16th National Conference of Emerging Researchers in Ageing

DIGGING FOR GOLD: BUILDING SUCCESS IN AGEING RESEARCH

6th November - 7th November, 2017— Perth, WA

Conference Program & Proceedings

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Curtin Ageing Research Network,

Faculty of Health Sciences,

Curtin University

Proudly welcomes you to the

16th National Conference of Emerging Researchers in Ageing

'Digging for gold: Building success in ageing research'

#ERA2017Perth

Contents

Welcome from the ERA 2017 Co-Convenors

We are pleased to welcome you to the 2017 Emerging Researchers in Ageing Conference at the Technology Park Function Centre, Perth, WA. The conference is hosted by the Curtin Ageing Research Network. As part of this welcome we acknowledge the Nyungar Wadjuk people as the traditional owners of country on which Curtin's Bentley campus and Technology Park sit, and acknowledge their continuing connection to land, sea and community. We pay our respects to the Nyungar Wadjuk people and their culture; and to elders, past, present and future.

Now in its 16th year, ERA has become a key event in the Australian Ageing Research calendar and has provided opportunities for many students and early career scholars to share their research, meet peers and friends with whom they will travel on their ageing research journey.

The theme of this year's conference is 'Digging for gold: Building success in ageing research', which draws together the rich history of our State and its mining wealth, with the search for quality (gold standard) research that will enrich the lives of our current and future ageing populations. While conducting, implementing and disseminating research outcomes through traditional approaches of publications and conferences presentations is an important aspect of the work researchers do, there also needs to be a focus on informing and influencing policy and practice. In doing this, we ensure that our research has substantially greater impact.

The workshops that follow our main conference day reflect key topics to support the careers of emerging researchers in ageing. They include reflections from several early career researchers on strategies to support successful careers following PhD completion; and also on the critical area of successfully using the media.

The conference program includes 31 oral presentations and a lunch time poster series. We encourage you all to attend and actively engage in these sessions to make it a truly successful and memorable conference for both you and all other attendees. Perth and Western Australia is an outstanding location for this conference, and we hope you have time to do some Perth and beyond sightseeing before or after the conference.

We would like to thank our generous sponsors who have made this event possible and the Australian Association of Gerontology as well as the ERA team. Once again, welcome to ERA 2017!

Dr Elissa Burton and Professor Keith Hill

Welcome from the ERA National Convenor

It is with great pleasure that I welcome you to the 16th National Conference of Emerging Researchers in Ageing. As a targeted conference supporting research students and early career researchers, it is a unique opportunity to get feedback from others at a similar point in their research journeys.

I encourage all participants to take up the opportunity to network during the conference, as the connections you make in ERA could end up sustaining you throughout your career in research and possibly beyond.

I would like to thank Professor Keith Hill and Dr Elissa Burton from Curtin University and the extended conference committee from across all multiple WA universities for their hard efforts in bringing this conference to fruition.

I would also like to thank all our conference sponsors, especially the ARC Centre of Excellence in Population Ageing Research (CEPAR) who are the primary sponsors of the ERA initiative and our two Silver Sponsors, the Australian Association of Gerontology and Curtin University.

This is the second time that ERA has taken place in WA and I look forward to returning to sunny Perth and to meeting you all.

Dr Matthew Carroll

ERA Emerging Researchers in Ageing Australia

MONASH University

cepar ARC CENTRE OF EXCELLENCE IN POPULATION AGEING RESEARCH

Curtin University

Acknowledgements

We appreciate the generous support of the following sponsors for ERA 2017

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School of Psychology and Exercise Science, Murdoch University

Best Full Written Paper and

Best Presentation by an AAG (Student and Early Career) member

Australian Association of Gerontology

Best Oral Presentation Sponsor

Hallmark Ageing Research Initiative, University of Melbourne

Welcome Reception Sponsor

Edith Cowan University

The Conference Organising Committee for ERA 2017 included:

* Elissa Burton, Curtin University
* Keith Hill, Curtin University
* Ann-Maree Vallence, Murdoch University
* Carol Crevacore, Edith Cowan University
* Jacqueline Francis-Coad, The University of Notre Dame
* Caroline Vafeas, Edith Cowan University
* Matthew Carroll, Monash University/ERA
* Courtney Hempton, Monash University/ERA
* Cath Josif, University of Western Australia
* Chiara Naseri, Curtin University
* Brendan Scott, Murdoch University
* Susan Slatyer, Curtin University & Sir Charles Gairdner Hospital

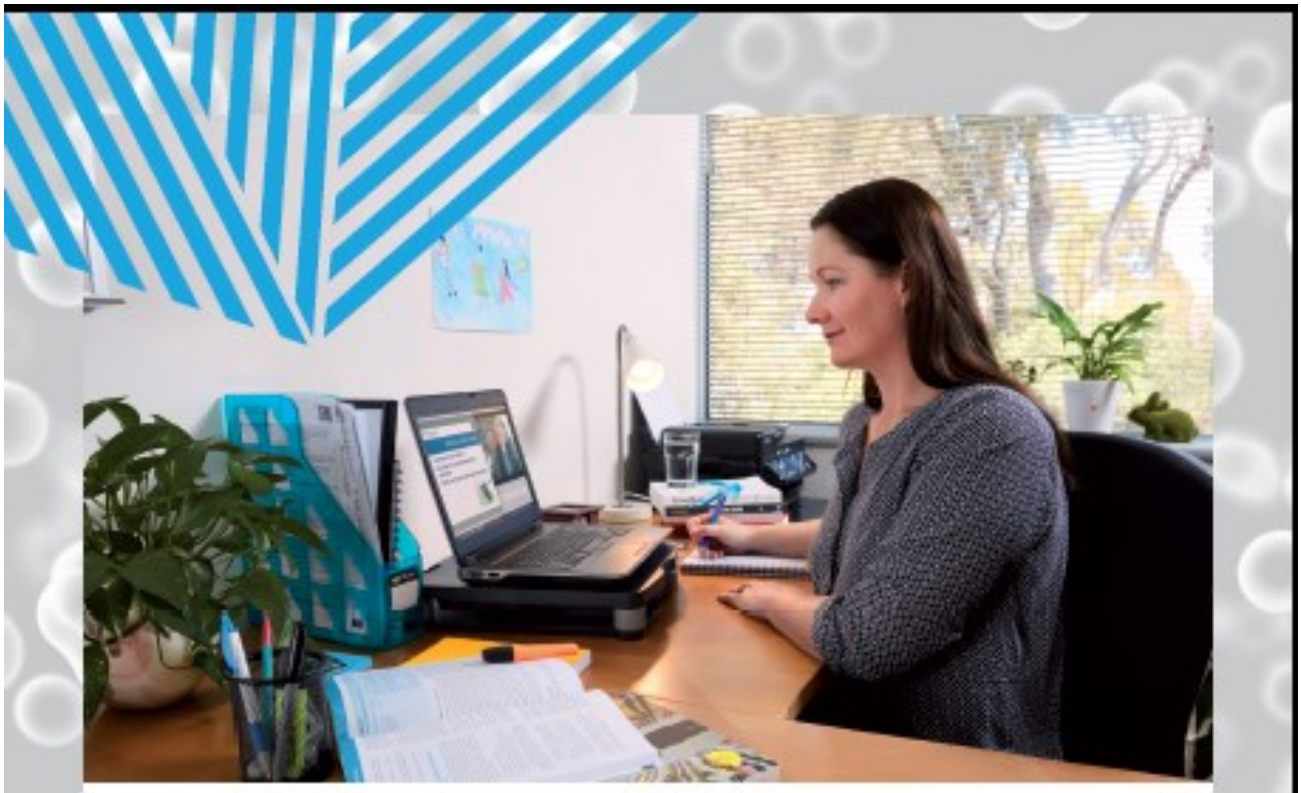
We would also like to acknowledge the staff from the School of Physiotherapy and Exercise Science at Curtin University for all their hard work, and the assistance of the ERA National Executive based at Monash University in ensuring the success of this event.

Message from our Sponsors - CEPAR

Message from our Sponsors - AAG

Message from our Sponsors - Murdoch University

Message from our Sponsors - Edith Cowan University



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Message from our Sponsors - Curtin University

(Curtin Ageing Research Network)

The Curtin Ageing Research Network is a unique collaboration that works across and between residential, hospital and community settings, which has an integrative capacity to make a real and positive difference to the health, well-being, performance and participation of older people.

Purpose
CARN's purpose is to conduct and facilitate the translation of high-quality research that enhances and supports the wellbeing, capability and independence of older people. Our ultimate purpose is to ***improve the experience of ageing***.

To this end, we:

- Contribute knowledge that advances society's understanding of ageing,
- Disseminate our latest research outcomes to researchers, clinicians, service providers and consumers,
- Communicate the outcomes and implications of evidence-based research to inform policy and practice in government and industry, and
- Educate, support and mentor future researchers to sustain momentum in ageing research.

We achieve this by:

- Building and sustaining a cohesive, interdisciplinary, cross-sector network of researchers with links to academia, industry and peak bodies,
- Partnering with healthcare, community care and residential care organisations to facilitate the translation of research outcomes into practice,
- Ensuring the 'consumer voice' is integral to decision-making across the life of research from concept to dissemination of results,
- Taking advantage of existing and new technologies, and
- Tailoring information to facilitate improvement in the health literacy of different target groups.

For further information about the Curtin Ageing Research Network, possible future collaborations or ageing related research with members of CARN, please contact Professor Keith Hill (Keith.Hill@Curtin.edu.au or 08 92663618); or Dr Elissa Burton (E.Burton@curtin.edu.au or 08 92664926).

Keynote Speakers

Dr Nick Waldron is a consultant geriatrician in Perth and the clinical lead of the WA Health Falls Prevention Health Network. He has led the implementation and subsequent review of the Falls Prevention Model Of Care in Western Australia.

In 2010, Nick completed a National Health and Medical Research Council National Institute of Clinical Studies WA Health Fellowship, cementing his unique blend of skills including: leadership, a practical knowledge of how to influence health systems and how to conduct and promote translational research.

Nick is an adjunct senior lecturer with the School of Medicine, Fremantle, University of Notre Dame Australia and is part of a Collaborative Research Network. Current research includes falls prevention and translation in the inpatient and mental health settings, as well more recently in end of life care.

Nick has been invited to speak at a number of national conferences and runs workshops in falls prevention and end of life decision-making. He sits on a number of state and national bodies for falls prevention and health services more broadly.

Dr Susan Slatyer holds a joint appointment as Research Fellow in the School of Nursing, Midwifery and Paramedicine and the Centre for Nursing Research, Sir Charles Gairdner Hospital. Her research areas encompass pain management and end-of-life care in acute care; the care of older people and/or their family carers during transitions in and out of hospital; the development of new approaches to care for older people with dementia and support for their family carers in hospital and community settings. Susan represents nursing on the Sir Charles Gairdner Group Human Research Ethics Committee and participates in the International Collaboration of Workforce Resilience. She is a passionate advocate for nursing research that generates and translates evidence to inform practice, and articulates the value of nursing to a sustainable health system. Susan was named 2016 WA Nurse/Midwife of the Year and winner of the Research Excellence award in the Western Australian Nursing and Midwifery Excellence Awards.

Prizes

ERA Best Oral Presentation ($250)
presented by Dr Ruth Williams and sponsored by the Hallmark Ageing Research Initiative

Presenting an oral paper at a research conference requires the ability to present a complicated research program in a clear, visually appealing and engaging manner. The presenter considered by the judging panel to be the best oral presenter will be awarded a prize to the value of $250, and a certificate.

ERA Best Poster ($250)
presented by Brendan Scott (Lecturer Murdoch University) and sponsored by the School of Psychology & Exercise Science, Murdoch University

Successful poster presentations require great skill in displaying just the right amount of content in an eye-catching way in order to get the desired message across. The poster considered by the judging panel to be the best will be awarded a prize to the value of $250, and a certificate.

ERA Best Full Paper ($250)
presented by Constance Kourbelis, President National AAG Student and Early Career Group

ERA prides itself on providing the opportunity to conference presenters to submit a full paper for peer review and have these papers included in the conference proceedings. The full paper considered by the judging panel to be the best will be awarded a prize to the value of $250, and a certificate.

Best presentation by an AAG Student or Early Career Member ($250)
Presented by Constance Kourbelis, President National AAG Student and Early Career Group

The AAG is pleased to also sponsor the Best Presentation by an AAG Student or Early Career Member Prize. The recipient will be awarded a prize to the value of $250, and a certificate.

Helen Bartlett Prize for Innovation in Ageing Research ($250)
presented by Dr Matthew Carroll, ERA National Convenor

The Helen Bartlett Prize for Innovation is awarded for the most original and creative research presented at the conference (oral presentation or poster). The prize recognises the outstanding contribution made by Professor Helen Bartlett, Vice-Chancellor, Federation University Australia, to the field of ageing research in Australia, particularly as the founder of the ERA initiative. A prize to the value of $250, and a certificate, will be awarded to the winning student.

Book prizes for runners-up supplied by Taylor & Francis

Bursaries

One of the ways the ERA initiative provides support for the training of a new generation of emerging researchers is through the provision of travel bursaries to ERA 2017 participants. This year 17 bursaries valued at $150 (local), $250 (interstate), and $500 (international), were offered to higher degree students to assist with the expenses of participating in the conference

The bursaries are sponsored by the ARC Centre for Excellence in Population Ageing Research, School of Psychology and Exercise Science, Murdoch University; the Western Australian Centre for Health and Ageing; and the Institute for Health Research at the University of Notre Dame Australia

The 2017 Bursary Recipients are:

Australian National University

Muhammad Ulil Absor

Janet Maccora

Central Queensland University

Bernadette Dimla

Indian Institute of Technology Kharagpur (India)

Tulika Bhattacharyya

International Institute for Population Sciences (India)

Yesuvadian Selvamani

Murdoch University

Nicole Gordon

Queensland University of Technology

Ilona Pappne Demecs

The University of Newcastle

Shazia Shehzad Abbas

Kofi Awuviry-Newton

Nanda Gopal Jayaraman

Kailash Thapaliya

The University of Notre Dame

Samantha Neylon

The University of Sydney

Hoi Ling Irene Mok

University of New England

Alison Rahn

University of South Australia

Reshma Shrestha

Conference Program

Monday 6th November 2017

8:30 – 9:00

Registration - Lobby area, Technology Park Function Centre

9:00 – 10:30

Opening Plenary - Theatre

Chair Dr Elissa Burton

Welcome, Acknowledgement Professor Keith Hill

Opening

Professor Torbjorn Falkmer, Dean of Research Faculty of Health Sciences

Curtin University

ERA Welcome

Dr Elissa Burton

School of Physiotherapy and Exercise Science, Curtin University

Dr Matthew Carroll

ERA National Convenor, Monash University

Message from the ERA Primary Sponsor - CEPAR

Professor Sharon Gordon

University of Western Australia

Message from our Silver Sponsor - Australian Association of Gerontology

Constance Kourbelis,

President National AAG Student & Early Career Group

Keynote Address

Dovetailing research, policy and practice — past and present

Dr Nicholas Waldron

Clinical Lead, WA Health Falls Prevention Health Network

WA Department of Health

10:30 – 11:00

Morning Tea and Poster Viewing

Cafe

Conference Program

	Session A	Session B	Session C
	Equity and Equality	**Biological Aspects**	**Physical Activity**
11:00-12:00	Theatre **Chair: Sue Slatyer**	Seminar Room 1 **Chair: Eileen Boyle**	Seminar Room 2 **Chair: Matthew Carroll**
	Couples' privacy in residential aged care ***Alison Rahn*** ***University of New England***	Pattern of medication use in women with Dementia ***Kailash Thapaliya*** ***University of Newcastle***	Risk factor modification following short term exercise programs of various types and intensities ***Nicole Gordon*** ***Murdoch University***
	The effect of ethnicity and culture on living arrangement, behaviour and care of older persons among four major ethnic groups in rural Indonesia ***Muhammad Ulil Absor*** ***Australian National University***	Combined vision and hearing impairment in the aged care sector – Development of a screening tool using a Delphi method ***Matthew Wittorff*** ***Curtin University***	Socioeconomic patterns and associated factors of muscle strength among older adults in India ***Yesuvadian Selvamani*** ***International Institute for Population Sciences, India***
	Families of choice perspective on respectful and inclusive model of care for older gays and lesbianS ***Bernadette Dimla*** ***Central Queensland University Australia***	Prevalence of atrial fibrillation among Australian women from 1996-2015 and factors associated with it ***Shazia Shehzad Abbas*** ***University of Newcastle***	Physical activity and sedentary behaviour in residential aged care facilities ***Sharon Parry*** ***Curtin University***
		Costs of major complications of Type 2 Diabetes: A systematic review ***Befikadu Legesse Wubishet*** ***University of Newcastle***	Characteristics of physical exercise and computer-based cognitive training interventions for people with mild cognitive impairment ***Lua Perimal-Lewis*** ***Flinders University of South Australia***

Murdoch UNIVERSITY

SCHOOL OF PSYCHOLOGY AND EXERCISE SCIENCE

Conference Program

	Session D	Session E	Session F
	Participation	**Neurological Aspects**	**Built Environment**
12:00-1.00	Theatre **Chair: Sue Slatyer**	Seminar Room 1 **Chair: Matthew Carroll**	Seminar Room 2 **Chair: Eileen Boyle**
	Impact of older workers' perception of human resource practices on intention to remain at work: A systematic review ***Hoi Ling Irene Mok*** ***University of Sydney***	Low intensity RTMS has age- and sex-dependent effects on the local response of the GLIA following a penetrating cortical stab injury ***Darren Clarke*** ***University of Western Australia***	Anyone can find the dirt. Be the one that finds the Gold! ***Samantha Neylon*** ***University of Notre Dame***
	Participatory art in aged care: A visual and interpretative phenomenological analysis of older residents' engagement with weaving ***Ilona Pappne Demecs*** ***Queensland University of Technology***	Age-related decline in voluntary movement and motor cortical connectivity: A transcranial magnetic stimulation study ***Peta Green*** ***Murdoch University***	Determining indicators of age-friendly built environments ***Reshma Shrestha*** ***University of South Australia***
	Exploring the experience of peers in encouraging participation in resistance training ***Paige Watkins*** ***Curtin University***	A neurogenic perspective on sarcopenia and ageing ***Vidya Krishnan*** ***The University of Western Australia***	
		Age-related changes in motor cortex function and manual dexterity ***Brittany Rurak*** ***Murdoch University***	
1:00-2:00		**Lunch and Poster Viewing** Cafe	

Conference Program

	Session G	Session H	Session I
2:00 – 3:00	**Relationships of Care** Theatre **Chair: Matthew Carroll**	**Impact of Falls** Seminar Room 1 **Chair: Eileen Boyle**	**Service Use and Planning** Seminar Room 2 **Chair: Sue Slatyer**
	Evolution of familial care and support systems for older people in Ghana: A literature review ***Kofi Awuviry-Newton*** ***University of Newcastle*** Family caregivers' burden in providing care to the hospitalised elderly: Findings from hospitals in Kolkata, India ***Tulika Bhattacharyya*** ***Indian Institute of Technology Kharagpur*** Start on-line: A videoconferencing support program for carers of people living with Dementia ***Ellen Gaffy*** ***National Ageing Research Institute***	Adverse events and gait speed in nursing home residents ***Samantha Fien*** ***Bond University*** Striking Gold – Australian and Welsh older people's knowledge, awareness, motivation and perceptions about falls and falls prevention in residential aged care homes ***Jacqueline Francis-Coad*** ***University of Notre Dame Australia/Curtin University*** Interventions to reduce falls in older adults recently discharged from hospital: A systematic review and meta-analysis ***Chiara Naseri*** ***Curtin University*** Evaluating the validity, reliability and feasibility of a falls risk assessment tool recommended for use in Australian residential aged care facilities. A mixed methods study ***Susan Nunan*** ***University of Queensland***	Aged care service provision within Australia's Primary Health Network Model: A case study ***Millicent Cripe*** ***University of Sydney*** Addressing elder abuse in general practice: Attitudes and experiences of GPs and older Australians ***Mike Franklin*** ***University of New England*** What do care staff in residential aged care settings think about falls and falls prevention: A cross -sectionals survey ***Jo-Aine Hang*** ***University of Notre Dame Australia/Curtin University*** Investigating barriers and facilitators of administering medicines to older people with swallowing difficulties in aged care facilities ***Aida Sefidani Forough*** ***Queensland University of Technology***
3:00—3:30	**Afternoon Tea and Poster Viewing** Cafe		

Conference Program

3:30-5:00

Closing Plenary - Theatre

Chair Professor Keith Hill

Keynote Address

The Accidental Researcher: From Clinical Nurse to Joint Appointment Research Fellow

Dr Sue Slatyer

Research Fellow

Curtin University and Sir Charles Gairdner Hospital

Announcement of Prizes

Best Oral Presentation—*Sponsored by* The University of Melbourne Ageing Research A Hallmark Research Initiative

Best Poster —*Sponsored by* Murdoch University School of Psychology and Exercise Science

Best Full Written Paper — *Sponsored by* AAG Australian Association of Gerontology

Helen Bartlett Prize for Innovation in Ageing Research

Best Presentation by an AAG Student or ECR member — *Sponsored by* AAG Australian Association of Gerontology

Announcement of the ERA Travel Exchange Recipients and ERA 2018 Conference

Courtney Hempton

ERA National Administrator

Conference close

Conference Reception

The Terrace

Sponsored by Australia ECU Edith Cowan University

5:00-7:00

Poster Sessions

Posters will be displayed throughout Monday 7th November. Delegates are encouraged to take time during tea and lunch breaks to view the posters and meet the authors.

No.	Title	Authors
1	Towards safer hospitals – A systematic analysis of hospital based adverse events	**Nanda Gopal Jayaraman** **The University of Newcastle**
2	Gender differences in cognitive reserve across the life course	**Janet Maccora** **Australian National University**
3	Perceived health benefits of higher education for an ageing Australian baby boomer population	**Margaret Hardy** **University of the Sunshine Coast**
4	Causing death: The obfuscation of 'Voluntary Assisted Dying'	**Courtney Hempton** **Monash University/Yale University**
5	Understanding the brain trainer	**Nicole Ee** **Australian National University**

Workshop Program—Tuesday 7 November

Tuesday 7 November 2017

9:00-12.00	Workshop 1 Using the media to market yourself	Workshop 2 'Playing the game'
	presented by Associate Professor Daniel Gucciardi (Associate Professor in Applied Psychology, Curtin University) Dr Fenella Gill (Senior Research Fellow, Curtin University School of Nursing, Midwifery and Paramedicine and Nurse Researcher, Princess Margaret Hospital for Children, Child & Adolescent Health) Ms Yasmine Phillips (Faculty of Health Sciences Media Consultant, Curtin University) Technology Park Function Centre Seminar Room 1	presented by Dr Elissa Burton (Research Fellow (Exercise Scientist) Curtin University) Associate Professor Anne-Marie Hill (Associate Professor Physiotherapy) Curtin University) Dr Belinda Brown (Research Fellow Neuroscientist) Murdoch University Technology Park Function Centre Seminar Room 2
	This workshop will focus on ways to market yourself through social media platforms (e.g. twitter). The knowledge translation session will help you to use language better when preparing grants and disseminating results. The media session will provide tips for working with the media to maximise dissemination of your research findings.	This workshop looks at building a research career and different pathway options for PhD students. Each presenter will give an overview of their different journeys as early career researchers to date and will highlight some of the enablers and barriers encountered along their journeys. They will provide some useful suggestions on what you can work on now to succeed in the future.

Conclusion of Workshops

12.00 Please note—conference participants registered for the joint ERA/AAG workshop on ***'Maintaining a Work-Life Balance as a Researcher'*** will need to proceed to the AAG conference venue at the Crown Convention Centre by 1.15pm.

Conference Abstracts (in alphabetical order)

PREVALENCE OF ATRIAL FIBRILLATION AMONG AUSTRALIAN WOMEN FROM 1996 – 2015 AND FACTORS ASSOCIATED WITH IT.

ABBAS Shazia Shehzad[1], MAJEED Tazeen[1], NAIR Balakrishnan Kichu[1], BYLES Julie[1]

[1]The University of Newcastle

Cardiovascular diseases (CVD) remain the leading cause of morbidity and mortality globally. Therefore, considerable investments were made in recent years to understand the CVDs; their natural history, associated risk factors and to develop management guidelines. However, the research to date has substantial under representation of women in research studies and trials, leading to debates with regards to generalizability and applicability of prevention and treatment recommendations for women. Atrial fibrillation (AF), considered as an emerging epidemic worldwide also has different patterns of disease initiation, progression and outcomes amongst women compared to men. However, limited knowledge is available regarding risk factors and pathophysiology of atrial fibrillation specific to women. This project, therefore aims to determine the prevalence of AF from 1996-2015 in older Australian women and identify factors associated with it. Survey data from the 1921-26 birth cohort of the Australian Longitudinal Study on Women's Health (ALSWH) will be used in this study. ALSWH is an ongoing, prospective study assessing the physical, mental and physiological aspects of Australian women's health and health service utilization since 1996. ALSWH data will be linked to the Medicare Benefit Scheme (MBS); Pharmaceutical Benefit Scheme (PBS) and the state based admission registry (hospital data). ICD-10-AM codes for AF as the principal or additional diagnosis from the hospital data will be used to assign women as having AF at each time point. The linked data would be further analysed to establish associations between AF and socio-demographic factors, health related factors and other comorbidities using multivariate logistic regression models. Findings from this study are expected to narrow the gap in the available knowledge and provide insights into the prevalence of AF over time and its major drivers among older Australian women. This may help in developing specific prevention and treatment strategies for AF among women in Australia .

THE EFFECT OF ETHNICITY AND CULTURE ON LIVING ARRANGEMENT, BEHAVIOUR AND CARE OF OLDER PERSONS AMONG FOUR MAJOR ETHNIC GROUPS IN RURAL INDONESIA

ABSOR Muhammad Ulil[1]

[1]Australian National University

Presently, there are 21 million people aged 60 and over in Indonesia, and this number is projected to rise to 48 million by 2035. A high proportion of these older persons (57%) lives in rural areas, commonly being areas from which younger people have moved to the cities, making life more difficult for older adults. This study aims to investigate the influence of ethnicity and culture in determining living arrangement, behaviour and care for rural elderly people in four major ethnic groups in Indonesia including Batak, Sundanese, Javanese and Balinese. The data used in this paper come from the Indonesian Ageing Survey in Rural Areas carried out among people aged 60 years and older in selected communities in nine provinces between 2015 and 2016. This study found that there is a gendered pattern in care and support provision for older persons. In Batak and Balinese ethnics which are patriarchal communities, older persons are mostly co-reside with their sons while in Sundanese and Javanese ethnics, which are bilateral communities, older persons are mostly living with their daughter. This type of living arrangement influence who are caring and what type of care provided to elderly. Culture also affect what is appropriate and inappropriate for male and female elderly. As a result, women's experiences of ageing are different from men. Ethnicity and culture shape the older persons' behaviour and coping strategies to solve daily hardships. It also shapes a gendered nature of some formal social welfare programs for elderly. Modifying the design and program implementation of social welfare program for elderly is a need to improve the welfare of older persons.

EVOLUTION OF FAMILIAL CARE AND SUPPORT SYSTEMS FOR OLDER PEOPLE IN GHANA: A LITERATURE REVIEW

AWUVIRY-NEWTON Kofi[1], BYLES E. Julie[1] & TAVENER Meredith

[1]Priority Research Centre for Generational Health and Ageing, The University of Newcastle, Australia

Background and Objectives: This paper discusses traditional family care and support networks, its evolution, as well as other evidence needed for policy and service development for older people in Ghana. It argues that understanding (*digging for gold*) how informal care has evolved over time and the nature of current state support systems will heighten the needs of older people and their carers. Methods: A systematic literature search on "traditional care system", government support", "contribution of older people" in PubMed, and Medline was conducted, complemented by hand searches in Google Scholar to access relevant documents that did not appear from the database search. Keywords such as "caregiving to the aged", and "social support" were used. Twenty 30 related studies out of which five came out from the search from databases whereas the others were hand searched. Findings: The review revealed a decline in traditional family care networks due to changing family composition and other relevant factors. Nevertheless, in the absence of formal state-provided services, adult children of older parents were the main providers of care and support, despite the difficulties this entailed. Conclusion: Projected increases in the older population, along with other social factors, such as constraints of caregiving, and other demands cast doubts on the sustainability of the adult

children care and support to older people. These increase the need for state intervention in ensuring the health, material and emotional needs of older people and their carers (adult children) as the number of older people increases in Ghana.

FAMILY CAREGIVERS' BURDEN IN PROVIDING CARE TO THE HOSPITALISED ELDERLY: FINDINGS FROM HOSPITALS IN KOLKATA, INDIA

BHATTACHARYYA Tulika[1], CHATTERJEE CHOPRA Suhita[1]

[1]Indian Institute of Technology Kharagpur

Family Caregivers play a vital role in providing physical and emotional care to the aged. Providing care to the ageing family member can be challenging. The care giver may be required to adopt a range of roles which can result in carers being overwhelmed. Furthermore, the personal priorities of the carer might have to be rearranged in order to accommodate caregiving. They frequently face substantial physical, psycho-socio-economic challenges. The study -- conducted on Family Caregivers of the hospitalised elderly -- explores caregiver's burden using Zarit Burden Scale. The data has been collected from randomly selected Multispecialty Public and Private Hospitals in Kolkata (India), after obtaining ethical clearance from the Institutional Review Board of both the Hospitals. The predictors of burden were also assessed using interview schedules. Among fifty-seven caregivers who participated in the study, caregiver's burden was identified among thirty respondents -- with twenty-six having mild to moderate burden and four having moderate to severe burden. Majority of the caregivers' were found to be female, reflecting the gendered nature of caregiving. Family caregivers spent more than six hours per day on caregiving, which severely disturbed their work-life -- including loss of job. The study revealed that the caregivers' marital status, family structure, academic qualification, occupation and time spent on caregiving are related to Family caregivers' burden. The burden of care giving was accentuated by poor access to information, counseling and supportive services. The paper concludes by indicating the need for greater state interventions for family caregivers.

LOW INTENSITY RTMS HAS AGE- AND SEX-DEPENDENT EFFECTS ON THE LOCAL RESPONSE OF GLIA FOLLOWING A PENETRATING CORTICAL STAB INJURY

CLARKE Darren[1], PENROSE Marissa A[1], HARVEY Alan R[2,3], RODGER Jennifer[1,3], BATES, Kristyn A[1].

[1]School of Biological Sciences, The University of Western Australia, 35 Stirling Hwy, Perth, WA, Crawley, Western Australia 6009, Australia

[2]School of Human Sciences, The University of Western Australia, 35 Stirling Hwy, Perth, WA, Crawley, Western Australia 6009, Australia

[3]Perron Institute for Neurological and Translational Science, Perth, WA, Australia

Astrocyte and microglial cell reactivity is a characteristic response to central nervous system injury. Activity of these glial cells is initially beneficial by limiting the spread of damage, but over time functional recovery is inhibited by a number of glia-related mechanisms. Previous studies have shown glial cell response is directly proportional to the degree of functional impairment following injury. Additionally, age and sex can influence the glial cell response to injury, creating further complications in the development of treatments. Repetitive transcranial magnetic stimulation (rTMS), a non-invasive form of brain stimulation, has shown experimental and clinical efficacy in a range of neuropsychiatric and brain injury conditions, but with different outcomes in adult and aged populations. The cellular mechanisms affected remain unclear, and animal studies are required to better understand how rTMS can be optimally applied across the human lifespan. In this study, we examined the effect of rTMS on the glial response to brain injury, and how age and sex may influence this effect. We applied a range of frequencies of focal low intensity rTMS for 14 days, following unilateral penetrating cortical stab injury in 3 month and 18 month female and male wild-type C57BL6/J mice. The spread and local response of reactive glia, and intensity and area of proteoglycan expression was quantified by immunohistochemical staining of serial brain sections around the lesion. rTMS effects on markers of reactive astrocytes (GFAP) and microglia (IBA1) were significantly decreased in females, but significantly increased in males. Furthermore, rTMS had a greater effect on GFAP and IBA1 expression in aged mice compared to adult mice. These results suggest that individual differences need to be factored into therapeutic rTMS protocols. In particular, more work analysing stimulation effects in relation to age and sex is required to determine how rTMS can best be used following neurotrauma.

AGED CARE SERVICE PROVISION WITHIN AUSTRALIA'S PRIMARY HEALTH NETWORK MODEL: A CASE STUDY

CRIPE Millicent[1]

[1]University of Sydney; ARC Centre of Excellence in Population Ageing Research (CEPAR)

In 2015, the Australian government replaced existing Medicare Locals with 31 Primary Health Networks (PHNs), the new organisational structure intended to provide a more efficient and effective healthcare system appropriate for an ageing and chronically ill population. Within its geographic catchment area, the PHNs work with existing stakeholders (e.g. GPs, Allied Health, Residential Aged Care Facilities, state-funded Local Health Districts) to commission services to meet identified needs. Aged Care is included as one of six key priority areas for targeted work, making PHNs central to building and integrating appropriate health services for older Australians. Taking a case study approach, this paper reports on the implementation and early operation of one PHN in metropolitan Sydney, with a specific focus on needs assessment and service delivery for older people. It will provide: 1) a brief overview of the PHN structure, governance and accountability mechanisms; 2) using interview data, provide insights into the implementation process relating to operations in the ageing and aged care sphere from the viewpoint of key stakeholders (PHN senior staff, PHN community advisory board members, external partners); 3) summarise the opportunities and challenges

to date associated with implementing this model in general, and specifically for older Australians, and consider whether it will go some way in addressing the multi-professional approach needed in providing appropriate health and care services for older people.

FAMILIES OF CHOICE PERSPECTIVE ON RESPECTFUL AND INCLUSIVE MODEL OF CARE FOR OLDER GAYS AND LESBIANS

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Background: Older gay and lesbian individuals build a network of friends they often refer to as families of choice or chosen families. This network replicates the role of biological families when caring for their older same-sex partners and friends. Whilst older gays and lesbians have experienced some form of discrimination or marginalisation from a number of health care providers, there is limited information on how similar encounters have personally affected their chosen families. This study aims to explore their experiences of stigma, discrimination and marginalisation as families and carers of older gays and lesbians. Method: Qualitative interviews were conducted with three
participants who identified themselves as chosen families: a same-sex partner, a long-time friend and a peer support person. The participants were from North Queensland regional and remote areas. The qualitative data were transcribed, analysed and grouped into recurring themes. Results: The chosen families' experiences with health care providers varied from pleasant, uncomfortable to hurtful. From their perspective, the nuanced behaviours and discursive language of health care providers can either acknowledge or undermine their roles as caregivers of older gays and lesbians. For a practice to be truly inclusive and respectful, health care service providers should recognise the important status and valuable contributions of chosen families as carers of older gays and lesbians. Conclusions: A review of workplace practices, procedures and documentation can enhance cultural safety and gain the trust and confidence of older gay and lesbian consumers and their families of choice. Understanding and addressing their areas of concerns will improve engagement with chosen families and optimise the health outcomes of older gay and lesbian individuals.

UNDERSTANDING THE BRAIN TRAINER

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Background & Aims: There has been a recent surge in the production of novel brain training products marketed as the "solution" to a dementia-free life. While the efficacy of commercial cognitive interventions is a topic of controversy, individuals across varying ages, genders and education levels continue to devote money and time to brain training programmes. To better understand this phenomenon, we aimed to explore the correlates of brain training across these demographic groups. Methods: A telephone survey was administered to 900 English speaking Australian residents. This nationally representative sample was recruited through random digit dialling and comprised of 59% males and 41% females. More than two thirds of participants had a secondary or higher qualification. Self-report information was collected on demographic variables, engagement with brain training and reasons for discontinuation, concerns about cognition, exposure to and fear of Alzheimer's disease. Results: The majority (74.6%) of participants had not attempted brain training, 18.2% had done so previously and 6.8% of participants were active brain trainers at the time of the study. Brain trainers had an average age of 51.34 (*SD* = 15.64) with more than three quarters having been engaged for a 6-month period or longer. Comparatively, 72.6% of ex-brain trainers reported stopping within the first month. Logistic regression analyses showed older, OR = 1.04, 95% CI [1.02, 1.05] less educated participants, OR = .78, 95% CI [.65, .98], were more likely to have never previously engaged, while younger age, OR = .96, 95% CI [.95, .97] and higher education, OR = 1.32, 95% CI [1.05, 1.66] predicted discontinuation. Being busy and lacking in time were the most nominated reasons for stopping brain training. Conclusion: Despite its appeal to some, a key limitation of brain training appears to be user retention, an important consideration in the evaluation of its utility.

ADVERSE EVENTS AND GAIT SPEED IN NURSING HOME RESIDENTS

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Background: Falls, wounds and hospitalisation are serious adverse events that may result in reduced independence and quality of life, and contribute to higher risks of disability and death in nursing homes. Objectives: To quantify the incidence of events (falls, hospital admissions and wounds) in nursing home residents and to determine if gait speed thresholds can predict falls. Design: A prospective cohort design was used to estimate the incidence and types of adverse events. Setting: Three nursing homes on the Gold Coast/Northern New South Wales, Australia. Participants: 100 nursing home adults consented to participate in this project. Measurements: The primary outcome included the number of adverse events accessed through the nursing homes records. We used negative binomial regression models adjusted for potential confounders to examine associations between gait speed group and falls suffered by residents in nursing home settings, and we reported incidence rate ratios (IRRs) with 95% CIs and the actual P-value. Results: During the six months, there were a total of 226 falls, 243 wounds, 65

hospital admissions and 29 deaths with 12% of the residents having a fall(s), wound, admitted to hospital and dying in the 6-month period. Gait speed was not a statistically significant factor that impacted adverse events. However, for every additional hospital admission there was a 28% increased rate of falling, for every additional wound there was a 7.8% increased rate of falling and for every kilogram increase in handgrip strength there was a 4.4% increase rate of falling. Residents were also found to have a decreased rate of falling if they were female (65.5%) and if they had a positive cognitive impairment Mini-Cog score (52%). Conclusion: The incidence of adverse events in Australian nursing homes is high, suggesting that continual refinement of assessment, education, awareness and management processes are required to improve resident outcomes.

STRIKING GOLD - AUSTRALIAN AND WELSH OLDER PEOPLE'S KNOWLEDGE, AWARENESS, MOTIVATION AND PERCEPTIONS ABOUT FALLS AND FALLS PREVENTION IN RESIDENTIAL AGED CARE HOMES

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Falls prevention interventions can only be effective in reducing falls amongst older people if they are adopted and enacted in their daily lives. There is limited evidence identifying what older people in residential aged care (RAC) facilities think and understand about falls and falls prevention, or what may limit or enable their adoption of interventions. This study was conducted in two countries and explored older people's knowledge and awareness of falls and their preferences, opportunities and motivation to undertake falls prevention interventions. Participants (n=70) were aged 65yrs and over, living in six RAC facilities in Perth, Australia and six RAC facilities in Swansea, Wales. A cross sectional survey using a customised questionnaire was administered face to face by trained research assistants. Findings from 70 participants indicated that 43 (61.4%) had fallen since admission. There were no significant differences between the two cohorts. Participants demonstrated limited knowledge about intrinsic falls risk factors and fewer opportunities to engage in strategies to address these. Almost all [n=67, (95.7%)] participants felt highly motivated to maintain their current functional mobility and independence in everyday tasks and were confident they could lower their risk of falling by using a self-selected prevention strategy. Key preferences for receiving falls prevention messages favoured a positive approach promoting staying healthy and independence [n=41 (58.6%)], reminders about safety using pictorial posters or brochures [n=37, (52.9%)] and small group discussions preferably with demonstrations [n=18, (25.7%)]. Findings from this study may assist organisations and staff to more effectively engage with older people living in RAC about falls prevention and provide targeted resources to address the needs and preferences of this population. Re-framing falls prevention messages positively by highlighting the motivational goals of maintaining functional mobility and independence with everyday tasks may facilitate adoption and enactment.

ADDRESSING ELDER ABUSE IN GENERAL PRACTICE: ATTITUDES AND EXPERIENCES OF GPs AND OLDER AUSTRALIANS

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This paper discusses how a social psychology principle, the bystander effect, helps us understand the attitudes and decision-making experiences of Australian GPs towards addressing elder abuse in general practice, and to what extent these experiences align with current elder abuse policies, clinical guidelines, online learning materials, and the expectations of older Australians. Australian GPs are mandated to recognise, assess, understand, and manage elder abuse and neglect. However, previous research demonstrates that GPs do not consistently notice the signs of elder abuse, struggle to define cases as abusive, do not always recognise their professional responsibility to intervene in elder abuse cases, experience a lack of education about how to plan elder abuse interventions, and experience ethical concerns about damaging the GP / patient relationship by intervening. The bystander model describes five steps to helping which mirror these GP challenges very closely: (1) noticing something is wrong; (2) deciding the event is an emergency; (3) deciding on degree of personal responsibility; (4) deciding the specific mode of intervention; and (5) implementing the intervention. The use of qualitative methods in this research enhances our understanding of GP experiences when addressing elder abuse, allowing us to dig for gold in this often quantitatively-driven research area. The findings may help to improve GP rates of intervention and prevent older Australians from experiencing elder abuse. Based on an analysis of key elder abuse documents and in-depth interviews with GPs and older Australians, we report emerging themes regarding GP challenges at the five distinct stages of the bystander effect model. The implications of these findings include recommendations for revisions of government policies, clinical guidelines, and online learning materials designed to aid GPs with elder abuse intervention strategies within the context of general practice.

START ON-LINE: A VIDEOCONFERENCING SUPPORT PROGRAM FOR CARERS OF PEOPLE LIVING WITH DEMENTIA

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Carers of people living with dementia (PLWD) experience depression and anxiety at higher rates than any other group in our community. Programs are needed to assist carers to manage their role, particularly to understand and manage the behavioural and psychological symptoms of dementia. The STrAtegies for RelaTives (START) program is an effective intervention for reducing anxiety and depression and improving quality of life amongst carers in the UK[1]. START consists of eight sessions of psycho-education delivered face to face in a one-to-one format to help carers better understand and manage behaviour of the PLWD. Due to geographic distances in Australia, it is not always possible to provide face to face interventions. The current project has adapted the UK START program for Australian carers of PLWD, and is piloting its delivery via video-conferencing to enable close replication of the START approach and provide access for carers living in rural areas. Thirty-five carers of PLWD will be recruited from rural and urban Victoria. Depression, anxiety, carer burden and quality of life measures will be completed at baseline and following the 8-week START program. The main aim of this pilot is to test the feasibility, acceptability and effectiveness of the on-line START program in reducing depression and anxiety in Australian carers of PLWD. In accord with the findings from the UK START program, we are expecting that carers will experience improvements in symptoms of anxiety, depression and quality of life. The real-time video-conferencing mode of delivery of the START program is also expected to be both acceptable and feasible to carers of PLWD.

[1]Livingston, G. et al. (2013). Clinical effectiveness of a manual based coping strategy programme (START, STrAtegies for RelaTives) in promoting the mental health of carers of family members with dementia: pragmatic randomised controlled trial. BMJ, 347. doi:10.1136/ bmj.f6276 .

RISK FACTOR MODIFICATION FOLLOWING SHORT TERM EXERCISE PROGRAMS OF VARIOUS TYPES AND INTENSITIES

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Background: Engaging in regular exercise can reduce the risk of developing cardiovascular disease through risk factor modification. Growing evidence supports high-intensity exercise and more recently small-muscle-mass training as alternatives to moderate-intensity exercise prescription. Objective: No studies have examined all three methods of exercise delivery with the primary outcome of risk factor modification. Methods: This study randomly assigned 46 healthy middle-aged adults (age: 61 ± 6 y, BMI: 28.4 ± 4.8 $kg.m^2$, peak aerobic capacity: 22.7 ± 6.5 $mL.kg^{-1}.min^{-1}$) to complete 24 sessions (8 wk; 3 $d.wk^{-1}$) of exercise training, using either high-intensity double-leg cycling (n=16; HDL), high-intensity single-leg cycling (n=14; HSL) or moderate-intensity double-leg cycling (n=16; MDL). Biomarkers of cardiovascular risk (total cholesterol, triglycerides, HDL-c, LDL-c, glucose), anthropometry measures (body mass, BMI, waist circumference, waist-to-hip ratio), resting blood pressure and aerobic capacity were assessed pre- and post-intervention. Results: Total work completed was greater ($p<0.01$) in MDL (5938 ± 1462 kJ) compared with the HDL (3462 ± 1063 kJ) and HSL (4423 ± 1875 kJ). Pre- to post-training differences were observed for waist-to-hip ratio (0.84 ± 0.09 cm vs 0.83 ± 0.09 cm, $p<0.01$), resting blood pressure (systolic: 129 ± 11 mmHg vs 124 ± 12 mmHg, $p<0.01$; diastolic: 79 ± 8 mmHg vs 76 ± 8 mmHg, $p<0.02$), total cholesterol (5.87 ± 1.17 $mmol.L^{-1}$ vs 5.55 ± 0.98 $mmol.L^{-1}$, $p<0.01$) and LDL cholesterol (3.70 ± 1.04 $mmol.L^{-1}$ vs 3.44 ± 0.84 $mmol.L^{-1}$, $p<0.01$), with no differences between conditions. Additionally, peak aerobic capacity increased following training (22.27 ± 6.36 $mL.kg^{-1}.min^{-1}$ vs 24.93 ± 7.55 $mL.kg^{-1}.min^{-1}$, $p<0.01$), with no differences between conditions. Conclusions: In healthy middle-aged adults, a short term training program using high-intensity exercise can provide similar outcomes to moderate-intensity exercise for less total work. The inclusion of HSL does not provide additional benefits compared with HDL or MDL training.

AGE-RELATED DECLINE IN VOLUNTARY MOVEMENT AND MOTOR CORTICAL CONNECTIVITY: A TRANSCRANIAL MAGNETIC STIMULATION STUDY.

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Ageing is associated with a decline in motor function and, as a consequence, an increased risk of falls. Increasing evidence suggests that age-related changes in motor areas of the brain play a key role in the decline in motor function in older adults. In particular, the primary motor cortex (M1) and the supplementary motor area (SMA), which are densely connected, play an important role in bimanual coordination, gait, and balance. Structural imaging studies show that the integrity of white matter declines with age, thus affecting cortico-cortical connectivity including SMA – M1. Transcranial magnetic stimulation (TMS) can be used to measure connectivity between SMA and M1, with previous dual-coil TMS studies showing facilitatory interactions between SMA and the M1 in younger adults. In the present study, we used TMS to measure SMA – M1 connectivity in younger (*N*=20) and older adults (*N*=18), and investigated whether the magnitude of the facilitatory

interaction between SMA – M1 is associated with bilateral motor function. Motor function was assessed using the Timed Up and Go, Four Square Step Test, and the Purdue Pegboard test. Older adults performed poorly compared to younger adults on all motor function tasks. There was greater SMA – M1 facilitation in younger than older adults, suggesting changes in SMA – M1 connectivity with age. Finally, there was a positive linear relationship between SMA – M1 facilitatory interaction and performance on the Timed Up and Go, Four Square Step Test, and the Purdue Pegboard test. That is, those with stronger SMA – M1 facilitation had better motor function. Together, these findings suggest that SMA – M1 connectivity (as measured by facilitatory interaction) is functionally relevant and decreases with age. These data provide a neurophysiological basis on which to test whether modifying SMA – M1 connectivity can improve voluntary motor function in older adults

SETTINGS THINK ABOUT FALLS AND FALLS PREVENTION: A CROSS-SECTIONAL SURVEY

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Falls account for the majority of adverse clinical events in residential aged care (RAC) settings. Previous studies showed that care staff in RAC settings spent approximately 45% of their eight hour shift on direct resident care, but there is limited evidence about care staff' knowledge and awareness regarding falls and falls prevention. The aims of the study were to explore care staff' levels of knowledge and awareness about falls and opportunity, confidence and motivation to undertake falls prevention strategies in RAC settings. A cross-sectional survey was undertaken using a custom designed questionnaire that was piloted in a previous study. Eight RAC sites participated in the survey with a response rate of 37.89% (n=147). One hundred and twenty nine (89.6%) of care staff surveyed had more than one year of experience working in RAC settings. Eighty seven (59.2%) care staff thought the residents' falls could be prevented from happening. Thirty nine (26.5%) care staff reported the residents they cared for were at high risk of falls. Sixty one (45.86%) care staff listed at least three strategies to prevent falls. However, only a small number of care staff reported on intrinsic falls risk factors and aligned falls prevention strategies such as checking medication (n=18, 13.53%), keeping residents hydrated (n=8, 6.02%) and scheduled toileting to prevent falls (n=4, 3.01%). Ninety eight (66.7%) care staff reported they preferred to have falls prevention training face to face rather than e-learning. Although care staff spend almost half of their time directly providing residents' care, they have limited knowledge about intrinsic falls risk factors and low levels of awareness about the high falls risk for residents in RAC settings. Future falls education training should incorporate these findings and tailor education to care staffs preference of delivery to facilitate improved adoption of falls prevention strategies.

PERCEIVED HEALTH BENEFITS OF HIGHER EDUCATION FOR AN AGEING AUSTRALIAN BABY BOOMER POPULATION

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The world population is ageing and it is expected those aged over 60 years will increase from 605 million to 2 billion by 2050 thus presenting health challenges and major implications for education skills and training. Although much has been written about baby boomers, those born between 1945 and 1966, and their potential impact on public services utilisation, such as health, there is limited research about the potential impact of later life education on the health of baby boomers. Further research is needed to quantify the benefits of university level learning for baby boomers, and society, and to determine how best to meet the associated pathways to meet these goals. This will be achieved by a four phase study, utilising an adapted health action process approach: (1) literature review; (2) interviews held with university enrolled baby boomers to determine what they believe are the actual benefits, including health and social benefits, of studying at university in later life, as well as the social and academic barriers, and costs they have encountered; (3) an online survey of the general baby boomer population, to increase generalisability of the study and (4) option 1 - reinterview participants from Phase 2 to determine if their perceptions of the university experience have changed. Option 2 - if a large enough sample is identified, targeted interviews will take place with respondents who are highly motivated to enrol in a university course but face high barriers. Although this study is primarily qualitative in nature, some quantitative data collection will be used, in both Phase 2 and 3, to develop and validate demographic measures. The results of the study will identify the role higher education could play in developing the personal skills of older people to assist them make better health choices.

CAUSING DEATH: THE OBFUSCATION OF 'VOLUNTARY ASSISTED DYING'

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In jurisdictions across the world that provide for lawful medical assistance to die, the majority of assisted deaths reported are individuals aged over 65 years. Victoria is anticipated to become the first state in Australia to provide for voluntary assisted dying, with legislative and policy recommendations being drafted by a state government Ministerial Advisory Panel. An issue receiving little academic attention is how cause of death as a result of voluntary assisted dying should be certified. The majority of public submissions to the Ministerial Advisory Panel commenting on this issue have recommended that, in accord with similar jurisdictions, cause of death is certified

as "the underlying condition… because the person is dying from the condition anyway"[1]. Prima facie, certifying the cause of death following voluntary assisting dying as the 'underlying condition' (i.e. the condition that qualified the individual for access to voluntary assisted dying), fails to reflect both the mechanism and the intent of voluntary assisted dying, and is inconsistent with otherwise adopted approaches to recording cause of death in the state of Victoria. Examining this perplexing approach to voluntary assisted dying as a mode of death, I will argue that recording the cause of death following voluntary assisted dying as an internal 'underlying condition' problematically obscures both the external mechanism of death (assistance to die), and the intent of the mechanism to *cause* death.

[1]Department of Health and Human Services. (2017). *Voluntary assisted dying bill — Interim report of the Ministerial Advisory Panel: Consultation overview*. Melbourne: Victoria State Government DHHS. Retrieved from health.vic.gov.au/about/health-strategies/voluntary-assisted-dying-bill.

TOWARDS SAFER HOSPITALS – A SYSTEMATIC ANALYSIS OF HOSPITAL BASED ADVERSE EVENTS

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People go to hospitals to get relief from major illnesses after exhausting all other options and older people being some of the key users of health services in hospitals are especially affected. During treatment for a primary illness, the hospital admission can, independently, pose further health risks resulting in hospital readmissions or further visits to the medical practitioner. Unintended medical events or adverse events (AE) are reported in quite a significant proportion of patients in public and private hospitals. The problem is not limited to any specific geography or economic developmental status. AEs are prevalent in all countries including the United States, United Kingdom, Australia, New Zealand and Canada. A number of AEs have resulted in death and disability, with a large proportion deemed to be preventable. Many strategies have been employed by governments to address these problems, but with mixed results. While the methods of investigation vary, the California Medical Insurance Feasibility Study, Harvard Medical Practice Study, Quality in Australian Health Care Study, Utah and Colorado Study, and the Canadian Adverse Events Study, have found AEs to occur in 4.65% to 16.6% of hospital admissions. We aim to conduct a systematic analysis of the methodologies of these studies, establish indices and estimate standardized rates for hospital-related AEs using Australian healthcare policy guidelines. The objectives of this systematic review will be to identify best indicators, and 'key gaps' about these indicators in the literature. Given the paramount importance of evaluating hospital based adverse events among older people, assessment of these indicators and addressing them through evidence based policy recommendations will lead towards safer hospitals and healthy ageing.

A NEUROGENIC PERSPECTIVE ON SARCOPENIA AND AGEING

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Ageing results in progressive decline in skeletal muscle mass and function known as sarcopenia that leads to frailty and loss of independence. Sarcopenia is of increasing importance as our population rapidly ages and it is essential to understand the underling neuromuscular mechanisms in order to develop targeted interventions to maintain healthy ageing. We have compared young and old male C57Bl/6J mice, aged 3 and 27 months (M), for sciatic nerves and spinal cord changes, plus conducted a detailed time- course study of changes in sciatic nerves of normal male mice aged 4, 15, 18, 22 and 24M. The sciatic nerves innervating the lower limb muscles were collected and analyzed using western blotting, immunohistochemistry and transmission electron microscopy (TEM). Nerves appeared healthy until 15M, but changes were evident by 18-22M. Immunofluorescence staining of sciatic nerves showed age related decrease in motor (choline acetyltransferase) and sensory (isolectinB4) axons numbers. Immunoblotting analysis revealed increasing levels of various neuronal and cytoskeletal proteins including S100, Tau, Choline acetyltransferase, SMI-32 and Vimentin along with significantly increased expression of autophagy marker p62, indicating impaired protein degradation in ageing nerves. The TEM revealed protein aggregates that were significantly increased in the old sciatic nerves (aged 27M). Preliminary analyses of immunostained sections of lumbar spinal cords (where the sciatic nerve originates) from the same young (3M) and old (27M) male mice, also revealed striking changes in the old spinal cords indicating sensorimotor impairment These observations provide new insight into the neuronal contribution to the onset and progression of sarcopenia. Such mechanistic insight underlying sarcopenia is essential in order to design the best therapeutic targets for interventions to maintain healthy ageing.

GENDER DIFFERENCES IN COGNITIVE RESERVE ACROSS THE LIFE COURSE

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Recent research has suggested that cognitive reserve is a protective factor for cognitive decline in ageing, however it is still unknown which indicators of cognitive reserve are most relevant and at which points in the life course. This poster considers various proxies for cognitive reserve and how they relate to cognitive outcomes across the lifespan.

Using the Personality and Total Health (PATH) Through Life dataset from the Centre for Research on Ageing, Health and Wellbeing in Canberra, Australia, cross-sectional associations between exposures representing cognitive reserve (including educational attainment, occupational complexity and lifestyle activities) and cognitive outcomes (including memory, executive function and overall cognition) are investigated in approximately 7500 participants aged in their 20s, 40s and 60s. As there is some evidence to suggest that men and women experience age-related cognitive decline differently, the following research questions are of particular interest: are there aspects of cognitive reserve that are gender-specific? Are proxies of cognitive reserve the same for women and men? Are they the same in different-aged cohorts? Do different proxies of cognitive reserve impact different cognitive domains for women and men? Although cross-sectional study of cognitive reserve and cognitive outcomes is unable to examine causality and may be limited by ascertainment bias, this analysis nevertheless provides a broader understanding of relevant aspects of cognitive reserve at baseline, laying the groundwork for further longitudinal analysis. Investigating specific aspects of cognitive reserve in this way will facilitate targeted and potentially gender-specific public health recommendations for maintaining cognitive health throughout the life course.

IMPACT OF OLDER WORKERS' PERCEPTION OF HUMAN RESOURCE PRACTICES ON INTENTION TO REMAIN AT WORK: A SYSTEMATIC REVIEW

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Background: Public policy and research on ageing workforce have often focused solely on the macroeconomic simulations of anticipated work participation rates among older workers. These simulations often assumed anticipated financial gain is the main factor influencing older workers' incentive to work. They also assumed older workers will always be in a condition to work until retirement age and beyond. However, these macroeconomic simulations often lack consideration about how individual incentives to remain at work and perception of human resource (HR) practices affect older workers' actual work participation rates. Objective: This paper discusses the impact of older workers' perceptions of HR practices on their decisions to continue working to or beyond retirement age. The four most common HR practices to retain older workers are flexible work arrangements, training opportunities, job content and ergonomic adjustments, and age-diversity practices. Methods: Studies about workplace factors that influence older workers' work intentions published from 1979 to 2017 were identified. Studies were included if older workers' perception of HR practices was used to assess their work intentions and participation. Narrative synthesis of the 20 selected papers. Results: This study found older workers report flexible work to be the most useful workplace strategy to help them continue working to or beyond retirement age. Age-diversity practices are least frequently reported by older workers to affect their work intentions. Work identity is the main factor that influenced older workers' perception of and response to HR practices. Conclusions: Results identified the importance of tailoring HR practices and retention strategies according to older workers' sense of work identity. Workplace human resource practices targeted at older workers are often not fully utilized by this population group. Recommendations are made with the aim to design more responsive and tailored HR practices that address older workers' work identity and perception of workplace retention strategies.

INTERVENTIONS TO REDUCE FALLS IN OLDER ADULTS RECENTLY DISCHARGED FROM HOSPITAL: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: Older people who are discharged from hospital have high rates of functional decline and falls. The aim of the study was to synthesize the evidence for effective falls prevention interventions for older adults recently discharged from hospital. Data Sources: Six electronic databases (MEDLINE Ovid, PubMed, CINAHL Plus, EMBASE, AMED and Psych INFO) searched from 1990 to 2017 published and unpublished literature in English. Study Selection: Studies were included if participants were community-dwelling adults 60+ years discharged from hospital; delivered falls prevention interventions; were randomized controlled trials (RCT), or pseudo-RCTs; measured falls within 6 months after discharge. Data extraction: Study quality was assessed using a standardized Joanna Briggs Institute of Systematic Reviews critical appraisal tool (MAStARI). Data synthesis: Quantitative data were pooled using Rev-Man Review Manager®.

Results: 16 studies were included in the review, with 9 studies meta-analyzed by intervention groups. Evidence was summarized using GRADE Pro. Home hazard modifications (2 studies) did not significantly reduce falls or proportion of participants who fell (low GRADE), however for those participants with previous falls history (2 studies un-pooled), was effective in reducing falls. Home exercise interventions (3 studies) did not significantly reduce falls (very low GRADE), and significantly increased the proportion of participants who fell (RR 1.36, 95% CI 1.10 to 1.69) (moderate GRADE). Nutritional supplementations for malnourished older people (1 study) (low GRADE) reduced the proportion of participants who fell (HR 0.41, 95% CI 0.19 to 0.86). Conclusion: The recommended falls prevention interventions for older people recently discharged from hospital are to provide home hazard minimization particularly if older patients have a previous falls history and consider nutritional supplementation if they are malnourished. Further research to investigate the falls prevention effects of tailored education, cholecalciferol therapy and structured exercise programs in this population is warranted. Systematic review protocol registration number: doi:10.11124/JBISRIR-2016-002952.

ANYONE CAN FIND THE DIRT. BE THE ONE THAT FINDS THE GOLD!

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It is challenging for residential aged care service providers embarking on refurbishment projects to prioritise interventions in a meaningful, cost effective, consistent and sustainable way. The sector is faced with rising costs and increasing consumer expectations and thus providers may be unable to meet the costs of designing and building new facilities to provide optimal support for older people with complex needs. Therefore providers, particularly the not for profit sector, may need to consider the benefits of refurbishing residential aged care facilities. As there is limited research in this area to assist residential aged care providers with decision making regarding refurbishment, a narrative review was undertaken to clarify what is meant by refurbishment and furthermore to identify components which commonly fall within the scope of refurbishment. A systematic search was undertaken using databases pertinent to aged care environment. After screening for relevancy, data from n=61 studies were included in the final review. Through inductive content analysis, seven commonly occurring minor refurbishment categories were identified - Colour/Contrast; Flooring; Furniture; Lighting; Noise; Signage; and Wayfinding. Whilst we are not suggesting any priorities from these categories, our findings indicate that these would be an appropriate start to consider when refurbishing aged care facilities – particularly when coupled with the concept of understanding the environment through the eyes of the people who live there and to make the changes as enabling as possible for them.

EVALUATING THE VALIDITY, RELIABILITY AND FEASIBILITY OF A FALLS RISK ASSESSMENT TOOL RECOMMENDED FOR USE IN AUSTRALIAN RESIDENTIAL AGED CARE FACILITIES. A MIXED METHODS STUDY

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Falls have significant consequences for older adults with fall rates being the greatest in residential aged care facilities (RACFs), at around 1.7 falls per bed per year, resulting in a heavy burden on the older person and the health care system. The importance of frontline nursing staff involvement in falls risk practice in RACFs is significant, as is the importance of the validity, reliability and feasibility of fall risk assessment tools (FRATs) and their ability to guide risk reduction interventions. However, both these areas of falls research in RACFs remain understudied. Australian best practice guidelines recommend the use of the Peninsula Health Falls Risk Assessment Tool (PHFRAT) in RACFs. There is conflict in the literature regarding the predictive validity of this tool and consequently further validation is required. Therefore, my PhD research aims to address these gaps in the literature by further evaluating the validity, reliability and feasibility of the recommended PHFRAT while investigating frontline nursing staff's perceptions of and engagement with this tool. The research is being undertaken in a large RACF. Participants will include residents, senior clinical management staff, Registered Nurses and Assistants in Nursing. An explanatory sequential mixed methods approach will be used. Progress to date includes a comprehensive literature review of FRATs tested in RACFs, a retrospective falls audit and investigation into current falls risk practice in the chosen RACF. Findings from my PhD research will help to shed light on best practice recommendations in the crucial area of falls risk practice in RACFs. This mixed methods study will also make a significant methodological input to the area of falls research in RACFs with very few studies in this area using this methodology thus far.

PARTICIPATORY ART IN AGED CARE: A VISUAL AND INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS OF OLDER RESIDENTS' ENGAGEMENT WITH WEAVING

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Research into art activities in aged care has clearly established the benefits of creative activities, with arts-based interventions found to frequently improve both physiological and psychosocial health. However, experiences of art participation in aged care are rarely documented. In this longitudinal participatory art research, a professional tapestry artist moved her practice into one Australian aged care facility for six months and invited residents, staff and visitors to collaborate in designing and weaving a large tapestry based on the '*meaning of home*'. Using interpretative phenomenological analysis in combination with a visual essay, this case study analysis describes how three residents engaged with and experienced the project in three different ways: passively (Pam), partially (Alpal) and fully engaged (Lorna).

Pam was passively engaged, preferring to watch and comment only when triggered (e.g., memories, pleasure to the eye). Due to his physical condition (acute cystitis), Alpal was partially engaged and his experience focused on appreciation and creating the tapestry as becoming important, something to look forward to and assisting his recover. The third case study, Lorna, was fully engaged and experienced 'flow' as she developed the new creative skill of weaving and expressed herself creatively. Alongside the IPA analysis, this paper also uses researcher-produced photographs to visually convey, compare and contrast how these three residents experienced the same participatory art experience in very different ways. In combining the 'visual' with IPA, this paper gradually reveals the daily lived experience of aged care for older residents, the novelty and value of arts-based interventions, and the opportunities and challenges for aged care providers, artists and researchers. The paper concludes with recommendations for integrating visual data into IPA methods, analysis and reporting.

PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR IN RESIDENTIAL AGED CARE FACILITIES

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Aim: The aim of the study was to evaluate levels of physical activity and sedentary behavior in independently mobile older adults with and without dementia who were living in residential aged care. A secondary aim was to determine the relationship between functional performance and the variables of physical activity level and sedentary behavior. Methods: Participants (mean age 84 years ± 8 years, 30% with dementia) were 37 residents of an aged care facility. Physical activity levels and sedentary behavior were measured using a tri-axial accelerometer worn during waking hours for at least five days, and physical function was measured using the Short Physical Performance Battery test. Results: Participants with valid accelerometer data (n=28) spent, on average, 85% of the time sedentary, 11.5% of time in low intensity activity, 2.5% in light and 1% in moderate-to-vigorous physical activity. Physical activity at all levels of intensity was performed in bouts of less than10 minutes. Over half of sedentary time was accumulated in bouts of greater than 30 minutes. There was no relationship between functional performance and the variables of physical activity and sedentary behavior. Conclusions: Residents were inactive and highly sedentary. The study highlights the need to develop innovative ways of encouraging physical activity and limiting sedentary behavior in residential aged care.

CHARACTERISTICS OF PHYSICAL EXERCISE AND COMPUTER-BASED COGNITIVE TRAINING INTERVENTIONS FOR PEOPLE WITH MILD COGNITIVE IMPAIRMENT

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Challenges involved in designing any kind of intervention are well known. The challenge intensifies when dealing with older people with Mild Cognitive Impairment (MCI). This paper distils insights from physical exercise and computer-based cognitive training interventions delivered to community dwelling people with MCI. Background: It has been hypothesized that physical exercise and cognitive training might be effective in slowing cognitive decline if adopted in early stages of dementia. Early interventions to enable people who are predisposed to cognitive decline is important to address the disease burden in Australia's ageing population and non-pharmacological intervention is an attractive, cost effective solution which could be delivered remotely. Objective: Insights gained from previous studies are a good source of information for future studies. Therefore, the main aim of this paper is to draw insights from high quality interventions to guide the design of a future study. Method: This paper reports the finding of a recent literature search conducted as a precursor to the design of physical exercise and computer-based cognitive training interventions for community dwelling people with MCI. The literature review spanned 10 years from 2006 to 2016. The search was done using a structured search methodology in PubMed. Results: The search produced 266 papers. Of these 169 papers were rejected based on the titles. Eleven papers matched the inclusion and exclusion criteria and were included in this study. Six interventions involved physical exercise only, four involved computer-based cognitive training only, and one involved both. The common characteristics were categorized into the types of exercise and/or training administered, the setting, sample size, cognitive and/or functional outcome measures and characteristics unique to each intervention. Conclusion: Non-pharmacological interventions are viable for people with MCI. The interventions improved functional status, cognition and shows a promising future in addressing cognitive decline in older people.

COUPLES' PRIVACY IN RESIDENTIAL AGED CARE

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Currently, approximately 30 per cent of Australian aged care residents are partnered, with many experiencing institutional interference in their relationships. From the perspective of staff, duty of care usually takes precedence over privacy. Some institutions separate couples, residents' doors may be always kept open, staff enter without knocking, ignore 'do not disturb' signs, or gossip about residents, making it difficult for couples to be alone together. Based on findings from an online survey conducted in 2016 (part of a larger a mixed methods study) this presentation focuses on the needs of partnered Baby Boomers (born 1946-65) and, in particular, the levels of privacy that this generation of future residents anticipate

they will require to maintain their primary relationships in residential aged care settings. At a time marked by a policy shift towards consumer-directed residential aged care, it is pertinent to understand the needs of this subset of future consumers. The majority of respondents expected to remain sexual indefinitely, considered physical intimacy with their partners essential to their wellbeing, and required a high degree of privacy to maintain their relationships. Many expressed it was 'their business', and no-one else's, what happened in their rooms. Seven domains of privacy were investigated. Those considered most important for the maintenance of relationships were visual privacy, private space and bodily privacy. Service providers can prepare for this next generation of consumers by (1) developing clearly written privacy policies; (2) conducting individual privacy assessments of residents upon admission; (3) including privacy needs in resident care plans; and (4) creating a culture that allows staff and residents to develop mutual rapport and respect for each other. Enabling new residents and their families to make informed decisions when choosing a facility has the potential to improve the experiences of both residents and staff.

AGE-RELATED CHANGES IN MOTOR CORTEX FUNCTION AND MANUAL DEXTERITY

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Ageing is associated with a decline in manual dexterity, which compromises the functional independence of older adults. As we age, the area of the brain that controls manual dexterity—that is, the primary motor cortex (M1)—undergoes functional changes. Changes in M1 function, specifically cortical inhibitory processes, are thought to mediate age-related decline in manual dexterity. Previous research investigating cortical inhibition in older adults are inconsistent. These inconsistent findings may be due to age-related changes in facilitatory processes in M1, which may contaminate inhibitory processes. The research question for the current study was to investigate whether facilitatory and inhibitory processes interact and are associated with the decline in manual dexterity in older adults. Transcranial magnetic stimulation was used to measure the contamination of facilitation on inhibitory processes in younger (n = 26, age range: 18-35) and older adults (n = 21, age range: 61-86). Purdue Pegboard was used to examine manual dexterity. First, we characterised facilitatory processes by varying stimulation parameters to evoke (i) maximal facilitation (F_{MAX}) and (ii) minimal facilitation (F_{MIN}) in younger and older adults. Second, we measured inhibitory processes using the stimulation parameters that correspond to F_{MAX} and F_{MIN}. Inhibition measured at F_{MAX} reflects contamination of facilitation on inhibitory processes, whereas inhibition measured at F_{MIN} reflects a more pure measure of inhibition (with little to no contamination of facilitation). The results showed inhibition measured at F_{MAX} was significantly reduced in older than younger adults, but the magnitude of inhibition was not associated with manual dexterity. In contrast, there was no difference in inhibition between younger and older adults when measured at F_{MIN}, but the magnitude of inhibition was associated with manual dexterity in older adults. The current findings provide some support for an age-related reduction in inhibitory processes and suggest that greater inhibition is associated with better dexterity in older adults. Furthermore, these findings show that the M1 may act as a potential target to improve manual dexterity in older adults.

INVESTIGATING BARRIERS AND FACILITATORS OF ADMINISTERING MEDICINES TO OLDER PEOPLE WITH SWALLOWING DIFFICULTIES IN AGED CARE FACILITIES

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Background: Administering oral medicines to aged care residents with swallowing difficulties is a challenging task for healthcare workers. Healthcare workers in aged care facilities often face dilemmas and uncertainties when making decisions about the drug therapy of the residents with swallowing difficulties. This may lead them to modify medications, e.g. crush tablets, or open capsules, to facilitate administering medicines. These practices can be associated with an increased risk of medication administration errors which may negatively impact residents' health. Despite the high prevalence of inappropriate medication administration practices associated with swallowing difficulties in aged care facilities, little information is available regarding the underlying reasons for these practices. Objectives: To investigate the opinions and experiences of healthcare workers in aged care facilities regarding the barriers and facilitators of administering medications to residents with swallowing difficulties. Methods: Qualitative semi-structured interviews were carried out with a stratified sample of staff members from aged care facilities in Queensland, Australia who are involved with medication preparation and administration to residents. Potential staff members included managers of aged care facilities, nursing directors, nurses, nursing assistants, and personal carers. The participants were asked about their opinions and experiences regarding the barriers and facilitators of administering medicines to residents with swallowing difficulties. Qualitative thematic analysis of the interview transcripts was performed and the identified barriers and facilitators were reported. Results & Conclusion: Preliminary findings have identified knowledge gap, time constraints, cost and unavailability of alternative pharmaceutical formulations as potential barriers of optimum medication administration in residents with swallowing difficulties. Improving communication among healthcare

professionals and providing guidelines and references for dosage form modification were identified as some of the facilitators. These barriers and facilitators can describe a framework of practice that could benefit from the design of a pharmacy intervention in medication management for residents of aged care facilities.

SOCIOECONOMIC PATTERNS AND ASSOCIATED FACTORS OF MUSCLE STRENGTH AMONG OLDER ADULTS IN INDIA

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Background: Muscle strength, measures as grip strength in old age is an important predictor of disability, morbidity and mortality. Objectives: To examine the socioeconomic patterns and associated factors of grip strength among participants aged ≥45 years in India. Methods: Data from the Longitudinal Aging Study in India (LASI) Pilot conducted in 2010 (n= 1417) and WHO's Study on global AGEing and adult health (SAGE) - Wave 1, conducted in 2007 (n= 6895) were used. Years of schooling and wealth quintile are used as measures of socioeconomic status. Self-rated health and edentulism are used measures of general health status. Multivariate regression analysis was used to examine the nature and patterns of grip strength in India. Results: Results revealed a strong inverse association between socioeconomic status and grip strength. Further, the relationship between socioeconomic status and grip strength tended to converge in older ages, especially among men, suggesting convergence of health disparity in older age. Older adults in the north Indian states had poor grip strength compared to older adults in southern Indian states. A negative association between poor self-rated health and grip strength was observed in men and women. Edentulism in men was associated with reduced grip strength. Conclusions: This study showed a compelling evidence on regional and socioeconomic differentials in grip strength. Moreover, this study presented the evidence of socioeconomic convergence in health disparity in older ages in India.

DETERMINING INDICATORS OF AGE-FRIENDLY BUILT ENVIRONMENTS

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Background: Populations are ageing worldwide and the requirements of increasing numbers of older people need to be addressed in planning of cities and regions. Indicators of urban built environments can unravel key dimensions of the requirements of the ageing population. Indicators can work as measurable tools to assess and improve the age-friendliness of built environments. The World Health Organization (WHO) has developed a framework on how certain resources and structures enable interventions in form of policies, services and programs that help to improve the age-friendliness of a city. However, there is limited knowledge on identifying and categorising the determinants of ageing and age-friendly indicators in order to study each area distinctly.
Objective: This paper therefore discusses indicators of age-friendly environment focusing on aspects of built environments that are crucial to an ageing population. Methods: Relevant research on age-friendly built environments have been reviewed and scrutinized using document analysis. Results: This paper reports the findings of an extensive study resulting in a list of indicators pertaining to built environments categorized from a number of age-friendly indicators. Conclusions: Cautious consideration should be given to adapting the indicators of age-friendly cities to obtain an appropriate assessment of age-friendliness of a city. Identifying indicators can be the preliminary theme for ageing research, including the process by which cities could initiate and implement age-friendly plans. The success of established indicators, the prioritization of indicators and the economic benefits linked define success for age-friendly plans and the challenges associated. It is important that urban planners are involved in the research on developing age-friendly built environment indicators for designing age-friendly cities. Recommendations are aimed at evaluating the identified indicators for further validation for creating age-friendly living environments suitable for the overall well-being of aged people and encouraging them to age in place and lead to successful ageing.

PATTERN OF MEDICATION USE IN WOMEN WITH DEMENTIA

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Introduction/Background: Dementia is the second leading cause of death and third leading cause of disability burden in Australia. Medication dependency has increased exponentially in older age people with dementia. With increasing multimorbidity, older people with dementia are likely to use multiple medications before and after the onset of the disease, some to manage morbidity and others to manage the symptoms of dementia. While some medications (e.g. psychotropic, proton pump inhibitors, H2 -antihistaminics etc) have been found to be detrimental for dementia onset/progression, other medications (e.g. Antihypertensive, Statins, antidiabetics etc) are claimed to be beneficial. The aim of this study is to describe utilization of medications in women living with dementia followed for three years (2012-2015) before and after the diagnosis of the disease. Method: Design: Observational cohort study. Sample: Women from 1921-26 Australian Longitudinal Study in Women's Health (ALSWH) cohort reporting a diagnosis of dementia. Procedure: ALSWH survey data collected in 2012 will be linked to the Pharmaceutical Benefit Scheme (PBS) data. Dementia cases will be Identified using survey as well as linked administrative data. The medication prescribed to the patients with identified case of dementia will be longitudinally obtained from the database at baseline, before and after diagnosis of dementia.

Appropriate statistical tests will be applied. Results will be stratified by subtype of medication according to Anatomical Therapeutic Chemical (ATC) classification system. Expected outcomes: Using nationally representative data, could the findings will assist with assessment of the risks and –benefits of commonly used medications in Australian women with dementia as well as changing pattern of medication. The outcomes will inform policy regarding frameworks for the rational utilization of medications among older patients with dementia.

EXPLORING THE EXPERIENCE OF PEERS IN ENCOURAGING PARTICIPATION IN RESISTANCE TRAINING

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Background: Australia's ageing population is increasing with approximately 15% of people now aged 65 years and over. It is important to remain physically active as one ages and include two sessions of resistance training (RT) per week to maintain muscle strength. There is established evidence that RT is highly beneficial for this age group, but low levels of engagement are a problem. Barriers to RT participation include injury and not knowing anyone to go with. While there is strong evidence about the benefits of RT, there is scant evidence regarding the benefits of using peers to promote RT participation. Peers provide social support and take on roles such as advisor, educator and helper. Peer support involves learning from others who share an affinity (e.g. similar age). Objective: This study explored the experience of peers in encouraging participation in RT among older community dwelling adults. Two questions were fundamental to the research, 1) what are older people's perceptions of being a peer? And, 2) what do older people perceive are the positive and negative aspects of being a peer? Design: A qualitative study was undertaken using focus groups, researcher observations and semi-structured interviews. Methods: Older people (n=9) experienced in RT (2-month minimum) participated as peers; they provided peer support for 1 - 4 older people new to RT during the eight-week study. Thematic analysis of the data was conducted. Results: Perceptions of being a peer included: assisting others to improve their health, and, finding that some exercise participants did not appear to require peer support. Positive aspects identified were feeling satisfied about helping others and making new friends. Initiating contact when the peer and exercise participant had no prior acquaintance was perceived as a negative aspect. Conclusions: Peer-mentoring could help to promote RT among Australia's older population.

COMBINED VISION AND HEARING IMPAIRMENT IN THE AGED CARE SECTOR – DEVELOPMENT OF A SCREENING TOOL USING A DELPHI METHOD

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The prevalence of combined vision and hearing impairment increases dramatically in old age. However, little research has been conducted to identify older people experiencing this condition. Similarly, investigation is limited regarding the outcome of rehabilitation strategies that can enhance the quality of life this group. This study aimed to develop a screening tool to identify older people with a combined vision and hearing impairment as no valid and reliable tool existed for the Australia population. A panel of 7 nationally recognised experts in the fields of aged care and combined vision and hearing impairment was established and a three -round Delphi approach was used to develop the tool's items. In Round 1, panellists were asked to review questions from existing screening tools that identified vision or hearing impairment or both and if each question should or should not be included in the new screening tool. An option for adding questions was also provided. In Round 2, questions that were judged by at least half the panellists as appropriate for inclusion, plus other questions added by panellists, were rated on a Likert scale in terms of their suitability for inclusion. In Round 3, with the aim of achieving consensus on the inclusion of a reduced number of items, panellists were asked to verify their Round 2 ratings when provided with both the group mean and their own rating for each item. Items with the highest overall ratings were then included in the screening tool. Following piloting, further refinements were made and a scoring system was devised prior to providing it to the expert panel for their final review. This presentation will explain the outcome of each round of the Delphi process and decisions made regarding the tool's formatting and scoring system. Benefits and drawbacks of using the Delphi method for tool development will also be discussed.

COSTS OF MAJOR COMPLICATIONS OF TYPE 2 DIABETES: A SYSTEMATIC REVIEW

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Background: Diabetes complications pose a significant economic burden to health care systems and constitute a major part of the cost of diabetes. Studies have shown that health care utilisation and costs of diabetes complications are higher among older people. Objective: To systematically collate the available information on costs of major complications of type 2 diabetes in Australia, Canada, UK and USA. Methods: Literature were searched in Medline, Embase, Cochrane, Scopus and EconLit to identify relevant English-language articles for the period

2005-2007. Included studies presented monetary estimates on costs of one or more type 2 diabetes mellitus complications among adults 18 years and above. All costs were inflated to 2016 values using the health care component of consumer price indices in the respective countries. All costs were then converted into 2016 international dollars (Int$) (a hypothetical currency that buys equal amounts of goods and services in all countries), to facilitate comparability across countries. Results: The annual direct medical cost of myocardial infarction associated with diabetes were Int$13,833, Int$9,875 and Int$17,193 per patient in Australia, UK and US, respectively. Stroke costs were estimated at Int$16,623 in Australia and Int$10,535 in UK. Annual per patient costs of heart failure were Int$18,424 in Australia and Int$13,030 in the US. Similar costs were reported for diabetic foot ulcer. Annual per patient costs were Int$18,285 for Australia, Int$17,145 for Canada, and Int$12,241 for the US. Costs of nephropathy varied considerably ranging from Int$8,590 in US to Int$34,002 in Australia. Conclusions: Despite variation in methodology, the findings suggest that costs of complications constitute a major part of the economic burden of diabetes. Therefore, there is a clear need for reliable cost estimates on diabetes complications in order to better understand the economic burden of the diabetes to enable reliable economic evaluation of diabetes prevention and treatment services.

Full Papers

EVOLUTION OF FAMILIAL CARE AND SUPPORT SYSTEMS FOR OLDER PEOPLE IN GHANA: A LITERATURE REVIEW

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Background and Objectives: This paper discusses traditional family care and support networks for older people in Ghana. It considers the place of care within traditional culture, how informal care has evolved over time and the nature of current state support systems designed to meet the needs of older people and their caregivers. **Methods:** A systematic search was done in Medline and PubMed. The search terms, family care OR informal care OR social support AND older people AND Ghana yielded 84 peer reviewed journal articles, of which only three met the inclusion criteria after careful examination. The reference lists of the three articles were reviewed identifying a further nine articles. **Findings**: The search yielded 12 peer-reviewed journal articles in total. The research summarised in these documents highlighted a decline in traditional family care networks in Ghana due to changing family composition and other relevant factors. Nevertheless, despite some formal state-provided services, adult children remain the primary providers of care and support to older people. **Conclusion:** Projected increases in the number of older people along with social changes, and the burden and constraints of caregiving cast doubts about the sustainability of relying on adult children to provide care and support to older people. There is an increased need for state intervention to ensure the health, material and emotional needs of older people and their caregivers as the proportion of older people increases in Ghana.

Rationale

Similar to other countries, Ghana's older population is growing rapidly due to declining birth rates and increased longevity (Biritwum, Mensah, Minicuci, Yawson, Naidoo, Chatterji, & Kowal, 2013). Birth rates are projected to decline from 3.94 in 2017 to 3.20 in 2030 and 1.90 in 2060 (International Futures, 2014), and the projected reduction will be greater than the decline in birth rates in the developed world (He, Goodkind, & Kowal, 2016). Ghana's older population (defined here as people aged 60 years or over) increased more than seven-fold from 213,477(4.5%) in 1960 to 1,643,381(6.7%) in 2010 (Ghana Statistical Service, 2013). It is further estimated that the percentage of older people will rise to 9.6% by 2050 (HelpAge International, 2015). A key policy issue is whether Ghana is ready for the challenges associated with population ageing (Darkwa, 2000; Ocansey, Awusabo-Asare, Kumi-Kyereme, & Boadi-Kusi, 2013).

Population ageing has positive and negative implications for the wellbeing of older people and society at large (He et al., 2016). While on the one hand, it signals development and success, population ageing is also associated with increases in service need, so will require updated policies, and programs to respond to the current and future care and support needs of older people (Debpuur, Welaga, Wak, & Hodgson, 2010). The extended family has long been the primary source of support for older people in times of illness and frailty (Kumado & Gockel, 2003). This paper discusses traditional family caregiving and its evolution, bringing to light the modern model of familial care and support for older people. It further highlights current governmental and non-governmental support systems for older people, which provides a context for understanding current conditions for older people and their caregivers. Understanding how informal care has evolved over time and the nature of current state support systems will help plan for the future needs of older people and caregivers.

Methods

A systematic search was done in Medline and PubMed. The search terms, family care OR informal care OR social support AND older people AND Ghana yielded 84 peer reviewed journal articles, of which only three met the inclusion criteria after careful examination. The reference lists of the three articles were reviewed identifying a further nine articles, resulting in 12 peer reviewed journal articles in total.

The following three major themes were identified from the review: traditional care and support, care and support for older people in modern Ghana and the nature of governmental and non-governmental support systems for older people. This paper discusses the implications of these findings for policy and service development.

Traditional care and support

Before colonisation, life in Ghana was mainly rural with a patriarchal social system based on kinship (Ofori-Dua, 2014; Ray, 1986), and solidarity and mutual respect being the core features of the traditional Ghanaian way of life (Nyanguru, 2008; UNICEF, 2009). The extended family, an honoured institution, offered social and economic support to older people in times of economic hardship, disability, and isolation (Kumado & Gockel, 2003; Nukunya, 2003). Kumado and Gockel (2003) emphasised the relevance of the extended family whereby "traditional extended family practices transcended socioeconomic protection to offering psychological stability and moral upliftment" (Kumado & Gockel, 2003, p. 1). In traditional Ghanaian society, older people imparted wisdom to the younger generation. This explains the reason why when an older person dies, Ghanaians say "a library has caught fire" (Nyanguru, 2008, p. 52). Older people were respected in traditional Ghanaian society because they were considered as seniors and the repository of sociocultural customs and traditions (Van der Geest, 1997). However, as detailed in the next section,

traditional care and support for older people is breaking down (Brown, 1999; Nukunya, 2003), with increasing modernisation and urbanisation.

Care and support for older people in modern Ghana

In modern Ghana, the traditional extended family support system, which was multigenerational in nature, has declined, placing the primary responsibility for care of older people on adult children (immediate family) to care for ageing parents (Brown, 1999; Nukunya, 2003; Ofori-Dua, 2014; Sackey, 2005). The World Health Organization's Study on Global AGEing and Adult Health (SAGE) Ghana Wave 1 confirmed that adult children provided most of the care and support (90.9%) for older people (Biritwum, Mensah, Yawson, & Minicuci, 2013). Moreover, a study in Bamang, in rural Ghana, revealed that 20 out of the 30 older people who participated in the study depended on their children for care and support (Ofori-Dua, 2014).

Several factors have accounted for the breakdown of the traditional extended care and support for older people. One factor is migration, with Van der Geest (2002b) reporting on how movement of farmers to other rural areas where they could acquire vast tracts of arable land led to separation of family members. Migration to urban centres or abroad have also accounted for the breakdown in traditional family ties (Brown, 1999; Nyanguru, 2008; Oppong, 2006). For instance, in the wake of the economic instability of the 1980s, when about two million Ghanaians left the country to work abroad, 63% of older people lost the support of one or more of their children (Government of Ghana, 2010). Other factors include modernisation of society, introduction of formal education, population growth, a capitalist economy, economic hardship, and arrival of numerous religious doctrines (Nukunya, 2003; Ofori-Dua, 2014; Van der Geest, 2002b). Education has led to the instilling of modern values, inquiring minds, and the projection of new models of social relations (Nyanguru, 2008). The arrival of the Europeans in the 15th century brought Christianity to the land, which placed more focus on the nuclear family (Nukunya, 2003). Ofori-Dua (2014) noted that during Christian marriage ceremony, pastors refer to biblical scripts advising couples to leave their family and become one. Another factor has to do with the introduction of the Intestate Succession Law (Government of Ghana, 1985), which allowed the immediate family of the deceased to take control of family properties (Ofori-Dua, 2014). Prior to the introduction of this law, for instance, customs of the Akan ethnicity, the dominant ethnic group in Ghana, required that when a father died, his nephews were obliged to take control of the property and to take care of the entire family (Ofori-Dua, 2014).

While some children who travel abroad may provide financial or other support for a sibling caring for their older parent at home, Van der Geest (2002b) found that this was not always the case, with some caregivers complaining of not getting the financial support to care for ageing parents that they were promised. This may put an increased financial and physical burden on the remaining caregivers.

Nature of government and non-governmental support for older people

Government programs aimed at reducing the vulnerability of older people are mainly concerned with pensions and with providing access to health care. These include the Livelihood Empowerment against Poverty (LEAP) (Government of Ghana, 2008a), National Health Insurance Scheme (NHIS) (Government of Ghana, 2003), and Social Security and National Insurance Trust (Government of Ghana, 2009) programs. With regards to LEAP, eligible older people aged 65 years and over, and living in extreme poverty without any form of support, receive a grant from the Ministry of Gender, Children and Social Protection and are expected to enrol in the NHIS (Government of Ghana, 2007). The grants are minimal (between USD6 and USD12 bimonthly) so are not sufficient to support the needs of older people living in dire poverty, many of whom also lack family support (Dako-Gyeke & Oduro, 2013; Gbedemah, Jones, & Pereznieto, 2010). In addition to the inadequacy of grants, bureaucratic mismanagement has been found to delay cash payments to eligible beneficiaries (Abebrese, 2011) .

The NHIS (Government of Ghana, 2003) aims to ensure equitable health insurance for all Ghanaians, including older people (UNICEF, 2009). The NHIS covers prescriptions for diseases such as malaria, diarrhoea, upper respiratory tract infection, skin diseases, hypertension, diabetes and asthma (Government of Ghana, 2003). Retired public servants, people aged 70 years and over, childless older people aged 60-69, pregnant women, children under 18 years of age, and the extremely poor are exempt from making premium payments for health care (Ministry of Health, 2015).

In Ghana, there are no geriatric care units to care for the needs of older people (Ghana Business News, 2013). A study that assessed the policy and programs of Ghana reported that Ghana has a healthcare system that can address the health needs of older people (Araujo de Carvalho, Byles, Aquah, Amofah, Biritwum, Panisset, Goodwin, & Beard, 2015). As a result, the government has subsequently included additional measures to incorporate the health of older people into the health care system (Araujo de Carvalho et al., 2015) .

In 2009, the government introduced a three-tiered pension policy, the Social Security and National Insurance Trust, to replace the previous Cap 30 plan (Government of Ghana, 2006, 2008b). It comprises contributory social insurance and individual private pensions for the working population and voluntary contributions from those who work in businesses that are not controlled by the government (Kpessa, 2011b). However, workers in the informal sector are unable to contribute to long-term savings plans toward their income security in old age due to their limited income (Kpessa, 2011a, 2011b). Moreover, because the SSNIT is salary based, it is difficult for informal sector workers, who constitute the majority of the working population, to amass insurance entitlements. Six years after its inception, only 7.6% of people aged 65 years and older received a pension under this scheme (HelpAge International, 2015).

The Ghana National Ageing policy (Government of Ghana, 2010) shows that the government has some commitment to ensuring the well-being of the growing older population. Although no program has been established in Ghana to date, the policy seeks to revitalise the traditional model of familial care and support for older people. The government seeks to do this by incorporating traditional values and norms into relevant legislation including reviewing tax policies to provide tax concessions for those supporting older people, promoting public education on ageing and assisting family to identify, support and strengthen traditional support systems (Government of Ghana, 2010). Van der Geest (2016) considered the revitalisation to be unworkable, given demographic and economic changes and family values drifting away from traditional care, partly due to an increasing shift towards a nuclear family (Aboderin, 2006). A "right balance of family and state responsibility" (Aboderin, 2006, p. 164), is necessary to secure the wellbeing of older people and their caregivers. The Ghana National Ageing Policy (Government of Ghana, 2010) report does not make any provision for a government-funded pension, which could improve the lives of older people who worked in businesses not controlled by government. Moreover, there was no provision for long-term institutional care for the frail vulnerable older population without children, and living with a disability (Van der Geest, 2016).

While Ghana has no formal care system for older people (Ofori-Dua, 2014; Van der Geest, 2002b), there are some non-governmental organisations that provide care and support for older people. These include HelpAge International, Christian Health Association of Ghana, Sight Savers, Home Care Center, Ripples and Akrowa Aged Life Foundation. These programs do not meet the needs of all older people and are facing increasing financial challenges due to the rising ageing population (Van der Geest, 2016).

Implications for Policy and Service Provision

The wellbeing of older people and their caregivers should be a policy priority for the Ghanaian government. Currently, adult children are the main source of familial care and support for older people (Nortey, Aryeetey, Aikins, Amendah, & Nonvignon, 2017; Sanuade & Boatemaa, 2015; Van der Geest, 2002b). However, the sustainability of this care and support is in doubt. Financial, instrumental and social support should be provided to caregivers to minimize caregiving burden and difficulties, and to assist them in providing care when needed.

There should be formal and community care services provided for all older people with or without family care to promote their wellbeing. Moreover, support groups and respite care systems made up of trained caregivers should be introduced to aid caregivers who provide long-term care for frail older people at home. There is also a need for more research on caregiving for older people in Ghana to provide relevant data to aid policy and service development.

Summary/Conclusions

The literature has identified a decline in traditional wider familial care and support for older people in Ghana, leaving the burden on children of older people (Brown, 1999; Nukunya, 2003). The factors that have accounted for this change include employment of women, modernisation of society, rural-urban migration, and education. These changes are irreversible (Brown, 1999; Nukunya, 2003; Nyanguru, 2008; Ofori-Dua, 2014; Oppong, 2006; Van der Geest, 2002a). In a country where nursing homes, non-contributory social pension and government support of aged caregivers are non-existent, adult children may not be able to care for older people, despite their best efforts (Van der Geest, 2002a, 2002b). Further research is needed to gain more precise, in-depth understanding of the extent of met and unmet needs and the best balance between formal and informal care for older people in Ghana.

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REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION AND AGEING – WHAT ABOUT ASTROCYTES?

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The ageing brain

Ageing has various impacts on the brain, with well documented cognitive decline in memory, attentive and executive functions (Persson et al., 2006; Timothy A. Salthouse, 2004). A key feature of cognitive functions such as learning and memory is the plasticity of the brain, which is the ability to rearrange functional and anatomical connections at an individual and network level in response to environmental cues (Dunlop, 2008). Brain plasticity, or neuroplasticity, is impaired in aged humans and animals (Calabrese, Guidotti, Racagni, & Riva, 2013; Müller-Dahlhaus, Orekhov, Liu, & Ziemann, 2008; Tecchio et al., 2008). These age-related changes are not due only to neuron loss, but also involve circuit disruption via structural alterations and molecular changes to neurons (Morrison & Hof, 1997). Additionally, the impact of glial cells, especially astrocytes, on the reduced neuroplasticity with ageing is becoming increasingly recognised (Finch, 2003). Repetitive transcranial magnetic stimulation (rTMS) is a powerful brain stimulation tool that can be used to provide novel insights into the mechanisms that affect neuroplasticity with ageing.

Repetitive transcranial magnetic stimulation

The induction of neuroplasticity has therapeutic potential to restore function for neurological diseases and disorders, assist in injury repair, and counteract cognitive impairment. This could have a significantly beneficial effect on the ageing population, and ease economic and societal burdens associated with ageing. One such technique to modulate and induce neuroplasticity is rTMS, a non-invasive brain stimulatory approach via electromagnetic pulses (Pell, Roth, & Zangen, 2011). rTMS devices generate changing magnetic fields, to induce electric currents, which in turn affect charged particles and electrically sensitive substances such as brain tissue (Ridding & Rothwell, 2007) while passing through electrical insulators, such as skin and bone, unaffected. Although the mechanism of action rTMS has on brain cells and networks is not yet completely understood, it is suggested to modulate cortical excitability and neuroplasticity through altering the synaptic strength of neurons, analogous to the synaptic plasticity paradigms of long term potential and long term depression (Tang, Thickbroom, & Rodger, 2015; Vlachos et al., 2012). Furthermore, low intensity rTMS, that stimulates below neuronal action potential threshold, can also affect neuroplasticity, as previously shown clinically, and experimentally *in vivo* in humans (Martiny, Lunde, & Bech, 2010; Robertson et al., 2010) and in animal models (Makowiecki, Harvey, Sherrard, & Rodger, 2014; Rodger, Mo, Wilks, Dunlop, & Sherrard, 2012), although likely through different mechanisms. The effects of rTMS in human subjects are often transient, and difficult to replicate, with high variability between subjects (Maeda, Keenan, Tormos, Topka, & Pascual-Leone, 2000). Nonetheless, customisation of stimulation frequency and intensity paradigms has led to a broad consensus of excitability and inhibitory protocols at action potential threshold, suprathreshold and subthreshold levels (Wilson & St George, 2016).

rTMS and ageing

The effect of rTMS has been investigated in ageing humans and rodents, and has shown attenuated neuroplasticity induction and modulation in the aged cohorts compared to adults for some stimulatory paradigms. For example, pre-clinically, one week of high intensity 25Hz rTMS was applied to the hippocampus and posterior cortex of awake 3 months (adult), 10 months (ageing) and 24-26 months (old) rats. High intensity rTMS resulted in reduced paired pulse inhibition, frequency dependent inhibition, and serotonergic modulation of population spikes, and increased long term potentiation expression and in adult and ageing, but not old rats (Levkovitz & Segal, 2001). These results indicate the decreased rTMS-induced neuroplasticity in old rats compared to adult and ageing rats. Similar findings have been obtained in humans, for example, low frequency rTMS led to a reduction in motor evoked potential (MEP) amplitude in younger, but not older adults (Todd, Kimber, Ridding, & Semmler, 2010). However, intermittent theta burst stimulation (iTBS), an excitatory/facilitatory stimulation protocol has not shown any significant decline in motor evoked potentials (MEPs) in aged cohorts compared to adults by Young-Bernier, Tanguay, Davidson, and Tremblay (2014) and Di Lazzaro et al. (2008), although high inter-individual variability to the iTBS was noted in both studies. Given the decrease in brain size with age, and changes to cellular and network structure and function; variability and failure to find rTMS effects amongst ageing individuals could be reduced by improving the imaging, mapping, and electrophysiological techniques for coil placement for the ageing brain.

rTMS and Alzheimer's disease

rTMS has been used to further our understanding of neurodegenerative diseases, including Alzheimer's disease (AD) (Tatti, Rossi; Innocenti, Rossi, & Santarnecchi, 2016). Studies on the therapeutic effects of stimulation on people living with Alzheimer's Disease mainly focus on mild to moderate cases, because the potential to modulate neuroplasticity may be diminished in individuals with severe neurodegeneration (Anderkova & Rektorova, 2014). People with mild-to-moderate AD showed abnormal MEP facilitation with an excitatory 5Hz rTMS protocol (Inghilleri et al., 2006), indicating that atypical excitatory/facilitatory cortical plasticity may be present in people with AD (Freitas, Mondragón-Llorca, & Pascual-Leone, 2011). Interestingly, a recent meta-analysis reported that although rTMS and other non-invasive techniques have a significant and beneficial effect on cognitive performance in healthy ageing individuals, the effects were more pronounced in patients with AD (Hsu, Ku, Zanto, & Gazzaley, 2015). More specifically, Ahmed, Darwish, Khedr, Elserogy, and Ali (2012) applied 20Hz or 1Hz rTMS over

both hemispheres of the dorsolateral prefrontal cortex (DLPFC) of individuals with AD daily for 5 days, and reported mild to moderate patients, but not severe patients, that received 20Hz showed reduced duration of transcallosal inhibition (but no changes to active or resting motor threshold) after the final stimulation; and improved significantly on all clinical behavioural tests of cognitive function after the final stimulation, and at 1 and 3 months post-stimulation. Similarly, Cotelli et al. (2011) applied 20Hz stimulation (with different intensity and pulse train and stimulus intervals duration to the above study) daily for 5 days a week over 2 or 4 weeks to the DLPFC cortex of patients with AD. The authors found that auditory sentence comprehension improved following rTMS at 2 weeks and 12 weeks from the beginning of stimulation, but no other cognitive performance relating to memory, executive function or language abilities showed improvements. By examining individuals in the weeks to months following stimulation as per the above studies, issues of transience can be explored in the hope of producing more long-lasting therapeutic effects.

Another study examined the effect of rTMS paired with cognitive training on the cognitive function of patients with AD, and delivered 6 weeks of 5 days a week 10Hz stimulation with three additional months of non-stimulatory maintenance to two varying locations of cognitive interest a day (Rabey et al., 2013). There was a significant improvement in scores relating to cognitive performance and clinical status of patients with AD at both the 6- and 12-week time points, with little attenuation of the effect over time. Beneficial effects of pairing rTMS with cognitive training have been reported in similar studies (Bentwich et al., 2011; Lee, Choi, Oh, Sohn, & Lee, 2016).

In pre-clinical research, a more mechanistic approach has been taken related to rTMS effects on neurodegenerative disorders. For example, rats with an amyloid β (Aβ) induced hippocampal toxicity received two weeks of daily 1Hz rTMS, which resulted in partially restored hippocampal synaptic plasticity, and rescued neurotrophic and growth factor levels and excitatory neurotransmitter receptor expression (Tan et al., 2013). These molecular changes to neuroplasticity were associated with significantly increased spatial memory performance in the Morris water maze, however, it is not known whether the beneficial improvements observed in the study were accompanied with the removal of Aβ from the rat brains. Another study applied two weeks of daily 1Hz rTMS to adult (6 month) and ageing mice (15 month) at 110% or 150% resting motor threshold, and found that the 110% intensity led to beneficial spatial memory behavioural and molecular neuroplasticity changes whereas the 150% intensity resulted in detrimental changes (Ma et al., 2014). The higher intensity rTMS (that is 150% intensity) may have hastened senescent neurodegeneration. Experimental research on the effects of rTMS in ageing, cognitive decline, and neurodegenerative diseases requires greater focus on more immediate changes following rTMS to understand the mechanisms that are affected in senescent brains before assessing chronic effects. This could be achieved with gene expression analysis in the hours following stimulation, and electrophysiological recordings to interpret changes in neuroplasticity.

rTMS and astrocytes

The age-dependent changes in the brain are not all attributable to impaired neuronal function and neuronal degeneration. Established and emerging research now indicates glial cells, the non-neuronal cells of the brain in having a fundamental role in cognition (Chung, Welsh, Barres, & Stevens, 2015; Perea, Sur, & Araque, 2014), neuroplasticity (Pannasch & Rouach, 2013), degenerative diseases (Chin & Goldman, 1996) and injury outcome (Cregg et al., 2014). Astroglial cells are the most numerous of the non-neuronal cell types, and play a critical and multifaceted role to the homeostatic and normal function of neuronal activity (Pascual et al., 2005; Seifert, Schilling, & Steinhäuser, 2006; Simard & Nedergaard, 2004; Takano et al., 2006). However, in the ageing brain, astrocytes cells become increasingly reactive and chronically exacerbate detrimental inflammatory activity (Badan et al., 2003; Kyrkanides, O'Banion, Whiteley, Daeschner, & Olschowka, 2001). However, it is less clear what impact the age-altered glia have on neuroplasticity, function, and structure in the healthy ageing brain. Furthermore, is the declining function and degeneration of neuroglial cells in the ageing brain just a part of senescence, or are there external factors, such as lack of exercise (Kirk-Sanchez & McGough, 2014), which influence their detrimental progression?

While research shows that glial cells can be influenced by electromagnetic fields (Cullen & Young, 2016), responses of glial cells to rTMS has not been characterised to the same extent as the responses of neuronal cells. In a recent study, one week of daily 50Hz high intensity rTMS following a cerebellar lesion in rats led to reduced protein expression and immunohistochemical staining of GFAP and IBA1, the hallmarks of astrocyte and microglial cell reactivity, at the pontine nuclei (Sasso et al., 2016). Along with the attenuated glial activation, reduced neuronal death and improved neurological recovery were observed. However, the effects of rTMS on glial activity may not be applicable to all models, with 6 days of daily low intensity 1Hz or a complex 6-9Hz rTMS following transient focal cerebral ischemia failing to elicit changes in astrocyte or microglial responses (Bates, Clark, Meloni, Dunlop, & Rodger, 2012); although a significant increase in macrophage infiltration was observed in 6-9Hz and 1Hz stimulation groups, suggesting impaired blood brain barrier compared to sham stimulation. The different effects of rTMS in the injury models could be due to injury severity, differences in stimulation intensity or stimulation frequencies applied. Recently, we investigated the effect of two weeks low intensity rTMS on adult (3 month) and ageing (18 month) male and female mice following a penetrating cortical stab injury. Immunoreactivity for GFAP (astrocytes) and IBA1 (microglia) was assessed, with the density of GFAP-positive astrocytes and IBA1-positive microglia significantly reduced following 1Hz and 6-9Hz in adult and aged female mice, but significantly increased in adult and age males (Clarke, Penrose, Harvey, Rodger, & Bates, 2017). Sex differences following injury are extensively documented (Kyrkanides et al., 2001), however the contrasting effect of rTMS on glial reactivity markers between male and female mice was not expected. Unexpectedly, the effects of rTMS of astrocytes

and microglia were of a greater magnitude in the aged mice compared to the adult mice, which may be suggestive of rTMS altering inflammatory associated pathways rather than neuroplasticity changes.

Conclusion

A key aspect of improving the efficacy of rTMS in ameliorating senescent effects on the brain will be to elucidate why rTMS is less successful at inducing neuroplasticity in ageing populations. Considering that glial cells have such crucial roles in healthy brain function, and display a detrimental functional senescent transition, the investigation of rTMS and other non-invasive brain stimulation techniques should be more inclusive of glial effects, particularly in pre-clinical models. Research into whether the effects on rTMS on glia are direct, or act indirectly through neuronal modulation are required to further advance therapeutic avenues for rTMS. rTMS should be applied to aged individuals with caution until potential detrimental effects further investigated, with the functional differences between glia in adult and ageing populations carefully considered. This is an important issue, as the heterogeneity of glial activity may be a contributing factor in variation between individuals, and may permit personalised therapeutic approaches..

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ADDRESSING ELDER ABUSE IN GENERAL PRACTICE

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This paper discusses how a social psychology principle, the bystander effect, can help us determine whether elder abuse policy, guidelines, and learning materials aid general practitioners (GPs) to make decisions to intervene in suspected elder abuse cases. GPs are mandated to recognise, assess, understand, and manage elder abuse and neglect. However, research demonstrates that GPs do not consistently notice elder abuse signs, struggle to define cases as abusive, do not always recognise their professional responsibility to intervene, experience a lack of education about elder abuse response, and hold ethical concerns about damaging the GP / patient relationship by intervening. The professional bystander intervention model describes five steps to helping which mirror these GP challenges very closely: (1) noticing relevant cues; (2) construing the situation as suspected elder abuse; (3) deciding the situation is a personal responsibility; (4) knowing how to deal with the situation; and (5) deciding to intervene. Based on an analysis of key elder abuse sources, the authors illustrate five major themes from the data and focus on the central theme; separating intention to harm and carer stress when defining elder abuse. Our analysis reveals that the sources include information that may help GPs to define elder abuse, particularly when carer stress is present, however, their efficacy to do so may depend on the ability of individual GPs to separate these concepts

Elder abuse is commonly defined as "…a single, or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust, which causes harm or distress to an older person. Elder abuse takes various forms such as physical, psychological, emotional, or sexual and financial abuse. It can also be the result of intentional or unintentional neglect." (WHO, 2002).

Despite general practitioners (GPs) being mandated to recognise, assess, understand and manage elder abuse (RACGP, 2014), intervention in elder abuse presents ethical and practical challenges for GPs (Johnson, 2000). This is further complicated by differences in GPs' and older Australians' perceptions of what constitutes elder abuse (Hempton et al., 2011) and differences in their perceptions of the severity of abuse: GPs perceive specific cases of elder abuse as less severe than older Australians do (Helmes & Cuevas, 2007). The current paper presents a thematic analysis of elder abuse policies, guidelines and training materials for GPs, and represents one of three studies in the lead author's PhD program of research. This work is using qualitative thematic analysis to examine the role of the GP to address elder abuse in Australia. The later studies involve analyses of interview data with GPs and older Australians. Importantly, the purpose of this work is not to point fingers at GPs or suggest poor practice. Rather, it is to present a clear and coherent analysis that tells the story of the dataset (Braun & Clarke, 2013). The specific research question addressed in this paper was: *What do the themes, derived from a qualitative analysis of NSW elder abuse policy, clinical guidelines, and learning materials, tell us about the efficacy of these documents to help GPs respond affirmatively through the five steps of the professional bystander intervention model?*

According to the bystander model (Darley & Latane, 1970) there are five steps to helping. This has been recently revised in the professional bystander intervention model to examine responses to elder financial abuse in the UK (Gilhooly et al., 2013). In the current study, this model was extended to include all forms of elder abuse. The five steps in the revised model are: (1) noticing relevant cues; (2) construing the situation as suspected elder abuse; (3) deciding the situation is a personal responsibility; (4) knowing how to deal with the situation; and (5) deciding to intervene.

Methods

The dataset comprised four key sources, selected on two factors: the geographical location of the research (NSW, Australia) and the authoritative scope of the documents (from macro to micro). They were: (source i) the NSW Government elder abuse policy, developed by Family and Community Services (NSW Government, 2015); (source ii) the Royal Australian College of General Practitioners (RACGP) clinical guideline for abuse and violence (RACGP, 2014); (source iii) an online RACGP elder abuse training webinar (RACGP, 2015); and (source iv) the video case study of elder abuse (titled "The Kleins") associated with the webinar (Victorian Department of Health and Human Services, 2015).

Results to date

NVivo 11 was used to conduct the initial content analysis of the dataset, resulting in 69 codes. Patterns of codes were identified and led to the development of candidate themes. Thematic analysis and interpretation resulted in five final themes, which were respectively mapped onto the five steps of the professional bystander intervention model (see Table 1).

The following discussion focuses on theme two: 'Separating intention to harm and carer stress when defining elder abuse'. Intention to harm, carer stress and defining elder abuse were the most frequent codes in the initial coding process and formed a consistent pattern across the entire dataset. Carer stress is debated in the literature as being a poor, but often cited, predictor of the emergence of elder abuse. (Bergeron, 2001; Brandl & Raymond, 2012; Pillemer & Finkelhor, 1989) .

Table 1
Results of Thematic Analysis of the Elder Abuse Sources.

Theme		Supporting extract
1.	Awareness precedes observation	'It's actually thinking about the fact that this might happen, because often, if you don't have that suspicion there, you may not recognise these bruises that Mr Klein had as actually indicators of abuse.' (source iii)
2.	Separating intention to harm and carer stress when defining elder abuse	'I think what it's important to note is that the intent may not have been to do harm. But the result was definitely harm to an older person...' (source iii)
3.	A GP mandate for managing elder abuse is inconsistent across the sources	'Elder abuse needs to be considered by any health practitioner seeing elderly patients, as they have a pivotal role in the recognition, assessment, understanding and management of elder abuse and neglect'. (source ii) Note: NSW policy (source i) does not specifically recognise the role of the GP, but does recognise other professional roles (e.g., police and NSW elder abuse helpline).
4.	Deciding how to intervene for both the victim and perpetrator	'…the needs of the older person at risk of abuse or who has been abused and the abuser must be kept separate at all times. (source i) Winnie [elder abuse victim] remains in her daughter's [perpetrator] house with some extra aids… which allows her daughter time out of the house; and Winnie attends the day centre once a week. (source ii)
5.	Implementing interventions through interagency solutions	'You may involve the home nursing service, home help, day centre, carer support groups or other local services.' (source ii & iv)

This theme captures the notion that a GP's suspicion of elder abuse may be subsumed by a diagnosis of carer stress. This can result in failure to construe a situation as suspected elder abuse, despite the GP having concerns for the victim and is illustrated in the following case study:

> *Since Winnie [elderly mother] has moved in, there is not much space in the house and the children are fighting more often… Winnie's daughter receives no help from her other sisters and is expected to cope with the increased washing, cooking and other duties… When you [the GP] make house calls to Winnie you notice that she has marks and bruises on her arms and upper torso. These are explained away by her daughter, who says that she is becoming clumsier and keeps knocking into things…You are worried about pressing the issue because your clinic is the only one in town and you do not want to upset anybody.* (source ii)

Caregivers are often held in high regard for providing unpaid work that benefits vulnerable community members. This can make it difficult for GPs to label their actions as abusive, especially if due to apparent stress. Addressing this, the NSW policy states: *'Carers play a very important role but due to circumstances may become abusive. These circumstances include: the stress of the carer role…'* (source i).

Associated with carer stress is the concept of unintentional harm. Unintentional harm poses a challenge to healthcare professionals when defining cases of elder abuse (Yechezkel & Ayalon, 2013). The RACGP webinar host responded to this challenge:

> *…I think the answer is yes, this is elder abuse, because if we go back to the definition, any pattern of behaviour causing harm to an older person within a relationship of trust, then clearly… Mr Klein has been harmed… I think what's important to note is that the intent may not have been to do harm. But the result was definitely harm to an older person,*

and that's what we really have to look at…
So yes, this is a case of abuse. (source iii).

Separating the definition of elder abuse from unintentional harm and carer stress requires good questioning skills on the part of the GP. This is a key component of developing accurate interpretations of a situation before deciding to intervene (Darley & Latane, 1970).

> *[GP talking with elder abuse victim separately from the perpetrator]*
>
> Dr Brewer: "Bill, how long do you reckon I've been your family doctor?"
>
> Mr Klein: "Huh, since um... oh... nah, don't remember."
>
> Dr Brewer: "Well, I'd say about 25 years… Look, Joan's a good woman. Together I've seen you raise a loving family… but I need to be upfront with you. I'm concerned about those bruises… you need to know they're making me wonder whether Joan is tired or struggling. Maybe both of you are under pressure. Do you think Joan is struggling…?"
>
> Mr Klein: "Yeah."
>
> Dr Brewer: "Look, I firmly believe that there are issues at home, and that you both need help. Would it be alright if I talk to Joan about services that might help you both?" (source iv).

Implications for policy and practice

This research highlights the need to ensure that: (1) policies, guidelines, and training materials transfer knowledge from the literature about carer stress and elder abuse; and (2) GPs are adequately trained to acknowledge both elder abuse and carer stress, and that decisions to diagnose genuine cases of elder abuse are not subsumed by diagnoses of carer stress.

Summary

This research sets out to examine if key elder abuse sources provide a platform for Australian GPs to follow the five steps of the professional bystander intervention model for responding to elder abuse. Four documents were selected for thematic analysis resulting in five themes that map onto the bystander effect model. A central theme in the data, and the literature, is 'separating intention to harm and carer stress when defining elder abuse'. The analysis suggests that the efficacy of the sources to help GPs construe situations as suspected elder abuse (step two of the professional bystander intervention model) remain unclear or may be more effective for GPs who are comfortable separating the concepts of carer stress and unintentional harm from cases of suspected elder abuse.

Despite academic debate (Bergeron, 2001; Brandl & Raymond, 2012; Pillemer & Finkelhor, 1989), carer stress remains closely entangled with elder abuse in policy, guidelines, and training materials. The efficacy of the four sources to help GPs construe situations as suspected elder abuse, especially in cases involving carer stress or unintentional harm, remain unclear and may depend on GP preferences for addressing either carer stress or elder abuse, rather than acknowledging them both collectively.

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COUPLES' PRIVACY IN RESIDENTIAL AGED CARE

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Currently, a third of Australian aged care residents are partnered, with many experiencing institutional interference in their relationships. Staff duty of care usually takes precedence over privacy. Some institutions separate couples; residents' doors may be kept open; staff enter without knocking, ignore 'do not disturb' signs, or gossip about residents; all of which make privacy a challenge. This paper reports on findings from an online survey into the needs of partnered Baby Boomers (born 1946 -65) and the levels of privacy that they anticipate they will require to maintain their primary relationships in residential aged care facilities. At a time marked by a policy shift towards consumer-directed residential aged care, it is pertinent to understand the needs of this subset of future consumers. Our research found that the majority of respondents expected to remain sexual indefinitely, considered physical intimacy with their partners essential to their wellbeing, and required a high degree of privacy to maintain their relationships. Respondents were asked to rate seven domains of privacy. Those considered most important were visual privacy, private space, and bodily privacy. This paper outlines various ways for service providers to prepare for the next generation of consumers, initiatives that would enable residents and their families to make informed decisions when choosing a facility, potentially improving the experiences of both residents and staff.

Introduction

In 2014-15, 51,444 permanent Australian aged care residents (30%) were married or partnered (Australian Institute of Health and Welfare [AIHW], 2005), many of whom were separated when one partner entered care alone. Research suggests that when entering together, some institutions actively separate partners and/or restrict privacy (Bauer et al., 2013; Rahn, Jones, Bennett, & Lykins, 2016). Common practices include keeping residents' doors open, staff entering without knocking, ignoring 'do not disturb' signs, or gossiping about residents (Bauer et al., 2013). Whether in care together or living separately, such conditions make it difficult for couples to maintain their intimate relationships (Edwards, 2003). Opportunities for physical intimacy depend on perceived privacy within the residential aged care facility (RACF) (Hajjar & Kamel, 2004). From the perspective of staff, balancing duty of care with respect for residents' privacy represents a challenge, with staff holding the balance of power (Petronio & Kovach, 1997).

Expressions of physical affection can influence the quality of relationship and partner satisfaction, which in turn may affect the health and wellbeing of each partner. Evidence exists that caring physical contact benefits both partners by regulating emotion, lowering stress hormones, promoting health and wellbeing and fostering long-term survival and quality of life (Debrot, Schoebi, Perrez, & Horn, 2013; Rancourt, MacKinnon, Snowball, & Rosen, 2017). Likewise, regular and positive sexual interactions influence relationship satisfaction (Heiman et al., 2011). Despite some aged care residents remaining sexually active, staff and family members often perpetuate ageist stereotypes that older people are asexual (Bauer et al., 2013; Hajjar & Kamel, 2004), resulting in partners being afforded little to no privacy.

The *Aged Care Act 1997* (Cth) purportedly protects residents' privacy. However, without a universal definition of privacy (Australian Law Reform Commission [ALRC], 2008; Leino-Kilpi et al., 2001), the concept remains open to normative and subjective interpretations. Privacy is considered by many to be a basic human need that supports (1) personal autonomy; (2) emotional release; (3) self-evaluation; and (4) protected communication (Leino-Kilpi et al., 2001). Research into privacy in health settings has identified seven domains of privacy: (1) physical; (2) psychological (3) bodily; (4) territorial; (5) communicational; (6) informational; and (7) social (ALRC, 2008; Leino-Kilpi et al., 2001).

This paper presents findings from phase three of a three-part mixed methods study (some findings not discussed here were reported in Rahn et al., 2016). One aim of the study was to investigate what degree of privacy partnered Baby Boomers anticipate needing to maintain their primary relationships in RACFs. The literature review prior to phase one revealed that there is currently a lack of research into consumer needs prior to entering residential care. At a time marked by an ageing Baby Boomer cohort, together with a policy shift towards consumer-directed residential aged care, it is pertinent to understand the privacy needs of future consumers, particularly the needs of partnered aged care residents, to identify whether existing aged care practices are suitable for this cohort.

Method

An anonymous questionnaire consisting of 36 questions, both quantitative and qualitative, was designed using a web -based survey tool (Qualtrics). This was subsequently tested on three experts for face validity and pilot tested on a small sample. Seven topics identified from interviews in phase one of the study informed the survey design: (1) demographic data; (2) important relationship ingredients; (3) attitudes to physical intimacy and sexual pleasure; (4) experiences of RACFs to date; (5) anticipated relationship and privacy needs in care settings; (6) types of services couples may require; and (7) steps taken to communicate one's future wishes.

After obtaining ethics approval from the University of New England, partnered Australian Baby Boomers (born 1946-65) were recruited using volunteer sampling. The survey was promoted for three months in 2016 via paid Facebook advertising, in electronic newsletters and on social media

pages and websites belonging to three organisations - COTA (Council on The Ageing), the Australian Association of Gerontology and Queensland AIDS Council (an organisation running aged care sexual diversity training). To participate, respondents followed an electronic link in the advertisement to the Qualtrics website, where they gave implied consent before commencing.

Results were analysed by the first author then checked by the three co-authors (collectively experienced in qualitative and quantitative analysis). To limit researcher bias, two qualitative data analysis techniques were used: (1) constructionist thematic analysis (see Braun and Clarke, 2006), using QSR NVivo software; and (2) automated web-based content analysis (Leximancer), which generates concepts and maps relationships between themes (see Smith & Humphreys, 2006). Basic quantitative analysis was also applied using Microsoft Excel software.

Results

Of 367 surveys received, 199 were excluded (46 did not meet inclusion criteria and 153 only supplied demographic data), leaving 168 valid responses. The majority of participants were born in Australia (n=125, 74%), lived in non-metropolitan areas (n=113, 67%) and earned less than $60,000 per annum (n=102, 61%). Australian Aboriginals/ Torres Straight Islanders were also represented (n=7, 4%). Additional demographics are detailed in Table 1. Due to the methods of promoting the survey, approximately 30% of respondents had work-related experience of RACFs.

Table 1
Participant Demographics

	N	% of total
Sex		
Female	142	84.5%
Male	26	15.5%
Year of birth		
1946-55	112	67.7%
1956-65	56	33.3%
Sexual Orientation		
Opposite sex attracted	152	90.5%
Same sex attracted	13	7.7%
Attracted to both sexes	2	1.2%
Attracted to neither sex	1	0.6%
Relationship status		
Married	125	74.4%
Cohabiting / De facto	27	16.1%
Single, in a relationship	9	5.4%
Other relationship structure	7	4.2%

For most participants, maintaining their intimate relationship was 'vital' (n=91, 54%) or 'somewhat important' (n=42, 25%). A key theme to emerge was 'togetherness', that sharing life together was important for both individuals' sense of wellbeing. Talking together, feelings of love, friendship, companionship, physical affection, kindness, playfulness, shared experiences, humour and laughter were listed as important elements. Respondents found it difficult to separate features of their relationship from the day-to-day business of living and sleeping together. The majority slept in a shared bed (n=150, 89%) and many (n=95) said sleeping together was both comforting and an essential part of their relationship. One woman described how they "both can't sleep without the other" and

> *…still long for that companionship, talking with each other…and praying together before we sleep. We hold each other's hand until we sleep...It's a great comfort and security to have him beside me* (FR30). ('FR' denotes female respondents (e.g. FR1, FR2, FR3) and 'MR' denotes males (e.g. MR1, MR2, MR3)).

Of those who slept separately (n=18), time in bed together was still an important setting for chatting and expressing physical affection, such as hugs, cuddling, kissing, holding hands, touching, stroking, massage and affectionate squeezes. Sexual enjoyment was also highly valued by the majority of participants, regardless of whether they slept together. Three quarters of men (n=18) and over half of women (n=78) considered sexual pleasure an 'essential' part of life'. More than half the sample (n=96, 57%) did not think they would ever stop being sexual.

When asked to rank seven domains of privacy, respondents identified (1) visual (being seen) (n=136) as most important; followed by (2) private space (control of self, room and belongings) (n=135); (3) bodily (nudity) (n=125); (4) acoustic (being heard) (n=121); (5) communication (talking, writing, internet access) (n=116); (6) who one socialises with (n=115); and (7) personal information/data (n=108). However, when analysed by sex, men identified communication privacy as the top priority (n=22, 92%) and bodily privacy as a low priority (n=15, 63%). Most participants (n=133, 79%) required 'as much privacy as possible' to feel comfortable expressing themselves intimately or sexually.

Implications for policy and practice

These results have important implications in terms of 'consumer-directed' care for partnered Baby Boomers. Providers need to consider: (1) an organisational privacy policy; (2) staff training to actively engage staff in supporting residents' privacy needs; (3) lockable residents' rooms, designed for visual and acoustic privacy; (4) protected internet access for residents; (5) rooms large enough to accommodate up to king-sized beds; and (6) bed sizes of choice. They also need to plan how they will cater to the privacy needs of residents whose partners live offsite.

Such recommendations may seem difficult to accommodate, unnecessary and/or inappropriate in a culture that devalues or ignores the sexual and intimacy needs of older people, but there are already moves to accommodate such needs in Australia and overseas. Facilities such as Aurrum in Erina, New South Wales; Australian Unity's Campbell Place, Victoria; and Nambucca Valley Care, New South Wales (to name a few) already offer couple suites with double beds.

Summary

It is difficult for people to know 10 to 20 years in advance whether or not they may remain partnered or feel the same as they do currently about their relationship. Nonetheless, it is clear that this group places a high value on their intimate partnerships and desire living environments that support those relationships. While not generalisable to all Baby Boomers, the results of this study present a range of attitudes that Australian aged care providers can expect to encounter from this cohort. Importantly, their shared bed is a highly valued setting in which much of their relationship is conducted, with the implication that providers need to offer options regarding room sizes, bed sizes and secure spaces. In addition, service providers can prepare for this next generation of consumers by: (1) developing clear privacy policies; (2) creating a culture of mutual rapport and respect between staff and residents; (3) designing built environments that support the privacy of partnered residents; (4) conducting individual privacy assessments of residents upon admission; and (5) including privacy needs in resident care plans. Such initiatives would enable residents and their families to make informed decisions when choosing a facility, potentially improving the experiences of both residents and staff.

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DETERMINING INDICATORS OF AGE-FRIENDLY PHYSICAL ENVIRONMENTS

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Background: Populations are ageing worldwide and the requirements of increasing numbers of older people need to be addressed in planning of cities and regions. Indicators of the urban physical environment can help identify key dimensions of need for the ageing population and serve as measurable tools to assess and improve the age-friendliness of physical environments. The World Health Organization (WHO) has developed a framework of resources and structures to enable interventions to improve age-friendliness of a city. However, there is limited knowledge on identifying and categorising the determinants of ageing and age-friendly indicators related to the physical environment. Objective: This paper therefore discusses indicators of the age-friendly environment focusing on aspects of the physical environment that are crucial to ageing population. Methods: Relevant research on age-friendly physical environments has been reviewed and scrutinised using document analysis. Results: This extensive review resulted in a list of physical environment indicators that are age-friendly. Conclusions: Cautious consideration should be given to adopting these indicators to obtain an appropriate assessment of age-friendliness of a city. Identifying indicators can be the preliminary theme for further ageing research. The success of established indicators, prioritisation of indicators and resulting economic benefits define the success of age-friendly plans and associated challenges. It is important that urban planners are involved in the research on developing indicators of age-friendly physical environment for designing age-friendly cities. Recommendations are aimed at evaluating the identified indicators for further validation for creating age-friendly living environments suitable for the overall well-being of aged people.

Rationale

The increase in life expectancy, coupled with declining birth rates over recent decades, has led to substantial population ageing throughout the world. The global population aged 60 years and more is increasing (WHO, 2007) and this demographic shift is generating social, economic and personal challenges for societies, families and individuals. One of the effective policy approaches for responding to demographic ageing is planning for communities to be more age-friendly (WHO, 2007). Age-friendliness can be supported through changes across various sectors, with the World Health Organization (WHO) identifying eight major areas for age-friendly cities (WHO, 2015), which are further divided into three main clusters (Jackisch et al., 2015); namely physical environment, social environment and municipal services (Figure 1). This paper only focuses on one cluster – 'physical environments', which is grouped under three categories: outdoor spaces and buildings, transportation and housing (as shown in Figure 1).

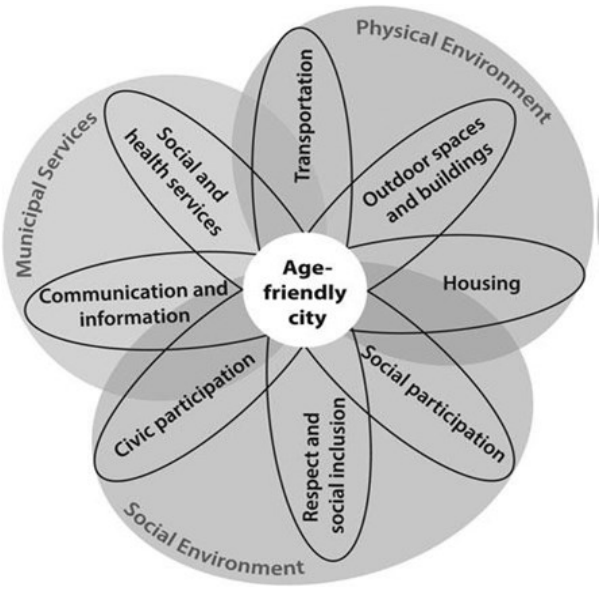

Figure 1. Three clusters for eight domains of an age-friendly city (Source: Jacklish et al., 2015)

Indicators are useful tools for baseline assessments, target setting, monitoring and evaluation (WHO, 2015). The indicators relating to age-friendliness can be used to measure the baseline level of age-friendliness of a city and monitor changes over time as relevant interventions are implemented (Coleman, 2015). In addition to identification of major areas for age-friendly cities, the WHO developed a general framework showing how certain resources and structures enable interventions in the form of policies, services and programs that promote the age-friendliness of physical and social environments (WHO, 2015). This framework has established a set of core and supplementary indicators to monitor and evaluate the progress in improving the age-friendliness of urban environments. This guide and the indicators presented within are not meant to be a prescriptive set of guidelines to be strictly followed but rather something to be adapted, as necessary and appropriate, to build an indicator set that is most meaningful and relevant in the local context. However, there are some limitations to the WHO's indicators set. First, while the core indicators have been selected to cover key outcomes of age-friendly city initiatives and, reliance on only the core set of indicators provides insufficient overview of the broader determinants of ageing and health. Careful consideration should be given to adopting the core indicators and supplementing them with additional indicators to obtain an assessment appropriate for the specific location. Second, the core indicators were developed with a focus on the urban context at the local government level which has limitations for investigating related issues in suburban and rural contexts and at higher levels of government or at broader geographic scales (WHO, 2015).

The core indicators put forwarded by WHO for measuring the age-friendliness for cities consist of equity, accessibility of the physical environment and inclusiveness of the social environment (WHO, 2015). Besides the core indicators by WHO, the Organisation for Economic Co-operation and Development (OECD) has developed indicators to measure ageing societies in terms of key 'indicators by sector' which

include health and social care, community activity, labour, housing/living environment, transport mobility and urban (OECD, 2015). Another set of indicators developed by Hanibuchi et al. (2012) include general trust, norms of reciprocity, attachment to a place, horizontal organization, vertical organization, meeting friends under social capital indicators and residential density, street connectivity, land use mix, availability of parks or green spaces under neighbourhood walkability. Likewise, several studies have suggested other indicators of age-friendliness (Cerin et al., 2016; Cicerchia, 1996; Coleman, 2015; Fitzgerald & Caro,2014; Jones et al., 2003; Molzahn, Gallagher & Mcnulty, 2009; Ruza et al., 2015; Landorf, Brewer & Sheppard, 2007; von Wirth, Grêt-Regamey & Stauffacher, 2015). However, few studies have considered the role of different aspects of the built or physical environment in contributing to ageing well. This paper reviews previous research to identify age-friendly indicators focusing on only the built or physical environment aspects based on previous research.

Methods

This paper is based on review of research papers on age-friendly cities and indicators and employed a three-phase approach as shown in Figure 2 below.

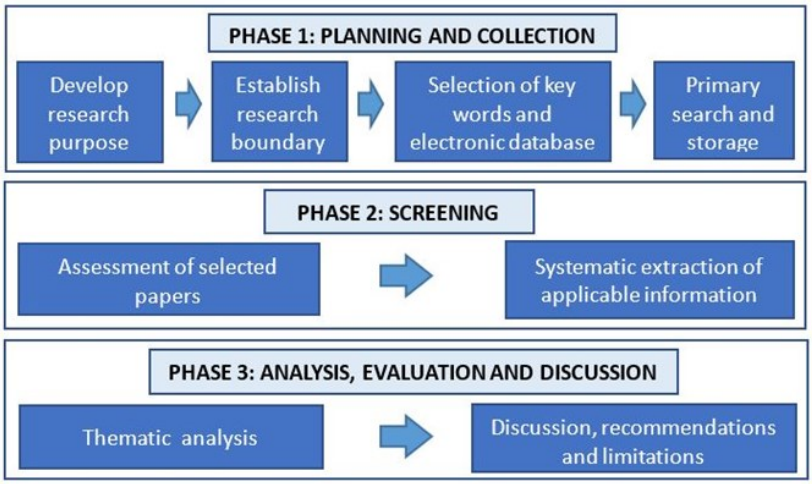

Figure 2. Depiction of the three-phase review and evaluation of previous research

Phase 1 (Planning and collection): In this phase, the research purpose was developed and research boundaries were established. The primary search was based on journal article/ book chapter/ conference papers over the period of year 1987-2017. The electronic databases included Google Scholar, Scopus, ProQuest, Web of Science, and Science Direct and the keywords searched included 'age-friendly cities', 'age-friendly indicators', 'age-friendly built environment', 'age-friendly physical environment'. This search resulted in a total of 214 articles being sourced.

Phase 2 (Screening): In this phase, the most suitable articles were identified based on the research context, relevancy, published year and scope. Articles that were out of scope or duplicates were rejected. The primary screening resulted in 72 articles being rejected, leaving 15 articles for the final assessment phase.

Phase 3 (Analysis, evaluation and discussion): In the final phase, thematic analysis of the 15 articles was conducted, involving a detailed evaluation, to identify themes on key areas for developing age-friendly communities sorting out the age-friendly physical or built environment indicators. The indicators pertaining to "age-friendly physical environments" are listed under three categories: outdoor spaces and buildings, transportation and housing (as shown in Figure 1).

Results

This paper reports the findings of a review and thematic analysis of the published literature resulting in a list of indicators related to physical or built environments categorized from the plethora of overall age-friendly indicators. A total of 215 age-friendly indicators were identified as contributing to age-friendly environment. Out of these, 88 were age-friendly physical environment indicators. Out of total 88 indicators, 34 indicators relate to outdoor spaces and buildings, 36 for transportation and 18 for housing. The most commonly reported age-friendly physical environment indicators identified are accessibility, safety, walkability, availability of different facilities and services, encouraging ageing in place (able to remain in same place), presence of outdoor seating, age-friendly parks and gardens, good public transportation facilities and community spaces, etc. The full list is presented in Appendix A.

Implications for policy and practice

The identification of age-friendly physical environment indicators can be the starting point for identifying processes by which cities initiate and implement age-friendly plans. It can assist in measuring the associated economic benefits which can define the success of age-friendly plans and the linked challenges. An age-friendly built environment index can assist in raising awareness and promote advocacy around the world emphasizing the need for designing physical environments suitable for ageing people (Coleman, 2015). This list of physical environment indicators will be helpful for achieving age-friendliness of a city. It can help developing strategies and policies for improving guidelines and specifications for designing age-friendly environments.

Summary

Thoughtful consideration should be given when adopting age-friendly indicators to ensure that an appropriate assessment of the local context is undertaken, identifying additional locally specific indicators in addition to the core WHO ones. Such research that develops age-friendly physical environment indicators have been found to be helpful for developing overall age-friendly environments. Further research evaluating the identified indicators is recommended, to validate their use promoting age-friendly living environments suitable that facilitate the overall well-being of older people.

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APPENDIX A

The Table 1 below is the summary of the result of this paper which shows the list of the indicators (measurable tools) that will be useful for creating age-friendly environment helping aged people to age well. The table is the list of only age-friendly indicators pertaining to physical or built environments which have been categorized into three domains: outdoor spaces and buildings, transportation and housing (see Figure 1 also).

Table 1

Age-friendly Physical Environment Indicators

Serial number	Indicators
Outdoor spaces and buildings	
1	Accessible / easy to access to Public transportation stops / transit points Public spaces Public buildings Parks Various facilities and services Recreational facilities Housing Public restrooms in parks and public areas Sidewalks and pathways Priority vehicle parking
2	Safe/ Secure Environment Traffic safety Safety in public places/ buildings and open spaces Personal safety Safety on public transit by training drivers, local policy and information for seniors
3	Walkability / walkable surroundings
4	Land use mix (accommodating more than one type of function within a set of buildings or a specific area)
5	Density of built up area
6	Availability of parks or green spaces
7	Build pocket parks
8	Ensure parks and gardens are designed with ageing and accessibility in mind including handrails, lighting, accessible benches, shade, clear markers, etc.
9	Develop senior designed park or garden within location of senior centres or housing
10	Create accessible raised garden beds
11	Increase access to farmers markets and community gardens
12	Benches in front of parks, stores, churches, libraries, post office and restaurants
13	Availability of community service centres
14	Pleasant and clean environment
15	Availability of outdoor seating or somewhere to rest
16	Adequate public toilets
17	Adequacy and availability of health and social services and specialized services
18	Proper location of the residences
19	Easy street pattern with good street connectivity
20	Measures to reduce difficulties due to street topography
21	Ensure comfort in physical environment
22	Ensure pleasure in physical environment
23	Place permanent interactive equipment in public spaces (such as chess table)
24	Seating at natural activity nodes with arm rests / back rests
25	Ensure libraries as age friendly hubs
26	Neighbourhood schools utilized as multi-functional facilities
27	Integrate hospitals and long-term care settings into neighbourhoods
28	Encourage intergenerational spaces
29	Ensure gathering spaces and parks offer clear visual viewing
30	Building addresses be legible to those with limited vision
31	Measures to combat severe climatic and weather conditions
32	Measures to combat air pollution
33	Adequacy and availability of accessible care and ageing well services
34	Preventive measures and planning for disaster preparedness for all providers of essential services
35	Availability of good transportation facilities
36	Adequacy and availability of public transportation facilities
37	Age-friendly vehicles and priority seating on buses

Serial number	Indicators
Transportation	
38	More convenient travel destinations
39	Well - maintained roads
40	Well - marked streets
41	Traffic calming measures
42	Community transport facilities
43	Good driving conditions
44	Adequacy and availability of parking facilities
45	Proper linkage between different modes of transport
46	Measures to control traffic congestion
47	Age-friendly pavements
48	Safe pedestrian crossings
49	Adequate and accessible walkaways and cycle paths
50	Ensure sidewalks are accessible, level and pedestrians are prioritized
51	Improve street lighting, street connectivity and street conditions
52	Ensure safe and connected pedestrian pathways
53	Redesign intersections at key locations to improve pedestrian safety
54	Separate pedestrians from vehicles such as providing traffic islands, wider sidewalks and bike lanes
55	Ensure safe walking routes to common destinations
56	Extend pedestrian crossing times and include countdown clocks
57	Restricting vehicle access in high pedestrian areas
58	Ensure that active transportation (biking, walking, public transit, etc.) is available in all areas of the city
59	Ensure that sidewalk meets width for wheelchair, pavement is smooth, level, non-slip and pedestrians are prioritised
60	Benches in bus shelters and at all public transit locations
61	Ensure that sidewalks connect to common spaces used by seniors
62	Ensure that street signage is present and legible
63	Implement car - free zones
64	Ensure warning signs of crossroads in advance
65	Accessible location and conditions of bus stops with proper bus shelters and lights
66	Large writing on all bus signs
67	Relocating bus stops to far side of intersection
68	Foster the use and availability of alternative transportation options such as van transport systems
69	Ensure easy mobility
70	Improve infrastructures for pedestrian
Housing	
71	A range of affordable and appropriate housing options
72	Neighbourhood satisfaction
73	Perceived home environment
74	Perceived building quality
75	Age - friendly buildings
76	Appropriate block size
77	Appropriate size of housing
78	Appropriate setback of dwellings from the street
79	Residential facilities for people unable to live at home
80	Home safety modifications and fall prevention services
81	Allow granny cottages and accessory dwelling units
82	Encourage ageing in place (remaining in same place as long as possible)
83	Encourage co-housing and other housing models
84	Encourage smaller and compact development
85	Discourage development of seniors only communities
86	Implement flexible zoning to allow for mixed-use and intergenerational uses
87	Increase disaster planning for senior housing providers
88	Ensure existing plan includes assisting vulnerable populations in emergencies

ERA 2018 National Conference—Monash University

The ERA 2018 National Conference will be taking place in Melbourne on 19 and 20 November and will be hosted by the newly established *Dementia, Ageing and Neurodegeneration Network* at Monash University. The network is a Monash-wide initiative involving researchers from all faculties and is focused on building collaborative and innovative research in the area of ageing, building on the expertise across the university.

The co-convenors of the network, Professor Julie Stout and Dr Ian Harding, are keen to support doctoral and early career research with the network holding its inaugural Research Symposium on 28 November 2017 (just a couple of weeks after ERA 2017!) which will be highlighting the work of students and ECRs.

The network is excited at the prospect of hosting ERA in 2018 and looks forward to welcoming you to Melbourne in November next year.

Like this year, ERA 2018 will be immediately prior to the Australian Association of Gerontology conference to make it easy for people to transition between our two ageing conferences.

To keep up to date, join our mailing list at

http://www.era.edu.au/era-register.php

Professor Julie Stout

Dr Ian Harding

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