matua & Van Der Wal, 2015). Descriptive phenomenology emphasises gaining knowledge through direct exploration of a person's experiences and focuses on describing the first-hand experience being investigated. Participants were interviewed at three time points to capture a rich understanding of their TCP experiences, exploring their rehabilitation journey at admission through recovery phases and when preparing for eventual discharge. Bracketing is an important component in this approach so that the researcher's pre-understandings are put aside to provide an analysis that faithfully describes, and raises awareness of, the everyday experience of the participants (Matua & Van Der Wal, 2015). Adopting this approach allowed researchers to gain a rich and true understanding of older adults' experiences of TCP (Liamputtong, 2013; Matua & Van Der Wal, 2015). Hence, phenomenology is useful for clinical researchers to gain knowledge of the participant's experiences in a health context, as these experiences can guide and inform clinical practice.

6.2.3 Participants and Setting

A purposive sample of participants [older adults (n=16), and family members (n=4) nominated by older adults] were recruited within a week of admission at a TC facility in WA from March 2020 to September 2020. Recruitment strategies included advertisement flyers being disseminated at the TC facility and the referring hospital with potential participants being invited to contact the researcher either via email or telephone. Inclusion criteria for older adults were being aged 60 years and above, able to communicate and undertake an interview without the

need of an interpreter and either providing written, informed consent or having a family member or legal guardian able to provide written, informed consent (for older adults with a MMSE <23/30) (Folstein, Folstein, & McHugh, 1975). All older adults admitted to the facility were screened on admission using MMSE. For any older adults who expressed an interest in taking part in the study but who had scored less than 23/30, the researcher approached their next of kin to have a joint discussion regarding the study and for the family member, with the agreement of the older adult, to provide written, informed consent. Older adults who were admitted to the facility for respite care or who were not actively participating in the rehabilitation program or were there for less than two weeks were excluded. Inclusion criteria for family members were being aged 18 years and above, able to provide written consent and able to understand and communicate in English throughout the interview without the need of an interpreter.

Staff (n=11) working at the TC facility and two off-site health professionals who had experience referring older adults into TCP from hospital were also invited to participate. Inclusion criteria for TCP staff and off-site hospital health professionals were being aged 18 years and above, working at the designated TC facility for a minimum of 3 months or had experience of referring older adults to TCP and able to provide written consent. Sampling family and health professionals' experiences in TCP as well as the older adults assisted the researchers in gaining rich and in-depth information from multiple perspectives (Liamputtong, 2013; Patton, 2002).

6.2.4 Data Collection Procedure

6.2.4.1 Interview

Semi-structured face-to-face interviews were conducted in a quiet, private room at the TC facility with the individual participant and the primary researcher (JAH). Some interviews were also conducted through individual telephone calls due to Covid19 restriction of access to the facility between March 2020 to June 2020. All older adults completed three interviews. Nine older adults completed all three interviews face-to-face, while seven older adults completed some interviews online or via telephone. In this sub-group of participants, one completed all three interviews online, while the remaining six had at least one face-to-face interview with others online or via telephone. The therapy assistants at the facility set up either an online video call or telephone call making sure the older adult was seated comfortably in a quiet room with a drink and call bell within reach, before leaving them to talk with the researcher (JAH). Each interview lasted approximately 30 to 45 minutes and was audio-recorded on an external recording device. The researcher (JAH) made journal notes during the interview, including observations of the participant's body language, gestures and non-verbal expressions. Older

adults were interviewed at three time points (initial, mid-way and one week prior to discharge) during their admission and family members were interviewed at two time points (at admission and one week prior to discharge). TC staff were interviewed twice (approximately 8 weeks apart) and off-site health professionals were interviewed once. The full interview schedule for all participants is presented in Table 6.1.

Table 6.1
Full interview schedule for all participants

Participants, n	Initial interview	Mid interview	Final interview
Older adults, 16	16	15	16
Family, 4	4	N/A	4
TCP staff, 11	11	N/A	9
Health Professional, 2	2	N/A	N/A

Notes:
N/A, Not Applicable
TCP, Transition Care Programs

6.2.4.2 Topic Guide

The semi-structured interview guide contained open-ended, non-directive questions and was piloted to explicitly ascertain any sensitive content or topics of potential bias for removal. The researchers made minor adjustments to the interview guide after piloting, to make the questions clearer and easier to understand. Guiding questions and interview procedure were constructed to explore in depth participants' understanding and awareness of TCP, their expectations about undertaking TCP and their thoughts and feelings throughout the TCP journey. The interview guides are presented in Appendix L, Table L.1 to Table L.4 respectively.

The nature of qualitative enquiry itself makes it subject to the influence of a researcher's prior assumptions and experiences (Creswell, 2014; Liamputtong, 2013). Reflexivity was undertaken by the primary researcher (JAH), a female physiotherapist with 5 years of gerontological experience in both clinical and research settings. Although the researcher had an awareness of TC settings through her experience as a physiotherapist, she had not worked at the participating TC facility and thus had no prior relationship with the participants. All the other researchers were physiotherapist who had experience of working with older adults in both clinical and research settings for more than 10 years. The researcher (JAH) kept a journal enabling her to remain engaged in critical self-awareness throughout the research process. Employing the concept of bracketing assisted the researcher to set aside her pre-conceived

beliefs and biases to uncover the essence of the phenomenon being studied and retain the authenticity of the participants' lived experience (Creswell, 2014; Liamputtong, 2013). An audit trail was constructed to demonstrate dependability, by clearly detailing all aspects of the research process. Member checking was conducted with two to three participants after each round of interviews to strengthen the credibility of the study. The combination of these processes aimed to enhance the trustworthiness of the findings (Creswell, 2014; Liamputtong, 2013).

6.2.5 Data Analysis

Each interview audio was listened to multiple times and was transcribed verbatim by the primary researcher (JAH) to familiarise herself with the data. This assisted in gaining an accurate understanding of participants' experiences and added credibility to the results (Liamputtong, 2013). The software package QSR NVivo 12 for windows (NVivo qualitative data analysis software, QSR International Pty Ltd. Version 12, 2021) was utilised to manage the data and to explore codes and patterns across the dataset. The consolidated criteria for reporting qualitative research (COREQ) guidelines were adhered to when designing and conducting the study and reporting the findings (Tong, Sainsbury, & Craig, 2007). This aimed to improve research rigour and ensure comprehensiveness and credibility of the interviews while promoting transparency in reporting among researchers (Tong et al., 2007).

Thematic analysis using an inductive approach generated themes from the "bottom up" and identified patterns which are linked to the data collected (Braun & Clarke, 2013). Three researchers coded and examined the data independently for each interview group with the primary researcher (JAH) coding all interviews, a second researcher (PH) coding family members' interviews, while a third researcher (JFC) coding staff, older adults and off-site health professionals' interviews. The researchers conferred back and forth through the data coding as a method of triangulation that aimed to strengthen the analysis. Keywords were identified from the data and codes were grouped into categories. Two researchers (JAH, JFC) continuously explored new categories and examined patterns in the interview data with the aim of gaining a rich description that included all perspectives. Data collection ceased upon saturation as confirmed through consensus by all three researchers having reviewed the data to ascertain that sufficient information had been obtained, with no new identified codes or themes emerging (Liamputtong, 2013).

The researchers developed candidate themes and examined whether all the data pertaining to the codes were able to be allocated into these themes. The first researcher (JAH) compared her initial findings with the two other researchers (JFC, PH) and a fourth researcher (AMH) who

was an experienced senior researcher in gerontology reviewed the candidate themes (Creswell, 2014). Themes were then examined and refined to ensure each theme represented the data collected to create an initial thematic map to assist in conceptualising the findings. The thematic map was further refined by all researchers to ensure it reflected the overall findings of the data collected. Finally, accuracy of findings was assessed using the study objective with researchers identifying an overarching theme, this assisted to answer the research question: what is the lived experience older adults undertaking facility-based TCP?

6.3 Results

There were 33 participants (16 older adults, four family members, 11 TC staff and two hospital health professionals) who completed the interviews. All participants provided written, informed consent, other than one participant who had a MMSE of 22/30. This participant provided informed consent alongside their next of kin who provided written, informed consent. Two TC staff did not complete the second interview as both resigned from the TC facility during the study period. The mean age of the older adults was 80.6 years (standard deviation 9.48), half were female (n=8, 50%) and the predominant admission diagnosis was orthopaedic (n=13, 81.3%). The majority of TC staff (n=9, 81.2%) had worked in TC for more than 30 months. Characteristics of the study sample are presented in Table 6.2.

Table 6.2
Demographic characteristics of all participants

Characteristics	Older adults	Family members	TCP staff	Hospital health professionals[a]
n	16	4	11	2
Number of females, n (%)	8 (50)	1 (25)	7 (63.6)	2 (100)
Age (years)				
Mean (SD)	80.6 (9.48)	60.8 (5.5)	44.3 (10.6)	36.5 (6.36)
Range	63-96	56-68	26-60	32-41
Length of stay in TCP (days)				
Mean (SD)	75.7 (28.5)			
Range	28-126			
Highest education level, n (%)				
Postgraduate	0 (0)		5 (45.5)	1 (50)
Undergraduate	3 (18.8)	2 (50)	5 (45.5)	1 (50)
Certificate TAFE	2 (12.5)		1 (9.09)	
Year 12 completion	3 (18.8)	2 (50)		

Characteristics	Older adults	Family members	TCP staff	Hospital health professionals[a]
Year 7 to year 11	6 (37.5)			
Primary school and below	2 (12.5)			
Living situation, n (%)				
Alone	12 (75)			
With partner	4 (25)			
Primary diagnosis, n (%)				
Orthopaedic	13 (81.3)			
Neurological	2 (12.5)			
Geriatric[b]	1 (6.25)			
Experience with TCP, n (%)		2 (50)		
Years working in TCP				
Mean (SD)			3.43 (1.78)	
Range			1-6	
Role in TCP/hospital				
Manager			1 (9.09)	
Allied health[c]			3 (27.3)	2 (100)
Therapy assistant			2 (18.2)	
Carer			4 (36.4)	
Registered nurse			1 (9.09)	

Notes:
SD, Standard Deviation; TAFE, Technical and Further Education; TCP, Transition Care Program
[a]Health professionals working in hospital but were interviewed after work hours
[b]Geriatric conditions including acopia
[c]Occupational therapist, physiotherapist and social worker

6.3.1 Overarching Theme – Is My Journey Destination Home?

Older adults in this study described their transition experience from hospital, through TCP and subsequently to home or permanent RAC. The overarching theme identified the TCP experience as a journey with the central query being, 'Is my journey destination home?' This journey was influenced by multiple factors including older adults' understanding about the context and nature of TCP, their expectations about what TCP entailed, their physical and mental ability to engage with and complete the rehabilitation program and mastery of skillsets to regain functional independence. The behaviour of TC staff towards them and support, or absence of support, from family members added another layer of complexity that contributed to the older adult's journey being charged with emotional "highs and lows". This wave of emotions, which the older adults ascribed to their positive and negative experiences, provided a lens (emotional) through which to view their journeys (de Jong et al., 2019; Wurm, Tomasik, & Tesch-Romer,

2010). One 82-year-old lady (P05) reflected on her distress then disappointment and finally acceptance of her placement:

> *I was a bit distressed at first…when they sent me here, I felt as though well at least I should be keeping up with what they started me on in the hospital…but it didn't occur, so I was a bit upset about that…I've got over it.*

Many older adults were filled with uncertainty as to why they were transferred to a TC facility and whether or not they would be going home. This was perceived as a negative experience as exemplified by a 78-year-old lady (P02), who shook her head tearfully saying, 'I don't know where I am going'. Hospital health professionals (HP02) also acknowledged the older adults' uncertainty describing transferring to TC as:

> *Fear of the unknown…they don't know what that place looks like…it's another disruption, another move, it's not home.*

A few older adults understood why they were participating in TCP but still perceived the opportunity as a negative, due to the inability to participate in their community and loss of their life role. This was re-iterated by an 86-year-old lady (P03) who was grieving the loss of providing care for her sick husband:

> *It [TCP experience] is…somewhat painful in many ways and a lot of time you feel sad…I lost [caring for] my husband…he is with his daughters.*

Prevailing uncertainty through the journey led to feelings of insecurity as illustrated by a 91-year-old gentleman (P07), 'I don't know what the details are for discharge. I need to see the social worker.' However, the determination to return home was overwhelming for some, as exemplified by an 86-year-old lady (P03) who on discussing her discharge plan stated, '…still going home. I don't want to share a room with another person for the rest of my life. It is just not the same.'

There were eight main themes identified *(understanding regarding TCP, expectations about TCP, goals, functional ability, mastery, program, staff behaviour, and family support)*. These themes are described as follows:

6.3.2 Understanding Regarding TCP

Older adults understanding of TCP was constructed from the information they received in the hospital setting, their family members' understanding and their personal experiences of prior rehabilitation. One 85-year-old lady (P14) demonstrated her well informed understanding stating, 'Transition care is a half-way house, you get the extra intervention to get you more

mobile.' However, most older adults had a lack of understanding as to what TCP entailed at admission, 'I didn't know quite what it [TCP] would be' stated an 80-year-old gentleman (P04). Older adults' level of understanding as to why they were transferred to TC and what the program entailed influenced their willingness to participate in rehabilitation. TC staff felt this stemmed from the hospital setting:

> *Quite often what they're [older adults] told in hospital is not what TCP actually is [and] that's a problem'* (60-year-old female, TS05).

Some older adults had a preconceived understanding that they were going to a TC facility just to be looked after and they wouldn't be doing much activity, one 85-year-old gentleman (P04) commented, 'I thought before coming here it [TC] was like a holiday camp!' This was augmented by a hospital health professional who perceived the purpose of TCP was only to assist with maintenance of the older adults' functional abilities, not necessarily to improve their function adding:

> *So really it's just for maintenance so they don't get worse because that is the whole point right? ...because it is not a rehab ward* (female HP01).

Towards the end of the program, some older adults felt more confident and at ease as they gained some understanding of the purpose of TCP, relaying it provided them an opportunity to plan for returning home safely:

> *I feel confident enough that I will manage on my own, but to have her [my daughter] there for the first two weeks will be reassuring* (82-year-old, lady, P05).

6.3.3 Expectations About TCP

Preconceived ideas of what TCP involved shaped older adults' expectations on admission to TCP. This was acknowledged by TC staff who were aware of older adults' misconceptions:

> *Initially when people come here, they walk in and they look and they think this is a nursing home and think I don't want to be in a nursing home* (48-year-old female, TS10).

Most TC staff acknowledged that older adults' uncertainty on admission was evidenced by preconceived ideas as to why they had been admitted to TCP rather than returning directly home:

> *Sometimes some clients don't have any idea what's going on, why they're here from hospital instead of going home straight* (39-year-old male TC staff, TS12).

Many older adults were expecting to return home directly from hospital and it was a real shock when they found themselves in TC for further rehabilitation. A 63-year-old gentleman (P12) after

being admitted for a few days expressed his frustration and grief saying, 'I am fed up with this place, I am supposed to be home by now.' One 76-year-old lady (P13) questioned, 'Who knows what to expect?' when expressing her uncertainty regarding TCP from the lack of information provided. There were further expressions of anger and frustration when expectations were unmet, examples included not receiving an individualised exercise program, not having a variety of activities suited to personal needs or short lengths of stay. This was supported by TC staff:

> *I try and tell them [clients who prefer one to one exercise] that it's hard for us to give them the same length of involvement or engagement as they would get in a group... because it's not time efficient…it's not possible* (58-year-old female, TS02).

Although many older adults readjusted their expectations, during the second interviews some still felt aggrieved with the loss of freedom and autonomy to undertake their usual activities:

> *I haven't been able to get out in the garden yet…they don't allow me to go out on my own in case I fall over* (77-year-old gentleman, P01).

Some family members also stated that their experiences did not match their expectations of the TC service with a 68-year-old male(F04) adding:

> *We didn't really know what we were in for…we didn't know that it's not possible to have somebody with him [family member] 24/7.*

6.3.4 Goals

Team goal setting (including the older adult) in TCP is important to allow TC staff to partner with older adults and work towards realistic achievable goals. When older adults were asked if they had set any goals with TC staff at admission, many were unable to remember whether they had been asked, an 80-year-old gentleman (P04) commented, 'They did [establish goals] in hospital but not sure if they have done it here.' This uncertainty may have been partly due to confusion following a sudden transfer to a new environment and the large number processes and assessments happening at admission. This was refuted by TC staff who were very clear that goals were established from admission:

> *A lot of people come with a discharge goal pathway that's been determined through the family conference and the TCP coordinator...we re-established that [goal] with the person and with the family and that evolves over time* (60-year-old female, TS05).

However, most older adults did not have a goal that specifically related to their rehabilitation in TCP. When asked about their goals they described a discharge goal which was overwhelmingly to return home. This was exemplified by an 86-year-old lady (P14) who stated,

'My son said I need to go to an intermediate place before going home… the goal I want to achieve.' In the initial research interview, the majority of older adults stated their goal was to return home. This was exemplified by a 77-year-old gentleman (P01) who stated, 'My main goal is to get home…motivation is to be home again.'

6.3.5 Functional Ability

Understanding their physical limitations at admission, such as immobilisation due to a fracture healing, influenced older adults' perceptions of the TC journey as physical limitations impacted on functional ability and consequently, independence. Some older adults experienced low mood and they were less willing to engage in rehabilitation if they felt their functional ability was not improving:

> *I am frustrated about not getting anywhere…I want to get down to the next stage* (86-year-old lady, P03).

Other participants who were experiencing functional decline on admission to TCP, especially where this presented as a decrease in their physical ability, felt motivated and excited as they saw improvement in their physical ability to perform a task commenting:

> *I have exercises that I have to do every day…and the way I'm going, I feel I have improved a lot* (91-year-old gentleman, P10).

Older adults with mental health conditions, such as depression or anxiety, had more difficulty engaging in rehabilitation which in turn impacted their functional recovery.

> *When I am feeling very down, I don't feel like doing anything* (64-year-old lady, P09).

6.3.6 Mastery

Mastery of skills in TCP, such as walking independently and safely, strongly influenced older adults' TC experience. Skill mastery was impacted by several factors. The structure of the program influenced the time available for supervised practice and subsequent repetition of skills, which is necessary for motor learning. Older adults' abilities to overcome impairments, in conjunction with their mental, emotional and social wellbeing enabled progression of skills, an 82-year-old lady (P05) shared her thoughts adding:

> *I'm getting myself as active mentally and physically as possible, and I think that's really helped get me to where I am today, which is ready to go home.*

Having support, encouragement, and opportunity to practice functional tasks, such as showering and dressing was important in empowering older adults to master a skill:

> *Here staff are making a change [for older adults] …for instance initially I struggled to have a shower…but now I feel more confident to shower with staff beside me…* (91-year-old gentleman, P10).

In contrast, older adults felt disheartened and disempowered when they were held back from practising a skill:

> *They don't trust us to do it ourselves, virtually helping me with showering… I was required to work harder in hospital…I could almost do everything in hospital* (80-year-old gentleman, P04).

6.3.7 Program

Although the TCP is goal-oriented, program components such as exercise or cognitive activity groups were not tailored for each older adult, leading one 76-year-old lady (P13) to state, 'Activities are alright…we do the same exercises everyday it is a bit too much…don't need to do the same things everyday.' Some found the program activities uninteresting, 'a bit boring...Still doing exercises...' (78-year-old gentleman, P08) and another 85-year-old gentleman (P06) commented, 'Not terribly interested in Bingo…I got my marbles. I don't need that type of stimulation.' Limited therapy services on the weekend were mentioned by both older adults and staff as a disappointment with potential rehabilitation time wasted. During the 2020 Covid19 restrictions (March - May), older adults in TCP were offered individual therapy sessions, which were perceived overall as a positive enhancement of the program. Older adults' readiness and willingness to engage in the program was important to ensure a positive experience in TCP as embodied by a 91-year-old gentleman (P10), 'You got to be prepared to do what they ask you to do' and for some the level of activity provided was sufficient:

> *You don't have much time to do anything else, there's always something to do* (91-year-old gentleman, P10).

6.3.8 Staff Behaviour

Staff behaviour towards older adults either enhanced or worsened their experience in TCP. Positive staff behaviours, such as listening and empathising, clear communication and building rapport helped older adults to settle, adapt to the TCP routine and trust the staff. This empowered older adults to engage in the program and have a more positive experience. One 64-year-old lady (P09) commented:

> *They [staff] have been very helpful trying to find a place for me, having my wound looked after, easy to communicate… staff spending more time with you and more activities here…If you are upset, they give you a bit of space.*

Conversely, negative staff behaviours such as not responding to the call bell in a timely manner made family anxious and increased their sense of distrust as a 68-year-old male (F04) commented:

> *We pretty much immediately knew that there were going to be some issues because they had insufficient staff to have a quick response to alarms that go off…he's had two falls, both of which could have been avoided.*

6.3.9 Family Support

Family support appeared to influence whether older adults experienced a positive journey in TCP, with one 88-year-old gentleman (P10) expressing, 'a lot of family support from my boys and wife…they motivated me to get better to go home.' Conversely, some older adults had a negative experience when family members doubted their commitment to the program an 85-year-old lady (P03) stated, 'my daughter thinks I am not taking this [TCP] serious enough after my fall.' Family support also contributed to whether older adults were able to return to their former community life or less favourable living arrangements:

> *I discussed with my daughter [regarding 24 hours care] and she said I can do it [return home]* (76-year-old lady, P13).

Others felt frustrated and disappointed when their family members were unsupportive of their goal to return home, pushing RAC placement against their will:

> *My family wants me to be in a nursing home, but I want to be in my own home*
> (86-year-old lady, P14).

Having supportive family members who actively listened to them and acted in their best interest appeared to enable older adults to experience a positive journey through TCP even when they ended up admitted to aged care homes:

> *Wherever I go, I will be happy. All my children are getting it [RAC] for me*
> (91-year-old gentleman, P07).

6.4 Discussion

Older adults perceived their transition journey through TCP as a positive or negative emotional experience primarily influenced by their planned or tentative discharge destination. Factors that influenced their experience and subsequent emotional responses were their understanding of TCP, their expectations, functional ability, mastery of skills, goals, family

support, and staff behaviour. Some older adults feared the unknown and felt insecure because they were unsure of what TCP entailed and were anxious about whether they would be able to return home versus requiring admission to RAC. Similarly studies in Australia and the US have reported high levels of uncertainty and ambivalence amongst older adults admitted to TCP when the expected discharge destination is unclear (Cations et al., 2020; Sefcik et al., 2017). Our findings contrast with a cohort admitted to an IC program in Denmark who reported a largely positive experience. However, this group of older adults had clear pre-planned goals to be discharged home (Martinsen et al., 2015) which may have positively influenced their expectation of TCP in achieving their desired outcome. Although TCP is a time of uncertainty, the older adults did not receive basic information about what TCP entailed and did not have clear goals for their rehabilitation. These are changes that could easily be made if staff in the hospital and TCP addressed these problems. These suggested changes are supported by other researchers in the area (Gadbois, Tyler, & Mor, 2017; Sefcik et al., 2016; van Seben et al., 2019).

Older adults' emotional responses impacted their motivation to participate in rehabilitation, with positive responses being associated with increased motivation. This finding was similar to older adults who were more motivated to participate in in-patient rehabilitation if they wanted to return home (van Seben, Smorenburg, & Buurman, 2019). Our study found older adults grieved and felt frustrated at their loss of independence when they were unable to perform personal ADL independently in TC and were unable to get back to their roles in community. Adjusting to a 'new normal' functional level while being overwhelmed with changes to their health has been associated with older adults feeling underprepared for what lies ahead when transitioning from hospital to a new environment (Grimmer, Moss, & Falco, 2004; Liebzeit, Bratzke, Boltz, Purvis, & King, 2020; Sefcik et al., 2017). Lack of preparatory information about TC, having pre-conceived ideas and unmet expectations expressed by older adults were confirmed family members, TC staff and hospital clinicians which strongly suggested that more preparation is required prior to TC admission (Gadbois, Tyler, & Mor, 2017; Sefcik et al., 2016). This concurs with previous findings that the lack of clinicians' knowledge of what TCP entails (Burke et al., 2017), older adults not being given the opportunity to ask questions (Allen, Hutchinson, Brown, & Livingston, 2017), miscommunication at hospital discharge (Giosa, Stolee, Dupuis, Mock, & Santi, 2014) and family members not being involved in decision making (Reid & Hulme, 2008) leads to older adults experiencing negative emotions and feeling underprepared to undertake TCP. Family member support also strongly influenced whether older adults experienced TCP positively and contributed to them being able to discharge home. Older adults undertaking rehabilitation in inpatient rehabilitation facilities in the USA were also more likely to return home if their family members were supportive and had the capacity and resources to care for them at home (Lutz et al., 2017).

The older adults in our study had functional deficits related to mobility and self-care, therefore skill mastery was important in regaining functional independence. However, most participants were not able to enunciate rehabilitation specific goals. Not having clear rehabilitation goals resulted in some older adults having unrealistic expectations regarding the skill mastery required to achieve discharge home. This finding was similar to previous findings where health professionals in an inpatient rehabilitation setting reported their patients were unable to provide a goal that they wanted to achieve and often had unrealistic goals (van Seben et al., 2019). Even though TC staff reported mutual goals were set during the family conference in the hospital setting and with the TC coordinator and staff, most older adults had no recollection of these discussions. This could be due to older adults being overwhelmed with meeting so many different people and receiving large volumes of information, particularly at TC admission. This may indicate that staff need to discuss goals at subsequent sessions following the TC admission process. A national survey in UK reported that older adults reported that they felt their experiences were less than adequate because they were not sufficiently involved in goal setting and decision making and that discharge planning was not discussed (Young et al., 2015).

6.4.1 Strengths and Limitations

A key strength of the study is that to the authors' knowledge, it is the first to explore the lived experience of older adults undertaking a facility-based TCP. The validity of the study was enhanced by triangulating perspectives of the older adults' TCP journey with two supporting sources (family members and TC staff) (Creswell, 2014). Additionally, interviews were conducted by an experienced physiotherapist who was not part of the TCP organisation, which may have allowed participants to feel more confident to set aside socially desirable responses and provide a negative response if desired. This also aimed to address ethical considerations in working with older adults, to ensure their opinions were respected as being in private and in confidence, in addition to comments being de-identified and presented as a whole. Of the 16 older adults interviewed, 13 had an orthopaedic diagnosis which may have influenced their perception of TCP. However, these participants had multiple comorbidities of which the orthopaedic diagnosis was one more factor in their functional decline. Therefore, we feel that they are the representative sample of a TCP population. Participants were frailer, older adults who had just been through hospital admissions and sometimes serious illnesses, hence researchers provided extended time for the participants to decide whether they would like to enrol in the study. All participants were also encouraged and given the opportunity to discuss the research with family members or friends, so that they could reflect and feel confident about deciding whether or not to participate. Participants were offered care prior to all interviews, to

address any requirements for drinks, comfort and other physical needs. Family members who participated were also reminded that their comments would not be provided directly to the facility, but would be combined and presented as part of a de-identified report.

The study was completed by physiotherapists as primary interviewer and data analysts, which could have influenced the interview and analysis. However, both senior researchers (AMH & JFC) are gerontology specialised physiotherapists who have a holistic and advanced understanding of geriatric care and multidisciplinary team. And the student was an experience graduate who worked part-time in aged care settings. Therefore, we feel confident that the themes represent participants' experience about TCP. Due to the nature of the Covid19 pandemic, some interviews were conducted either using online or telephone calls which limited the researcher's observation of participants' body language, gestures and emotions portrayed during the interview. Four participants met the researcher for the first time through an online call which may have resulted in reduced rapport and made observation of verbal cues challenging and only one participant had all three calls online. The findings were generated from one facility and hence cannot be generalised to other TC settings. Our findings may be helpful for other settings that undertake facility-based rehabilitation programs. Further research to explore and understand how to involve older adults in their own discharge planning when they are unwell is important especially when critical changes in life roles and living situations are planned. Extensive research has examined older adults' discharge from the hospital system (Gonçalves-Bradley, Lannin, Clemson, Cameron, & Shepperd, 2016; Greysen et al., 2017; Leppin et al., 2014). However, rapidly changing services that now encourage aged care in the home and the growing ageing population suggest we need to deepen our understanding of the problems older adults encounter in the transitional care system.

6.5 Conclusion

Older adults discharged from hospital to a TC facility for rehabilitation experienced their journey as one of great uncertainty. Some older adults experienced additional anxiety about whether they would be able to return home. Physical, mental, and emotional wellbeing such as grief and anxiety about their situation impacted their motivation and ability to engage in the rehabilitation provided. Clear goals, understanding the purpose of TCP, being able to manage expectations and having family support improved the older adults' experience. Health professionals and family may require more resources and training to emotionally support older adults at the time of transition from hospital to TCP, as it was frequently experienced as overwhelming and a time of great turmoil. Further research recommendations from this study will be discussed in Chapter 8.

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Chapter Seven

7

Health-Related Outcomes of Older Adults Undertaking a Transition Care Program: A Prospective Cohort Study

Preface

This chapter describes phase two (Study 4) of the research. Following phase one, gaps in comprehensively measuring older adults' health outcomes in TCP were identified. Subsequently, validated and reliable assessment tools were chosen to conduct a holistic evaluation of health outcomes. A prospective cohort study was conducted to: i) comprehensively evaluate health outcomes of older adults undertaking a facility-based TCP; ii) compare health outcomes between participants discharged home and those discharged to RAC.

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PAPER 5

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The author's version of the manuscript is presented with modifications to suit the style and format of this thesis. Submission details are provided in Appendix M.

Abstract

Introduction

Although TCP aim to assist older adults to improve their functional independence to return home, only limited studies have evaluated broader health outcomes of older adults undertaking TCP. Hence, the aims of the study were to: i) comprehensively evaluate health outcomes of older adults undertaking a facility-based TCP; ii) compare health outcomes between participants discharged home and those discharged to RAC.

Methods

Older adults (aged 60 years and above) who were undertaking a TCP were recruited on admission to the facility. Changes in physical function, cognitive ability, emotional and social wellbeing were evaluated. Data were analysed using linear mixed modelling.

Results

There were 47 participants [mean age 80.0 (±8.9) years] enrolled in the study, of whom 26 (55.3%) were discharged home, 14 (29.8%) to RAC and 6 (12.8%) readmitted to hospital. Participants demonstrated improvement, between admission and discharge, in ADL [MBI 12 (IQR 26)], functional ability [DEMMI 11.0 (SD 10.4)] and quality of life [EQ-5D-5L 5 (IQR 20)]. Participants discharged home showed greater improvement in functional ability [DEMMI 13.6 (95%CI 9.8-17.4)] compared to those discharged to RAC [DEMMI 6.9 (95%CI 1.7-12.0)] (interaction p-value = 0.04). Participants discharged home also showed less decline in instrumental ADL [Lawton's scale -0.8 (95%CI -1.3-(-0.2)] compared to those discharged to RAC [Lawton's scale -2.1 (95%CI -2.9-(-1.4)] (interaction p-value = 0.002).

Conclusion

Older adults completing TCP demonstrated improvements in physical, cognitive and psychosocial function, which all contribute to returning to independent community living. CGA assisted in identifying deficits in domains of functional ability, which may enable clinicians to more effectively tailor TCP for older adults.

7.1 Introduction

Older adults have high rates of hospital admissions, comprising between 22% to 42% of all admissions annually, in both the UK and Australia (Australian Institute of Health and Welfare, 2020; Dalrymple et al., 2020). Over one third of older adults experience significant functional decline during their admission and encounter difficulties returning to independent living (Hoogerduijn et al., 2012). After discharge, older adults are at risk of unplanned hospital readmissions, falls, functional decline and unplanned admissions to RAC (DePalma et al., 2013; Naseri et al., 2020). TCP have been established in multiple countries to provide short-term goal-oriented rehabilitation for older adults after hospitalisation. These programs aim to improve functional independence for return home and prevent premature admission to RAC (Australian Government Department of Health, 2019; Cations et al., 2020; Young, Gladman, Forsyth, & Holditch, 2015).

Older adults who undertake TCP show changes in health outcomes, including making significant improvement in performance of ADL (Cations et al., 2020). However, only discharge destination and ADL function are reported consistently (Australian Government Department of Health, 2019; Cations et al., 2020; Hang, Francis-Coad, et al., 2021). In Australia the MBI is the single assessment mandated by the Federal government for use in TCP. However, the MBI measures only one component of function namely, independence of ADL, which evaluates whether the older adult can safely complete personal care tasks (Australian Government Department of Health, 2019; Cations et al., 2020). Limited research has reported cognitive, emotional, physical mobility or social outcomes of older adults undertaking TCP (Hang, Naseri, et al., 2021). Older adults require capability across cognitive, social and physical domains to regain or maintain sufficient functional ability to live independently in the community (McGilton et al., 2021; Young et al., 2015). Therefore, current assessment procedures may not be ideal. Rehabilitation programs for older adults have been found to be more effective when a comprehensive type of assessment is conducted, as this allows appropriate tailoring of rehabilitative treatment to maximise recovery (Pilotto et al., 2017; Ward & Reuben, 2020).

Recent national audits of TCP have recommended that health professionals assess older adults' health-related outcomes using CGA to holistically evaluate functional ability to return to independent community living (Australian Government Department of Health, 2019; Young et al., 2015). Older adults who were assessed using CGA at hospital admission and in-patient rehabilitation were more likely to be living at home one year after hospitalisation, and those who completed tailored inpatient geriatric rehabilitation demonstrated functional improvement and were less likely to be discharged to RAC (Bachmann et al., 2010; Pilotto et al., 2017; Ward &

Reuben, 2020). Both Australian and UK national audits reported that older adults had other unmet needs whilst undertaking TCP and measuring physical function alone was not helpful to assist this cohort to plan for discharge (Australian Government Department of Health, 2019; Young et al., 2015).

Presently, it is uncertain which range of assessments would holistically and effectively evaluate older adults' functional ability when they undertake facility-based TCP, although using a range of health-related outcome measures is recommended (Australian Government Department of Health, 2019; Cations et al., 2020; Hang, Francis-Coad, et al., 2021; Young et al., 2015). Assessing a holistic range of health-related outcomes allows health professionals to tailor intervention plans specific to the older adult's needs (Pilotto et al., 2017; Ward & Reuben, 2020). This type of assessment facilitates close monitoring of the older adult's improvement across multiple domains of health while they complete TCP and may also assist to identify which domains of function are most closely associated with successful discharge home (Pilotto et al., 2017; Ward & Reuben, 2020). A recent systematic review demonstrated that although older adults made significant improvements in MBI, future studies that comprehensively evaluate the effectiveness of TCP on other health-related outcomes are required (Hang, Naseri, et al., 2021). Therefore, this study implemented a holistic assessment of older adults undertaking TCP that would comprehensively measure their functional ability across a number of domains. The aims of the study were to: i) comprehensively evaluate older adults' health-related outcomes when undertaking a facility-based TCP and ii) compare health-related outcomes between participants discharged home and those discharged to RAC.

7.2 Methods

7.2.1 Design

A prospective cohort study was conducted, participants were measured at admission and discharge. The study is reported following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (von Elm et al., 2008).

7.2.2 Ethical Considerations

Ethical approval was obtained from Curtin University Human Research Ethics Committee and research approval was obtained from Amana Living Inc. Clinical Governance Committee. All participants provided written informed consent.

7.2.3 Participants and Setting

Older adults who were admitted to a 47 bed TC facility in WA from October 2020 to June 2021 were invited to participate. In Australia facility-based TCP vary in duration from between four to 12 weeks (Australian Government Department of Health, 2019). Inclusion criteria were being in the first week of admission, aged 60 years or older, admitted to undertake a TCP with a projected LOS of at least two weeks and able to communicate and understand language spoken through the assessment. All older adults who received TCP were assessed by the Aged Care Assessment Team at the tertiary hospital. Criteria for TCP admission were that the patient was living in the community prior to hospital admission and they had to be admitted into TCP directly after hospital discharge. Older adults with mild to moderate cognitive impairment (MMSE 17-23) (Folstein, Folstein, & McHugh, 1975) required their legal guardian to provide written informed consent. Exclusion criteria were, moderate to severe cognitive impairment receiving palliative care, or being admitted to wait for permanent RAC placement.

The facility staffing included a manager, registered nurses, physiotherapist, social worker, and an occupational therapist. A general practitioner, speech pathologist, nutritionist and podiatrist visited as required. Care assistant staff provided daily personal care. The TCP included function and mobility training, cognitive activities, preparatory home visits, discharge planning and organising care support required for older adults after discharge.

7.2.4 Data Collection Procedure

Participants were recruited within their first week of admission to the TC facility. Health-related outcomes were measured during the first week of admission and at discharge. Data collected during the initial assessment were age, gender, date of admission to TC facility, hospital LOS, living situation, use of walking aid prior to hospital admission and at discharge from hospital to TCP, and falls history (prior to TC facility admission, including in hospital) (see Table 7.1). Receiving assistance with ADL prior to admission was categorised using the Katz Index and for IADL using the Lawton's scale (Katz, Downs, Cash, & Grotz, 1970; Lawton & Brody, 1969). Socioeconomic status was categorised by the older adult's postcode using the Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) 2016 (Australian Bureau of Statistics, 2018). The primary diagnosis was categorised as neurological, cardiorespiratory, orthopaedic, general medicine, or geriatric conditions (polypharmacy, incontinence, malnutrition, delirium and falls risk) (Buurman et al., 2011). A diagnosis of a mental health condition by the psychiatric team in addition to a participant's primary diagnosis was categorised as a separate independent variable.

7.2.5 Outcomes

Health-related outcomes were chosen as being representative to evaluate the four domains of function (Pilotto et al., 2017; Ward & Reuben, 2020). Outcome measures were chosen based on valid and reliable measurement tools previously used in older rehabilitation populations.

7.2.5.1 Feasibility

Prior to the study a suite of 10 assessment tools, measuring relevant health-related outcomes, was piloted with a purposive sample of older adults (n=10) and staff (n=5) to determine feasibility for the TC population and setting (Wong et al., 2021, see Appendix B). All assessments were able to be administered in a timely manner and identified changes in the physical, cognitive, emotional and social domains of function. Staff who administered CGA using the selected assessment tools found the outcomes and tools acceptable and suitable for this cohort (Wong et al., 2021, see Appendix B). The older adults (n=10, mean age 78.9$\pm$9.1) found the assessment process acceptable and perceived that participating in CGA assisted them in understanding their perceived state of health (Wong et al., 2021, see Appendix B).

Outcomes were:

1. Physical function, evaluated by assessing:

    - ADL, measured using the MBI (Mahoney & Barthel, 1965) by TC nursing staff. The MBI measures the older adult's ability to complete personal care tasks including showering and toileting (scored 0-100) with higher scores indicating better ADL performance;
    - Functional mobility, measured using the DEMMI (de Morton, Brusco, Wood, Lawler, & Taylor, 2011) that measures mobility, including gait, balance, transfers and endurance. This outcome has been used in both acute and subacute geriatric rehabilitation; 15-items assessment, score range 1-100, higher score indicating more independence;
    - Functional mobility measured using TUG (Podsiadlo & Richardson, 1991) (seconds), a validated assessment of gait, balance and walking ability;
    - Gait speed measured using 10 metre-walk test (Fiser et al., 2010). Gait speed is a validated measure. Speed is associated with falls risk, ability to mobilise in the community and progression of health conditions;

2. Cognitive ability, measured using the Montreal Cognitive Assessment (MoCA) (Nasreddine et al., 2005) which contains 12 tasks that assess multiple domains of cognitive function. The MoCA distinguishes those with mild cognitive impairment from older adults with normal cognitive function, range 0-30, higher score indicating better cognitive level.
3. Emotional wellbeing, assessed using the Patient Health Questionnaire-9 (PHQ-9) (Löwe, Unützer, Callahan, Perkins, & Kroenke, 2004), higher score denotes depression.
4. Social wellbeing, evaluated by assessing:
    - HRQoL, measured using the EQ-5D-5L (The EuroQol Group, 1990), using five dimensions of health with five response levels for each dimension presented as a 5-digit index value. Self-perceived health status is measured using a visual analogue scale (VAS) scored from 0-100, where 100 points equal the best health imaginable;
    - IADL, measured using Lawton Instrumental Activities of Daily Living Scale (Lawton & Brody, 1969), which assesses 8 domains of IADL (e.g. shopping, transport), with score 0 or 1, higher score indicates better level of independent living skills. Participants self-reported functional skills using this instrument were crossed checked with the hospital aged care assessment team report (for TCP admission score) and services arranged by social worker at discharge from TCP; and
    - Discharge destination, reported as either home, RAC or readmission to hospital.

7.2.6 Statistical Analysis

Quantitative data were analysed using STATA version 16.1 (StataCorp. 2019. Stata Statistical Software: Release 16. College Station, TX: StataCorp LLCs). Data were summarised using descriptive statistics. Group comparisons were performed using χ^2 or Fisher's exact tests for categorical comparisons and Mann-Whitney U or t-tests for continuous outcomes depending on normality. Changes in health-related outcomes within the whole cohort, home and RAC were analysed using Wilcoxon signed-rank test. Linear mixed modelling was used to predict the changes in health-related outcomes within the groups (whole cohort, home and RAC) and between the groups (home and RAC). Data were transformed if required. Gait speed and time taken to complete the TUG test were analysed using negative binomial regression. Results were reported as predicted mean differences and 95% CI.

The sample size was calculated based on a previous audit conducted by the researchers at the same TC facility using MBI scores (Hang, Francis-Coad, et al., 2021). The mean difference in MBI from admission to discharge was 13.7 (SD 16.1) (for the score range 0-100) (Hang, Francis-Coad, et al., 2021). This corresponded to a MCID established (1.85 points out of a total

of 20 points) for MBI reported in another study in a rehabilitation population (Hsieh et al., 2007). It was determined that a sample of n=34 older adults would have 80% power (alpha=0.05) to detect a standardised mean difference (effect size) of 0.44 in the MBI (based on mean difference±SD=11± 25) in a matched pair t-test to compare pre-post measures in a single group (using the statistical power analysis program G*Power 3.1.9.4) (Faul, Erdfelder, Buchner, & Lang, 2009). As TC facilities admit a frail, older population, including those with recent medical instability, a recruitment target of 50 participants was planned to allow for attrition due to hospital readmission, death or withdrawal.

7.3 Results

7.3.1 Participants' Flow Through the Study

Participant's (n=47) flow through the study is shown in Figure 7.1. Six participants were readmitted to hospital after enrolment and did not return to the TC facility, of those three (6.4%) died. Forty-one participants completed baseline and discharge assessments. Twenty-six (63.4%) participants were discharged home, 14 (34.2%) to RAC and one (2.4%) to another rehabilitation centre. Characteristics of the cohort are presented in Table 7.1.

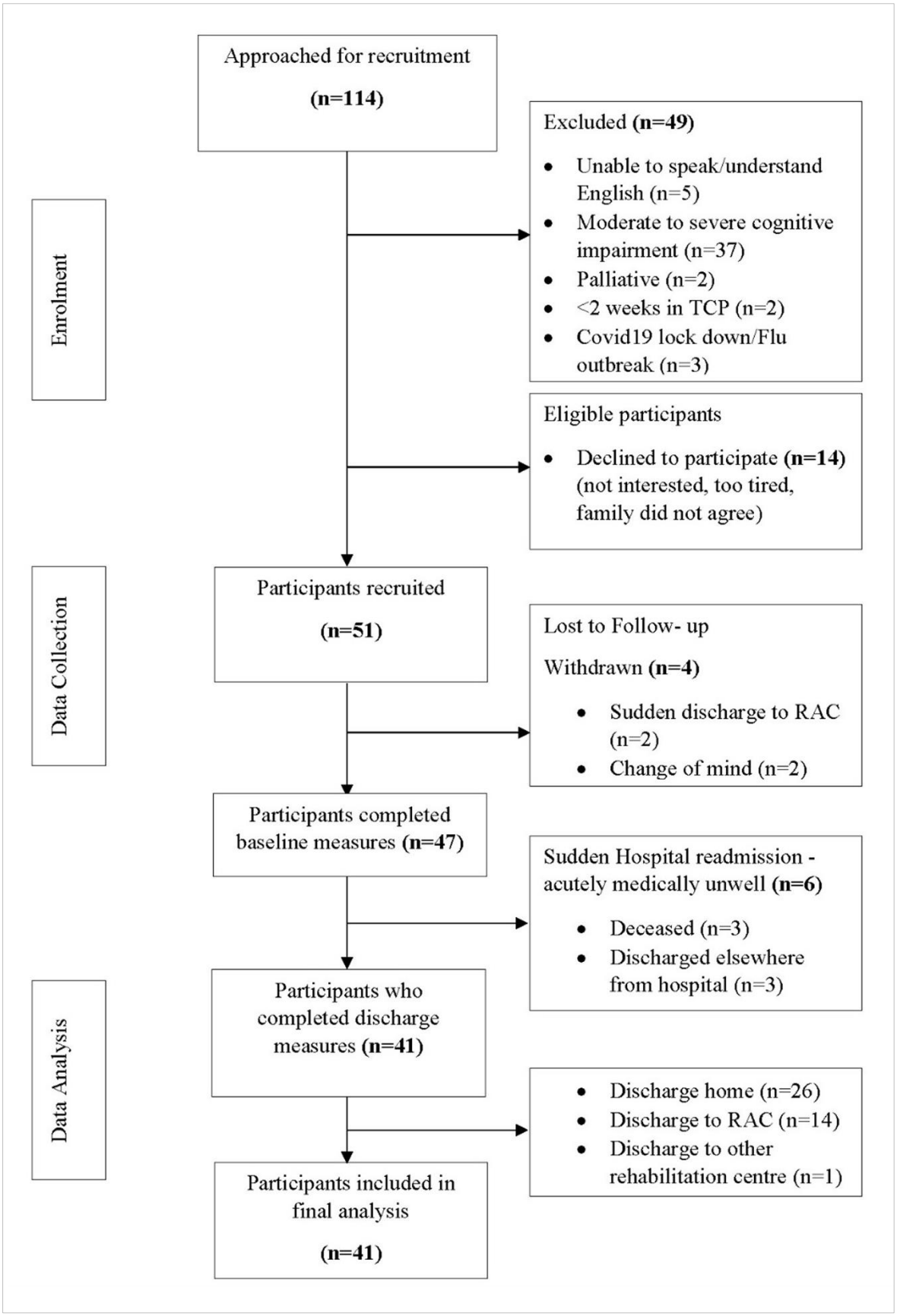

Figure 7.1 Participants' flow through the study

Table 7.1

Participants' characteristics and group comparisons for older adults discharged home compared to RAC

Characteristic	Whole cohort n=41[a] *n* (%)	Home (n=26) *n* (%)	RAC (n=14) *n* (%)	p-value
Age, mean (SD)	80.1 (8.9)	78.7 (9.1)	83.2 (8.2)	0.13
Age 60-79 years	18 (43.9)	13 (50.0)	4 (28.6)	0.32
Age ≥80 years	23 (56.1)	13 (50.0)	10 (71.4)	
Gender, female	22 (53.7)	14 (53.8)	7 (50.0)	1.00
Socioeconomic status, IRSAD[b]				
I	6 (14.6)	4 (15.4)	2 (14.3)	1.00
II	13 (31.7)	8 (30.8)	5 (35.7)	
III	22 (53.7)	14 (53.8)	7 (50.0)	
Hospital length of stay (days), mean (SD)	28.3 (19.6)	30.0 (22.6)	25.6 (13.4)	0.50
TC length of stay (days), mean (SD)	60.6 (30.3)	62.4 (29.0)	57.2 (34.4)	0.62
Pre-hospital admission living situation				
Lives alone	24 (58.5)	15 (57.7)	8 (57.1)	1.00
Lives with others[c]	17 (41.5)	11 (42.3)	6 (42.9)	
Received ADL support prior to hospitalisation	11 (26.8)	6 (23.1)	5 (35.7)	0.47
Received IADL support prior to hospitalisation	36 (87.8)	22 (84.6)	13 (92.9)	0.64
Uses walking aid prior to hospitalisation				
None or walking stick	22 (53.7)	13 (50.0)	8 (57.1)	1.00
Walking frame	15 (36.6)	10 (38.5)	5 (35.7)	
Non-ambulant	4 (9.8)	3 (11.5)	1 (7.1)	
Primary medical diagnosis				
Orthopaedic (includes hip fracture)	20 (48.8)	15 (57.7)	4 (28.6)	0.11
Geriatric related[d] and general medicine[e]	21 (51.2)	11 (42.3)	10 (71.4)	
Has a mental health diagnosis[f]	13 (31.7)	9 (34.6)	3 (21.4)	0.48
>7 comorbidities	37 (90.2)	24 (92.3)	12 (85.7)	0.60
Visual impairment[g]	16 (39.0)	13 (50.0)	2 (14.3)	0.04
Cognitive impairment[h]	11 (26.8)	6 (23.1)	5 (35.7)	0.47
Falls history in 12 months prior to hospital admission				
No fall	7 (17.1)	4 (15.4)	3 (21.4)	0.68
1 or more falls	34 (82.9)	22 (84.6)	11 (78.6)	
Falls in TC during admission (number of participants)				
No fall	30 (73.2)	21 (80.8)	8 (57.1)	0.15
1 or more falls	11 (26.8)	5 (19.2)	6 (42.9)	

Notes:
ADL, Activities of daily living; IADL, Instrumental activities of daily living; RAC, Residential Aged Care; SD, Standard Deviation; TC, Transition Care. All data are reported as n (%) unless otherwise stated
[a]One participant was discharged to another rehabilitation facility
[b]IRSAD = The Index of Relative Socio-Economic Advantage and Disadvantage 2016 (Australian Bureau of Statistics, 2018), where I = most disadvantaged socioeconomic area (decile 1 to 4) and III = most advantaged socio-economic area (decile 9 and 10)
[c]Lives with partner except n=5 lives with other family member
[d]Includes frailty, polypharmacy, falls risk and mental health (Buurman et al., 2011)
[e]Includes cardiorespiratory and stroke
[f]Co-morbidities, includes secondary diagnosis of depression, anxiety and schizophrenia
[g]Includes glaucoma, macular degeneration and legally blind
[h]Measured using Montreal Cognitive Assessment (MoCA) (Nasreddine et al., 2005), scored ≤23/30

7.3.2 Changes in Health Outcomes Within Groups

Changes in health-related outcomes within the groups (whole cohort, home and RAC) are presented in Table 7.2 and Figure 7.2. Participants discharged to RAC had lower function on admission to TCP compared to those discharged home in all domains of function except for gait speed. There were statistically significant improvements in the whole cohort's performance of ADL, functional mobility, emotional wellbeing and HRQoL between admission and discharge (see Table 7.2 and Figure 7.2). There was significant decline in the cohort's ability to perform IADL at discharge compared to admission (see Table 7.2 and Figure 7.2). Participants discharged home demonstrated significant improvements in their performance of ADL, functional mobility and HRQoL between admission and discharge with a significant decline in performance of IADL. Participants discharged to RAC showed significant improvement in performance of ADL between admission and discharge, with significant decline in performance of IADL.

Table 7.2 (i)

Changes in health-related outcomes between admission and discharge - within group comparisons

	Whole cohort (n=41)[b]			
Outcome[a]	**Admission**	**Discharge**	**Changes**	**p-value**
Physical Domain				
Modified Barthel Index	50.58 (45.28, 55.87)	67.65 (62.35, 72.95)	16.48 (11.00, 21.97)[c]	<0.001
de Morton Mobility Index	33.70 (29.44, 37.96)	44.93 (40.66, 49.19)	10.22 (7.02, 13.41)	<0.001
Time Up and Go (seconds)[d]	35.89 (27.27, 44.52)	29.30 (22.26, 36.35)[c]	-0.19 (-0.39, 0.02)[e]	0.070
10 Metre-Walk Test (ms^{-1})[d]	0.51 (0.25, 0.77)	0.57 (0.31, 0.83)	0.12 (-0.62, 0.86)[e]	0.751
Cognitive Domain				
Montreal Cognitive Assessment	24.80 (23.68, 25.92)	25.20 (24.08, 26.32)	0.27 (-0.28, 0.83)	0.333
Emotional Domain				
Patient Health Questionnaire-9	7.10 (5.30, 8.90)	6.05 (4.25, 7.85)	-1.19 (-2.87, 0.50)	0.167
Social Domain				
EQ-5D-5L (Index Value)	0.47 (0.38, 0.56)	0.61 (0.51, 0.70)	0.12 (0.02, 0.21)[c]	0.016
EQ-5D-5L (VAS)	62.63 (56.26, 68.99)	72.43 (66.06, 78.79)	10.26 (3.29, 17.23)	0.004
Lawton's Scale (0-8)	5.45 (4.94, 5.96)	4.20 (3.69, 4.71)[c]	-1.46 (-1.90, -1.01)	<0.001

Notes:

VAS, Visual Analogue Scale

[a]All values are reported in mean (95% Confidence Interval) unless otherwise stated

[b]One participant was discharged to a rehabilitation facility

[c]Minimal clinical important difference

[d]Analysed using negative binomial regression; Non-ambulant at admission n=9, non-ambulant at discharge n=5

[e]Coefficient reported

Table 7.2 (ii)

Changes in health-related outcomes between admission and discharge - within group comparisons

	Home (n=26)[b]				RAC (n=14)			
Outcome[a]	**Admission**	**Discharge**	**Changes**	**p value**	**Admission**	**Discharge**	**Changes**	**p value**
Physical Domain								
Modified Barthel Index	54.27 (47.70, 60.84)	72.73 (66.16, 79.30)	18.46 (11.97, 24.95)[c]	<0.001	43.71 (34.76, 52.67)	58.21 (49.26, 67.17)	14.50 (5.66, 23.34)[c]	0.001
de Morton Mobility Index	35.00 (29.71, 40.29)	48.58 (43.29, 53.86)	13.58 (9.79, 17.36)[c]	<0.001	31.29 (24.08, 38.49)	38.14 (30.94, 45.35)	6.86 (1.70, 12.01)	0.009
Time Up and Go (seconds)[d]	33.82 (23.99, 43.64)	26.13 (18.78, 33.49)[c]	-0.26 (-0.49, -0.03)[e]	0.027	40.25 (24.08, 56.41)	35.95 (21.34, 50.55)	-0.11 (-0.44, 0.22)[e]	0.500
10 Metre-Walk Test (ms^{-1})[d]	0.52 (0.19, 0.84)	0.59 (0.28, 0.90)	0.13 (-0.69, 0.95)[e]	0.759	0.48 (0.05, 0.91)	0.54 (0.08, 0.99)	0.11 (-1.12, 1.34)[e]	0.860
Cognitive Domain								
Montreal Cognitive Assessment	26.15 (24.76, 27.55)	26.85 (25.45, 28.24)	0.69 (0.03, 1.35)	0.039	22.29 (20.39, 24.18)	22.14 (20.25, 24.04)	-0.14 (-1.04, 0.75)	0.755
Emotional Domain								
Patient Health Questionnaire-9	6.50 (4.27, 8.73)	5.77 (3.54, 8.00)	-0.73 (-2.72, 1.26)	0.472	8.21 (5.18, 11.25)	6.57 (3.53, 9.61)	-1.64 (-4.36, 1.07)	0.235
Social Domain								
EQ-5D-5L (Index Value)	0.49 (0.37, 0.60)	0.67 (0.56, 0.79)	0.19 (0.08, 0.30)[c]	0.001	0.44 (0.28, 0.59)	0.48 (0.33, 0.63)	0.04 (-0.11, 0.20)	0.135
EQ-5D-5L (VAS)	65.96 (58.07, 73.85)	74.69 (66.80, 82.58)	8.73 (0.49, 16.98)	0.038	56.43 (45.68, 67.18)	68.21 (57.46, 78.97)	11.79 (0.55, 23.02)	0.040
Lawton's Scale (0-8)	6.04 (5.41, 6.67)	5.27 (4.64, 5.90)[c]	-0.77 (-1.29, -0.25)	0.004	4.36 (3.50, 5.22)	2.21 (1.35, 3.07)	-2.14 (-2.86, -1.43)	<0.001

Notes:

RAC, Residential Aged Care; VAS, Visual Analogue Scale

[a]All values are reported in mean (95% Confidence Interval) unless otherwise stated

[b]One participant was discharged to a rehabilitation facility

[c]Minimal clinical important difference

[d]Analysed using negative binomial regression; Non-ambulant at admission n=9, non-ambulant at discharge n=5

[e]Coefficient reported

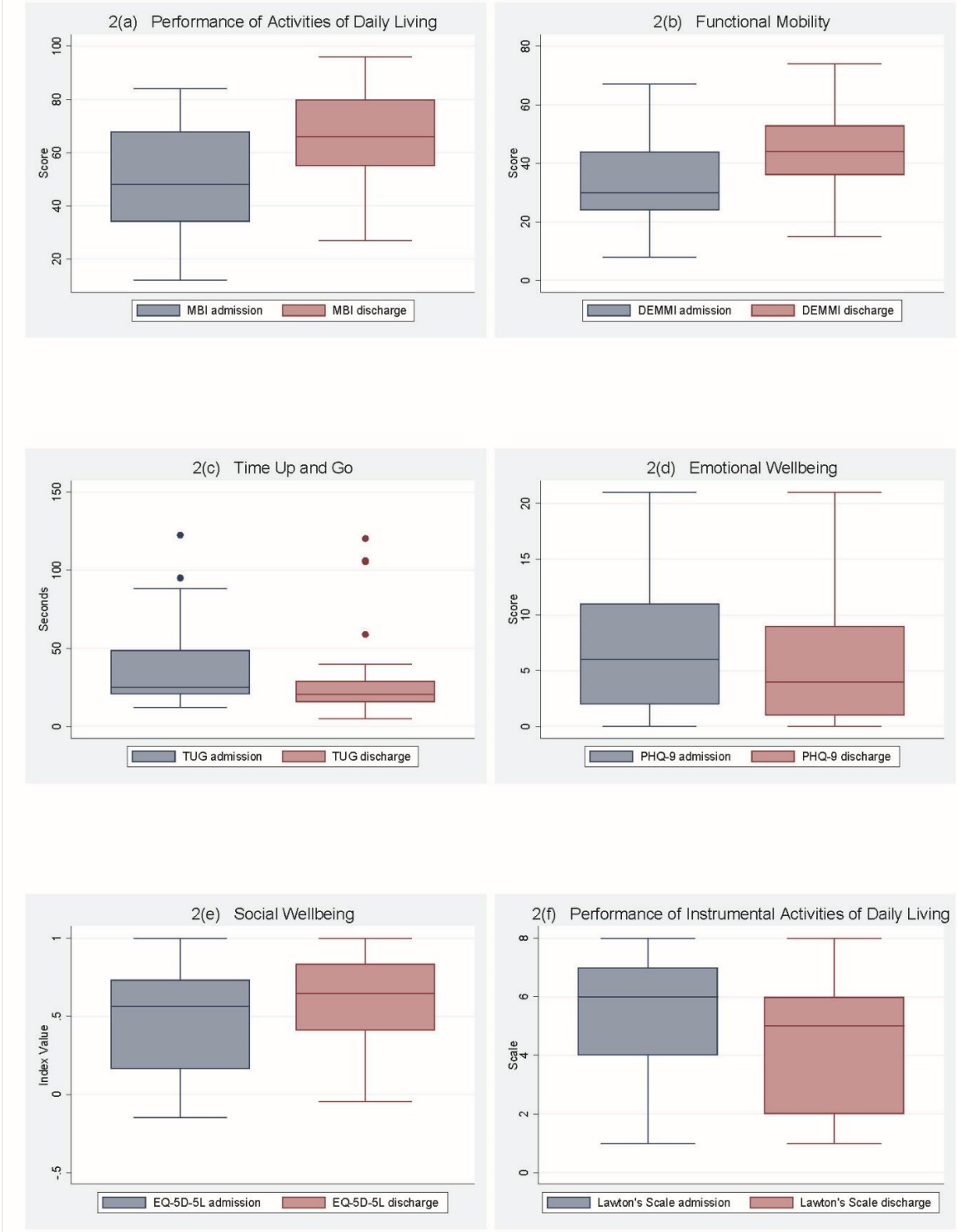

Figure 7.2 Cohort changes in health outcomes between admission and discharge

7.3.3 Changes in Health Outcomes Between Participants Discharged Home Compared to RAC

Changes in health outcomes between participants discharged home compared to RAC are presented in Table 7.3 and Figure 7.3. There was a significant difference in the magnitude of change of functional mobility from admission to discharge between the two groups (p=0.04) (see Table 7.3 and Figure 7.3). Participants discharged home demonstrated significantly greater improvements in functional mobility [13.6 points (95% CI 9.8-17.4), p<0.001] compared to those discharged to RAC [6.9 points (95% CI 1.7-12.0) p=0.01)].

Table 7.3
Modelling predicting functional improvement

	Home		RAC		
Health outcomes	**Predicted mean differences (95% CI)**	**p-value**	**Predicted mean differences (95% CI)**	**p-value**	**Interaction p-value**
MBI	18.5 (12.0-25.0)	<0.001	14.5 (5.6-23.3)	0.001	0.5
DEMMI	13.6 (9.8-17.4)	<0.001	6.9 (1.7-12.0)	0.01	0.04
TUG (seconds)	-0.3 (-0.5-(-0.03))	0.03	-0.1 (-0.4-0.2)	0.5	0.5
10MWT (metre/second)	0.1 (-0.7-0.9)	0.8	0.1 (-1.1-1.3)	0.9	1.0
MoCA	0.7 (0.03-1.4)	0.04	-0.1 (-1.0-0.8)	0.8	0.1
PHQ-9	-0.7 (-2.7-1.3)	0.5	-1.6 (-4.4-1.1)	0.2	0.6
EQ-5D-5L index value	0.2 (0.1-0.3)	0.001	0.04 (-0.1-0.2)	0.6	0.1
EQ-5D-5L VAS	8.7 (0.5-17.0)	0.04	11.8 (0.5-23.0)	0.04	0.7
Lawton's Scale	-0.8 (-1.3-(-0.2))	0.004	-2.1 (-2.9-(-1.4))	<0.001	0.002

Notes:
CI, confidence intervals; DEMMI, de Morton Mobility Index; MBI, Modified Barthel Index; MoCA, Montreal Cognitive Assessment; PHQ-9, Patient Health Questionnaire-9; TUG, Time Up and Go; 10MWT, 10 Metre Walk Test; VAS, Visual Analogue Scale

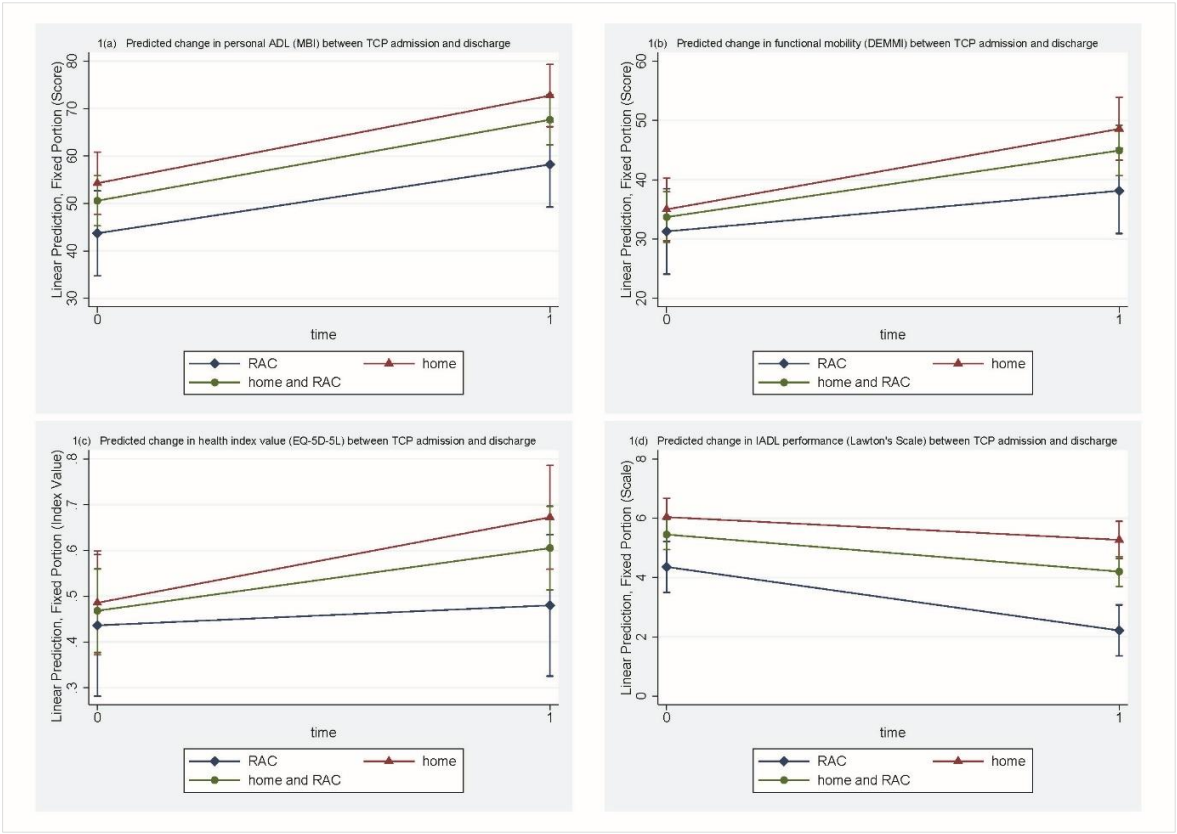

Figure 7.3 Predicted changes in health outcomes between participants discharged home compared to RAC

7.4 Discussion

This study followed a cohort of older adults who were undertaking a facility-based TCP to holistically evaluate their health-related outcomes. Using a CGA framework holistically identified changes in participants' functional ability through domains of mobility, cognitive ability, emotional and social wellbeing between admission and discharge. Having a broad and deep understanding about functional ability has the potential to improve health outcomes by addressing older adults' individual needs within MDT care. Other research in hospital and rehabilitation settings has identified the importance of CGA in identifying an older adult's individual functional needs, and suggested that health professionals could potentially improve older adults' functional deficits if rehabilitation is tailored to each individual's needs (Pilotto et al., 2017; Ward & Reuben, 2020). While some studies in TCP have evaluated HRQoL and functional mobility such as gait speed, no research, to the authors' knowledge, has evaluated conducting CGA in TCP settings (Cations et al., 2020; Hang, Naseri, et al., 2021). Using CGA has been found to assist health professionals to gain a better, holistic understanding of an older adult's health, and therefore develop a more tailored approach when providing medical, rehabilitation and social service care for the older adult (Pilotto et al., 2017; Ward & Reuben,

2020). Findings from this study support national audits which recommend using CGA in TCP settings to provide a more holistic understanding of older adults' needs (Australian Government Department of Health, 2019; Young et al., 2015). This recognises that if TCP are better tailored for the older adults undertaking them, this can potentially improve the numbers of older adults safely discharged from TCP to independent living in the community.

The whole cohort demonstrated clinically significant improvement in MBI, TUG and EQ-5D-5L VAS (Bohannon & Glenney, 2014; Walters & Brazier, 2005). Older adults who were discharged home showed clinically meaningful improvement in MBI, DEMMI, TUG and EQ-5D-5L index (Bohannon & Glenney, 2014; de Morton et al., 2011; Siojker et al., 2017; Walters & Brazier, 2005). Those who were admitted to RAC permanently showed clinically meaningful improvement in MBI, TUG and EQ-5D-5L VAS. The whole cohort made clinically significant improvement in TUG suggesting that TCP assisted older adults to improve their physical capabilities. The TUG test provides in depth information regarding older adult's physical capability as it assesses strength, balance and gait. Despite making clinically significant improvements in a number of health domains, there was a clinically significant decline in performance of IADL at discharge compared to pre-hospital admission levels (Lawton & Brody, 1969). This affected those who were discharged home as this may limit their ability to participate in community living.

Older adults who completed TCP made functional gains across multiple health domains, including physical, emotional and HRQoL, between admission and discharge. While MBI only identified improvement in self-care ability, CGA was able to identify multiple components of functional mobility (measured by the DEMMI and TUG). The DEMMI comprehensively measures mobility across a broad spectrum of tasks such as being bed transfers, standing balance and walking endurance. This can assist in identifying deficits to tailor rehabilitation focused on improving safe independent mobility (de Morton et al., 2011). HRQoL measured by EQ-5D-5L also improved in the cohort. HRQoL provides valuable information regarding perceptions on the impact of health care on older adults' lives and has been found to predict mortality and morbidity (Centers for Disease Control and Prevention, 2018). CGA also identified, through measuring gait speed and TUG, that mobility, balance and strength were still below age normative levels, which could compromise successful ability to mobilise safely at home (Fiser et al., 2010; Podsiadlo & Richardson, 1991). Gait speed is an important indicator for determining risk of falls and safe mobilising in the community (Fiser et al., 2010). Additionally, CGA identified the cohort experienced significant decline in performing IADL at discharge compared to their pre-hospital admission levels, indicating that they required assistance in performing daily activities

such as cooking and shopping. This component of functional ability could be important to improve over a longer period post TCP, as there has been limited research focusing on the long term success of TCP in enabling older adults to remain independently living in the community (Cations et al., 2020; Hang, Naseri, et al., 2021; Young et al., 2015).

While 34.2% of the cohort were discharged to RAC, CGA identified that the magnitude of change of cognitive ability, performance of ADL and self-perceived health status during TCP stay in both groups were similar in terms of improvement. However, older adults who were discharged to RAC had lower functional capability at admission compared to those who were discharged home. It may be that these older adults were frailer and had more physical limitation at admission, especially those with cognitive impairment and require longer rehabilitation and greater resources to be discharged home (Cations et al., 2020). A recent systematic review suggested that older adults with cognitive impairments are able to return home if their family provide care, in addition to the services provided (McGilton et al., 2021).

7.4.1 Strengths and Limitations

Strengths of the study include that to the authors' knowledge it is the first to report health-related outcomes from a cohort of older adults undertaking TCP using a CGA framework. Participants were prospectively enrolled and there were minimal missing data. A feasibility study was also conducted prior to study commencement. The feasibility study found the chosen outcomes and measures were acceptable and suitable for use in the TC setting (Wong et al., 2021, see Appendix B). Assessment tools that were chosen had been validated and used in TC settings previously (Cations et al., 2020; Hang, Naseri, et al., 2021). Despite Covid19 restrictions, the sample size was achieved through recruitment. The sample size was calculated based on a retrospective dataset from the same TC setting (Hang, Francis-Coad, et al., 2021), which strengthened the conclusions that could be drawn from the study. Limitations include that the study was conducted in only one TC setting. While TCP provide standard services across Australia there is substantial heterogeneity between health services. This includes the catchment area and hospitals from which admissions are accepted. Hence, results may not be generalisable to all TC facilities if the population and TC services provided significantly differ from our study.

The study was conducted during Covid19 pandemic, which intermittently made accessibility to the facility and recruitment of participants difficult. There were visitor restrictions, and the number of older adults transferred from hospitals to the TC facility were less than pre-Covid19. A moderate limitation was that we were only able to recruit participants

with mild cognitive impairment due to the Western Australian government's guardianship law. Participants with moderate to severe cognitive impairment comprised 32.5% of the population at the TC facility where this study was conducted. However, older adults with severe cognitive impairment were mainly admitted to wait for residential care placement. Further research is required to understand whether CGA would be useful for participants with moderate or severe cognitive impairment. However, previous research has successfully used CGA for older adults with cognitive impairment (Pilotto et al., 2017), hence it could be applicable to translate these findings more broadly in the TC facility population.

7.5 Conclusion

Older adults who completed TCP in a facility setting showed improvements across physical, emotional, and social domains of function between admission and discharge. Older adults who were discharged to RAC also made improvements, but they demonstrated lower levels of functional ability on admission. Undertaking a CGA identified gaps in older adults' physical ability, cognitive ability, and psychosocial wellbeing which all contribute to an older adult's ability to successfully live independently in the community after they complete TCP. These assessment findings can provide clinicians with a comprehensive understanding of older adults' functional deficits. Implications for policy and practice, and recommendations for research based on these findings will be discussed further in Chapter 8.

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Chapter Eight

8

Synthesis and Conclusion

Preface

This chapter summarises and synthesises findings from the research conducted as part of this thesis. Strengths and limitations of the research are discussed. Finally, recommendations for clinical practice and future research in the TC population are provided.

The research evaluated the impact of TCP on older adults' health and wellbeing by determining the health-related outcomes and the benefits, barriers and enablers for older adults undertaking TCP in a TC facility in WA. Overall, findings provided new knowledge about the benefits of TCP for older adults, as well as identifying barriers and enablers to older adults undertaking TCP. Findings demonstrated that older adults who completed facility-based TCP made improvements in mobility (measured using DEMMI) and psychosocial function, in addition to performance of ADL. Both performance of ADL and HRQoL showed clinically significant improvements but the changes in DEMMI did not reach minimal clinical significance (de Morton et al., 2011; Siojker et al., 2017; Walters & Brazier, 2005). Improvement in these domains of function all contribute to successful discharge to independent community living. Changes in cognitive function were not clinically significant, which may reflect that cognition is not a rapidly changing domain of function unless an acute delirium is present (Wu et al., 2019). However, not all older adults were discharged home – a proportion were discharged to RAC. Additionally, qualitative findings identified that older adults undertaking TCP experienced great uncertainty about their discharge destination and feared losing their independence.

8.1 Summary of Background to the Research

Transition care (Australia), intermediate care (UK) and skilled nursing (USA) describe a number of programs that have emerged since early 2000 in response to a gap in health and social services for older adults at the time of hospital discharge. Numerous studies have identified that older adults are at risk of unplanned hospital readmission within 30 days after hospital discharge, especially if they have some level of functional impairment prior to hospital admission and are not provided with appropriate interventions to target these functional deficits (Graham et al., 2018; Greysen, Cenzer, Auerbach, & Covinsky, 2015). Transition care programs were established in response to the gaps in services and rehabilitation identified for at risk and deconditioned older adults being discharged from hospital to home (Australian Government Department of Health, 2021; Medicare.gov, n.d.; Young et al., 2005). These programs provide low-intensity therapy to older adults in either a TC facility, community (home) or community hospital (ward) (Australian Government Department of Health, 2021; Medicare.gov, n.d.; Young, Gladman, Forsyth, & Holditch, 2015). The aim of TCP is to facilitate older adults to regain their functional ability and plan for any required long-term social support when they are discharged home.

However, there was limited research that had evaluated whether facility-based TCP improved older adults' health-related outcomes apart from evaluating changes in self-care. It was also unclear if facility-based TCP were an effective means of supporting older adults to return to independent community living (Cations et al., 2020; Toles, Colón-Emeric, Asafu-Adjei, Moreton, & Hanson, 2016). No research had comprehensively evaluated older adults' health outcomes using a holistic assessment that would provide a broad understanding of function. Additionally, very few studies (none in Australia) had investigated older adults' perspectives about their experiences in facility-based TCP (Martinsen, Harder, & Norlyk, 2015; Sefcik et al., 2017; Topaz et al., 2015).

8.2 Aims and Methods of the Research

The purpose of the research was to evaluate the impact of TCP on older adults' health and wellbeing by determining the health-related outcomes and the benefits, barriers and enablers for older adults undertaking TCP in a TC facility in WA. The specific research aims were:

1. To synthesise the best available evidence for the effectiveness of TCP on health-related outcomes for older adults admitted to a TC facility after hospitalisation (Study 1 – Chapters 3 and 4);
2. To audit a transition care service to identify the association between the characteristics of older adults undertaking a facility-based TCP and i) discharge destination and ii) functional improvement (Study 2 - Chapter 5);
3. To explore the lived experience of older adults undertaking a TCP at a TC facility in WA (Study 3 - Chapter 6); and
4. To: i) comprehensively evaluate older adults' health-related outcomes when undertaking a facility-based TCP and ii) compare health-related outcomes between participants discharged home and those discharged to residential aged care (Study 4 – Chapter 7).

A two-phased mixed methods design was utilised to collect data from a variety of sources to strengthen the research findings (Creswell & Plano Clark, 2017), reported in four studies. In phase one, a systematic review and meta-analysis (Study 1, see Chapter 4) was conducted according to a published protocol (Hang, Francis-Coad, Naseri, Waldron, & Hill, 2020, see Chapter 3). Concurrently, a retrospective audit (n=169 cases) of a TC facility population (Study 2, see Chapter 5) was conducted to identify the association between older adults' characteristics and discharge destination and functional improvements. In phase two, an exploratory study (Study 3, see Chapter 6) utilising a descriptive phenomenological approach was conducted.

Older adults, family members, TC staff and off-site health professionals were invited to participate in semi-structured interviews to gain a rich understanding about older adults' lived experience in TCP. Finally, Study 4 (see Chapter 7) used a prospective observational design to comprehensively measure older adults' health-related outcomes across four domains of function at admission and discharge.

8.3 Synthesis of Research Findings

8.3.1 Phase One

Phase one of the research demonstrated that older adults benefited from undertaking TCP in a facility setting. Meta- analysis of seven studies (2069 participants) from Norway, Italy and USA demonstrated that 80% [95%CI (0.78-0.82), very low GRADE evidence] of older adults were discharged home after completing TCP in a TC facility (see Chapter 4). These findings strongly contrasted with the discharge prevalence of 21.4% reported in a recent Australian national audit (Cations et al., 2020). However, both the systematic review and the Australian audit reported few other health outcomes (Cations et al., 2020; Hang, Naseri, et al., 2021). Meta-analysis from seven studies that reported performance of ADL demonstrated improvement in ADL [MBI 17.65 points (95%CI 5.68-29.62, p=0.004), very low GRADE evidence] between admission and discharge (see Chapter 4). However, MBI only measures performance of personal self-care, hence it was unclear if TCP improved broader health outcomes impacting functional ability such as cognition, HRQoL and IADL. Studies did not specify whether participants regained their pre-morbid levels of function.

Subgroup analysis of the outcome 'discharge home' based on countries demonstrated that Australian TCP had lower proportions [52%, (95% CI 0.38-0.65)] of older adults discharged home from TC facilities compared to those in Norway [80% (95% CI 0.78-0.82)]. Meta-regression suggested that the heterogeneity between the subgroups was not significant, meaning that the differences were likely due to the heterogeneity within individual studies. This suggests that there is a significant gap that needs investigation, and more outcomes, especially patient reported outcome measures (PROM), could assist in determining whether older adults are receiving optimum benefits from completing TCP (Australian Government Department of Health, 2019; Williams, Sansoni, Morris, Grootemaat, & Thompson, 2016; Young et al., 2015). Additionally, the variation in the components of the TCP delivered in different countries demonstrated that TCP required further investigation and comparison to determine what the differences are, and which TCP could be most effective for older adults. Variations in TCP could be partly due to differences in admission criteria for the TC facilities where studies included in

the systematic review were conducted. For example, in both Norway and USA older adults are admitted to TC facilities after a shorter hospital LOS compared to Australia (Abrahamsen, Haugland, Nilsen, & Ranhoff, 2014, 2016; Cations et al., 2020; Mallinson et al., 2014). There are other differences, including that in Japan older adults can stay longer in TC facilities compared to Australia and in Norway older adults are admitted to TC facilities with better baseline performance in ADL (Abrahamsen et al., 2014; Cations et al., 2020; Morita et al., 2018).

Findings from the retrospective audit identified that 54 (32.0%) cases were discharged home, 20 (11.8%) were readmitted to hospital and 93 (55.0%) were admitted to permanent RAC (Hang, Francis-Coad, et al., 2021, see Chapter 5). The proportion of older adults discharged home reported in this audit was similar to the lower prevalence levels (between 21.4% to 63.0%) of older adults discharged home from TC facilities described in other Australian studies (Cations et al., 2020; Lawler, Shields, & Taylor, 2019; Parker, Hill, Cobden, Davidson, & McBurney, 2015). This may indicate variability within Australian TCP, concurring with findings from the systematic review (Chapter 4) (Hang, Naseri, et al., 2021). Further investigations could determine whether variation exists in the therapy or other services delivered by TC providers as part of their TCP and if this confers additional benefits to the older adults who complete TCP. In concordance with the systematic review findings, older adults who were discharged home showed improvement in performance of ADL of over 10 points as measured by the MBI (Hang, Francis-Coad, et al., 2021; Hang, Naseri, et al., 2021). However, a recent Australian national audit that found that older adults undertaking facility-based TCP were less likely to show improvement in functional ability compared to those who undertake community-based TCP (Cations et al., 2020). The audit identified that limited health outcomes were assessed, with only performance of ADL and cognitive ability recorded at admission. These findings are supported by international and national studies that also only reported discharge destination and performance of ADL, suggesting other health outcomes were not evaluated (Abrahamsen et al., 2014, 2016; Mallinson et al., 2014; Hang, Naseri, et al., 2021).

In summary, phase one of the research showed that there were variations in TCP provided within Australia and internationally, which made it difficult to clearly identify which facility-based TCP work best. Very low GRADE evidence meant it was uncertain whether older adults were successfully discharged to community living after completing facility-based TCP. Studies reported mainly on performance of ADL with limited studies reporting any other, or a range of broader health outcomes. This leads to uncertainty about exactly what benefits are being achieved from undertaking facility-based TCP. A national audit found that 63.1% older adults were admitted to permanent RAC within six months post TCP (Cations et al., 2020), suggesting

that TCP may not have sustained benefits. Overall, findings from phase one suggested that further research to evaluate the benefits of measuring other health outcomes in facility-based TCP was required to identify the impact of TCP on older adults' eventual ability to return to community living. Realist evaluation approaches could be used to comprehensively understand program outcome variation related to context, by posing the questions of what works, for whom, how and under what conditions (Hewitt, Sims & Harris, 2012; Pawson & Tilley, 1997). In particular, there were no PROM used in the TC facility setting, hence it was unclear whether older adults believed that their health and quality of life improved after undertaking TCP.

8.3.2 Phase Two

Phase two of the research was conducted in a TC facility to evaluate older adults' health outcomes, including their understanding and perceptions regarding TCP. While the findings showed that older adults made improvement in health outcomes across multiple domains of function, the older adults described challenging experiences throughout their time in the TC facility (see Chapter 6). To our knowledge, this was the first research in Australia that sought to understand older adults' TC journey through the personal lens of the older adult's viewpoint. Importantly phase two found that older adults' experiences of their TC journey were viewed predominantly through a negative emotional lens, due to fear of losing their independence, grief due to loss of their life-role in their community and uncertainty about their discharge destination. This suggests they were not prepared to engage in rehabilitation and required more day-to-day support from the TC staff (Sefcik et al., 2017; Topaz et al., 2015). Interview findings highlighted a mismatch between older adults' expectations of TCP prior to admission versus their lived experience that contributed to feelings of dissatisfaction and uncertainty.

Overall, facility-based TCP need to consider using PROM, as these provide valuable information regarding individuals' perceptions regarding the impact of health care on their lives. These measures have been found to predict mortality and morbidity (Australian Commission on Safety and Quality in Health Care, 2019; Nelson et al., 2015; Williams et al., 2016).

The prospective study identified that older adults' health outcomes improved across multiple domains of function between admission and discharge from TCP (Chapter 7). CGA is a multi-dimensional assessment that aims to evaluate older adults' health domains using a functional approach, broadly categorised as physical ability, cognitive ability, emotional wellbeing and social wellbeing (Pilotto et al., 2017; Ward & Reuben, 2020). CGA was able to identify changes (both improvement and decline) in the components of functional mobility and provide valuable information regarding self-perceived HRQoL (Pilotto et al., 2017; Ward &

Reuben, 2020). Using CGA in hospital, rehabilitation or community settings has been found to enable older adults to receive holistic care (Parker et al., 2018; Pilotto et al., 2017; Stoop et al., 2019; Wilkinson & Harper, 2021). CGA was also found to enable therapists to tailor rehabilitation to meet individual's needs, making rehabilitation more effective in reducing frailty and improving functional outcomes in these settings (Parker et al., 2018; Pilotto et al., 2017; Stoop et al., 2019; Wilkinson & Harper, 2021). However to our knowledge, no research, apart from this study, has reported on the use of CGA in facility-based TCP.

Performance of IADL (such as shopping and cleaning) at discharge showed a significant decline compared to admission, indicating that older adults would require care assistance with IADL to return to their community. Prior research has also reported that fewer older adults regained pre-hospitalisation performance of IADL after hospitalisation compared to performance of ADL, as IADL encompass more complex tasks that require higher level cognitive skills to perform (Cameron, Crotty, & Kurrle, 2021; Soh et al., 2021). This suggests a gap in the rehabilitation provided in facility-based TCP that could be addressed with task-oriented practice of IADL skills to better prepare older adults for return to independent living in the community. Previous studies have demonstrated that having good self-rated health and cognitive function as well as implementing tailored multicomponent therapy, including IADL practices and strategies to overcome problems at home, assisted community-dwelling older adults to improve in performing IADL (Fujiwara et al., 2008; Gitlin et al., 2006). CGA also identified that older adults discharged home significantly improved in mobility, balance and strength through measuring TUG and DEMMI but they did not make significant improvements in gait speed. However, their discharge measurements were below values that have been demonstrated to be normative for community populations (see Chapter 7). This places the older adult at risk of failing to cope at home, increased risk of falls, unplanned hospital readmissions and inability to return to their usual level of participation in community life (DePalma et al., 2013; Fiser et al., 2010; Naseri et al., 2020).

Finally, older adults who were discharged to RAC demonstrated similar magnitude of change in cognitive ability, performance of ADL and HRQoL, but were admitted to the TC facility with lower functional capability [MBI on admission 38.0 (IQR 32.0) points] compared to those who were eventually discharged home [MBI on admission 57.0 (IQR 25.0) points, see Chapter 7]. This suggests that older adults discharged to RAC may have latent functional recovery that could be facilitated if the duration of TCP was longer or the rehabilitation is tailored to their individual needs.

In summary, although the prospective study showed older adults made significant functional gains with improvement in multiple health outcomes, the emotional toll and difficult experiences described by older adults throughout TCP suggested that the care provided did not appear to meet the individual's needs. Older adults may require more emotional and social support while completing TCP, along with improved pre-admission information. While older adults made changes across a range of health outcomes, most outcomes were not measured by the TC facility, and a holistic assessment, such as CGA was not completed. Using CGA to holistically measure older adults' health outcomes including PROM could enable health professionals to better understand older adults' functional ability and tailor rehabilitation to meet the individual's needs.

8.4 Strengths of the Research

The mixed methods design was a key strength of the research. Findings from phase one of the research contributed to the design of phase two. Findings from both phases were then synthesised to answer the research objective. Using both quantitative and qualitative phases of research provided strengths that compensated for the weaknesses in each method (Creswell & Plano Clark, 2017, p.12, 13). For example, the qualitative method enabled the voices of the older adults to be heard, while the quantitative method using a systematic review design enabled the context of TCP to be understood. This mixed methods approach enabled the researcher to gain a more comprehensive understanding of older adults' health outcomes and their experiences undertaking TCP, including understanding possible barriers and enablers to identify where future TCP research is required.

A strength of phase one of the research was that the systematic review followed a published protocol (Hang et al., 2020, see Chapter 3), and when data from multiple studies were pooled, sensitivity analyses were performed to assist in explaining the variation in programs. Variations existed between facility-based TCP both between countries and between programs within Australia - these variations were identified using meta-regression. The retrospective audit confirmed the variation in the improvement of performance of ADL and proportions of older adults discharged home in our TC setting. Our findings were confirmed by a national audit of TCP which also showed variation across both home and facility-based TCP in Australia (Cations et al., 2020). Reviewing phase one findings, we identified that using a CGA would be valuable to holistically evaluate older adults' health outcomes in facility-based TCP (Pilotto et al., 2017; Stoop et al., 2019; Wilkinson & Harper, 2021). For phase two of the research, the sample size for the prospective study was able to be calculated based on the changes in performance of ADL using our retrospective cohort data from phase one, which was from the same TC setting.

Another strength of phase two was that we conducted a feasibility study prior to the prospective study to determine if the chosen outcomes and assessment tools were acceptable and suitable for use in the TC setting (Wong et al., 2021, see Appendix B). As participants were prospectively enrolled, minimum data were missing.

A further strength of the phase two research was that it was the first, to the authors' knowledge, to report health-related outcomes from a cohort of older adults undertaking TCP using a CGA framework. Our health outcomes included PROM which provided information regarding older adults' perceived health status at admission and discharge.

The qualitative study added strength to the research findings as it provided an authentic and rich perspective regarding the TCP experience as voiced by the older adults themselves through use of a descriptive phenomenological approach. This approach emphasised gaining knowledge and describing the first-hand experiences of the individual being investigated (Matua & Van Der Wal, 2015). The qualitative data collection followed guidelines by Creswell and Plano Clark (2017) and Liamputtong (2013) that utilised an audit trail and conducted member checking with two to three participants after each round of interviews to strengthen the credibility and trustworthiness of the findings. Our findings were also strengthened by triangulating data from staff and family members which added to the credibility of the findings (Creswell & Plano Clark, 2017; Liamputtong, 2013).

8.5 Limitations and Challenges of the Research

The systematic review demonstrated very low GRADE evidence for the proportions of older adults discharged home and improvements in functional ability hence recommendations could not be made. Additionally, since studies reported different measures, it was not possible to pool all data to make comparisons.

This research focussed on facility-based TCP and only one TC facility was evaluated. Although TCP provide services across Australia that follow Federal government regulations, there is substantial heterogeneity between the services provided by different health care organisations (Gray et al., 2012; Hang, Francis-Coad, et al., 2021; Lawler et al., 2019). Hence, our findings may not be generalisable to all TC facilities if their populations and services significantly differ from ours. Further research would be beneficial to evaluate older adults' health-related outcomes when undertaking community-based (home) TCP compared to facility-based TCP.

The TC organisation partnering our research was only able to identify whether older adults were suitable to be admitted for their TCP, based on the information provided by the referring

hospital. A national report demonstrated that some hospital staff still referred older adults to TCP to await permanent admission to RAC (Australian Government Department of Health, 2019). Therefore, we were unable to determine if some older adults who should have been referred to TCP were being discharged home instead. TC staff, interviewed as part of the qualitative study (Chapter 6), expressed concern regarding information being incomplete in hospital discharge summaries and that they seldom received a detailed handover from the referring hospital. This could have affected the quality of the assessment and treatment that older adults received while completing TCP.

Another limitation was that our research project did not have capacity to follow-up participants who were readmitted to hospital or follow-up participants after discharge from TCP to evaluate longer term outcomes, such as any hospital readmission or admission to RAC. We were also unable to interview older adults after discharge from TCP and to obtain their perspective about their life course after TCP and their feedback for other older adults would have been valuable to ascertain.

As the research was conducted during Covid19 pandemic, the numbers of older adults admitted from hospital to undertake TCP at the facility were reduced compared to pre-Covid19 admission rates. Visitor restrictions also made accessibility to the facility and recruitment challenging. During Study 3, not being able to complete face-to-face interviews made it difficult to build rapport with some participants where online video calls were utilised to gain insight into their journey. The researcher had to rely on TC staff to assist older adults to video call to overcome the technology barrier for conducting the interviews.

Participants enrolled in phase two of the research were all screened as having either normal cognition or mild cognitive impairment, except one participant, who had their next-of-kin provide informed consent. Covid19 restrictions and State Government requirements for enrolling individuals with cognitive impairments into research studies limited our capacity to follow up potential participants' next-of-kin in a timely manner for enrolment. Therefore, our findings may not be generalisable to facility-based TCP where the population contains large numbers of older adults with moderate or severe cognitive impairment. We did observe that in our TC facility older adults with moderate and severe cognitive impairment (approximately 32%) were infrequently enrolled in TCP. In our facility older adults with moderate or severe cognitive impairment were usually admitted to await permanent placement in RAC. In a national study the proportion of older adults with a diagnosis of dementia was reported to be a quarter of the population undertaking facility-based TCP, so we envisage that our cohort may be representative of the population of other facility-based TCP (Cations et al., 2020). In both phase

one and phase two of the research, our findings showed that older adults with cognitive impairment were less likely to be discharged home, concurring with other studies in Australia and Norway (Abrahamsen et al., 2014; Cations et al., 2020). However, our retrospective study demonstrated that older adults with cognitive impairment did make improvements in functional ability. Therefore, future studies in TCP settings that enrol older adults with cognitive impairment are required.

8.6 Recommendations of the Research

8.6.1 Implications for Policy and Practice

Facility-based TCP differed broadly between countries and within Australia, including in the type of outcomes reported. These variations suggest that providers of Australian TCP could learn from each other through collaboration, to identify program strengths and weaknesses for mutual benefit. This could be achieved through the use of audit and feedback to measure and benchmark findings with other TC facilities to improve local effectiveness. Audit and feedback is a means of improving the quality of care and services, by enabling clinical care staff to evaluate their programs and performance against evidence-based guidelines identifying gaps in practice (Ivers et al., 2012). These providers could work together to address practice gaps and institute quality improvements throughout TCP in Australia. This could contribute to determining the best evidence for program content and delivery to achieve better health outcomes for older adults.

Both phases of the research when combined demonstrated the importance of conducting a more holistic CGA in TCP. Therefore, it is recommended that TC facilities conduct CGA for older adults undertaking TCP. This may assist clinicians to better understand changes in older adults' health and wellbeing, and subsequently inform tailoring of rehabilitation and support services for the individual older adult undertaking TCP. This may better prepare the older adults to transition back to independent living in the community. The use of PROM in addition to other health outcomes could enable health professionals to identify individuals' HRQoL, preferences and assess the effectiveness of therapy provided, which might assist to better tailor rehabilitation in TCP (Australian Commission on Safety and Quality in Health Care, 2019; Black, 2013; Williams et al., 2016). Additionally, PROM could facilitate more holistic decision making to promote better quality care. This in turn may enable TC staff to better support older adults' psychologically, to manage the emotional turmoil they experience while undertaking TCP (Nelson et al., 2015; Williams et al., 2016). Clinicians nationally and internationally may be conducting components or local variations of CGA in TCP without reporting these results, hence

the published evidence did not capture this information. Although CGA required time and staff to perform, the tools chosen in the prospective study were piloted and were found to be feasible to conduct CGA in this setting.

Measuring health outcomes using a CGA framework highlighted areas of functional decline. Older adults who were discharged home had declined in their ability to perform IADL and still demonstrated balance and functional limitations, with discharge assessments of these mobility elements being below normative values for community living. Providers of facility-based TCP should consider assessment and individualised therapy for older adults to develop IADL skills such as shopping. This could be done as day visits home, or to the community, or as simulation programs within the TC facility. Providers should also consider either providing more therapy within TCP to improve older adults' strength and balance or develop follow up outpatient therapy services that ensure they are able to build on the gains they made through TCP participation.

The audit (Study 2) identified that 63% of older adults discharged to RAC had cognitive impairment but these older adults still made significant improvements in performance of ADL. CGA assessment completed as part of Study 4 also identified that older adults who were discharged to RAC significantly improved in performance of ADL. Older adults who are identified as being at risk of RAC admission on transfer to a TC facility may benefit from longer rehabilitation that is tailored to meet the needs of the individual, especially those older adults with cognitive impairment. This may assist these older adults to avoid admission to RAC.

Older adults experienced great uncertainty throughout their TC journey while concurrently grieving over their loss of life-roles, including the possibility that they would not be able to return home. Health professionals and other TC staff need to be aware of this emotional toll experienced by older adults and work to advocate and empower discussion of their concerns and provide day-to-day support during this transition period. Additionally, TC providers could provide more access to psychology and counselling services for older adults and their families. Having a better understanding of TCP prior to admission could also facilitate older adults to have more positive expectations and be more prepared to engage in TCP. Health professionals in both TC facilities and hospital settings should include careful discussions with older adults and family members at admission prioritising goal setting, but not overwhelming them with information.

Most older adults interviewed in Study 3 reported misinformation or gaps in information provided in the hospital setting prior to TC admission. Hospitals should consider providing a formal education program for trained staff, so they can lead discussions with older adults that

are meaningful and timely regarding what is provided in TCP. Clinicians should be suitably knowledgeable to provide older adults with the appropriate support to prepare them both mentally and physically for completing TCP. Hospital MDT should also focus on providing an accurate plan with goals that prepare the older adult to undertake TCP. In summary, hospitals should institute procedures that facilitate staff to work more closely with organisations who provide facility-based TCP to promote a positive transition to the TC facility.

8.6.2 Implications for Future Research

8.6.2.1 Research in Facility-Based TCP

Research conducted in facility-based TCP is limited. The review was of very low quality based on GRADE criteria. The primary analysis of the review included five observational studies which provided only level IId and IIIe evidence (The Joanna Briggs Institute, 2016) and the control groups of two RCTs. Even though the risk of bias and inconsistency was rated as low, there were high levels of imprecision and indirectness which lowers confidence in the overall quality of the evidence. Regarding other health-related (secondary) outcomes, most studies only measured performance of ADL. Future higher quality studies that evaluate whether undertaking facility-based TCP restores an older adult's pre-hospital level of function, other than performance of ADL are required. Future studies that directly compare facility-based TCP with inpatient rehabilitation or home-based services on health-related outcomes would also provide evidence about how admission criteria for TCP compared to home programs or hospital rehabilitation should be managed.

Studies conducted in Australia reported lower proportions of older adults discharged home with longer LOS in TCP compared to other TCP globally. This suggests that future research may benefit from international comparisons to evaluate which programs are most effective in facilitating older adults' discharge home. There were noticeable variations between and within countries that could be due to the differences in admission criteria, therapy intensities and duration and staffing ratios. Research could be conducted through international collaborations to determine the best practice in delivering TCP. International collaborations that utilise realist evaluation approaches to determine what type of program works best, for which population of older adults and how it should be delivered in the different settings would be beneficial (Hewitt et al., 2012; Pawson & Tilley, 1997). This type of research could lead to greater understanding of how to construct TCP such that greater proportions of older adults are discharged home.

Findings from phase one studies did not specify whether older adults regained their pre-morbid levels of independence or whether they required increased community support. Findings

from phase two showed that older adults had declined in performance of IADL at the completion of facility-based TCP. Hence, more research that examines older adults' performance of IADL during and after TCP is required. Identifying the type of IADL training (facility-based or community-based) that could better prepare older adults to discharge back to the community is urgently required. From our findings this appeared to be important to those older adults who complete facility-based TCP.

It is important to determine if older adults remained living in the community after discharge and to identify if further rehabilitation would benefit this population. A national study on TCP found that 63% who were discharged home from facility-based TCP were admitted to RAC within six months (Cations et al., 2020). Therefore, longitudinal cohort studies that follow this population overtime after discharge are important to increase understanding about this population. Further intervention studies that evaluate ongoing community rehabilitation would be useful.

Limited studies have comprehensively evaluated older adults' health outcomes in TCP using a holistic approach and suitable assessment tools. Living independently in the community requires an adequate level of function including cognitive, emotional, and social abilities (Parker et al., 2018; Stoop et al., 2019). Hence, it would be important to evaluate how to comprehensively measure older adults' health outcomes in a manner that holistically evaluates function. Valid and reliable assessment tools were chosen to holistically evaluate health outcomes (see Chapter 7). However, more research is required to determine which outcomes and relevant measures would comprehensively provide the best assessment information for TC health professionals. Future research should also evaluate whether using CGA as part of TCP to tailor rehabilitation improves older adults' health outcomes, as previous research in both acute and rehabilitation settings has reported benefits (Pilotto et al., 2017; Ward & Reuben, 2020).

Our research only addressed facility-based TCP. Future research should compare community-based TCP (home) and facility-based TCP to gain better understanding of all TCP outcomes, including the potential benefits of each type of program. Conducting RCTs that examine TCP in the home compared to facility-based TCP could be feasible to gather high quality evidence that can inform clinical practice.

Participants experienced great uncertainty throughout their TC journey, particularly at time of admission where many older adults were confused about the purpose of completing TCP. TCP appeared to be stressful regarding critical changes in life-roles and living situations. Future research in other facility-based TCP to extend these findings is required. Research that examines the type of resources and training that would better prepare health professionals and family

members to emotionally support older adults completing TCP would also be beneficial. Finally, older adults in our study felt that they were unprepared to engage in their rehabilitation at admission to the TC facility. Further research could evaluate whether providing formal education and goal setting sessions at the commencement of TCP improves older adult's confidence and motivation to engage in TCP. Further research to explore and understand how to actively involve older adults and their families in TCP while supporting them during rehabilitation and discharge planning when they are unwell is important.

8.7 Conclusion

This research provided new knowledge and evidence about the health-related outcomes of older adults who undertake facility-based TCP and the lived experiences of their rehabilitation journey in a TC facility. Older adults demonstrated significant improvement in health outcomes across multiple domains of function. However, some functional and mobility limitations remained at discharge. Older adults expressed anxiety and grief about their experiences in TCP, especially uncertainty about returning home and how their present situation impacted their life journey. Research that evaluates how to comprehensively assess older adults' health-related outcomes is required. This would enable clinicians to better tailor rehabilitation within the scope of scarce TCP health resources and could improve older adults' TCP outcomes. In particular this type of research could enhance older adults' ability to successfully return to independent community living, rather than to RAC. Future research and clinical practice should seek to work closely with older adults to make their TCP journey a positive experience that helps them return to successful activity and participation in their community life.

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APPENDICES

Appendix A Co-Author Signed Consent Forms

Paper 1 (contributing to Chapter 3)

Hang, J. A., Francis-Coad, J., Naseri, C., Waldron, N., & Hill, A. M. (2020). Effects of facility-based transition care programs on health-related outcomes in older adults: A systematic review protocol. *JBI Evidence Synthesis, 18*(11), 2425-2434. doi:10.11124/JBISRIR-D-19-00240

	Conception and design	Acquisition of data & method	Analysis & statistical method	Interpretation & discussion	Final approval
Hang, J.A.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Francis-Coad, J.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Naseri, C.			X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Waldron, N.	X			X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Hill, A.M.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					

Paper 2 (contributing to Chapter 4)

Hang, J. A., Naseri, C., Francis-Coad, J., Jacques, A., Waldron, N., Knuckey, R., & Hill, A. M. (2021). Effectiveness of facility-based transition care on health-related outcomes for older adults: A systematic review and meta-analysis. *International Journal of Older People Nursing,* 00, e12408. doi:10.1111/opn.12408.

	Conception and design	Acquisition of data & method	Analysis & statistical method	Interpretation & discussion	Final approval
Hang, J.A.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Naseri, C.		X		X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Francis-Coad, J.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Jacques, A.			X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Waldron, N.	X			X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Knuckey, R.	X			X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Hill, A.M.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					

Paper 3 (contributing to Chapter 5)

Hang, J. A., Francis-Coad, J., Naseri, C., Jacques, A., Waldron, N., Purslowe, K., & Hill, A. M. (2021). Identifying the association between older adults' characteristics and their health-related outcomes in a transition care setting: A retrospective audit. *Frontiers in Public Health, 9,* 688640. doi:10.3389/fpubh.2021.688640

	Conception and design	Acquisition of data & method	Analysis & statistical method	Interpretation & discussion	Final approval
Hang, J.A.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Francis-Coad, J.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Naseri, C.		X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Jacques, A.			X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Waldron, N.	X			X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Purslowe, K.	X			X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Hill, A.M.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					

Paper 4 (contributing to Chapter 6)

Hang, J. A., Francis-Coad, J., Ho, P., Waldron, N., Purslowe, K., & Hill, A. M. (2022). "Is my journey destination home?" Exploring the experiences of older adults who undertake a transition care programme: A qualitative study. *Ageing & Society*. 1-16. doi:10.1017/S0144686X22000253.

	Conception and design	Acquisition of data & method	Analysis & statistical method	Interpretation & discussion	Final approval
Hang, J.A.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Francis-Coad, J.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Ho, P.			X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Waldron, N.	X	X		X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Purslowe, K.	X			X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Hill, A.M.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					

Paper 5 (contributing to Chapter 7)

Hang, J. A., Francis-Coad, J., Jacques, A., Waldron, N., Purslowe, K., & Hill, A. M. (2021). *Health-related outcomes of older adults undertaking a transition care program: A prospective cohort study.* Manuscript submitted for publication and under peer review.

	Conception and design	Acquisition of data & method	Analysis & statistical method	Interpretation & discussion	Final approval
Hang, J.A.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Francis-Coad, J.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Jacques, A.			X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Waldron, N.	X	X		X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Purslowe, K.	X			X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Hill, A.M.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					

Supplementary Paper (Feasibility Study to Chapter 7)

Wong, Y. G., **Hang, J. A.**, Francis-Coad, J., & Hill, A. M. (2021). *Using comprehensive geriatric assessment for older adults undertaking a facility-based transition care program to evaluate health outcomes: A feasibility study*. Manuscript submitted for publication and under peer review.

	Conception and design	Acquisition of data & method	Analysis & statistical method	Interpretation & discussion	Final approval
Hang, J.A.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Wong, Y.G.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Francis-Coad, J.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					
Hill, A.M.	X	X	X	X	X
I acknowledge that these represent my contribution to the above research output. Signed					

Appendix B Supplementary Paper (Feasibility Study to Chapter 7)

Title:	Using comprehensive geriatric assessment for older adults undertaking a facility-based transition care program to evaluate health outcomes: A feasibility study.
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Abstract

Aims: The aim of the study was to determine the feasibility of using a comprehensive geriatric assessment (CGA) in a transition care setting to evaluate changes in older adults' health-related outcomes.

Methods: A convenience sample of older adults (n=10) admitted to a transition care facility to undertake rehabilitation and staff (n=5) was recruited.

Results: Older adults (mean age = 78.9±9.1) underwent physical, cognitive, social and emotional assessments demonstrating improvements across all domains including functional mobility (de Morton Mobility Index; baseline 41.5±23.0, discharge 55.0±24.0, p=0.01) and quality of life (EQ-5D-5L; baseline 59.0±21.7, discharge 78.0±16.0, p<0.01). Staff found CGA using the selected outcome measures to be acceptable and suitable. Older adults perceived that participating in CGA assisted in understanding their present state of health.

Conclusion: Incorporating CGA to evaluate health outcomes in transition care using a suite of assessment tools was feasible and enabled a holistic functional assessment.

Keywords: Continuity of patient care; intermediate care; transition care; rehabilitation; outcome measures; comprehensive geriatric assessment; aged care

Introduction

More than one-third of older adults who are admitted to hospital experience significant functional decline with reduced ability to perform activities of daily living (ADLs), including bathing and dressing.[1,2] Additionally, around 40% of older adults experience poorer performance with more complex instrumental ADLs (IADLs) such as shopping and cleaning.[2,3] This is due to factors including poor pre-admission function, presence of multiple comorbidities and development of iatrogenic problems resulting from the hospitalisation.[3,4] This functional decline has been found to be significantly associated with reduced independence, hospital readmissions, unplanned admissions to residential aged care (RAC) homes and mortality post-hospital discharge.[3] Transitional care programs (TCP) have been introduced in countries such as United Kingdom (UK), United States of America (USA), Canada and Australia to provide short-term therapeutic care to older adults to help them regain functional ability and return to independent living after hospital discharge.[5-8] The programs aim to reduce hospital readmissions after discharge and reduce the need for unplanned admissions to RAC.[5,6] Transition care programs are delivered by multidisciplinary teams and include physical therapy, occupational therapy, social work, nursing and personal care.[5-8]

Transition care programs have been found to improve functional outcomes in older adults post-hospital discharge[5-7,9] with improvements in mobility, self-care and ADL performance on discharge.[7,10] However, evidence is mixed on the effectiveness of TCP in improving other health-related outcomes for older adults such as mobility and discharge destination. Over 60% of older adults in the USA demonstrated slow gait speeds and severe disability at discharge from TCP.[11] In facility-based settings in Australia, older adults who completed TCP have been found to be more likely to be admitted to RAC and have increased mortality compared to age-matched populations.[10] Therefore, more comprehensive assessments may be required on admission to identify older adults' functional deficits, for tailored rehabilitation to be provided. This could enable TCP to be more effective for older adults by addressing improvements across multiple health domains to achieve optimum health outcomes, including discharge home rather than to RAC. Recent reviews of TCP in Australia and the UK have identified that the current assessment outcome measures may only provide limited information about the functional ability of older adults undergoing TCP.[12,13] National audits have recommended that outcome measures used should provide a holistic picture of older adults' health status, instead of only assessing ADL performance as mandated in the current TCP model.[12,13]

It has been suggested that implementing comprehensive geriatric assessment (CGA) could help tailor rehabilitation to older adults' needs.[12-14] Comprehensive geriatric assessment is a

multi-dimensional assessment that aims to evaluate older adults in terms of their impairments, functional capacities and needs in order to be able to develop a holistic plan of care.[15,16] Frameworks of CGA vary but most often address function broadly categorized under physical, emotional, cognitive, and social domains.[14-16] However, in Australia, the only health-related outcome measure mandated as part of assessment for older adults undertaking TCP is the MBI.[6] The MBI only assesses the older adult in the performance of ADLs (part of the physical domain)[17], without assessing deficits in other domains of function.[18,19] As part of CGA, a set of valid and standardized outcome measures are essential to help healthcare professionals design tailored rehabilitation programs aimed at improving the functional status of older adults to maximize their independence and quality of life (QoL).[20] These assessments should identify impairments and activity limitations and evaluate changes in all four domains of function as described by CGA.[20] However, a suite of standardized assessment tools has not been evaluated for use in TCP settings despite previous recommendations to adopt a more holistic approach to assessment.[12,13] Therefore, it is important to determine what range of outcome measures are feasible to perform as part of a CGA for older adults undertaking TCP.

The primary aim of the study was to evaluate whether measuring older adults' health-related outcomes using CGA was feasible in a transition care setting. The secondary aim was to evaluate if the assessments identified the impact of undertaking a facility-based TCP on older adults' health outcomes across physical, mental, social and emotional domains. This feasibility study was intended to inform a planned prospective observational cohort study that would implement CGA for older adults undertaking a facility-based TCP.

Methods

Study design

A feasibility study using pre-post test design was conducted between November 1 – December 31, 2020. Feasibility studies are used to determine the acceptability and suitability of an intervention for a given population.[21] This includes the selection of outcome assessment tools, methodological procedures and resources required.[21]

Participants and setting

The study was conducted at a 47-bed transition care (TC) facility located in Western Australia where older adults were admitted for short-term restorative care. A convenience sample of older adults were recruited through advertisement using flyers placed throughout the

TC facility. Eligibility criteria were: being over 60 years of age, undertaking a restorative TCP, scoring > 23/30 on the Mini Mental State Examination (MMSE)[22] and being able to provide written informed consent. Older adults were excluded from the study if they did not speak English or were admitted to the facility to await admission to RAC or palliative care. Further restrictions due to the COVID-19 pandemic resulted in older adults who were receiving care in isolation for infection control being excluded.

Health professional staff at the TC facility were also recruited to provide feedback about the feasibility of using the selected outcome measures. Recruitment utilized a short verbal presentation at a staff meeting and advertisement using flyers placed in the staff room. Inclusion criteria for staff were: ability to communicate in English and employment at the TC facility in a clinical capacity for at least 3 months.

Outcome measures

A suite of assessment tools were chosen to measure the physical, social, emotional and cognitive health-related outcomes based on the CGA framework[20] and are summarized in Table B.1.[7,11,23-25] These standardized and validated assessment tools were: the MBI[17], de Morton Mobility Index (DEMMI)[26], Timed Up and Go (TUG)[27], 10-meter Walk Test (10MWT)[28], Lawton scale[29], EQ-5D-5L[30], Patient Health Questionnaire-9 (PHQ-9)[31], Geriatric Depression Scale (GDS)[32], Mini Mental State Examination (MMSE)[22], and the Montreal Cognitive Assessment (MoCA)[33]. The MoCA and MBI were already being used for assessment at the participating TC facility.

As part of CGA, participants' history of falls[34], number of prescribed medications[35] and medical conditions were also recorded at the point of admission to the TC facility.[36] Demographic information including age, use of walking aids, care support prior to hospital admission, living situation prior to hospital admission, previous functional status, and LOS in hospital were also collected. For the purpose of this feasibility study, patient goals were not assessed but these were included for participants as part of the usual care provided at the TC facility.

Table B.1

Summary of assessment tools used as part of comprehensive geriatric assessment

Component	Measurement or Assessment Tool	Description
Medical Domain		
Medications	Number of medications	Polypharmacy is associated with frailty, unplanned hospitalisations and mortality.35
Diagnoses	Number and type of medical conditions	Presence of multiple medical conditions is associated with functional decline and poor ADL performance.
Physical Domain		
Independence of ADLs	Modified Barthel Index	10 items scored out of 5, 10 or 15 depending on the task, and a total score out of 100 will be given. A higher score indicates greater independence.
Mobility	de Morton Mobility Index	15 items scored from 0-2 to derive a raw score of out of 19, which will be converted to a transformed score of out of 100. Community dwelling older adults score 82 on average. A higher score indicates greater functional ability.
Functional Ability	Timed Up and Go	Time taken in seconds (s) to complete task. Normal range = 8-11s, lesser time taken indicates better functional ability.
Gait speed	10-metre Walk Test	Time taken to walk 10m as fast and safe as possible. A shorter timing indicates faster gait speed and better performance.
Falls	Falls history for previous 12 months	History of falls associated with poor outcomes such as decreased function, morbidity and mortality.[34]
Social Domain		
Living Situation	Discharge destination	Home, residential aged care or hospital.
Instrumental Activities of Daily Living (IADL)	Lawton scale	8 domains with scored 0 or 1, with a total score of 8. Individuals scored according to their highest level of function in each domain.

Emotional Domain		
Depression	Patient Health Questionnaire-9	9 questions scored from 0-3 and a total score out of 27 will be given. The higher the score, the greater the severity of depression.
	Geriatric Depression Scale	30 yes/no questions with a score of 1 given for each response that matches the provided answer at the end of the question. Score ranges from 1-15, score > 4 indicates presence of depressive symptoms.
Cognitive Domain		
Cognitive Ability	Mini Mental State Examination	Two sections assessing different domains of cognitive function, with a total score of 30. A lower score indicates greater cognitive impairment.
	Montreal Cognitive Assessment	12 tasks assessing different domains of cognitive function with a total score of 30. A lower score indicates greater cognitive impairment.

Feasibility evaluation

Feasibility considerations were the time taken to complete the individual assessment tool, whether the older adults were capable of undertaking and completing the assessment, and barriers to administering any of the assessment tools, informing CGA suitability and acceptability.

Specifically, older adults were surveyed after all outcome measures were completed to gain their feedback regarding the acceptability of the assessment procedure. Four open-ended prompts were used regarding i) time taken for the assessment, ii) ease of completing the assessment, iii) usefulness of the assessment in helping them understand their health status, and iv) suggestions and feedback to improve the assessment experience. Participating staff undertook a short survey consisting of four items, including two open ended questions, to ascertain if they found it easy to administer each assessment tool and if any adverse events occurred. The open prompts asked staff to evaluate whether they felt it was i) acceptable to administer the chosen assessment tools and ii) whether they were suitable for the TC facility setting.

Data collection procedure

Older adults were recruited during their first week of admission to the TC facility and their health-related outcomes were measured using the suite of assessment tools. The occupational therapist administered the MMSE and MoCA, nurses administered the MBI and physiotherapists administered the other outcome measures (10MWT, DEMMI, TUG, EQ-5D-5L, Lawton scale, GDS and PHQ-9). Questionnaires were conducted face-to-face at the older adult's bedside, while physical assessment items were conducted in their room and along the corridors of the TC facility. The same outcomes were re-measured at discharge using the procedure previously described.

On completion of all outcome measures the researcher met one-to-one with participating staff and older adults, to conduct the feasibility evaluation survey. Responses were noted verbatim by the researcher.

Data analysis

Data were analyzed using Stata version 16.0 (StataCorp, College Station, Texas, USA). Quantitative data for the feasibility outcomes of assessment completion and time taken were summarized using descriptive statistics and reported as frequencies and proportions. Responses to survey questions seeking categorical information, such as suitability and acceptability, were subjected to quantitative content analysis.[37] Data were extracted based on the number and

frequency of categories identified within each document.[37] Results were summarized using counts and exemplar statements presented using tables. The researchers engaged in dialogue to reach agreement on the coding and analysis.

Quantitative data for each assessment of the physical, social, emotional and cognitive health outcomes were summarized using descriptive statistics. Data were not normally distributed, except for the EQ-5D-5L, therefore changes in health outcomes between baseline and 6 weeks post-admission were analyzed using Wilcoxon signed-rank tests. Changes in the EQ-5D-5L were analyzed using the paired t-test. Statistical significance was set at $p \leq 0.05$ for all analyses (two-sided). Changes in outcomes between baseline and 6 weeks post-admission were subsequently compared to established Minimal Clinically Significant Differences (MCID) for each outcome, where MCID had been previously described.[23,38-47] Outcomes where MCID was achieved at 6 weeks post-admission were noted.

The sample size was estimated pragmatically based on the TC facility's current admission rate, the range of patients and the information required to inform the conduction of a larger prospective study in the TCP population.[48] It was thought that between 6 to 8 participants would be sufficient to evaluate the feasibility of using the selected assessments. Hence, the sample size was set at n=12 to allow for loss to follow up or withdrawal.

Results

There were 23 admissions to the TC facility during the recruitment period. Seventeen older adults met eligibility criteria and of those, five declined to participate. Twelve older adults enrolled in the study but two withdrew prior to measurement due to unexpected discharge from TCP. Therefore, ten older adults (mean age 78.9 years, SD ± 9.1 years) completed baseline and discharge measurements, details of their characteristics are presented in Table B.2. Five health professional staff (one occupational therapist, two nurses, and two physiotherapists) also participated.

Table B.2
Participant characteristics

Characteristics	**Number of participants** *n*=10 (100%)
Age 60-79 years	6 (60)
Age ≥80 years	4 (40)
Gender, male	6 (60)
Transition care length of stay (days), median (IQR)	46 (26)
Discharge destination	
Home	5 (50)
Residential aged care	5 (50)
Previous living situation	
Lived alone	6 (60)
Lived with partner	3 (30)
Lived with other people	1 (10)
Received pre-hospitalisation care support[a]	
ADL	1 (10)
IADL	8 (80)
Use of walking aids	
None	7 (70)
Wheeled walking frame	2 (20)
Wheelchair (non-ambulant)	1 (10)
Primary medical diagnosis	
Orthopaedic	3 (30)
Cardiorespiratory	2 (20)
Geriatric-related	2 (20)
Other	3 (30)
Mental health diagnosis (comorbidity)[b]	3 (30)
Falls history in last 12 months prior to admission to transition care	
No falls	3 (30)
1 fall	3 (30)
Multiple (≥2 falls)	4 (40)
Presence of visual impairments[c]	5 (50)

Notes:
SD, standard deviation; IQR, interquartile range. All data reported as n (%) unless otherwise stated.
[a]Pre-hospitalisation care support includes both formal and informal support
[b]Mental health diagnoses include bipolar disorder, depression and memory deficits.
[c]Visual impairments include cataracts, glaucoma and macular degeneration.

Feasibility

Feasibility findings are presented in Table B.3. The suite of assessments took 55.9 ± 7.3 mins to complete. As the MoCA was administered separately, the time taken for completion was not included in combined data reported above. The occupational therapist estimated that between 30 - 60 minutes was required to complete the MoCA depending on the older adult's cognitive ability.

All ten older adults reported feeling positive regarding their overall assessment experience, they felt capable participating in the assessments and well informed regarding their current health status. Most older adults felt the assessment procedure was not too time consuming, however one suggested that 30mins would be more acceptable hence this could be an area for improvement. Six (60%) older adults found the assessments easy to comprehend, while three (30%) commented that they lost a bit of focus due to the sheer number of questions across all measures. Eight (80%) participants reported knowing their assessment findings helped them "understand their abilities and wellbeing better." Two older adults also mentioned that participating in assessment helped "relieve boredom" as they perceived there was nothing much to do at the TC facility.

Details of the staffs' evaluation regarding the suitability and acceptability of the selected outcome measures are presented in Table B.3. All staff (n=5) reported the assessment tools were easy to administer, with zero adverse events reported during the study period. Staff agreed that the assessments provided useful information for rehabilitation and care planning. When administering the GDS staff perceived it was less acceptable for some older adults, as questions regarding suicidal thoughts and death engendered some discomfort.

Table B.3

Evaluation of selected outcome measures for CGA

Outcome (n = 10 participants)	**Number of participants assessed at admission/discharge** n (%)	**Duration taken to complete measure (mins)** (mean ± SD)	**Evaluation comments from staff**
Physical Domain			
10-meter Walk Test	9 (90%) / 9 (90%)	2.4 ± 0.53	Minimal equipment required Useful for quickly identifying gait impairments for further assessment and care planning Walking speed score helpful for comparing with normative values for other functional correlates Test condition of self-paced walking speed can be conducted relatively easily in patients with moderate to severe cognitive impairment as minimal instruction is required One participant unable to perform 10MWT due to being non-ambulant (at least 3 years) prior to hospital admission
Modified Barthel Index	100 (100%) / 100 (100%)	10.5 ± 1.54	Completed by TC nurses at both admission and discharge Provides useful information regarding personal ADL performance to assist with care planning
de Morton Mobility Index	100 (100%) / 100 (100%)	14.3 ± 5.35	Useful as part of initial and discharge assessment as it comprises ~~of~~ balance, bed mobility and ambulation measures Useful as provides a comprehensive patient functional mobility profile for nursing and therapy staff management in a short amount of time Hierarchy of tasks are useful in assisting to set smaller interim goals Used across health and home care settings thus scores can be compared in longer term evaluation of patient functional mobility Use will depend on baseline function pre-hospitalisation

Outcome (n = 10 participants)	**Number of participants assessed at admission/discharge** n (%)	**Duration taken to complete measure (mins)** (mean ± SD)	**Evaluation comments from staff**
Timed Up and Go	9 (90%) / 9 (90%)	2.53 ± 0.96	Easily completed at patient's bedside Provides very quick review of gait (walking), balance (turning) and leg strength (sit to stand) Requires a patient to understand a 5-stage command hence low suitability for moderate cognitive impairment One participant was unable to perform TUG due to being non-ambulant (at least 3 years) prior to hospital admission
Social Domain			
Lawton scale	100 (100%) / 100 (100%)	5.8 ± 2.17	Provides useful information regarding older adults' IADL performance to assist with planning for community discharge
EQ-5D-5L	100 (100%) / 100 (100%)	3.6 ± 1.12	Provides useful information regarding older adults' self-perceived general health and wellbeing for program engagement
Cognitive Domain			
Mini Mental State Examination	100 (100%) / 100 (100%)	7.9 ± 2.88	Easier to administer as it takes less time Provide useful information on executive function, memory, orientation, language to facilitate communication Has ceiling effect Inclusion in assessment depends on type of client Useful for older adults who are rarely assessed with MMSE
Montreal Cognitive Assessment	100 (100%) / 100 (100%)	30-60	Completed by TC occupational therapist More sensitive in detecting mild cognitive impairment Requires more time to assess

Outcome (n = 10 participants)	**Number of participants assessed at admission/discharge** n (%)	**Duration taken to complete measure (mins)** (mean ± SD)	**Evaluation comments from staff**
Emotional Domain			
Geriatric Depression Scale	100 (100%) / 100 (100%)	5.8 ± 3.14	Can help screen patients for potential depressive symptoms at discharge that may require referral for services post-TCP discharge Can make some patients feel slightly uncomfortable on specific questions Questionnaire a bit long for administration Less relevant for TCP clients; will not use as part of usual assessment unless indicated
Patient Health Questionnaire-9	100 (100%) / 100 (100%)	6.4 ± 2.50	Provides useful information for patients with potential depressive symptoms While this measure focused on diagnostic criteria for DSM-IV depressive disorders, it is less repetitive and provoking Assists clinicians to tailor activities for symptoms such as poor sleep, change in appetite and loneliness Less relevant for these clients Some questions appeared to make clients feel uncomfortable Less provoking and more general compared to GDS

Changes in patient health outcomes

Changes in older adults' health outcomes are presented in Table B.4 and changes in the 10MWT, EQ-5D-5L, MoCA and PHQ-9 are also presented in Figure B.1. There were significant improvements at discharge compared to admission in: ADL performance measured by the MBI, gait speed measured by the 10MWT, mobility measured by the DEMMI and HRQoL as measured by the EQ-5D-5L. There was a significant reduction in depressive symptoms as measured by the GDS and a significant decline in IADL performance as measured by the Lawton scale at discharge compared to admission.

Table B.4

Changes in older adults' health-related outcomes during a TCP

Outcome	Admission	Discharge	p-value
Physical Domain			
Modified Barthel Index[a]	71.50 (16.00)	76.50 (14.00)	0.008[c]
de Morton Mobility Index[a]	41.50 (23.00)	55.00 (24.00)	0.011c
Timed Up and Go[a]	25.16s (23.37)	21.88s (15.47)	0.859
10-metre Walk Test[a]	0.40 m/s (0.27)	0.52 m/s (0.15)	0.008c
Social Domain			
Lawton scale[a]	6 (2)	4 (4)	0.013[c]
EQ-5D-5L index value[b] *(mean ± SD)*	0.63 ± 0.28	0.64 ± 0.27	0.751
EQ-5D-5L health state score[b] *(mean ± SD)*	59.00 ± 21.71	78.00 ± 16.02	0.007c
Emotional Domain			
Patient Health Questionnaire-9[a] *(mean ± SD)*	5.60 ± 6.74	3.80 ± 5.16	0.100
Geriatric Depression Scale[a]	4.00 (2.00)	1.50 (1.00)	0.011c
Cognitive Domain			
Mini Mental State Examination[a]	27.50 (1.00)	28.50 (5.00)	0.277
Montreal Cognitive Assessment[a]	24.00 (6.00)	25.50 (4.00)	0.292

Notes:

SD, standard deviation; IQR, interquartile range; EQ-5D-5L, five-level version of EuroQOL five-dimensional health-related quality of life. Data reported as median (IQR) unless otherwise stated.

[a]Wilcoxon signed rank test used

[b]paired-t test used

[c]$p < 0.05$

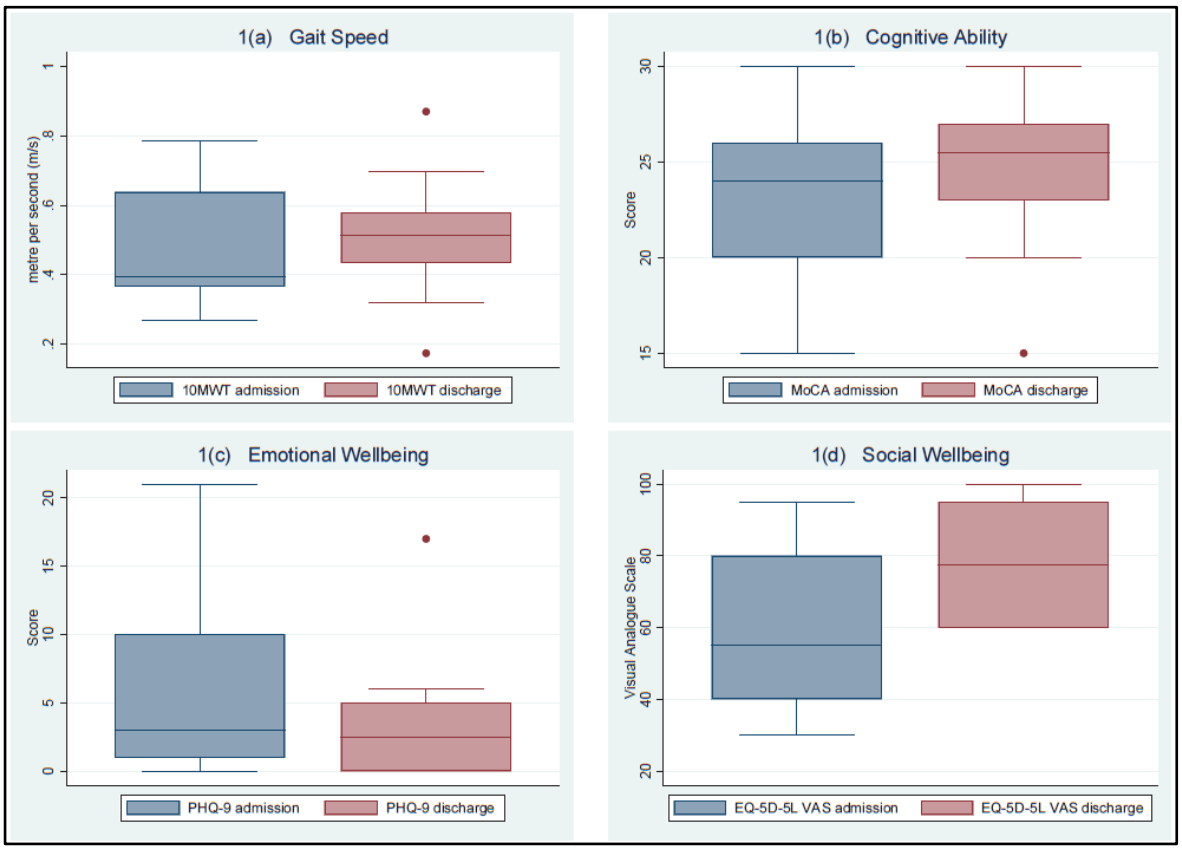

Figure B.1 Changes in older adults' health outcomes measured at admission and discharge. 1(a) Gait speed, 1(b) Cognitive ability, 1(c) Emotional wellbeing, 1(d) Social wellbeing

Mean changes for each health outcome compared to established MCID are presented in Table B.5. Older adults demonstrated clinically significant improvements in two of four outcomes in the physical domain and one outcome in each of the social, cognitive and emotional domains. Conversely, there was a clinically significant decline in IADL performance as measured by the Lawton scale.

Table B.5
Changes in the MCID for health-related outcome measures during TCP

Outcome	MCID	Change observed
Physical Domain		
Modified Barthel Index	1.85 points[38]	5.0 points[a]
de Morton Mobility Index	12.0 points[23]	14.5 points[a]
Timed Up and Go	3.4s[39]	3.28s
10-meter Walk Test	0.14 m/s[40]	0.12 m/s
Social Domain		
Lawton scale	0.5 points[41]	-7.0 points[a]
EQ-5D-5L index value	0.06-0.16[42]	0.01
EQ-5D-5L health state score	8-11 points[42]	19 points[a]
Emotional Domain		
Patient Health Questionnaire-9	5 points[43]	1.8 points
Geriatric Depression Scale	2 points[44]	2.5 points[a]
Cognitive Domain		
Mini Mental State Examination	1.6-2.0 points[45]	1.0 point
Montreal Cognitive Assessment	1.22-2.0 points[46,47]	1.50 points[a]

Notes:
MCID, minimal clinically significant difference; EQ-5D-5L, five-level version of EuroQOL five-dimensional health-related quality of life, [23,38-47] = MCID reported in reference population
[a]Clinically significant change

Discussion

Findings from this study demonstrated that it was feasible to measure older adults' health-related outcomes using CGA in a Transition Care setting, enabling a holistic, tailored approach to rehabilitation programming. The use of CGA in different health settings, such as hospitals, and rehabilitation facilities with multidisciplinary teams has been shown to allow patients to receive holistic care from appropriate healthcare professionals.[15,16] To our knowledge the feasibility of using CGA in TCP has not been previously reported, although recent reviews of TCP suggest a more comprehensive and holistic assessment of older adults is required.[10,13,49] The outcome measures chosen for inclusion in CGA were able to identify clinically significant changes in older adults' function in the physical, social, cognitive and emotional domains at program completion. The inclusion of CGA in settings other than TCP has also assisted therapists tailor rehabilitation to meet the needs of community-dwelling older adults, making programs more effective in reducing frailty and improving functional outcomes.[36,50]

Feasibility

All outcome measures were reported as acceptable as they provided useful clinical information, were easily administered and caused no adverse events. Staff felt that overall the outcome measures were suitable for the TC population with minimal floor or ceiling effects. The PHQ-9 was deemed a more suitable primary assessment of wellbeing compared with the GDS in this population, as it was perceived to be more conducive to older adults for disclosing their emotional needs. Although assessment tools such as the TUG and 10MWT were useful in identifying underlying impairments and activity limitations causing poor physical function in ambulant individuals,[28] some older adults were unable to undertake them due to being non-ambulant on admission. Completing CGA was found to require an increased time commitment compared with the current assessment procedure. The research conditions also meant eight measures were administered in a single contact session, which was a little overwhelming for some participants. However, the short duration taken to complete each individual outcome measure, when shared amongst multidisciplinary TC staff, administered at different contact times could contribute to improved acceptability. Importantly, older adults who completed CGA expressed satisfaction at knowing how they performed across the range of assessment measures. This provided them with a better understanding of their health and wellbeing and the relevance of rehabilitation, making them feel more confident to participate in TCP. Older adults in US inpatient settings similarly expressed the need to understand the reasons and potential benefits for undertaking further rehabilitation, rather than returning home, in order to commit to program participation.[51]

Changes in patient health outcomes

The MBI, which is mandated in TCP, identifies older adults' limitations with ADL performance represented in the physical domain of function only.[17] The inclusion of outcome measures representing the other domains of function, as part of CGA, informs healthcare providers regarding an older adult's social, cognitive and emotional wellbeing contributing to a more holistic picture of function.[16] The addition of gait speed and functional mobility measures can also help identify impairments and limitations in other aspects of the physical domain, such as mobility and balance, indicating that the older adult may require more targeted rehabilitation before discharge.[27,28] The older adults in our study recorded slower times on the 10MWT and TUG gait measures compared with normative values for community-dwelling older adults.[28] Gait speeds are correlated with physical aspects of function, such as the ability to rise from a chair or safely cross a road.[28] The slower gait speed findings suggest older adults in TCP may

benefit from additional rehabilitation aimed at improving mobility for safer and successful return to community living.[28] Older adults' IADL performance, as measured by the Lawton scale, declined during the study period. A prior trial also reported that participation in hospital-based transitional rehabilitation had no impact on older adults IADL performance.[52] This suggests a gap exists, where a decline in IADL performance is not addressed by the current rehabilitation components making up a TCP, increasing the risk of the older adult having poorer health-related outcomes, such as reduced independence or unplanned admissions to RAC.[1-3]

Clinically significant changes were observed in six of the ten selected outcome measures. Similar findings were reported in previous studies in TCP, where clinically significant changes were reported for gait speed and the functional mobility.[7,11,23] The ability of the selected outcome measures to detect MCIDs is also important as it means the TCP was able to elicit a clinical improvement that was meaningful and beneficial to the older adult.[28]

Strengths and limitations of the research

A key strength of this study was having experienced staff conduct the suite of assessments, as their understanding of and experience in TCP enabled them to assess and evaluate whether they were suitable for the TCP population. Participants included older adults with many different primary diagnoses and mobility levels reflecting the admission profile and thus contributing to the sample being representative.[10]

Limitations of the study were the small sample size and single site. The small sample size for the study may have potentially contributed to inaccuracies in the changes detected at discharge from TCP, such as the decline in IADL performance. While the suite of assessments proved feasible to conduct in our TC setting, feasibility findings could be better generalized to TCP with a larger sample size, involving more TC facilities and settings across different countries. We did not include older adults with moderate or severe dementia. However, these older form a smaller proportion of the TCP population and may be admitted to await residential care placement rather than undertake rehabilitation.[10] The inclusion of cognitive assessments (MMSE and MoCA) which are validated and used in rehabilitation settings can help identify patients with cognitive deficits that may benefit from therapy and hence tailor programs accordingly.[24,49] There was a lack of established MCIDs based on TCP populations for most of the selected outcome measures. Hence, the outcome measures were selected based on their use in previous TCP studies, as well as their validity, reliability and clinical suitability for the TCP population.[7,11,23-25]

Conclusions

This study demonstrated that measuring older adults' health-related outcomes using CGA was feasible in a transition care setting. The outcome measures selected identified older adults' improved across all four domains of function, with clinically significant changes detected in physical, social and emotional domains. These findings may better assist therapists in tailoring rehabilitation for older adults' functional needs prior to discharge, facilitating a smoother transition to community living. Future research with a larger sample size, across a range of TC settings and countries is required to evaluate the impact of CGA in TCP on improving health-related outcomes for older adults.

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Disclosure statement

The authors declare no conflict of interest.

Ethical approval

The study was approved by Curtin University's human research ethics committee (approval number HRE2020-0506) and the participating organization's clinical governance committee (Amana Living Inc.). All participants provided written informed consent prior to participating in the study.

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Appendix C Human Research Ethics Approvals

Curtin University

Research Office at Curtin

GPO Box U1987
Perth Western Australia 6845

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

18-Jan-2019

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

Dear Anne-Marie Hill

RE: Ethics Office approval
Approval number: HRE2019-0021

Thank you for submitting your application to the Human Research Ethics Office for the project **To determine the characteristics of the population of older patients admitted into a Transition Care Program Facility in WA in the past two years period - a retrospective analysis**.

Your application was reviewed through the Curtin University Low risk review process.

The review outcome is: **Approved**.

Your proposal meets the requirements described in the National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007)*.

Approval is granted for a period of one year from **18-Jan-2019** to **17-Jan-2020**. 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
Francis-Coad, Jacqueline	Supervisor
Hang, Jo-Aine	Student

Approved documents:

Document

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:

- proposed changes to the approved proposal or conduct of the study
- unanticipated problems that might affect continued ethical acceptability of the project
- major deviations from the approved proposal and/or regulatory guidelines
- serious adverse events

3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
8. Data and primary materials must be retained and stored in accordance with the Western Australian University Sector Disposal Authority (WAUSDA) and the Curtin University Research Data and Primary Materials policy
9. Where practicable, results of the research should be made available to the research participants in a timely and clear manner
10. Unless prohibited by contractual obligations, results of the research should be disseminated in a manner that will allow public scrutiny; the Human Research Ethics Office must be informed of any constraints on publication
11. Approval is dependent upon ongoing compliance of the research with the Australian Code for the Responsible Conduct of Research, the National Statement on Ethical Conduct in Human Research, applicable legal requirements, and with Curtin University policies, procedures and governance requirements
12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Special Conditions of Approval

None.

This letter constitutes low risk/negligible risk 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

Amy Bowater
Ethics, Team Lead

Research Office at Curtin

GPO Box U1987
Perth Western Australia 6845

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

27-Mar-2020

Name: Anne-Marie Hill
Department/School: Curtin University
Email: Anne-Marie.Hill@curtin.edu.au

Dear Anne-Marie Hill

RE: Amendment approval
Approval number: HRE2020-0075

Thank you for submitting an amendment request to the Human Research Ethics Office for the project **Exploring the journey of older adults through Transition Care Program - a qualitative study**.

Your amendment request has been reviewed and the review outcome is: **Approved**

The amendment approval number is HRE2020-0075-01 approved on 27-Mar-2020.

The following amendments were approved:

- Make changes to the current recruitment methods by asking the TCP staff to hand out information and flyers to their colleagues and older adults undertaking TCP at the transition care facility in Mosman Park. Potential participants can then phone us or we will phone them (with their verbal permission passed on through staff) and we can inform them about the study.
- Interview all participants through telephone line or video call using zoom or skype, whichever that is more convenient to the participants. All phone calls will be recorded using an external recording device to ensure all information provided by the participants are captured thoroughly. Participants will still be told that phone calls will be audio recorded the same as if they did a face-to-face interview.
- With the current situation of restrictions on visitors or students attending the transition care nursing home, we would also like to call the participants weekly to check on their journey in TCP, as we will be unable to observe and diarise their situation by visiting to interview them.

Condition of Approval:

It is the responsibility of the Chief Investigator to ensure that any activity undertaken under this project adheres to the latest available advice from the Government or the University regarding COVID-19.

Any special conditions noted in the original approval letter still apply.

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:
   - proposed changes to the approved proposal or conduct of the study
   - unanticipated problems that might affect continued ethical acceptability of the project
   - major deviations from the approved proposal and/or regulatory guidelines
   - serious adverse events
3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)

4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
8. Data and primary materials must be retained and stored in accordance with the Western Australian University Sector Disposal Authority (WAUSDA) and the Curtin University Research Data and Primary Materials policy
9. Where practicable, results of the research should be made available to the research participants in a timely and clear manner
10. Unless prohibited by contractual obligations, results of the research should be disseminated in a manner that will allow public scrutiny; the Human Research Ethics Office must be informed of any constraints on publication
11. Ethics approval is dependent upon ongoing compliance of the research with the Australian Code for the Responsible Conduct of Research, the National Statement on Ethical Conduct in Human Research, applicable legal requirements, and with Curtin University policies, procedures and governance requirements
12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

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

Associate Professor Sharyn Burns
Chair, Human Research Ethics Committee

Research Office at Curtin

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Perth Western Australia 6845

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Web research.curtin.edu.au

09-Sep-2020

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

Dear Anne-Marie Hill

RE: Ethics approval
Approval number: HRE2020-0506

Thank you for submitting your application to the Human Research Ethics Office for the project **Evaluating the use of health-related outcome measures in older adults who undertake a Transition Care Program (TCP) in a Transition Care Facility: a prospective observational study**.

Your application was reviewed by the Curtin University Human Research Ethics Committee at their meeting on **04-Aug-2020**.

The review outcome is: **Approved**.

Your proposal meets the requirements described in National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007)*.

Approval is granted for a period of one year from to **08-Sep-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	Supervisor
Francis-Coad, Jacqueline	Supervisor
Waldron, Nicholas	Supervisor
Hang, Jo-Aine	Student
Wong, Ying Git	Student

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:
   - proposed changes to the approved proposal or conduct of the study
   - unanticipated problems that might affect continued ethical acceptability of the project
   - major deviations from the approved proposal and/or regulatory guidelines
   - serious adverse events
3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion

report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
8. Data and primary materials must be retained and stored in accordance with the Western Australian University Sector Disposal Authority (WAUSDA) and the Curtin University Research Data and Primary Materials policy
9. Where practicable, results of the research should be made available to the research participants in a timely and clear manner
10. Unless prohibited by contractual obligations, results of the research should be disseminated in a manner that will allow public scrutiny; the Human Research Ethics Office must be informed of any constraints on publication
11. Ethics approval is dependent upon ongoing compliance of the research with the Australian Code for the Responsible Conduct of Research, the National Statement on Ethical Conduct in Human Research, applicable legal requirements, and with Curtin University policies, procedures and governance requirements
12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Special Conditions of Approval

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

Associate Professor Sharyn Burns
Chair, Human Research Ethics Committee

Appendix D Amana Living Clinical Governance Letter

AMANA LIVING
part of the Anglican community

Corporate Office PO BOX 933 Subiaco WA 6904
Ground Floor 541 Hay Street Subiaco WA 6008
tel 08 9424 6300 fax 08 9388 3142
amanaliving.com.au

22 November 2018

Dr. Anne-Marie Hill
School of Physiotherapy and Exercise Science
Faculty of Health Science, Curtin University,
Kent St
BENTLEY WA 6102

Re: Transition Care - Evaluation of Program

Dear Associate Professor Hill,

This letter provides authorisation for Associate Professor Hill from Curtin University to access Amana Living patient records. It also provides authorisation to approach staff, clients and family members regarding their journey and experience in transition care program (TCP) at Amana Living Transition Care Mosman Park, where these individual stakeholders have agreed to be part of the research.

The access authorisation refers to the research team of Associate Professor Hill, a postgraduate PhD candidate Ms. Jo-Aine Hang, co-supervisor Dr. Jacqui Francis-Coad, co-supervisor Dr. Nicholas Waldron and a bio-statistician Ms. Angela Jacques.

The approval for research is granted with the following conditions:

- Retrospective/past data collected through patient records at Amana have been de-identified for confidentiality
- Participation from any individuals, including staff, patients or family members is voluntary
- Individuals' contact details are not released to the research team and the individuals are not to be contacted directly by the members of the research team out of hours or at home
- Published data arising from this research will not identify any individual participant
- Confidentiality forms will be signed by the research team
- All studies within the research project will be reviewed for approval by Curtin University Human Research Ethics Committee (HREC) and research will commence after HREC approval is obtained.

Authorisation is granted for a period of 2 years from the date of this letter.

For further information regarding the approval, please contact me on 0407 303 725 or by email: MMcCarthy@amanaliving.com.au.

Yours sincerely,

MARIAN McCARTHY
General Manager Health Care Quality Assurance
Amana Living

AMANA LIVING

Agreement on Guidelines for Data Collection:

Transition Care - Evaluation of Program

Retrospective study procedural guideline for collecting data (to be submitted to Curtin HREC when applying for Ethical approval for the Study):

1. PhD student researcher will be visiting the central office at the organisation to retrieve data from the archive case file of past clients (1st July 2016 – 30th June 2018). Case file will only be accessed when the organisation's liaison is on site.
2. An excel spreadsheet with the past clients' initials and study ID will be created. This spreadsheet will be stored at the organisation's central office.
3. The PhD student researcher will spend approximately 4-6 hours each visit to collect data using iCare and if required, access archive case file of past clients.
4. All data collected will be stored securely at the organisation's central office.
5. Once all data have been collected, the PhD student researcher will take the de-identified data (with only the participants' study ID, postcode, age, educational level and primary diagnosis) to Curtin University, School of Physiotherapy and Exercise Science for data analysis. The de-identified excel spreadsheet will be stored securely with a password at Curtin University on the University's secure research data system.
6. During the data analysis, only the research team (Associate Professor Anne-Marie Hill, Dr. Jacqui Francis-Coad, Dr. Nicholas Waldron and Ms. Angela Jacques) have access to the data collected to ensure data is analysed and reported accordingly.
7. Once data analysis is completed for this study, the findings will be emailed to the organisation's liaison in the form of a report.
8. Publications or presentations will present grouped data which do not identify any client details on an individual level.

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31 August 2020

Dr. Anne-Marie Hill
NHMRC Early Career Researcher Fellow 2012-2015,
PhD, MSc, BApp Sc (PT), Grad Cert Uni Teaching,
APA Gerontological Physiotherapist,
Associate Professor, Research.

School of Physiotherapy and Exercise Science,
Faculty of Health Science,
Curtin University,
Kent St,
Bentley, Western Australia
Australia 6102

Re: Extension of Approval for Transition Care – Evaluation of Program Project

Dear Professor Hill,

This letter provides authorisation for Professor Hill from Curtin University to access Amana Living Inc patient records. It also provides authorisation to approach staff, patients and family members regarding their journey and experience in transition care program (TCP) at Amana Living Transition Care Mosman Park where these individual stakeholders have agreed to be part of the research.

The access authorisation refers to the research team of Associate Professor Hill, a postgraduate PhD candidate Ms. Jo-Aine Hang, co-supervisor Dr. Jacqui Francis-Coad, co-supervisor Dr. Nicholas Waldron, co-supervisor Chiara Naseri and a bio-statistician Ms. Angela Jacques.

The approval for research is granted with the following conditions:

- Retrospective/past data collected through patient records at Amana have been de-identified for confidentiality
- Participation from any individuals, including staff, patients or family members is voluntary
- Individuals' contact details are not released to the research team and the individuals are not to be contacted directly by the members of the research team out of hours or at home

- Published data arising from this research will not identify any individual participant
- Confidentiality forms will be signed by the research team
- All studies within the research project will be reviewed for approval by Curtin University Human Research Ethics Committee (HREC) and research will commence after HREC approval is obtained.

Authorisation is granted for a period of 2 years from the date of this letter.

For further information regarding the approval, please contact me on 0457 856 220 or email zzeeman@amanaliving.com.au.

Yours sincerely,

ZENITH ZEEMAN
General Manager Residential Care

Appendix E Paper 1 - Banner Page (Contributing to Chapter 3)

SYSTEMATIC REVIEW PROTOCOL

Effects of facility-based transition care programs on health-related outcomes in older adults: a systematic review protocol

Jo-Aine Hang[1,2] · Jacqueline Francis-Coad[1,2,3,4] · Chiara Naseri[1,2,5] · Nicholas Waldron[6] · Anne-Marie Hill[1,2]

[1]School of Physiotherapy and Exercise Science, Faculty of Health Science, Curtin University, Perth, WA, Australia, [2]The Western Australian Group for Evidence Informed Healthcare Practice: A JBI Centre of Excellence, Perth, WA, Australia, [3]Institute for Health Research, The University of Notre Dame Australia, Fremantle, WA, Australia, [4]School of Physiotherapy, The University of Notre Dame Australia, Fremantle, WA, Australia, [5]Research and Service Development Lead, Independent Living Assessment Incorporated, Perth, WA, Australia, and [6]Department of Aged Care and Rehabilitation, Armadale Kelmscott Memorial Hospital, East Metropolitan Health Service, Perth, WA, Australia

ABSTRACT

Objective: The objective of the review is to synthesize the best available evidence on the effects of transition care rehabilitation programs on health-related outcomes in older adults admitted to a transition care facility.

Introduction: Approximately 30% of older adults admitted to hospital experience functional decline after hospital discharge. To enable older adults to return to independent community living after hospitalization, transition care programs (TCPs) that focus on promoting safe recovery and maximizing older adults' functional ability have been developed. Limited studies have examined whether undertaking TCPs after hospitalization result in improved health-related outcomes in older adults compared to usual discharge care.

Inclusion criteria: Studies that include participants 65 years of age or older, deliver TCPs in a facility-based setting, and report health-related outcomes will be included. Randomized and quasi-controlled study designs as well as observational cohort designs with pre-post outcomes will be included.

Methods: A three-step search strategy will be utilized. Databases that will be searched are PubMed, CINAHL (EBSCO), AMED (Ovid), PsycINFO, and Embase (Ovid). Studies published after 2000 will be included. Results of the search strategy will be presented using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram. Data extracted will include population characteristics, study design, duration, and intensity of the TCP, and health-related outcomes significant to the review question, including the discharge destination from TCPs (independent community living, residential aged care, or hospital). Quantitative data, where possible, will be pooled in statistical meta-analysis.

Systematic review registration number: PROSPERO (CRD42020177623).

Keywords continuity of patient care; intermediate care; length of stay; rehabilitation; residential facilities

JBI Evid Synth 2020; 18(0):1–10.

Introduction

Older adults who have been recently hospitalized are at high risk of functional decline and re-hospitalization.[1] There is strong evidence that approximately 30% of older adults have reduced ability to perform one or more activities of daily living (ADL) after hospital discharge compared to pre-admission.[2,3] Many older adults who require hospital admission are frail and have multiple comorbidities.[2,3] Hospital-caused functional decline superimposed on existing comorbidities may prevent older adults from returning to independent living in the community, resulting in hospital readmissions, which in turn can lead to further functional decline, and may also subsequently lead to admission into residential aged care (RAC).[1-5] Additionally, although older adults comprised 42% of all hospital admissions in Australia in 2016–17, 90% of these admissions were episodes of acute care and only 7%

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The authors declare no conflicts of interest.

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Appendix F PROSPERO Registration

NIHR | National Institute for Health Research

PROSPERO
International prospective register of systematic reviews

To enable PROSPERO to focus on COVID-19 submissions, this registration record has undergone basic automated checks for eligibility and is published exactly as submitted. PROSPERO has never provided peer review, and usual checking by the PROSPERO team does not endorse content. Therefore, automatically published records should be treated as any other PROSPERO registration. Further detail is provided here.

Citation

Jo-Aine Hang, Jacqueline Francis-Coad, Chiara Naseri, Nicholas Waldron, Anne-Marie Hill. Effectiveness of facility-based transition care programs on health-related outcomes for older adults: a systematic review. PROSPERO 2020 CRD42020177623 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020177623

Review question

In older adults (aged 65 years and older) who have been discharged from hospital, what is the effect of undertaking a transition care program (TCP) in a Transition Care facility on health-related outcomes, including functional ability and discharge to independent community living, compared to usual discharge care or other rehabilitation programs?

Searches

PubMed, CINAHL Plus with full text (EBSCO), AMED (Ovid), PsycINFO (Ovid) and Embase (Ovid) were the databases used to search published studies.
Unpublished studies were searched through Mednar, Trove (theses only) and ProQuest dissertations and theses databases. Trial registry databases were searched using Current Controlled Trials (http://www.isrctn.com) and National Institute of Health Clinical Database (http://www.ClinicalTrials.gov).

Only studies published in English between 1st January 2000 to 31st of January 2020 were included as TCP services, an equivalent to Intermediate Care commenced in year 2000 in UK and in year 2004 in Australia.

Types of study to be included

Studies that were randomised-controlled trials, non-randomised trials, observational pre-post designs were included. Prospective and retrospective cohort studies were included if repeated measures used a health-related outcome before and after a TCP is delivered. Case-control studies, single-case studies and studies that used qualitative methods were excluded from this review.

Condition or domain being studied

Discharge destination and functional ability of older adults who completed TCP

Participants/population

This review considered studies with participants who were older adults aged 65 year or above undertaking a TCP. This review also included participants with a range of medical or surgical conditions. This review excluded participants receiving palliative care or participants who were not participating in rehabilitation unless the data from rehabilitation participants could be extracted separately for analysis.

Intervention(s), exposure(s)

A TCP is defined as a program which provides goal-oriented care and time-limited rehabilitation in a designated transition care facility for older adults admitted directly from hospital.

Comparator(s)/control

This review considered studies with no comparison group, comparing TCP to usual care, or comparing TCP to other rehabilitation program such as Inpatient-Rehabilitation Facility. Studies were included if they compared the effect of usual TCP compared to the effect of an additional intervention with usual TCP.

Context

This review focused on TCP delivered in facility-setting. All studies that provided TCP in the community or an outpatient setting were excluded as the rehabilitation environments and mode of delivery differs between community-setting and facility-setting TCP.

Main outcome(s)

The primary outcome of this review is the social domain of health-related outcome of discharge destination. The number of participants discharging from Transition Care facility upon completing TCP to independent community living, permanent residential aged care and readmission to hospital will be reported.

Measures of effect

The proportions of participants discharging to community compared to other, residential aged care compared to other and hospital compared to other will be reported. Odds ratios will be used to determine if there is a significant proportion of participants discharged home compared to other settings.

Additional outcome(s)

Secondary outcomes were presented according to the following domains:
Independence in activities of daily living domain: measured using Modified Barthel Index (MBI);
Physical domain: measured using gait speed measured in metres per second or functional mobility outcomes measured using de Morton Mobility Index (DEMMI);

Emotional domain: measured using Geriatric Depression Scale (GDS) or other outcomes;

Cognitive domain: measured using Mini Mental Scale Examination (MMSE) or other outcomes;

Health-related quality of life domain: measured using EQ-5D or other outcomes;

Adverse events: measured such as mortality or falls prevalence or incidence.

Measures of effect

Effect sizes will be expressed as either odds ratios, weighted mean differences or standardized mean difference with 95% confidence interval calculated depending on the outcome measured used in the studies.

Data extraction (selection and coding)

Study Selection
All identified citations were uploaded into bibliographic software EndNote X8.2 and duplicates were removed. Two researchers screened the titles and abstracts independently to identify studies for full text screening. All full text studies were assessed in detail against the inclusion criteria by two independent reviewers and reasons for excluded studies were recorded. Any disagreements between the two reviewers were arbitrated by the third independent reviewer. Reasons for excluded studies will be reported in the review. A full search results will be presented in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).
Data Extraction

Data from all included studies will be extracted independently by two reviewers using the standardised data extraction tool from the JBI reviewers' manual. Details about participants and setting, study design, sample size, health-related outcomes measured in the studies as well as length of stay in TCP and intensity of therapy will be extracted. Any disagreements between the two reviewers will be arbitrated by the third independent reviewer.

Risk of bias (quality) assessment

All studies included for this review were critically appraised independently by two reviewers using the JBI Critical Appraisal Checklist for randomised-controlled trial, quasi-experimental studies and cohort studies. Any disagreements between the two reviewers will be resolved through discussions. A third reviewer will be asked to mediate until mutual agreement is reached if neccessary.

Strategy for data synthesis

Effect sizes will be expressed as either odds ratios, weighted mean differences or standardized mean difference with 95% confidence interval calculated depending on the outcome measured used in the studies. Where possible, meta-analysis will be conducted and data will be pooled.

Analysis of subgroups or subsets
Subgroup analysis will be conducted if there are sufficient data to assess whether the intensity of the TCP had an impact on the health-related outcomes.

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Type and method of review
Meta-analysis, Systematic review

Anticipated or actual start date
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Anticipated completion date
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N/A

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Language
English

NIHR | National Institute for Health Research

PROSPERO
International prospective register of systematic reviews

Country
Australia

Stage of review
Review Ongoing

Subject index terms status
Subject indexing assigned by CRD

Subject index terms
MeSH headings have not been applied to this record

Date of registration in PROSPERO
05 July 2020

Date of first submission
01 May 2020

Details of any existing review of the same topic by the same authors
None known

Stage of review at time of this submission

Stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	No
Data extraction	No	No
Risk of bias (quality) assessment	Yes	No
Data analysis	Yes	No

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.
The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.

Versions
05 July 2020

Appendix G Paper 2 - Banner Page (Contributing to Chapter 4)

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ORIGINAL ARTICLE

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Effectiveness of facility-based transition care on health-related outcomes for older adults: A systematic review and meta-analysis

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Abstract

Background: Although Transition Care Programmes (TCP) are designed to assist older adults to regain functional ability after hospitalisation, it is unclear whether TCP improve older adults' health-related outcomes.

Objectives: The objective of the review was to synthesise the best available evidence for the effectiveness of TCP on health-related outcomes for older adults admitted to a transition care facility after hospitalisation.

Methods: Searches were conducted using the databases PubMed, AMED (Ovid), Embase (Ovid), PscyINFO (Ovid) and CINAHL (Full text) and grey literature from January 2000 to May 2020 in English only. Studies that reported health-related outcomes of older adults (aged 65 and above) who received TCP in a facility setting were deemed eligible for inclusion following critical appraisal by two reviewers. Data were pooled in meta-analysis where possible, or reported narratively.

Results: A total of 21 studies from seven countries [($n = 5$ RCT, $n = 16$ observational cohort studies) participants' mean age 80.2 (±8.3)] were included. Pooled analysis (2069 participants, 7 studies) demonstrated that 80% of older adults undertaking TCP were discharged home [95% CI (0.78–0.82, $p < 0.001$), $I^2 = 21.99\%$, very low GRADE evidence]. Proportions of older adults discharged home varied widely between countries (33.3%–86.4%). There was a significant improvement in ability to perform activities of daily living (2001 participants, 7 studies) as measured by the Modified Barthel Index [17.65 points (95% CI 5.68–29.62, $p = 0.004$), $I^2 = 0.00\%$, very low GRADE evidence].

Conclusions: The proportion of older adults discharged home from TCP compared to other discharge destinations differs between countries. This could be due to the intensity of the rehabilitation delivered and the maximum length of stay allowed prior to discharge.

Appendix H Characteristics of Included Studies for Systematic Review

Table H.1

Characteristics of Included Studies for Systematic Review

Author, year (country)	Characteristics	
Abrahamsen et al., 2014 (Norway)		
	Methods	Prospective observational cohort
	Duration of study (months)	19
	Setting	19 beds, 1 RAC
	Participants	N=557, Follow-up: N=557 (3 not accounted for), Age: 86 (70-102)† y Gender (female) 387, Diagnosis: Medical/Orthopaedic 340/217
	Baseline functional mobility	BI‡ 15 (4-20)†
	Baseline cognition	MMSE‡ 26 (8-30)†
	Full time staff	1.2 PT, 0.7 OT, 15 RN, 1 GP, 1 Geriatrician
	Therapy duration	N/R
	Health-related outcomes reported	Discharge destination (home and RAC), BI‡
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	14-21§
Abrahamsen et al., 2016 (Norway)		
	Methods	Prospective observational cohort
	Duration of study (months)	43
	Setting	19 beds, 1 RAC
	Participants	N=961, Follow-up: N=959 (2 dropped out), Age 85 (70-102)† y

Author, year (country)	Characteristics	
		Gender (female) 657, Diagnosis: Medical/Orthopaedic 615/346
	Baseline functional mobility	BI‡ 75 (10-100)†
	Baseline cognition	MMSE‡ 26 (8-30)†
	Full time staff	1.2 PT, 0.7 OT, 15 RN, 1 GP, 1 Geriatrician
	Therapy duration	N/R
	Health-related outcomes reported	Discharge destination (home and RAC), BI,‡ Adverse event (death)
	Hospital length of stay (days)	5 (1-51)†
	TCP length of stay (days)	14 (2-33)†
Chen et al., 2002 (USA)		
	Methods	Retrospective observational cohort
	Duration of study (months)	Late 1998 – Early 1999
	Setting	10 Free-Standing RAC (SNF); 7 Free-Standing Rehabilitation Hospitals; 3 Subacute Rehabilitation Units in General Hospitals
	Participants	RAC n=1200 (n=12 admitted to RAC from community; n=60 lived in other settings prior to hospital admission); Rehabilitation Hospital n=492; General Hospital n=284, Follow-up: RAC n=1200; Rehabilitation Hospital n=492; General Hospital n=284
		Age RAC 77.9 (9.9)‖ y; Rehabilitation Hospital 74.6 (13.7)‖ y; General Hospital 73.2 (13.2)‖ y
		Gender (female) [RAC 804; Rehabilitation Hospital 320; General Hospital 176]
		Diagnosis: Stroke/Orthopaedic/Debility [RAC 216/768/204; Rehabilitation Hospital 197/221/74; General Hospital 134/133/17]
	Baseline functional mobility	FIM‡ Self-care: RAC 50.8 (40.9-56.3);† Rehabilitation Hospital 47.4 (37.7-56.3);† General Hospital 44.2 (32.2-50.8)†
		FIM Mobility: RAC 19.5 (13.9-24.7);† Rehabilitation Hospital 21.4 (13.8-26.4);† General Hospital 21.4 (11.2-27.2)†
	Baseline Cognition	FIM Cognition 84.7 (63.7-99.7);† Rehabilitation Hospital 66.6 (48.4-84.7);† General Hospital 63.7 (44.6-92.9)†

Author, year (country)	Characteristics	
	Full time staff	N/R
	Therapy duration (min/day)	RAC Total 104 (52)‖ [OT 40 (27);‖ PT 58 (30);‖ ST 5(16)‖]; Rehabilitation Hospital Total 85 (52)‖ [OT 36 (13);‖ PT 41 (15);‖ ST 8 (13)‖]; General Hospital Total 100 (34)‖ [OT 41 (16);‖ PT 47 (19);‖ ST 11 (14)‖];
	Health-related outcomes reported	Discharge destination (community†† and RAC), FIM‡ (Self-care, mobility, cognition, bladder)
	Hospital length of stay (days)	RAC: N/R; Rehabilitation Hospital: N/R; General Hospital: N/R
	TCP length of stay (days)	RAC 22 (15);‖ Free-Standing Rehabilitation Hospital 19 (12);‖ Subacute Units in General Hospital 17 (12)‖
DeJong et al., 2009 (USA)		
	Methods	Prospective observational cohort
	Duration of study (months)	13
	Setting	8 Free-Standing RAC (SNF), 1 Hospital-based SNF, 11 IRF
	Participants	RAC n=543; Hospital-setting n=266; IRF n=1343, Follow-up: RAC n=543; Hospital-based n=266; IRF n=1343
		Age: RAC 73.6 (9.7)‖ y; Hospital-based 73.3 (7.4)‖ y; IRF 70.0 (11.2)‖ y, Gender (female) [RAC 404; Hospital-based 188; IRF 928]
		Diagnosis: Orthopaedic excluded hip fracture (Total Knee Replacement/Total Hip Replacement) [RAC 353/190; Hospital-based 189/77; IRF 859/484]
	Baseline functional mobility	FIM‡ motor: RAC 48.9 (8.5);‖ Hospital-based 46.20 (8.4);‖ IRF 40.7 (8.2)‖
	Baseline cognition	FIM‡ cognitive: RAC 33.5 (3.8);‖ Hospital-based: 30.2 (3.8)‖ ;IRF 20.9 (5.4)‖
	Full time staff	N/R
	Therapy duration (hours/day)	RACF 1.2 (0.3)‖ PT/OT; Hospital-based SNF 1.5 (0.2)‖ PT/OT; IRF 2.1 (0.4)‖ PT/OT
	Health-related outcomes reported	Discharge destination (community††), FIM‡ motor
	Hospital length of stay (days)	RAC 4.3 (3.2);‖ Hospital-based 3.5 (1.5);‖ IRF 4.3 (3.3)‖
	TCP length of stay (days)	RAC 14.2 (8.0);‖ Hospital-based 8.9 (3.4);‖ IRF 9.5 (4.2)‖

Author, year (country)	Characteristics	
Fiorini et al., 2013 (Italy)		
	Methods	Prospective observational cohort
	Duration of study (months)	N/R
	Setting	1 RAC
	Participants	N=299, Follow-up: N=299, Age: 80.1 (8.3)‖ y Gender (female) 183, Diagnosis: Medical only
	Baseline functional mobility	BI‡ 42.1 (27.7)‖
	Baseline cognition	MMSE‡ 18.1 (7.5)‖
	Full time staff	N/R
	Therapy duration (hours/day)	N/R
	Health-related outcomes reported	BI, ‡ MMSE‡
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	26.0 (11.6)‖
Galizia et al., 2018 (Italy)		
	Methods	Prospective observational cohort
	Duration of study (months)	12
	Setting	1 RAC; 1 General Hospital
	Participants	RAC N=44; General Hospital N=31, Follow-up: RAC N=44; General Hospital N=31 Age: RAC 80.2 (6.8)‖ y; General Hospital 82.5 (5.9)‖ y, Gender (female) [RAC 26; General Hospital 12] Diagnosis: Chronic heart failure and/or acute exacerbation of chronic obstructive pulmonary disease (COPD) (excluded MMSE <18 and recent lower limb fracture)
	Baseline functional mobility	BI:‡ RAC 51.3 (22.7);‖ General Hospital 63.7 (30.2)‖
	Baseline cognition	MMSE: RAC 25.3 (3.3);‖ General Hospital: 25.5 (2.6)‖
	Full time staff	N/R

Author, year (country)	Characteristics	
	Therapy duration	RAC: Optimal medical therapy (heart medication) and 40mins/day (6 days)‖ of bed mobility, transfer training, walking, exercise training (cycle ergometer or treadmill, breathing exercises), education (focusing on adherence, awareness of the importance of exercise training and home exercise) General Hospital: Optimal medical therapy only
	Health-related outcomes reported	Discharge destination (home, assisted living and RAC), BI,‡ POMA,‡ Gait Speed (10metres, ms^{-1})
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	N/R
Gustavson et al., 2019 (USA)		
	Methods	Prospective observational cohort
	Duration of study (months)	15
	Setting	1 RAC (SNF)
	Participants	n=140, Follow-up: n=140, Age: 78.5 (10.0)‖ y; 80 (49-99)† y Gender (female) 97, Diagnosis: Orthopaedic/Cardiorespiratory/Other 33/14/93 Diagnosed with dementia: 11
	Baseline functional mobility (n=85)	BI‡ 47.3 (9.7)‖
	Baseline cognition (n=122)	BIMS‡ 13.2 (2.5)‖
	Full time staff	N/R
	Therapy duration (total minutes)	1293 (793);‖ 1056 (151-4533)†
	Health-related outcomes reported	Discharge destination (home, assisted living, RAC), SPPB,† Gait speed (4 meters, ms^{-1})
	Hospital length of stay (days) (n=135)	4.4 (3.5);‖ 4 (0-27)†
	TCP length of stay (days) (n=137)	17.0 (10.8);‖ 14 (1-70)†
Herfjord et al., 2014 (Norway)		
	Methods	RCT
	Duration of study (months)	9.5
	Setting	15 beds in 1 RAC; 2 General Hospitals

Author, year (country)	Characteristics	
	Participants	RAC n=190; General Hospitals n=186, Follow-up: RAC n=190; General Hospitals n=186 Age: RAC 83.6 (70-96)‡‡ y; General Hospitals 84.6 (71-98)‡‡ y, Gender (female) [RAC 139; General Hospitals 137] Diagnosis: Medical/Orthopaedic/Other [RAC 78/60/52; General Hospitals 72/68/46]
	Baseline functional mobility	BI:‡ RAC 70 (0-100);‡‡ General Hospitals N/R
	Baseline cognition	N/R
	Full time staff	RAC: Daily observation, mobilization, nutrition, practicing self-care. Individualized physiotherapy treatment, 12.7 FTE RN, 3x/week group PT, physician (either specialist in geriatric medicine and internal medicine or trainee doctor) 2x/week, multidisciplinary team meeting twice/week General Hospitals: Usual hospital care (might differ between the two hospitals due to no requirements for details of hospital treatments), presence of physicians on weekend, diagnostic tests availability (radiological examination, telemetry), multidisciplinary assessment not applied systematically
	Therapy duration (hours/day)	N/R
	Health-related outcomes reported	Discharge destination (home, RAC and other institution/hospital), adverse event (death)
	Hospital length of stay (days)	RAC 1.6 (0-4);‡‡ General Hospital 7.0 (0-36)‡‡
	TCP length of stay (days)	RAC 17.3 (1-34)‡‡
Hong et al., 2019 (USA)		
	Methods	Retrospective observational cohort
	Duration of study (months)	23
	Setting	1 RAC (SNF), 1 IRF
	Participants	RAC N=33103; IRF N=66082, Follow-up: RAC N=33103; IRF N=66082 Age: RAC 83.3 (7.8)‖ y; IRF 79.4 (7.6)‖ y, Gender (female) [RAC 21466; IRF 36462] Diagnosis: Stroke only
	Baseline functional mobility	RAC: MDS 3.0‡ (mobility/self-care) [40.8 (9.4)‖/41.9 (11.7)‖]; IRF: IRFPAI‡ (mobility/self-care) [44.2 (7.4)‖/45.0 (11.1)‖]
	Baseline cognition	N/R

Author, year (country)	Characteristics	
	Full time staff	N/R
	Therapy duration (hours/day)	RAC: N/R; IRF: 3
	Health-related outcomes reported	RAC: MDS 3.0‡ mobility and self-care; IRF: IRFPAI‡ mobility and self-care
	Hospital length of stay (days)	RAC 5.9 (4.2);‖ IRF 4.6 (3.0)‖
	TCP length of stay (days)	RAC 38.1 (24.1);‖ IRF 15.2 (7.3)‖
Jette et al., 2014 (USA)		
	Country	USA
	Methods	Retrospective observational cohort
	Duration of study (months)	12
	Setting	68 RAC (SNF)
	Participants	n=6896, Follow-up: n=6896 Age: RAC 76.5 (776.2-76.8)§§ y, Gender (female) 4336 Diagnosis: Orthopaedic/Cardiorespiratory/Stroke and other neurological/Other: 2496/1066/1582/2358 Excluded LoS in TCP >100, death, hospital readmission and 4hrs/day of therapy.
	Baseline functional mobility	FIM‡ 66.0 (65.5-66.5)§§
	Baseline cognition	N/R
	Full time staff	N/R
	Therapy duration (hours/day)	Nursing Care per resident: 45 RACF > 3.5hrs/day and 23 RACF <3.5hrs/day; Therapy intensity: 37 RACF provided <1.0hrs/day; 26 RACF 1.0-1.5hrs/day; 5 RACF >1.5hrs/day
	Health-related outcomes reported	Discharge destination (Community††), FIM‡
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	13 (10.0)†

Author, year (country)	Characteristics	
Jung et al., 2016 (USA)		
	Methods	Retrospective observational cohort
	Duration of study (months)	120
	Setting	15,496 RAC (SNF)
	Participants	n=481,908, Follow-up: n=481,908 Age: RAC 83.1 (7.2)‖ y, Gender (female) 366,250 Diagnosis: Hip fracture only Excluded LoS in TCP >100, receiving highest 0.1 percentile of therapy.
	Baseline functional mobility	ADL‡ measure 17.6 (4.5)‖
	Baseline cognition	CPS‡ 1.3 (1.6)‖
	Full time staff	N/R
	Therapy duration (mins/week)	450.1 (190.1)‖ OT/PT/ST
	Health-related outcomes reported	Discharge destination (home, other facilities, hospital)
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	32.6 (22.2)‖
Lawler et al., 2019¶¶ (Australia)		
	Methods	RCT (TCP vs additional family assisted therapy)
	Duration of study (months)	19
	Setting	72 residential beds in hospital-based and RAC
	Participants	n=35 [Control (TCP) n=18; Treatment (TCP and family-assisted therapy) n=17], Follow-up: n=35 [Control n=18; Treatment n=16] Age 84.1 (6.1)‖ y [Control 85 (6);‖ Treatment 83 (6)‖] y, Gender (female) [Control 11; Treatment 10] Diagnosis: Orthopaedic/General medicine/Stroke/Other (Control 7/7/2/2; Treatment 7/5/3/2) Cognitive impairment: Control 10; Treatment 6
	Baseline functional mobility**	MBI‡: Control 64.8 (18.7),‖ Treatment 70.9 (19.4)‖

Author, year (country)	Characteristics	
	Baseline cognition	N/R
	Full time staff	N/R
	Therapy duration	Control: Standard PT twice weekly various duration (mobility training, exercise, caregiver training and discharge planning by a physiotherapist or allied health assistant). Treatment: Standard PT and 4 additional family-assisted therapy sessions by a family member trained by a physiotherapist (including transfer practice, walking or simple exercises)
	Health-related outcomes reported	Discharge destination (home and RAC), MBI,‡ Short Falls Efficacy Scale,‡ Steps per day (n), EQ-5D-3L index and visual analogue scale,‡ ICECAP-O‡
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	Control 64.5 (33.5);‖ Treatment 58.5 (34.9)‖
Lenze et al., 2012 (USA)		
	Methods	RCT (TCP vs enhanced medical rehabilitation)
	Duration of study (months)	16
	Setting	3 units of 1 RAC (SNF)
	Participants	n=26 [Control (TCP) n=12; Treatment (TCP and enhanced medical therapy) n=14], Follow-up: n=26 [Control n=12; Treatment n=14] Age [Control 75.7 (9.0);‖ Treatment 80.8 (7.2)‖] y, Gender (female) [Control 10; Treatment 10] Diagnosis: Deconditioning due to cardiopulmonary conditions/stroke/orthopaedic/medical (excluding severe cognitive impairment, lifetime psychotic disorder, active substance abuse, palliative care or metastatic cancer (Control 6/3/2/1; Treatment 8/2/4/0)
	Baseline functional mobility	BI‡: Control 28.3 (16.0);‖ Treatment 32.2 (20.7)‖
	Baseline cognition	SBT‡: Control 5.2 (4.4);‖ Treatment 4.3 (3.6)‖
	Full time staff	N/R
	Therapy duration (mins/day)	Control: 21.5 (10.6)‖ PT/.OT (or assistants) Treatment: 47.2 (14.5)‖ PT/OT (or assistants) trained in enhanced medical rehabilitation (EMR, a set of behavioral skills for therapists to integrate into their therapy practice to increase therapy intensity and older adult's engagement in all sessions)

Author, year (country)	Characteristics	
	Health-related outcomes reported	BI,‡ Gait speed (6 meters, ms^{-1}), 6 minute walk (feet walked)
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	N/R but reported as therapy days in TCP, Control 29 (19.5);‖ Treatment 34.9 (20.2)‖
Lenze et al., 2019 (USA)		
	Methods	RCT (TCP vs enhanced medical rehabilitation)
	Duration of study (months)	48
	Setting	2 RAC (SNF)
	Participants	n=229 [Control (TCP) n=115; Treatment (TCP and enhanced medical therapy) n=114], Follow-up: n=220 [Control n=110; Treatment n=110] Age [Control 79.2 (7.7)‖; Treatment 79.5 (8.2)‖] y, Gender (female) [Control 75; Treatment 74] Diagnosis: Musculoskeletal/cardiopulmonary conditions/renal/neurological/other (excluding severe cognitive impairment, psychotic disorder, or medical conditions preventing study participation such as metastatic cancer) (Control 44/47/7/5/22; Treatment 36/56/7/5/19)
	Baseline functional mobility	BI‡: Control (n=114) 34.7 (12.8);‖ Treatment 32.2 (13.1)‖
	Baseline cognition	SBT‡: Control 3.8 (3.2);‖ Treatment 4.4 (3.6)‖
	Full time staff	N/R
	Therapy duration (mins/day)	Control: PT 48.6 (15.9)‖ OT 39.9 (13.0)‖ Treatment: PT 45.6 (13.4)‖ OT 37.7 (12.1),‖ PT/OT trained in enhanced medical rehabilitation (EMR, a set of behavioral skills such as motivational techniques for therapists to integrate into their therapy practice to increase therapy intensity and older adult's engagement in all sessions)
	Health-related outcomes reported	Discharge destination (home), BI,‡ Gait speed (6 meters, ms^{-1}), 6 minute walk (feet walked)
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	Control 23.4 (11.7);‖ Treatment 23.5 (14.4)‖

Author, year (country)	Characteristics	
Leung et al., 2016 (Canada)		
	Methods	Prospective pre-post observational cohort
	Duration of study (months)	15
	Setting	30 beds RAC (Slow-stream rehabilitation)
	Participants	n=104, Follow-up: n=104 Age: RAC 81.6 (8.4)‖ y, Gender (female) 71, Diagnosis: Hip fracture/medically complex/stroke/other musculoskeletal 31/32/19/22
	Baseline functional mobility	FIM‡ total 55.8 (18.8);‖ FIM motor 33.0 (13.4)‖
	Baseline cognition	MoCA‡ ≤ 23 n=72
	Full time staff	2 OT, 1 OT assistants, 2 PT, 2 PT assistants, 0.6 dietician, 0.5 ST, 0.5 therapeutic recreation staff, 1 social worker, 2 part-time GP, nurse-to-older adults ratio: 1:5 day time, 1:10 night time
	Therapy duration	20 minutes 3x per week initially, can progress to longer duration up to 5x per week
	Health-related outcomes reported	Discharge destination (home and RAC), FIM‡ (total and motor), Grip strength (Kg), Gait speed (4 meters, ms^{-1}), BBS,‡ PHQ-9‡
	Hospital length of stay (days)	39.0 (34.1)‖
	TCP length of stay (days)	82.5 (26.4);‖ 82.5 (25-155)‡‡
Mallinson et al., 2014 (USA)		
	Methods	Prospective observational cohort
	Duration of study (months)	52
	Setting	6 RAC (SNF), 4 IRF
	Participants	RAC n=69 (n=3 residents from RAC); IRF n=78, Follow-up: RAC n=69; IRF n=78 Age: RAC 83.4 (7.6)‖ y; IRF 80.7 (7.0)‖ y, Gender (female) RAC 51; IRF 47 Diagnosis: Hip fracture followed by surgical intervention only
	Baseline functional mobility	IRFPAI‡ (self-care): RAC 21.6 (4.4)‖ IRF 22.6 (2.2)‖ IRFPAI‡ (mobility): RAC 15.2 (2.8)‖ IRF 15.4 (3.1)‖

Author, year (country)	Characteristics	
	Baseline cognition	Cognition status Minimum Data Set 2.0 Short-term memory impairment: RAC n=25; IRF n=10 Long-term memory impairment: RAC n=8; IRF n=3 Impairment with daily decision making: RAC n=41; IRF n=22
	Full time staff	N/R
	Therapy duration (mins/LOS day)	OT/PT/ST/Respiratory therapy/Psychology services - RAC 79.0 (22.8);‖ IRF 139.0 (22.6)‖
	Health-related outcomes reported	Discharge destination (home, assisted living, RAC), IRFPAI‡ (mobility and self-care)
	Hospital length of stay (days)	RAC 6.3 (5.3);‖ IRF 6.4 (4.5)‖
	TCP length of stay (days)	RAC 27.7 (13.8);‖ IRF 15.1 (5.4)‖
Millar et al., 2017 (Northern Ireland)		
	Methods	Prospective observational cohort
	Duration of study (months)	2
	Setting	3 RAC
	Participants	n=74 (n=6 admitted directly from home/usual place of residence), Follow-up: n=38 Age: 83.5 (7.4)‖ y; 83.5 (66-102)‡‡ y, Gender (female) 47 Diagnosis: fall (with or without fracture) 26
	Baseline functional mobility	N/R
	Baseline cognition	N/R
	Full time staff	N/R
	Therapy duration	N/R
	Health-related outcomes reported	Discharge destination (home, RAC, hospital), adverse event (potentially inappropriate prescribing)
	Hospital length of stay (days)	N/R
	TCP length of stay (days) (n=38)	22.0 (10.9);‖ 22.0(3-48)‡‡

Author, year (country)	Characteristics	
Morita et al., 2018 (Japan)		
	Methods	Retrospective observational cohort
	Duration of study (months)	24
	Setting	3,459 RAC
	Participants	n=342,758, Follow-up: n=189,469 Age: 84.3 (8.2)‖ y, Gender (female) 235,055 Diagnosis: Dementia/Tube feeding/Dysphagia/Implementation of medical treatment/requiring rehabilitation 96,764/1,348/10,308/38,706/231,715
	Baseline functional mobility	N/R
	Baseline cognition	N/R
	Full time staff (per 100 older adults)	1 physician, 9 RNs, 25 caregivers, 1 PT/OT/ST
	Therapy duration	N/R
	Health-related outcomes reported	Discharge destination (home, RAC, hospital), adverse event (death)
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	137 (62-300)†
O'Brien and Zhang, 2018 (USA)		
	Methods	Retrospective observational cohort
	Duration of study (months)	12
	Setting	3,605 RAC (SNF)
	Participants	All intensities n=311,338 [High therapy intensity n=89,891; Medium-high therapy intensity n=122,784; Medium-low therapy intensity n=77,916; Low intensity n=20,747], Follow-up: n=277,713 [High therapy intensity n=80,542; Medium-high therapy intensity n=109,646; Medium-low therapy intensity n=69,423; Low intensity n=18,029]

Author, year (country)	Characteristics	
		Age: All intensities 81.9 (7.9)[§] y [High therapy intensity 81.1 (7.8);[‖] Medium-high therapy intensity 82.1 (7.8);[‖] Medium-low therapy intensity 82.4 (7.9);[‖] Low intensity 81.9 (8.2)[‖]] y, Gender (female) 202,370 [High therapy intensity 59,418; Medium-high therapy intensity 78,950; Medium-low therapy intensity 51,113; Low intensity 13,133], Diagnosis: variety of medical diagnosis
	Baseline functional mobility	RUG-III[‡] All intensities 12.9 (3.5)[‖] [High therapy intensity 12.8 (3.2);[‖] Medium-high therapy intensity 12.9 (3.4);[‖] Medium-low therapy intensity 13.0 (3.6);[‖] Low intensity 13.4 (4.2)[‖]]
	Baseline cognition	CPS[‡] All intensities 2.5 (1.6)[‖] [High therapy intensity 2.0 (1.4);[‖] Medium-high therapy intensity 2.6 (1.6);[‖] Medium-low therapy intensity 2.8 (1.7);[‖] Low intensity 3.4 (2.0)[‖]]
	Full time staff	N/R
	Therapy duration (mins/day)	All intensities 49.8 (16.4)[‖] [High therapy intensity 68.0 (6.7);[‖] Medium-high therapy intensity 51.4 (3.8);[‖] Medium-low therapy intensity 36.4 (4.3);[‖] Low intensity 12.2 (12.7)[‖]]
	Health-related outcomes reported	Discharge destination (home, RAC, hospital), adverse event (death)
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	All intensities 39.5 (26.9)[‖] [High therapy intensity 35.6 (24.2);[‖] Medium-high therapy intensity 40.2 (26.7);[‖] Medium-low therapy intensity 41.7 (28.3);[‖] Low intensity 45.3 (31.7)[‖]]
Parker et al., 2015[‖‖] (Australia)		
	Methods	RCT (TCP vs additional functional incidental training)
	Duration of study (months)	18
	Setting	39 beds, hospital-based TCP
	Participants	n=60 [Control (TCP) n=32; Treatment (TCP and 4 additional episodes of functional exercise daily) n=28], Follow-up: n=60 [Control n=28; Treatment n=24] Age [Control 77.1 (11.2)[‖]; Treatment 79.5 (12.4)[‖]] y, Gender (female) [Control 21; Treatment 15] Diagnosis: Medical/Orthopaedic/Frail (Control 12/10/5; Treatment 12/7/6)
	Baseline functional mobility	DEMMI[‡]: Control 64.3 (17.2),[‖] Treatment 51.4 (17.3)[‖]
	Baseline cognition	N/R
	Full time staff	N/R

Author, year (country)	Characteristics	
	Therapy duration	Control: Standard PT twice weekly 1:1 treatment and appropriate classes (chair based, balance or hydrotherapy). Treatment: Standard PT and 4 additional episodes of functional exercise daily (targeted walking and sit-to-stand exercises) delivered twice weekly for 30 minutes and progressed by a research assistant (allied health assistant) weekly.
	Health-related outcomes reported	Discharge destination (home and RAC), DEMMI,‡ BBS,‡ Five Times Sit-To-Stand
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	Control 63.7 (32.5)‖ Treatment 65.7 (31.1)‖
Zhang et al., 2019 (USA)		
	Methods	Prospective observational cohort
	Duration of study (months)	57
	Setting	1 RAC (SNF)
	Participants	n=24,410, Follow-up: n=16,408 Age: 64.7 (13.4)‖ y, Gender (female) 17,254, Diagnosis: Multiple sclerosis with variety of medical comorbidities such as hypertension, depression, diabetes and anaemia.
	Baseline functional mobility	ADL 17.6 (4.6)‖
	Baseline cognition	N/R
	Full time staff	N/R
	Therapy duration (hours/week)	9.7 (6.5-12.6)†
	Health-related outcomes reported	Discharge destination (home)
	Hospital length of stay (days)	N/R
	TCP length of stay (days)	N/R

Notes:

[†]Median (IRQ)
[‡]BI = Barthel Index, measures ADL, range 0-20, higher score indicates greater independence in ADL
[§]Mean length of stay not reported but stated one of the TCP admission criteria was discharge home within 2 weeks
[||]Mean (SD)
[††]Discharged to community referred to either home or assisted living in the community in USA
[‡‡]Mean (Range)
[§§]Mean (95% Confidence Intervals)
[||||]Unpublished data were sought from corresponding author (baseline functional mobility and TCP LOS were sought from Lawler et al. 2019; discharge data were sought from Parker et al. 2015)

MMSE = Mini Mental State Examination, measures cognitive function, range 0-30, higher score indicates better cognitive function
FIM = Functional Independence Measure, 18-items assessment normally scored between 18 and 126, higher scores denote better independence, Chen et al. 2002 reported Rasch-transformed score (0-100)
MBI = Modified Barthel Index, measures ADL, range 0-100, higher score indicates greater independence in ADL
POMA = Performance Orientation Mobility Assessment, measures balance and gait impairment, range 0-28, higher score indicates better functional mobility
BIMS = Brief Interview for Mental Status, measures cognitive function, range 0-15, higher score indicates better cognitive function
SPPB = Short Physical Performance Battery, measures static balance, gait speed and a 5-time-sit-to-stand (FTSTS), scores ranging from 0-12, higher score indicates greater functional ability
MDS 3.0 = Minimum Data Set 3.0, 6-items for mobility, 5-items for self-care, use in skilled nursing facilities in USA, scores were scaled from 0-100, higher score indicates greater functional ability
IRFPAI = Inpatient Rehabilitation Facility-Patient Assessment Instrument, 5-items for mobility, 6-items for self-care, use in inpatient rehabilitation facilities in USA, scores were scaled from 0-100, higher score indicates greater functional ability
CPS = Cognitive Performance Scale, measures cognitive function, score range 0-6, higher score indicates more severe cognitive impairment; O'Brien and Zhang 2018 score range 1-7, higher score indicates more severe cognitive impairment
ADL = activities of daily living measure, score range 0-28, higher score indicates greater disability; Zhang et al. 2019 reported using the validated Morris scale of independence in ADL, a mandated assessment performed as part of the Minimum Data Set assessment in SNF.
Short Falls Efficacy Scale International, measures Falls-related self-efficacy, score range 0-28, higher score indicates severe concern about falling
EQ-5D-3L = three-level version of the EuroQoL five-dimensional health-related quality of life, index ranges from 0-1, visual analogue scale ranges 0-100, higher score denotes better health-related quality of life
ICECAP-O tariff = Capability-related quality of life, score range 0-1, 1 indicating higher capability-related quality of life
SBT = Short Blessed Test, measures cognitive function, range 0-12, higher score indicating more cognitive impairment
MoCA = Montreal Cognitive Assessment, measures cognitive function, range 0-30, score of 23 or below indicates cognitive impairment, with lower score denotes more severe cognitive impairment
BBS = Berg Balance Scale, Measures postural control and stability, 14-items scale, range 0-56, higher score indicates better balance
PHQ-9 = Patient Health Questionnaire, measures of depression, 9-items assessment, score range 0-27, score of 10 or above indicates depression
RUG-III = Resource Utilization Group category scoring, measure the needs for assistance with ADLs, score 0-18, higher score indicates more assistance required to complete ADL
DEMMI = de Morton Mobility Index, measures ADL, 15-items assessment, score range 1- 100, higher score indicates more independence

Appendix I Supplementary Data (Contributing to Chapter 4)

Contents

Tables

Figures

References

Tables

Table I.1

Excluded studies and reasons for exclusion based on full text review

Item	Study	Reason for exclusion
1	Brusco NK, Taylor NF, Hornung I, Smith A, de Morton NA. (2012). Factors that predict discharge destination for patients in transitional care: a prospective observational cohort study. Aust Health Rev, 36(4), 430-436. doi:10.1071/AH11052	Included 11 settings with only one setting in RACF. The results were reported as whole cohort, hence unable to separate and analyse data separately for facility-based TCP.
2	Stauffer BD, Fullerton C, Fleming N, Ogola G, Herrin J, Stafford PM, Ballard DJ. (2011). Effectiveness and cost of a transitional care program for heart failure: a prospective study with concurrent controls. Arch Intern Med, 14(171), 1238-1243. doi:10.1001/archinternmed.2011.274	Conducted in community (home) transitional care setting, not facility-based.
3	Green J, Young J, Forster A, Mallinder K, Bogle S, Lowson K, Small N. (2005). Effects of locality based community hospital care on independence in older people needing rehabilitation: randomized controlled trial. BMJ. doi:10.1136/bmj.387498.387569.8F	No discharge destination recorded.
4	Young J, Green J, Forster A, Small N, Lowson K, Bogle S, George J, Heseltine D, Jayasuriya T, Rowe J. (2007). Postacute care for older people in community hospitals: a multicenter randomized controlled trial. J Am Geriatr Soc, 55, 1995-2002. doi:10.1111/j.1532-5415.2007.01456.x	No discharge destination recorded.
5	Nakanishi M, Shindo Y, Nimura J. (2016). Discharge destination of dementia patients who undergo intermediate care at a facility. J Am Med Dir Assoc, 17, 92.e1-92.e7. doi:10.1016/j.jamda.2015.10.018	Participants included in the study admitted to transition care facility directly from hospital, home and residential aged care. results were reported as a whole cohort, hence data for patients who were admitted to transition care facility from hospital were unable to be extracted and analyzed separately.
6	Senior HEJ, Parsons M, Kerse N, Chen M-H, Jacobs S, Hoorn SV, Anderson CS. (2014). Promoting independence in frail older people: a randomised controlled trial of a restorative care service in New Zealand. Age Ageing, 43, 418-424. doi:10.1093/ageing/afu025	Some patients were admitted to transition care facility directly from community and data for cohort who were transferred from hospital to transition care facility were presented as a whole cohort.
7	Parsons M, Senior HEJ, Chen M-H, Jacobs S, Vanderhoorn S, Brown PM, Anderson C. (2012). The assessment of services promoting independence and recovery in elders trial (ASPIRE): a pre-planned meta-analysis of three independent randomised controlled trial evaluations of ageing in place initiatives in New Zealand. Age Ageing, 41, 722-728. doi:10.1093/ageing/afs113	Unclear where the participants were recruited from; not clear from the results how many were discharged home or back to hospital.

Item	Study	Reason for exclusion
8	Zhang P, Hu Y-D, Xing F-M, Li C-Z, Lan W-F, Zhang X-L. (2017). Effects of a nurse-led transitional care program on clinical outcomes, health-related knowledge, physical and mental health status among Chinese patients with coronary artery disease: a randomized controlled trial. Int J Nurs Stud, 74, 34-43. doi:10.1016/j.ijnurstu.2017.04.004	Transitional care for patients with heart disease in an acute hospital setting not a facility-based TCP.
9	Vearing R, Casey S, Zaremba C, Bowden S, Ferguson A, Goodisson C, Potter J, Evry N, Charlton K. (2019). Evaluation of the impact of a post-hospital discharge transitional aged care service on frailty, malnutrition and functional ability. Nutr Diet. 76(4), 472-479. doi:10.1111/1747-0080.12511	Only evaluated at community-based (home) TCP in Illawarra, News South Wales.
10	Haghverdian BA, Wright DJ, & Schwarzkopf R. (2017). Comparison of postarthroplasty functional outcomes in skilled nursing facilities among Medicare and Managed care beneficiaries. Arthroplast Today. 3, 275-280. doi:10.1016/j.artd.2017.04.002	No standardized outcome measured used and insufficient health related outcomes to be included.
11	Garasen H, Windspoll R, Johnsen R. (2008). Long-term patients' outcomes after intermediate care at a community hospital for elderly patients: 12-month follow-up of a randomized controlled trial. Scand J Public Health, 36,197-204. doi:10.1177/1403494808089685	All outcomes were reported 12 months after TCP was completed, rather than at discharge.
12	Masiero S, Avenasi R, Pegoraro S, Frigo AC, Bonaldo L. (2011). Predictive factors for functional recovery in patients admitted to subacute care nursing home in Italy. Aging Clin Exp Res, 23, 74-77. doi:10.3275/6798	Uncertainty if all participants were all admitted directly from the hospital as introduction stated that patients could admitted from home or other inpatient care centers.
13	Burke RE, Whitfield EA, Hittle D, Min S-j, Levy C, Prochazka AV, Coleman EA, Schwartz R, Ginde AA. (2016). Hospital readmission from post-acute care facilities: risk factors, timing and outcomes. J Am Med Dir Assoc, 17(3), 249-255. doi:10.1016/j.jamda.2015.11.005	Included cases from acute hospitalisation (n=3246). Of this, n=2921 (90%) were admitted to a transition care facility but the other 10% did not have reported destination. Data were reported as two cohort – hospital readmission vs not readmitted (included the 10% that were not in TCP), and data for TCP were not reported separately. Hence, data were not able to be extracted and analyzed separately for cases that participated in TCP.
14	Jette DU, Warren RL, Wirtalla C. (2005). The relationship between therapy intensity and outcomes of rehabilitation in skilled nursing facilities. Arch Phys Med Rehabil, 86(3), 373-379. doi:10.1016/j.apmr.2004.10.018	No health-related outcomes reported.
15	Chen L-K, Chen Y-M, Hwang S-J, Peng L-N, Lin M-H, Lee W-J, Lee C-H, Longitudinal Older Veterans Study Group. (2010). Effectiveness of community hospital-based post-acute care on functional recovery and 12-month mortality in older patients: a prospective cohort study. *Ann Med*, *42*(8), 630-636. doi:10.3109/07853890.210.521763	All participants recruited were residents in a nursing home prior to TCP admission.

Table I.2

Critical appraisal of included randomised-controlled trials (5 studies)

ID	Study	Q1[a]	Q2[b]	Q3[c]	Q4[d]	Q5[e]	Q6[f]	Q7[g]	Q8[h]	Q9[i]	Q10[j]	Q11[k]	Q12[l]	Q13[m]
1	Herfjord et al. 2014	Y	Y	Y	N	N	N	U	Y	Y	Y	U	Y	Y
2	Lawler et al. 2019	Y	Y	Y	U	U	Y	Y	Y	Y	Y	Y	Y	Y
3	Lenze et al. 2012	U	U	N	U	N	U	Y	Y	Y	Y	Y	Y	U
4	Lenze et al. 2019	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
5	Parker et al. 2015	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y

Notes:

Y = Yes, N = No, U = Unclear, N/A = Not applicable

[a]Was true randomisation used for assignment of participants to treatment groups?

[b]Was allocation to treatment groups concealed?

[c]Were treatment groups similar at the baseline?

[d]Were participants blind to treatment assignment?

[e]Were those delivering treatment blind to treatment assignment?

[f]Were outcomes assessors blind to treatment assignment?

[g]Were treatment groups treated identically other than the intervention of interest?

[h]Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?

[i]Were participants analyzed in the groups to which they were randomized?

[j]Were outcomes measured in the same way for treatment groups?

[k]Were outcomes measured in a reliable way?

[l]Was appropriate statistical analysis used?

[m]Was the trial design appropriate, and any deviations from the standard RCT design (individual randomisation, parallel groups) accounted for in the conduct and analysis of the trial?

Table I.3

Critical appraisal of included observational cohort studies (16 studies)

ID	Study	Q1[a]	Q2[b]	Q3[c]	Q4[d]	Q5[e]	Q6[f]	Q7[g]	Q8[h]	Q9[i]	Q10[j]	Q11[k]
1	Abrahamsen et al. 2014	Y	Y	Y	U	Y	Y	Y	Y	Y	Y	Y
2	Abrahamsen et al. 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	Chen et al. 2002	Y	Y	Y	Y	Y	Y	U	Y	Y	U	Y
4	De Jong et al. 2009	Y	Y	Y	Y	Y	Y	Y	Y	Y	U	Y
5	Fiorini et al. 2013	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	Galizia et al. 2018	Y	U	U	Y	Y	Y	Y	U	Y	Y	Y
7	Gustavson et al. 2019	Y	Y	Y	U	U	Y	Y	Y	Y	U	Y
8	Hong et al. 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	U	Y
9	Jette et al. 2004	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y
10	Jung et al. 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
11	Leung et al. 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
12	Mallinson et al. 2014	Y	Y	Y	Y	Y	Y	Y	Y	Y	U	Y
13	Millar et al. 2017	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	Y
14	Morita et al. 2018	Y	Y	Y	U	U	Y	Y	Y	Y	Y	Y
15	O'Brien & Zhang 2018	Y	Y	N	Y	N	Y	U	U	U	U	Y
16	Zhang et al. 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes:

Y = Yes, N = No, U = Unclear, N/A = Not applicable

[a]Were the two groups similar and recruited from the same population?

[b]Were the exposures measured similarly to assign people to both exposed and unexposed groups?

[c]Was the exposure measured in a valid and reliable way?

[d]Were confounding factors identified?

[e]Were strategies to deal with confounding factors stated?

[f]Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?

[g]Were the outcomes measured in a valid and reliable way?

[h]Was the follow up time reported and sufficient to be long enough for outcomes to occur?

[i]Was follow up complete, and if not, were the reasons to loss to follow up described and explored?

[j]Were strategies to address incomplete follow up utilized?

[k]Was appropriate statistical analysis used?

Table I.4

Studies reporting other health-related outcomes

Study	Domain	Outcome measure	Results: Change between admission and discharge from TCP
Chen et al. 2002	Physical	FIM[a] Self-Care	Improvement: TCP group 24.0 (12.2-34.8);[b] rehabilitation hospital 17.4 (9.6-26.2);[b] and general hospital 15.5 (8.0-24.3).[b]
		FIM Mobility	Improvement: TCP group 24.7 (15.7-34.6);[b] rehabilitation hospital 16.3 (10.1-24.7);[b] and general hospital 17.1 (9.1-24.0).[b]
		FIM Bowel and bladder	Improvement: TCP group 16.9 (0-33.6);[b] rehabilitation hospital 25.9 (0-49.6);[b] and general hospital 11.2 (0-33.6).[b]
	Cognitive	FIM Cognition	Improvement: TCP group 0 (0-7.1);[c] rehabilitation hospital 5.9 (0-15.4);[c] and general hospital 2.6 (0-8.5).[c]
DeJong et al. 2009	Physical	FIM Motor	Improvement: TCP group 21.6 (7.7);[c] hospital-based TCP 23.4 (7.8);[c] and inpatient rehabilitation facilities 26.2 (8.0).[c]
Jette et al. 2004	Physical	FIM	Mean change per day of 0.43 (0.37-0.49)[d] with 1-1.5 hours of therapy per day and 0.69 (0.60-0.78)[d] with greater than 1.5 hours of therapy per day compared to less than 1 hour of therapy per day.
Fiorini et al. 2013	Cognitive	Mini Mental State Examination[e]	Improvement between admission and discharge ($p<0.001$).
Galizia et al. 2018	Physical	Performance Oriented Mobility Assessment[f]	Improvement between admission and discharge; significant difference between groups at discharge ($p<0.05$).
		Gait speed (10 meters)	No significant improvement between admission and discharge, or between group.
Gustavson et al 2019	Physical	Short Physical Performance Battery[g]	Mean change: 2.8 (2.2)[c] points, 87% (n=127) achieved a clinically meaningful change of ≥1 point.
		Gait speed (4 meters)	Mean change: 0.2 (0.2)[c] ms^{-1}, 78% (n=86) achieved clinically meaningful change of ≥0.1 ms^{-1}.
Hong et al. 2019	Physical	IRFPAI[h]/MDS 3.0[i] (mobility)	Greater improvement for IRF group [IRF 11.6 (11.5-11.7),[d] TCP 3.5 (3.4-3.6)[d]].
		IRFPAI/MDS 3.0 (self-care)	Greater improvement for IRF group [IRF 13.6 (13.5-13.7),[d] TCP 3.2 (3.1-3.3)[d]].
Lawler et al. 2019	Physical	Steps per day (accelerometer)	Intervention group doubled their daily steps 944 daily steps (139-1748.4)[d] more than the control group ($p<0.05$).
	Social	EQ-5D-3L[j]	No significant between-group difference [0.0 (-0.2-0.1)[d]].
		EQ-5D-3L Visual Analogue Scale	No significant between-group difference [1.2 (-8.1-10.5)[d]].
		Capability-related quality of life ICECAP-O tariff[k]	No significant between-group difference [0.0 (-0.1-0.1)[d]].

Study	Domain	Outcome measure	Results: Change between admission and discharge from TCP
	Emotional	Short Falls Efficacy Scale International (falls self-efficacy)[l]	Between group-difference -0.7 units (-3.0-1.7),[d] small effect size of 0.2 observed in favour of intervention group.
Lenze et al. 2012	Physical	6-minute walk test[m]	Significant improvement in intervention group compared to control group [139.4(125.3),[c] (p=0.026)].
		Gait speed	Significant improvement in intervention group compared to control group [0.17 ms^{-1} (0.16),[c] (p=0.003)].
Lenze et al. 2019	Physical	Gait speed (6MWT)	No significant between-group difference [Intervention 0.35 ms^{-1} (0.47);[c] Control 0.45 ms^{-1} (0.49),[c] (p=0.11)].
		6-minute walk test	No significant between-group difference [Intervention 170 (323);[c] Control 210 (302),[c] (p=0.91)].
Leung et al. 2016	Physical	FIM	Significant improvement: total FIM of 22.6 (14.0);[c] and motor FIM of 21.0 (12.2),[c] (p<0.001).
		Berg Balance Scale[n]	Significant improvement of 10.4 points (10.9),[c] (p<0.001).
		Gait speed (4MWT)	Significant improvement of 0.2 ms^{-1} (0.2),[c] (p<0.001).
		Grip strength	No significant change of 0.8 (4.7),[c] (p=0.12).
	Emotional	Patient Health Questionnaire[o]	Significant change of -1.5 (4.6),[c] (p=0.001).
Mallinson et al. 2014	Physical	IRFPAI (self-care)	Improvement: TCP group 7.5 (4.7);[c] IRF group of 5.8 (3.1)[c]
		IRFPAI (mobility)	Improvement: TCP group 7.8 (4.4);[c] IRF group of 7.4 (3.8)[c]
Parker et al. 2015	Physical	de Morton Mobility Index (ADL)[p]	No significant differences between groups [Intervention 10.5 (0-17);[b] Control 5 (0-11),[b] U=0.157].
		Five times sit to stand test[q]	No significant differences between groups [Intervention -0.159 (-1.87-0.1);[d] Control -1.8 (-6.54-0.55),[d] (U=0.288)].
		Berg Balance Scale	No significant differences [Intervention 7 (2-13);[b] Control 3 (0-8),[b] (U=0.07).

Notes:
TCP, Transitional Care Programs; IRF, Inpatient Rehabilitation Facility.
[a]FIM = Functional Independence Measure, 18-items assessment normally scored between 18 and 126, higher scores denote better independence, Chen et al. 2002 reported Rasch-transformed score (0-100).
[b]Median (Interquartile Range, IQR)
[c]Mean (Standard Deviation, SD)
[d]Mean (95% Confidence Intervals)
[e]Measures cognitive function, range 0-30, higher point indicates better cognitive function
[f]Measures balance and gait impairment, range 0-28, higher score indicates better functional mobility
[g]Measures static balance, gait speed and a 5-time-sit-to-stand (FTSTS), scores ranging from 0-12, higher score indicates greater functional ability

[h]IRFPAI = Inpatient Rehabilitation Facility Patient Assessment Instrument, use in Inpatient Rehabilitation Facility, measures ADL and mobility, 6-items for self-care and 7-items for mobility, using transformed Rasch measure of 6-42 for self-care and 7-49 for mobility, higher scores indicating more independence function, Hong et al. 2016[9] reported Rasch-transformed score (0-100)
[i]MDS 3.0 = Minimum Data Set 3.0, 6-items for mobility, 5-items for self-care, use in skilled nursing facilities in USA, scores were scaled from 0-100, higher score indicates greater functional ability
[j]EQ-5D-3L = three-level version of the EuroQoL five-dimensional health-related quality of life, index ranges from 0-1, visual analogue scale ranges 0-100, higher score denotes better health-related quality of life
[k]Capability-related quality of life ICECAP-O tariff, score range 0-1, 1 indicating higher capability-related quality of life
[l]Measures Falls-related self-efficacy, score range 0-28, higher score indicates severe concern
[m]Functional mobility measured by the number of feet walked in 6 minutes
[n]Measures postural control and stability, 14-items scale, range 0-56, higher score indicates better balance
[o]Measures depression, 9-items (0-27), higher score denotes depression
[p]Measures ADL, 15-items assessment, score range 1- 100, higher score indicates more independence
[q]Measured by timing when an individual initially stands from a chair until they sit down after 5 repetitions

Table I.5

Proportions of older adults discharged home from TC facility compared to other inpatient facility

Author Year	Study design	Transition Care Facility			Other Inpatient Facility		
		Returned home/community[a] n (%)	**Discharge to other settings** n (%)	**Length of stay** (days)	**Returned home/community[a]** n (%)	**Discharge to other settings** n (%)	**Length of stay** (days)
Chen et al. 2002	Retrospective observational	984 (82)[a]	216 (18.0)	22 (15)[b]	359 (73)[a c]	133 (27)[c]	19 (12)[b c]
					213 (75)[a d]	71 (25)[d]	17 (12)[b d]
DeJong et al. 2009	Retrospective observational	517 (95.2)[a]	26 (4.8)	14.2 (8.0)[b]	261 (98.1)[a e]	5 (1.9)[e]	8.9 (3.4)[b e]
					1259 (93.8)[a f]	84 (6.2)[b f]	9.50 (4.15)[b f]
Herfjord et al. 2014	RCT	144 (75.8)	46 (24.2)	17.3 (1-34)[g]	134 (72.0)[d]	52 (28)[d]	7 (0-36)[d g]
Galizia et al. 2018	Prospective observational	38 (86.4)	6 (13.6)	N/R	10 (32.3)[d]	21 (67.7)[d]	N/R
Mallinson et al. 2014	Prospective observational	50 (72.6)	19 (27.4)	27.7 (13.8)[b]	57 (73.2)[f]	21 (26.8)[f]	15.1 (5.4)[b f]

Notes:

N/R, Not reported; RCT, Randomised-controlled trial

[a]Discharge to community is defined as discharge to home or assisted living

[b]Mean (SD)

[c]Free-standing rehabilitation hospital

[d]General hospital

[e]Hospital-based TCP provides 24-hour onsite physician coverage and onsite pharmacist coverage

[f]Inpatient rehabilitation facility (IRF) in USA which provides 3 hours of rehabilitation per day

[g]Mean (Range)

Table I.6

Narrative synthesis – Standardised TCP compared with additional therapy in TCP on discharge destination

Comparison	Narrative synthesis
Standardised TCP compared with additional therapy in TCP on discharge destination	An Australian pilot RCT reported that there was no between group difference for discharge destination (relative risk ratio of RACF admission for intervention group receiving additional family assisted therapy [RR 0.53, 95%CI (0.26-1.09)] or length of stay in TCP [mean difference -6.0days, 95%CI (-29.5-17.6), p=0.61] (Lawler et al., 2019). An RCT reported that there was no significant difference between groups for discharge home compared to RACF with 85.5% of participants receiving additional motivational behavioural therapy to increase engagement in rehabilitation returning home compared to 80.9% of participants receiving usual TCP (p=0.37) (Lenze et al., 2019).

Figures

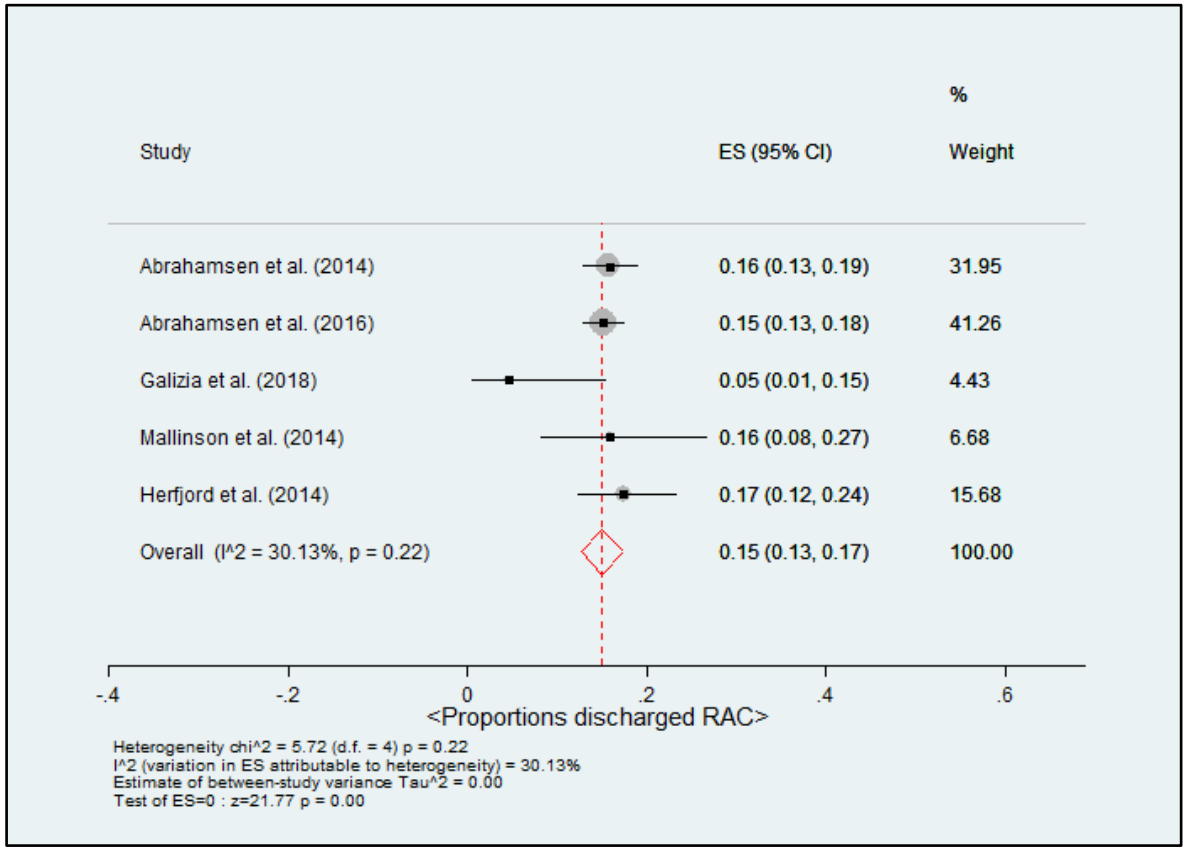

Figure I.1 Proportions of older adults admitted into RAC facility after completing a mean four weeks of TCP

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Notes: References used in this appendix are also found in Chapter 4 reference list

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Appendix J Paper 3 - Banner Page (Contributing to Chapter 5)

frontiers in Public Health

BRIEF RESEARCH REPORT
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Identifying the Association Between Older Adults' Characteristics and Their Health-Related Outcomes in a Transition Care Setting: A Retrospective Audit

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Introduction: Continued evaluation of Transition Care Programs (TCP) is essential to improving older adults' outcomes and can guide which older adults may benefit from undertaking TCP. The aim of this study was to audit a transition care service to identify the association between the characteristics of older adults undertaking a facility-based TCP and (i) discharge destination and (ii) functional improvement.

Materials and methods: An audit ($n = 169$) of older adults aged 60 years and above who completed a facility-based TCP in Australia was conducted. Outcomes audited were performance of activities of daily living (ADL) measured using the Modified Barthel Index (MBI) and discharge destination. Data were analyzed using logistic regression and linear mixed modeling.

Results: Older adults [mean age 84.2 (±8.3) years] had a median TCP stay of 38 days. Fifty-four older adults (32.0%) were discharged home, 20 (11.8%) were readmitted to hospital and 93 (55%) were admitted to permanent residential aged care. Having no cognitive impairment [OR = 0.41 (95% CI 0.18-0.93)], being independent with ADL at admission [OR = 0.41 (95% CI 0.16-1.00)] and a pre-planned team goal of home discharge [OR = 24.98 (95% CI 5.47-114.15)] was significantly associated with discharge home. Cases discharged home showed greater improvement in functional ability [MBI 21.3 points (95% CI 17.0-25.6)] compared to cases discharged to other destinations [MBI 9.6 points (95% CI 6.5-12.7)].

Conclusion: Auditing a facility-based TCP identified that older adults who were independent in ADL and had good cognitive levels were more likely to be discharged home. Older adults with cognitive impairment also made clinically significant functional improvements.

Keywords: aged, continuity of patient care, independent living, intermediate care, outcome assessment (health care)

Appendix K Paper 4 – Banner Page (Contributing to Chapter 6)

Ageing & Society

Article contents

Abstract

References

'Is my journey destination home?' Exploring the experiences of older adults who undertake a transition care programme: a qualitative study

Published online by Cambridge University Press: **21 April 2022**

Jo-Aine Hang, Jacqueline Francis-Coad, Portia Ho, Nicholas Waldron, Kate Purslowe and Anne-Marie Hill

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Abstract

Transition care programmes (TCP) provide older adults with goal-oriented rehabilitation after hospitalisation. However, limited research has focused on understanding older adults' experiences when undertaking TCP. Using a phenomenological approach, we explored the lived experience of older adults undertaking a TCP at a transition care facility in Australia. A purposive sample (N = 33 participants: 16 older adults, four family members and 13 staff) was recruited. Semi-structured interviews were undertaken at three time-points during admission and inductive thematic analysis was utilised. Older adults reflected on their TCP experiences through an emotional lens through which they deliberated, 'is my destination home?' Fear of losing independence and uncertainty about their discharge destination strongly influenced older adults' perspectives regarding their TCP experience. Emotional responses, both positive and negative, were influenced by expectations prior to admission, level of family support and staff behaviour. Staff and family concurred that many older adults were confused about their admission to the facility and initially were unprepared to engage in the rehabilitation provided. Older adults experienced TCP as a time of great uncertainty and feared the unknown when discharged from hospital to transition care. They expressed grief at the loss of existing life roles and anxiety about the possibility of being unable to return home. Health professionals need to inform and tailor rehabilitation for older adults to better support this transient time of life.

Appendix L Interview Guides for Conducting Semi-Structured Interviews

Contents

Table L.1

Interview guide for older adults

First interview (admission), second interview (mid-way), third interview (final)
Overarching question: What do you think your experience will be like undertaking a transition care rehabilitation program?* (now that you are midway through/now that you are at the end of your transition care how would you describe your overall experience?)
How are you feeling about being here?*
What is your understanding of a Transition Care Program?* (Now that you are midway/at the end, was transition care what you were expecting?)
Were you given opportunities to ask questions about the transition care programme while you were in hospital? (now that you are at the end, are you able to discuss your expectations regarding going home or nursing home with family or staff?)
Have you been asked what your goals are?*
What do you think (can you recall, what has) will motivate/encourage/ prevent you to participate in the program?*
Can you sum up in one word how you are feeling/ describe your experience here in one word?
Thank you so much for participating and giving me the opportunity to understand your journey in TCP.

*Prompt to expand as required (i.e. tell me more about it)

Table L.2

Interview guide for family members

First interview (admission) and Final interview (discharge)
Overarching question: What do you think (now that your family member is at the end) your experience will be like in terms of your expectation for having your loved one/family member (FM) undertaking a transition care rehabilitation program?*
What is your understanding of a Transition Care Program?*
Were you given opportunities to ask questions about the transition care rehabilitation programme while your FM was in hospital?
Thinking about your FM, how do you think they are feeling/will cope whilst they are here?*
Has your FM been asked what their goals are?*
Putting yourself in your FM's shoes, what do you think will motivate/encourage/prevent them participating in the rehabilitation here?*
How do you plan to assist him/her?*
Can you describe your experience here in one word?
Thank you so much for participating and giving me the opportunity to understand your journey in TCP.

*Prompt to expand as required (i.e. tell me more about it)

Table L.3

Interview guide for TC staff

First interview and second interview
Overarching question: What is your experience in providing Transition Care Program (TCP) to older adults?
How would you describe the purpose of TCP?*
Thinking about your role as a (……) here, how do you think your role can have an impact on older adults you cared for?*
What are your expectations of the older adults and their family members while they are here?*
Are you involved in establishing goals with the older adults you work with?*
How do you encourage the older adults you care for to engage in TCP activities to their best ability?*
How would you describe (older adult A)'s journey?*
Can you describe in one word your experience working here?
Do you see patient advocacy as a role for you/other TCP staff for the older adults you worked with?*
Thank you for participating in this research project. Your assistance is greatly appreciated.

*Prompt to expand as required (i.e. tell me more about it)

Table L.4

Interview guide for off-site health professionals

First interview and second interview
Overarching question: What is your understanding and expectation of Transition Care Program (TCP) and the patients you have referred so far?*
What is your understanding of a Transition Care Program?*
Thinking about the patients you have referred to TCP so far, why have you chosen to refer them to TCP?*
Thinking about the patients (older adults) that you have referred to TCP, how do you think he/she is feeling when you told them about TCP?*
How and when do you explain regarding what TCP is offering to your patients and family?
How do you work with your patients and family members to ensure their goals are handed over to the staff at TCP?*
Can you describe any of your patients' (older adults') experiences of a Transition Care Program?*
How do you think TCP should be utilised and why?*
Can you give me one word that comes to your mind when you think of TCP?
Thank you for participating in this research project. Your assistance is greatly appreciated.

*Prompt to expand as required (i.e. tell me more about it)

Appendix M Paper 5 – Under Peer Review (Contributing to Chapter 7)

Publication details

Evaluating Health-Related Outcomes of Older Adults Undergoing a Transition Care Program: A Prospective Cohort Study
--Manuscript Draft--

Manuscript Number:	
Full Title:	Evaluating Health-Related Outcomes of Older Adults Undergoing a Transition Care Program: A Prospective Cohort Study
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Keywords:	health outcomes; older adults; transition care programs; skilled nursing facilities; physical therapy
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Abstract:	Background and Purpose: Measuring health-related outcomes can inform physical therapists about the functional capabilities of older adults and guide rehabilitation. However, health-related outcomes for older adults undergoing transition care programs have been inconsistently reported. The aims of the study were to: i) evaluate health-related outcomes in older adults undergoing a facility-based transition care program; ii) compare health-related outcomes between participants discharged home and those discharged to permanent residential care. Methods: A prospective, single-site observational study was conducted at a transition care facility in Western Australia. Older adults (aged ≥ 60 years) were recruited on admission. The outcomes measured were physical ability (activities of daily living, mobility, gait speed), cognitive ability and emotional and social well-being (health-related quality of life, instrumental activities of daily living). Data were analyzed using linear mixed modelling. Results and Discussion: Fifty-one participants enrolled and 41 [mean age 80.0 (+8.9) years, 22 (53.7%) female] completed baseline and discharge assessments. Twenty-six (55.3%) participants were discharged home, 14 (29.8%) to residential care and one to a rehabilitation center. Participants significantly improved their activities of daily living, mobility and health-related quality of life, with significant decline in performance of instrumental activities of daily living. Participants discharged home showed significantly greater improvement in mobility compared to those discharged to residential care [De Morton Mobility Index home: 13.6 (95% CI 9.8, 17.4) vs residential 6.9 (95% CI 1.7, 12.0), (interaction p-value = 0.04)] and significantly less decline in independent

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