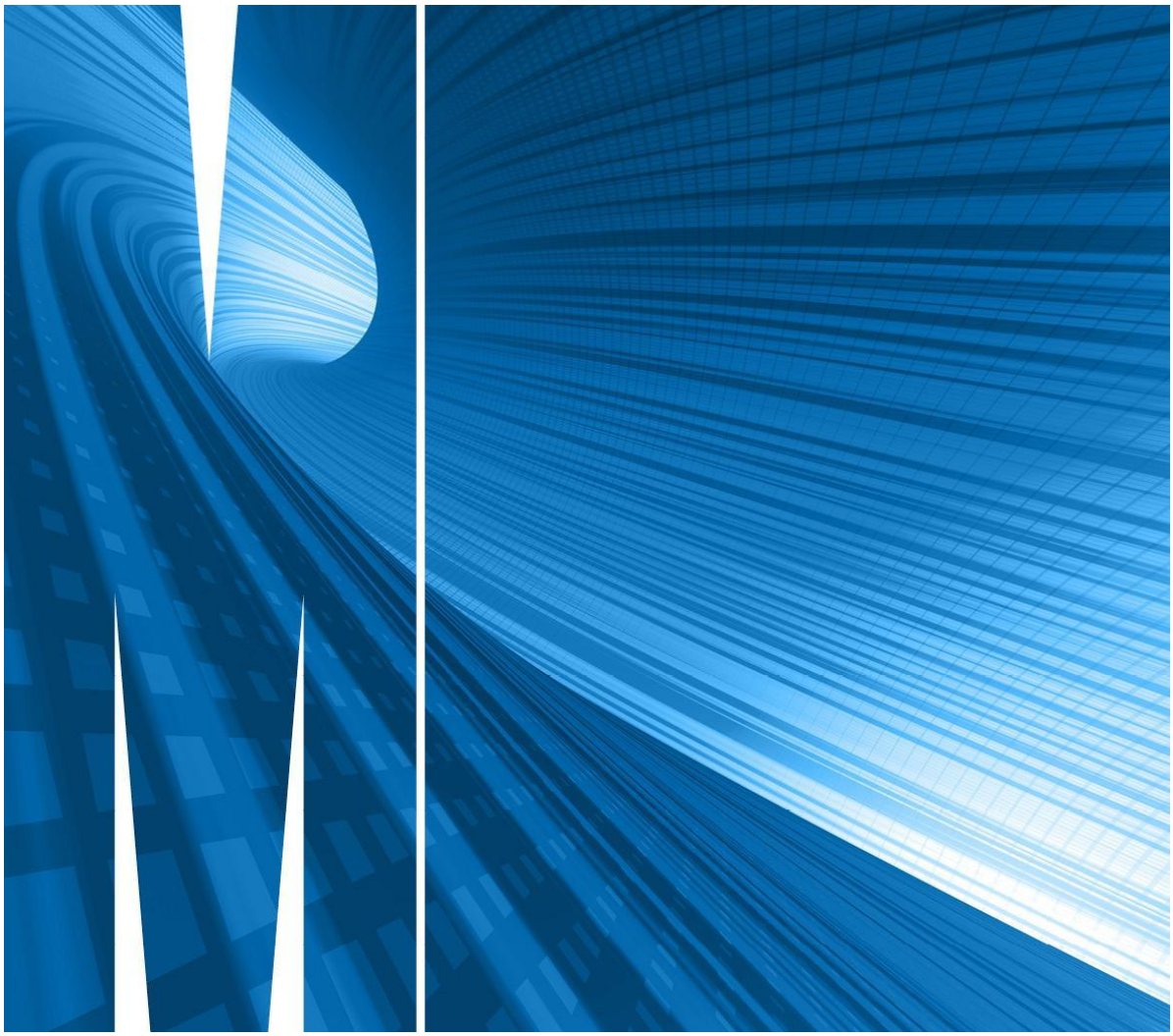
MONASH University

FACULTY
OF
ARTS



Rapid Evidence Assessment of Active Ageing and Healthy Behaviours for Veterans

Technical Report

February 2022

Prepared for the Department of Veterans' Affairs by N Warren, B Barbosa Neves,

Acknowledgements

This project was funded by the Department of Veterans' Affairs (DVA).

We acknowledge the work of staff members from Monash University who were responsible for conducting this project and preparing the report.

Associate Professor Narelle Warren (Project Lead), Dr Kate Burns (Project Manager), Dr Barbara Barbosa Neves, Dr David Colón-Cabrera, and Lewis Johnstone assisted in developing the search strategy, undertaking title, abstract and full-text screening, completing quality assessments and data extraction of the included peer-reviewed studies, and preparation of the project reports.

The authors acknowledge the traditional custodians of the unceded lands on which this work was undertaken. We recognise their continued connections to the land and waters and thank them for caring for Country for thousands of years. We acknowledge that they never ceded sovereignty. We pay our respects to First Nations Elders past and present, and honour their unique cultural and spiritual relationships to the land, and their rich contribution to society.

Table of contents

Executive summary

Veterans have unique health needs, outcomes, and challenges (AIHW, 2020; Brewin, et al., 2011; Finlay et al., 2019). This is particularly pronounced for veterans in middle- and later life (Wells, 2018), and may differ distinctly from non-veteran peers. These unique health needs are central to this rapid evidence assessment (REA).

While serving, veterans may generally have good physical and mental health with the support and structure provided by the Australian Defence Force (ADF) (AIHW, 2020). As veterans transition out of service, re-establishing and maintaining civilian life can be undertaken successfully. Indeed, the nature of service in the ADF may promote protective factors, such as employment, maintaining physical fitness, and accessing health and welfare services, 'that can lead to improved health and welfare outcomes' (AIHW 2018: 2). Furthermore, military values such as a sense of service and giving back to the community may promote positive social engagement and wellbeing for veterans in their civilian life (Barnett et al. 2021). However, the experience is varied and, for some veterans, civilian life may present social, financial, health, and wellbeing challenges (Transition Taskforce 2018).

For some veterans, adjusting to civilian life after service can be difficult and they may face an elevated risk of mental illness, alcohol, and drug use (Elbogen et al., 2012). Links have been found between veterans and justice involvement, suicide, homelessness, post-traumatic stress disorder (PTSD), and traumatic brain injury (Finlay et al., 2019). These issues can persist throughout the life course, including into older age. Veterans may use drugs and alcohol to address trauma received from serving, other mental health conditions, interpersonal stress and difficulty adjusting to civilian life (Canada & Peters, 2017). By identifying existing interventions to support and sustain healthy behaviours in individuals as they move through the middle and later life stages, this research can assist in the design, implementation, and planning of interventions to encourage healthy behaviours in Australian veterans throughout their life course. The concept of 'active ageing' may offer insights as to how best to achieve this.

Aims and objectives

The REA project addressed the following research questions:

1. What interventions and programs have been successful in encouraging the adoption and continuation of healthy behaviours in adults belonging to the following groups: 45-64; 65-90; the general population; and veterans (in Australia or overseas)?

2. What factors and characteristics are instrumental in the success[1] of the identified healthy behaviour interventions?

3. What are the barriers to accessing successful interventions that have been identified?

4. Which interventions work well with people aged 45-64 and 65-90 experiencing physical, mental illness and/or low social participation?

5. What are the gaps and limitations of current research available for diverse veteran populations?

Definitions: Active ageing, veterans, and healthy behaviours

We employed operational definitions for the following key concepts:

Active ageing

The research adopts the World Health Organization's (2020) definitions of active and healthy ageing, which highlight the need to focus on supportive environments and the creation of opportunities for middle- and older adults to maintain functional capacity, social participation and wellbeing as they grow older. Active ageing emphasises the *process* of ageing, not a fixed state.

Veterans

A veteran is a person who served in *military* service, regardless of the length of service and whether they had been deployed. For the purposes of this REA, veterans living in Australia and overseas were included.

Healthy behaviours

A consideration of healthy behaviours includes both a prevention and promotion focus. This raises questions of access, the social determinants of health (SDOH), ability to make good choices, and then the capacity for reducing risks.

Methods

The literature review was conducted utilising DVA's Rapid Evidence Assessment (REA) protocol. This approach is well suited for the time frame of this project and the specificity of the research questions. Each research question was addressed using the methodology provided in the protocol. As a methodology, REAs are employed to provide the results of a systematic search focused on interventions and selected studies, which is focused in terms of a specific or limited scope and over a shorter period of time (O'Donnell et al., 2016).

Research Questions 1, 2 and 4 were expected to be answered through clinical trial and program intervention studies with veteran and non-veteran populations. We expected that, to respond to Research Question 3, observational and qualitative studies would be examined, and that Research Question 5 would require attention to all study types in order to the identify gaps and limitations of existent research.

Findings

Findings from the REA demonstrate that programs and interventions linking broader dimensions of healthy and active ageing can assist older veterans to have a positive later life. The research suggests that interventions that promote an active physical and cognitive lifestyle not only help prevent and combat mental and physical health decline as they also increase quality of life and well-being in later life. When integrated with the descriptive (non-intervention) article findings, further strategies to promote healthy and active ageing are identified (Caspi & Cojocaru, 2021; Fogle et al., 2020; Gao et al., 2015). These include promoting protective psychosocial characteristics (e.g., purpose in life), social connectedness (e.g., meaningful social connections), and social engagement, as well as healthy physical, mental and cognitive health behaviours. Below, we first outline the intervention-related findings before contextualising these through an integrative analysis of intervention and descriptive studies identified during the REA.

Findings suggest that successful and healthy ageing interventions should be informed by a set of core priorities, namely: 1) address social isolation and loneliness, 2) promote movement and physical exercise, 3) cognitive functioning, 4) quality of life and well-being, 5) consider veteran identity, and 6) reduce risk behaviours and mitigate risk factors.

Address social isolation and loneliness

- The REA results show the need to consider social isolation and loneliness in healthy or active ageing interventions for both veteran and non-veteran populations (Bartlett et al., 2013; Yeung et al., 2019).

Movement and physical activity

- Exercise provides a wide range of physical, cognitive, mental, and other health benefits for midlife and older people. Many of the intervention articles contained in the REA supported maintaining physical movement as an important aspect of active ageing.

Cognitive functioning

- Cognitive functioning is a central aspect of active ageing and can be linked, in some cases, to physical wellbeing and activity. Different types of physical exercise have been shown to benefit cognitive function in older people. Interventions that promote cognitive functioning through a holistic approach have reported successful outcomes.

Quality of life and wellbeing

- Much of the contextual literature in the REA highlighted the importance of understanding and harnessing older people's perceptions of healthy ageing (e.g., Rozanova et al., 2015; Cernin et al., 2011). A key point articulated in the contextual literature is about empowering older people to make decisions about their health, wellbeing, and quality of life.

Consider veteran identity

- A military identity can contribute to a sense of connection among veterans. It can change over time and result in both positive and negative outcomes (Barnett et al., 2021; Brewster et al., 2020).
- Those who can combine a military and civilian/family social identity have more stable transitions and civilian re-integrations characterized by a heightened sense of belonging (Barnett et al., 2021).
- Studies suggest that veterans may be more likely to take part in peer support programs run by veterans than in non-veteran programs (Barnett et al., 2021; Brewster et al., 2021).

Reduce risk behaviours & mitigate risk factors

- The review literature in the REA demonstrates that targeting risk factors, such as smoking or physical inactivity, can help prevent and mitigate illnesses and diseases in later life, contributing to healthy or active ageing (Krivanek et al., 2021; LaCroix et al., 2016).

Implications

Overall, the findings have the following implications for program development and research:

- Consider broader definitions of healthy and active ageing that include middle and later life perspectives (e.g., older people's understandings).

- Employ a strengths-based or capability model that is not based on a deficit approach to ageing and health.

- Involve veterans in co-design and implementation of interventions.

- Incorporate peer-led interventions and programs that enhance the needs, identity, and aspirations of veterans.

- Personalise interventions, integrating psychosocial contexts and overcoming a one-size-fits-all model.

- Develop ‘comprehensive’ or holistic interventions, engaging with more than one component of healthy or active ageing.

The articles included in the REA cover: understandings of active ageing; healthy behaviours for midlife and older adults; and core issues concerning active ageing of veterans. By identifying interventions to support and sustain healthy behaviours in individuals, this REA can inform the design, implementation, and refinement of interventions to assist veterans to age actively. Findings demonstrate that programs and interventions drawing on a strength-based approach that links broader dimensions of healthy and active ageing – from active physical and cognitive lifestyle to purpose in life – can support a positive later life for veterans.

Introduction

Veterans have unique health needs, outcomes, and challenges (AIHW, 2020; Brewin, et al., 2011; Finlay et al., 2019). This is particularly pronounced for middle-aged and older veterans (Wells, 2018) and may differ distinctly from non-veteran peers. These unique health needs are central to this research study.

While serving, veterans may generally have good physical and mental health with the support and structure provided by the Australian Defence Force (ADF) (AIHW, 2020). As they transition out of service, re-establishing and maintaining civilian life can be undertaken successfully (Transition Taskforce 2018). Indeed, the nature of service in the ADF may promote protective factors, such as employment, maintaining physical fitness, and accessing health and welfare services, 'that can lead to improved health and welfare outcomes' (AIHW 2018: 2). Furthermore, military values, such as a sense of service and giving back to the community, may promote positive social engagement and wellbeing for veterans in their civilian life (Barnett et al. 2021). However, the experience is varied and, for some veterans, civilian life may present social, financial, health, and wellbeing challenges (Transition Taskforce 2018).

While most veterans successfully transition into civilian life, for some, adjusting to civilian life after service can be difficult and they face an elevated risk of mental illness, alcohol, and drug use (Elbogen et al., 2012). Links have been found between veterans and justice involvement, suicide, homelessness, post-traumatic stress disorder (PTSD), and traumatic brain injury (Finlay et al., 2019). Veterans may use drugs and alcohol to address trauma received from serving, other mental health conditions, interpersonal stress and difficulty adjusting to civilian life (Canada & Peters, 2017). By identifying existing interventions to support and sustain healthy behaviours in individuals, this research can assist in the design, implementation, and planning of interventions to encourage healthy behaviours in Australian veterans. The concept of 'active ageing' may offer insights as to how best to achieve this.

Research literature provides insights into active and healthy ageing for veterans and forms the basis for this report. While the literature in the following section either did not meet the inclusion criteria for our REA[1] or were not identified through the comprehensive literature search strategy (detailed on pages 20-24), they provided useful insights to guide our REA, shaping our inquiry and the literature search. They are

[1] The reason for non-inclusion of these articles most commonly related to a lack of focus on healthy or active ageing.

included here as providing important background information but do not form part of the REA.

Physical health and wellbeing for those aged 45-64

Physical health is one dimension of individual and group wellbeing. Physical health is often subjective but can be tied to autonomy to complete daily tasks and essential exercise. Placing importance on physical health can help people maintain a high standard of quality of life and prevent obesity and cardiovascular diseases. Several studies provide valuable and relatable insights for potential interventions to improve physical health for those aged between 45 and 64.

While the REA focuses on healthy behaviour in the midlife and older stage in life, these behaviours need to be situated within a life course approach. The discussion at the co-design workshop conducted in September 2021 reinforced this. The need to recognise healthy ageing along a continuum was reflected by Damschroder et al. (2014)[2], who conducted trials with veterans to test if small interventions promote weight loss. Delivered by non-clinician coaches, the program 'Aspiring to Lifelong Health' tested coaching via telephone or face to face in-person groups. Their design, described as an alternative to traditional weight loss management, attained positive results, especially regarding face-to-face in-person groups. However, limitations existed, as the trial ran for 12 months only without follow-up, several participants had comorbidities, and data was not collected on women.

While health and wellbeing have been largely understood in holistic ways, many programs and interventions are focused on specific lifestyle elements. Further research has elucidated the success of nutrition-based coaching to improve dietary behaviour and reduce weight gain in US veterans. Shahnazari et al. (2013)[3] study demonstrated that US veterans who underwent 3.75 hours per month of individual nutrition coaching over six months resulted in a 5% weight loss when compared to the baseline (92.8 to 88.2 kg: $P<0.001$). The results display that individualised nutritional coaching can be an effective intervention to promote healthy lifestyles. However, a recognition that study outcomes may have been shaped by a strong baseline desire of most (70%) participants to lose weight suggests that particular models focusing on behaviour change may have a role.

[2] This paper was not included in the REA as the focus is on obesity treatment rather than active / healthy ageing. This paper compares outcomes of weight loss interventions to the standard program MOVE! - more information about MOVE! can be found in the REA in the paper by Kahwati et al., (2011)

[3] This was not included in the REA as the focus is on nutrition rather than active / healthy ageing

Mode of delivery has also been posited as having an important effect on outcomes and is an element that requires consideration at the intervention design stage. Bokhour et al. (2016) developed an intervention that included stories from other veterans' successful physical health management, specifically hypertension. This peer-support model resulted in greater intentions to change behaviours compared to information being delivered by clinicians via video. Though the study outcomes showed statistically significant *intentions* to change behaviour, actual behaviour change was not assessed.[4]

To recognise how physical health influences mental health, Dale, Brassington, and King (2014)[5] conducted a systematic review to examine the effects of healthy lifestyle interventions on mental health. They concluded that multi-component interventions implementing psychological techniques to improve physical health have positive effects on mental health and are used to design interventions. Furthermore, they found interventions that target diet and exercise were particularly effective in improving mental health and wellbeing, suggesting that targeting physical and psychological health through the same intervention programs is viable. This shows the potential viability of the above studies in addressing both physical and mental wellbeing.

Mental health and wellbeing for those aged 45-64

Several interventions have been identified as being of use to improve mental health and wellbeing. These studies provide greater generalisability to support the implementation of interventions that may improve mental health within and toward the Australian veteran community. Chang and Sommers (2013)[6] provided alternative medical treatments via acupuncture and relaxation to reduce substance craving and anxiety in veterans located in residential facilities. They demonstrated that attending regular (up to 10 sessions) acupuncture and relaxation interventions reduced craving and anxiety levels for veterans. These results provide significant evidence and support for non-pharmaceutical approaches to reduce substance use disorders and anxiety.

Psychological interventions have also been demonstrated to have positive effects. Worley, Tate, and Brown (2012)[7] trialled a Twelve-step Facilitation (TSF) model integrating cognitive behavioural therapy (CBT). Participants with substance dependence and

[4] For this reason, it did not meet the inclusion criteria for the REA and thus was not included in our findings.

[5] This paper did not focus on healthy ageing and is not included in the REA

[6] This paper was not included in the REA as the focus is on substance misuse rather than active / healthy ageing

[7] This paper was not included in the REA as the focus was on substance misuse and depressive disorders rather than active ageing

depressive disorders experienced lower levels of depression after attending the TSF CBT and reported evident mental health benefits that extended beyond substance dependence. Worley, Tate, and Brown (2012) concluded that these effects suggest the use of this model to address future use of alcohol and drugs.

While remedial interventions have been shown to yield benefits for health and wellbeing, preventative interventions have also been shown to generate improvements. Bartram, Sinclair, and Baldwin (2010)[8] emphasised promotion and training to identify and approach mental health issues and argued that preventative interventions will have lasting impacts on individuals with the potential to change cultural attitudes towards mental health within their (non-veteran) industry. This argument was supported by a systematic review of ten mental health interventions for athletes, coaches, and officials. Breslin and colleagues (2017) aimed to determine the effectiveness of current mental health programs within sports to improve mental health awareness, knowledge and the ability to seek help, where and when required. They found that localised settings require specific strategies for engaging people in prevention - that is, interventions need to be targeted to best meet the specific needs of their population. Furthermore, they identified strong benefits for peer-led interventions, which incorporate more egalitarian approaches to knowledge transfer. This resulted in increased intentions to help or offer support to someone who may be experiencing mental health problems.

Physical health and wellbeing for those aged 65+

Given population ageing, it becomes imperative to produce and provide interventions to ensure healthy behaviours and active ageing. Ouslander et al. (2005)[9] provided strong evidence of the benefits of rehabilitative interventions to increase continence, mobility, endurance and strength via Functional Incidental Training (FIT) for veterans located in residential homes. While all aspects of physical health and wellbeing improved, with the exception of mobility, they noted significant implementation barriers in terms of staff workloads and care costs.

Home-based interventions may offer lower-cost options for improving physical health[10] recruited male veterans between 60-85 years of age, with a mean of 72.6 years of age, to participate in home-based counselling to improve walking and strength. Even brief counselling linked with primary care home visits increased walking and strength exercise

[8] This paper was not included in the REA as it was outside the date rage
[9] This paper was not included in the REA as it was outside the date rage
[10] This paper was not included in the REA as it was outside the date rage

in the participants, suggesting that interventions can be relatively simple and still have success. Similarly, Huffman et al. (2010)[11] found that a home-based physical activity intervention acted to improve health outcomes of veterans between 70-92 with either arthritis or diabetes and both. These findings recognise the potential for home-based models to improve the health and wellbeing of older veterans suffering from comorbidities.

Mental health and wellbeing for those aged 65+

Social isolation and decreased mental wellbeing are significant concerns for people in later life (Neves et al., 2019). Greaves and Farbus (2006) examined the effects of an intervention for people over 65 years of age who were experiencing depression and social isolation. They found that interventions focused on creative and social activities emphasising social interactions had meaningful benefits for participants, primarily regarding their psychological well-being. Their intervention program was individually tailored to participants' own interests, and involved regular contact and scaled-up personal social support. Such an intervention focuses on the support needs associated with 'life transitions', yet the personalised approach may be difficult to apply for large cohorts, such as the veteran community. Given the increase in online interventions for mental health and wellbeing, and in light of identified difficulties with implementations and usage for older veterans, Iasiello and colleagues (2018) call for creative strategies to best reach the intended demographics.

The current scope of research

As is evident from the literature reviewed above, while interventions are being developed for midlife and older adults, several issues remain in terms of the transferability between populations (for example, from a general population to veterans), the ability to address the particular needs of some sub-populations (for example, women veterans), or in terms of the reliability and sustainability of some interventions. Effective interventions may also yield broader benefits than originally anticipated - for example, Shahnazari and colleagues' (2013) work may have applicability for those who are less open to seeking a weight loss intervention - which may enhance an individuals' health as they age.

To this end, the Department of Veterans' Affairs called for a Rapid Evidence Assessment (REA) to look at interventions aimed at enhancing healthy behaviours and active ageing for midlife and older veterans and the general population to gain further insights into the efficacy, appropriateness, implementation, and sustainability of such programs.

[11] This paper was not included in the REA as it was outside the date rage

The current research seeks to identify strategies, programs, and interventions aimed at supporting the development of healthy behaviours in people, especially veterans, during their middle and later life. The research adopts a focus on active ageing and healthy ageing through a holistic and contextual approach. Part of this context involves a consideration of the specific personal, social, and environmental conditions that shape veterans' health and wellbeing. These factors are reflected in the unique health profiles of veterans when compared with non-veterans.

Methods

The literature review was conducted utilising DVA's Rapid Evidence Assessment (REA) protocol. This approach is well suited for the time frame of this project and the specificity of the questions being formulated. Each research question was addressed using the methodology provided in the protocol. As a methodology, REAs are characterised by their ability to generate the results of a systematic search focused on interventions and selected studies, provided over a specific or limited scope of time (O'Donnell et al., 2016).

As part of the development phase of the project, we conducted a co-design workshop with the DVA team via Microsoft Teams on 21st September 2021. This workshop had three main goals:

- To agree on the scope of the review, refine and develop the research questions we have proposed.
- To provide feedback on specific aspects informing the design of the review, outlining the most important elements to the DVA team.
- To facilitate the establishment of a collaborative partnership between our team and the DVA team.

From the co-design workshop, we were able to refine the inclusion and exclusion criteria that were used to search the literature and analyse the resulting data.

The literature searches were conducted from late October to early November 2021.

The project was conducted in consultation with video conferencing calls every month between the DVA and the authors.

The second co-design workshop took place via Microsoft Teams on 15th February 2022 with the DVA and Monash teams. The aims of the workshop were to:

- To present the REA findings and discuss the final report
- To establish the value of an integrative analysis
- To discuss the key takeaway messages
- To outline the considerations for implementation and future opportunities

At the second co-design workshop, we discussed the main findings and take-away messages contained in the report. It was agreed that the final report would utilise integrative analysis within the findings.

Aims and objectives

The project addressed the following research questions:

1. What interventions and programs have been successful in encouraging the adoption and continuation of healthy behaviours in adults belonging to the following groups: 45-64; 65-90; the general population; and veterans (in Australia or overseas)?

2. What factors and characteristics are instrumental in the success[12] of the identified healthy behaviour interventions?

3. What are the barriers to accessing successful interventions that have been identified?

4. Which interventions work well with people aged 45-64 and 65-90 experiencing physical, mental illness and/or low social participation?

5. What are the gaps and limitations of current research available for diverse veteran populations?

We employed the following operational definitions for the following key concepts:

Active ageing

The research adopts the World Health Organization's (2020) definitions of active and healthy ageing, which highlight the need to focus on supportive environments and the creation of opportunities for middle- and older adults to maintain functional capacity, social participation and wellbeing as they grow older. In Australia, understandings of ageing are largely based on a deficit model in which growing older is associated with

[12] For the purposes of this review, 'success' is defined as reported by the authors of the individual study outputs considered in this review.

significant declines in physical, mental and cognitive health. This has significant impacts on health promotion programs that seek to enhance health in middle and later life.

Our REA drew upon insights from Wells and colleagues' (2018) REA for the Department of Veterans' Affairs. Their report, 'Healthy and active ageing in the veteran population and factors or interventions that achieve positive effect,' identified key differences in the experiences of healthy ageing of veterans compared with nonveterans. These include:

- Veterans, particularly those in midlife, experience significant challenges to healthy and active ageing, particularly in relation to physical and mental health, and low social participation and inclusion;
- Issues around social participation and engagement for veterans - and the health effects of these - remain in need of greater exploration, and thus are a potentially important avenue for health programs;
- Psychosocial determinants of poor wellbeing outcomes for veterans differ from those of their non-veteran peers, although the protective factors cohere on education- and access-related factors; and
- The process by which healthy ageing can be realised is likely to differ between veterans and nonveterans.

While we explicitly sought to take a 'strengths-based approach' to the current REA, Wells et al.'s (2018) findings emphasised considerable challenges in veterans' experiences of active ageing; their insights shaped our analysis (as seen in the first three dot points above).

Following the first co-design workshop, we further operationalised the concept of active ageing to extend the above definition as more holistic and inclusive of the following dimensions:

- Having agency, and being autonomous in decision-making (i.e., having capacity);
- Being proactive and making deliberate decisions about one's life (and having appropriate resources to do that);
- Maintaining social participation and social connectedness; and
- Including an openness to change, which includes adaptability and future orientation.

Active ageing, therefore, emphasises the *process* of ageing, not being a fixed state.

Many of the challenges to active ageing faced by veterans may be addressed by appropriate support not only while in service but pre- and post-transition from service. However, there remain some key information gaps in relation to the practical strategies, programs and interventions that can support healthy and active ageing within the veteran community. To enhance the current research project, Australian and international research were examined to identify contemporary interventions and innovations in promoting and supporting active and healthy ageing for the veteran community.

Veterans

A person who served in *military* service, regardless of the length of service and whether they had been deployed. The REA was not limited to Australian veterans, although we sought to translate the insights from the REA to the Australian context (in the discussion, below).

During the co-design workshop, we further operationalised some of the core elements of veteran experiences as it relates to active ageing. In particular, our REA especially attends to the following:

- Recognition of the particular characteristics/features of veterans;
- Transitions from military to civilian life (includes the reasons for the transition and the impact of the transitions on the person's life experiences); and
- The influence of military service experiences on later life, including impacts on autonomy in health care seeking.

Healthy behaviours

A consideration of healthy behaviours includes both a prevention and promotion focus which raises questions of access, the social determinants of health (SDOH), ability to make good choices, and then the capacity for reducing risks. Following the co-design workshop, healthy behaviours have been conceptualised holistically. This includes the following dimensions:

- Social aspects (including family, social connections, participation);
- Mental aspects;
- Physical activity;
- Sleep;
- Nutrition (healthy eating);
- Sense of agency and self-awareness; and

- Managing known health risk behaviours.

Protocol and registration

The protocol for this review was approved by the DVA on October 14, 2021. Due to the REA design and the project timeline, it was deemed not feasible to register the REA protocol in PROSPERO (the International Prospective Register of Systematic Reviews). No amendments were made to the protocol after approval.

Eligibility criteria

Research questions 1, 2 and 4 were expected to be answered through clinical trial and program intervention studies with veteran and non-veteran populations. We expected that regarding Research Question 3, we would be looking at observational and qualitative studies. Research Question 5 would require attention to all study types in order to the identify gaps and limitations of existent research.

The following criteria were applied to our literature search:

- Inclusion criteria:
    - Focus on Active Ageing or Healthy Ageing (including the concepts of successful ageing and positive ageing);
    - Adult males and females aged 45-64 and 65-90 from the veteran population OR Adult males and females aged 45-64 and 65-90 from the nonveteran/general population. It should be noted that study samples which were wholly or mostly comprised adults aged 45 and over were included in the REA. This was a strategic decision taken in consultation with DVA due to the very limited studies exclusively focused on the midlife (45-64 years) or later life (65-90 years) stages;
    - Veterans as a focus of the study OR general population in the age group for comparison;
    - Published, peer-reviewed research studies OR Review/Systematic review/Meta-Analysis article on the topic;
    - Interventions focused on any of the following:
        - healthy behaviours,
        - reduced suicidal ideation,
        - risk factors/behaviours,
        - functional capacity, or

        - perceptions of healthy/active/successful ageing; and
    - Papers published from 2011 to present

Papers needed to meet all of these criteria to be included in the REA.

- Exclusion criteria:
    - Veterans only included as part of a larger (non-veteran) dataset for other research;
    - Papers published before January 2011;
    - Papers not in the English language;
    - Generalised exposure to war and conflict (not veteran role);
    - Service members on active duty;
    - Animal studies;
    - Medicine Clinical trials OR drug research effectiveness;
    - Interventions with biomarkers as an outcome measure;
    - Studies with prevalence outcomes;
    - Studies focused on a population suffering from a specific illness, disease, or condition without comparison to the non-diseased population; and
    - Books and dissertations.

We decided on these criteria before undertaking the database searches, and discussed these during the first co-design workshop. They were further refined, as needed, during the monthly meetings between the research team and DVA. The criteria were added to Covidence, a software program that the authors utilised to conduct and manage the REA.

Information sources

We conducted concurrent searches on the following databases for our searches: Medline, Web of Science, PsycInfo, Sociological Abstracts, CINAHL Plus, Anthropology+, Embase, Scopus, and Academic Complete. Relying on all of these databases ensured that sought to answer the research questions through a comprehensive literature search, by utilising databases in medicine, psychology, anthropology, sociology, and public health to search for peer-reviewed articles and research reports.

Search Strategy

To identify relevant literature, we developed a search strategy that addressed various themes that would answer the research questions. The search strategy was agreed upon by the research team and was tested prior to conducting the final searches.

We first used OR Boolean operators to find results within the broader themes, and subsequently combined the broader search themes with AND operators. That meant that each theme consisted of several keywords and terms that were associated with that theme. Subsequently, we combined these themes with AND operators to restrict the number of articles that were going to be part of our analysis. Our approach was intended to start with a broad scope to be subsequently refined and restricted in its final results. Though this was an REA, we decided to screen the resulting 5091 articles.

The search terms are summarised in Table 1 below, with full details of individual search strategies provided in Table 2.

Table 1: Key search terms used to undertake the Rapid Evidence Assessment

Search element	Notes
Active ageing search terms "healthy ageing" OR "healthy aging" [MESH] "active ageing" OR "active aging" "successful ageing" OR "successful aging" "positive ageing" OR "positive aging" (ageing OR aging) AND capacity "Ageing well" OR "aging well" OR "Well aging" OR "well ageing" [MESH]	Combined with Boolean Operator: OR
Healthy behaviours search terms "healthy behaviours" OR "healthy behaviors" "physical activity" "healthy eating" OR "healthy diet" OR "healthy nutrition" [MESH] healthy AND ('life style*' OR lifestyle*) behaviour* OR behavior* mental OR emotional OR cognitive risk AND (reduc* OR manag* OR mitigat*) voluntar* OR volunteer*	Combined with Boolean Operator: OR

learn* AND education* health AND (prevent* OR promot*) Loneliness OR isolati* OR inclus* Post-trauma* (Behavior* OR Behaviour*) AND (problem* OR disruptive OR dangerous OR hazardous OR addictive) addict* Alcohol AND (consumption OR drinking OR habit* OR abuse OR dependence OR addiction OR disorder OR misuse) (Tobacco OR cigarette*) AND (consumption OR smok* OR dependence OR disorder) drug* AND (illegal OR illicit OR addict*) sleep AND (disturbance* OR event* OR disruption*) (Social OR public OR politic* OR civic) AND (particip* OR engagement)	
Veterans search veteran* OR military OR servic* OR soldier* OR 'armed forces' OR troop* OR defence NB 'Servic*' was deleted from Medline search due to high irrelevant hits	Combined with Boolean Operator: OR
Age group search age* OR elder* OR aging* OR older OR aged OR middle-age* OR 'middle age*' OR midlife OR 'mid life' OR mid-life	Combined with Boolean Operator: OR
Social determinants search educat* OR income OR race OR ethnic* OR cultur* OR CALD OR poverty OR famil* OR household OR marital OR gender OR sex OR sexualit* OR LGB*	Combined with Boolean Operator: OR
Other parameters Intervention* OR Program*	Combined with Boolean Operator: OR
Combined searches (for full details, see Appendix A)	

Table 2: Search outcomes by database

	Medline	Web of Science	PsycInfo	Socy Abstracts	CINAHL Plus	Anthro'y +	Embase	Scopus	Academic Complete
Date	21/10/2021	21/10/2021	26/10/2021	26/10/2021	08/11/2021	09/11/2021	09/11/2021	09/11/2021	09/11/2021
Active ageing (or)	59,878	742,753	47,636	16,982	5,063	29	84,399	1,134,415	108,082
Healthy behaviours (or)	2,359,317	5,217,730	2,675,197	256,553	342,327	12,121	3,307,666	11,821,369	8,127,931
Veterans (or)	57,517	312,704	63,364	7,700	16,868	1,682	74,149	274,495	10,036,073
Social Determinants (or)	1,826,449	3,899,310	4,445	318,302	320,176	86,041	2,699,565	11,593,266	25,326,350
Combined searches (without 'other parameters') 2011-21	66	1,707	115	1,936	31	0	159	1,696	263
Combined searches (with 'other parameters') 2011-21	18	493	49		19	0	51	828	123
Imported to Covidence	Y	Y	Y	Y	Y	Y	Y	Y	Y

Study selection

The searches were conducted by Dr David Colon-Cabrera, and the results were uploaded into Covidence. Covidence allowed us to import the search results from the databases, as well as manage the REA process. By importing the results to Covidence, we were able to complete the Title and Abstract screening process, the full-text screening process, and the extraction of the studies selected for inclusion and analysis.

The resulting articles identified in the searches went through a two-stage process to determine whether they should be included in the study:

- The title and abstract of each article were reviewed by two members of the research team to determine if the article met the inclusion criteria; and
- When conflicts about the inclusion of the article arose, the article was discussed in team meetings to determine if the article was selected for further full-text review.

Articles selected for full-text review were divided among the team members and reviewed individually. Each team member flagged articles that were not clear on whether they met inclusion or exclusion criteria for the study, and these were discussed in our weekly meetings. In this manner, while not as rigorous as a systematic review, we were able to minimise bias given the REA methodology. Each member of the team made a determination on the article and included or excluded the article and recorded a reason for exclusion from a pre-populated list that they could edit and add a new (or more specific) exclusion criteria.

The flow of this process (identification, screening, eligibility, inclusion) is summarised in the PRISMA diagram (Figure 1, on page 29).

Data collection processes

Any review has the risk of bias, and while we tried to minimise it, this is an attribute expected with an REA. While we were not able to review all the included full-text articles by more than one member of the team, we discussed articles that warranted discussion for inclusion and exclusion in our weekly meetings. At least two members of the team reviewed all of the final articles selected for inclusion and further excluded ten articles after discussion.

The following information was extracted from the included articles: article title, date, authors, the country in which the study was conducted, study design, outcome variables, sample size, the aim of the study, data analysis, age group, ethnicity, gender, was the population veterans or general population, findings, and study recommendations. A summary table was produced capturing this data (see the Evidence Profile).

Risk of bias in individual studies

As part of our extraction process, we conducted a risk of bias (quality) assessment of the included intervention articles using the relevant checklists (determined by methodological approach) from the Joanna Briggs Institute (JBI; https://jbi.global/critical-appraisal-tools). This was translated into a star rating (out of 5 stars). For each 'present' item on the relevant JBI inventory, we gave the paper half a star. Papers ranged in quality from 2.5 to 4.5 stars, with the varying quality due to methodological issues. The quality weighting and methodological issues are identified in the findings section below.

Evaluation of the evidence

Our review followed the three-component evaluation process outlined by Wells (2018). First, we considered the strength of the evidence base. This involved considering the quality of the individual evidence items, the risk of bias, the quantity of evidence, and the study designs used (level of evidence). Second, we considered questions of consistency (or dependability) of the study results; this was evaluated by comparing each evidence item with others in the same category. Finally, we evaluated the applicability of the evidence to the Australian context.

Considering a strength-based approach

The REA planned to take a *strengths-based approach* that considers the existing 'strengths' (capabilities and capacities) of individuals and their communities to enact healthy and active ageing. In practice, this REA departs from this because the aim and scope of this REA focus on the health and social *challenges* faced by veterans as they age. While the reviewed interventions are aimed at health promotion, they are often justified by poor health outcomes – that is, they seek to address a 'problem'.

It is, thus, important to reiterate the heterogeneity of veterans: for example, physical and/or mental health issues are not experienced by the whole veteran population nor do health issues necessarily constrain all veterans' ability to age 'successfully'. Additionally, some health issues may be created or aggravated by social contexts despite the individual's motivation and capacity for action. Furthermore, the nature of interventions as 'solutionist' means that they respond to a problem or weakness (e.g., unhealthy behaviours) with a potential solution that is then evaluated for efficacy and efficiency. They also focus on veterans with known challenges. This can therefore limit exploration of the healthy behaviours and ageing successes of veterans. To address this limitation, and to avoid describing veterans in a simplistic or problematic light, we included contextual articles in this review and sought to present the findings drawing upon a strengths-based lens that provides evidence to support veterans to enhance or maintain their quality of life and sense of meaning and purpose.

Results

PRISMA diagram

The results of our search are outlined using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis approach, which is presented in Figure 1.

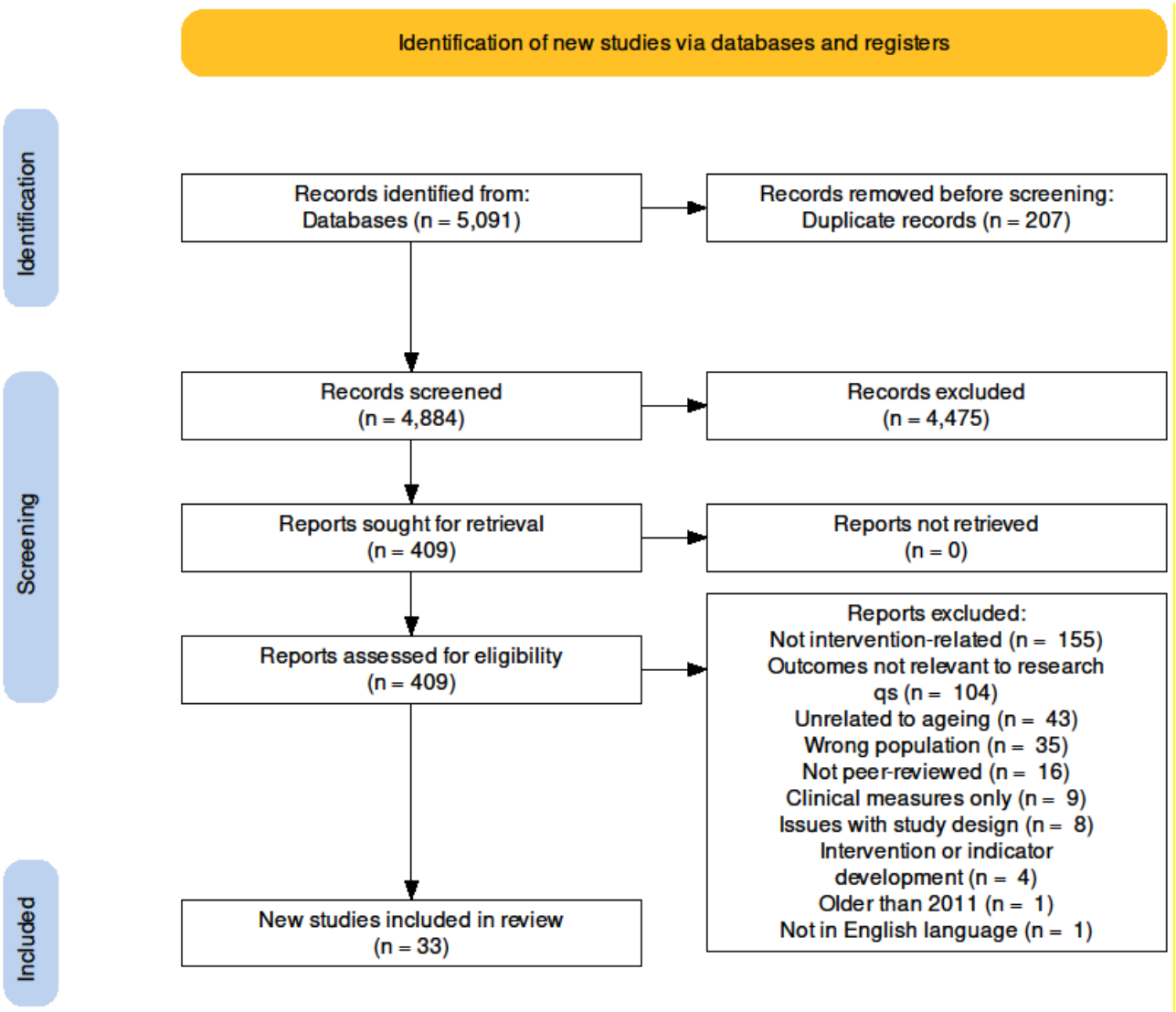


Figure 1: PRISMA diagram of the Active Ageing and Healthy Behaviours REA search (Source: Haddaway et al., 2021)

Post-hoc screening and analysis

Thirty-three articles were included for further analysis; 11 gave specific insights into interventions and 22 were deemed to yield more descriptive – or contextual – insights or

were reviews. These descriptive articles are indicated in the analysis below and remain in this report because a) they articulate some of the mechanisms that may contribute to the success or not of interventions, and b) they contain useful insights for future research.

Summary of the studies

Study populations

Of the included articles, 11 had samples consisting of veterans only, 15 were non-veteran samples only, and two were comparative and thus addressed both veteran and non-veteran populations. A further five articles were systematic reviews or meta-analyses of previously published literature. These are illustrated in Figure 2 below. In the following section, we describe the studies in greater detail, organised by population.

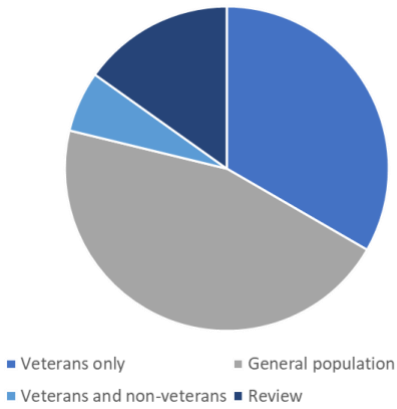


Figure 2: Summary of study populations

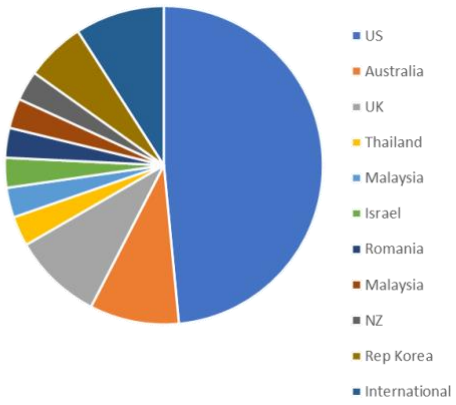


Figure 3: Summary of country locations

Countries

The articles included in this analysis drew upon research conducted in a range of countries globally (see Figure 3, above); this global focus was reflected in three of the five review articles. However, the majority of studies were undertaken in the United States (16 of 33 studies), which includes the remaining review studies. In both Australia (9% of the reviewed articles) and the United Kingdom (9%), three studies each, including two with veteran-only populations, were undertaken. Two studies were conducted in the Republic of Korea. Other countries included in the selected articles were: China, Israel, Malaysia, New Zealand, and Thailand (one study in each). It was unclear where the remaining study was conducted.

Specific population demographics

One area of interest identified through the first co-design workshop was the social and structural determinants of health. Veteran populations are heterogenous, but it was anecdotally thought that research did not recognise this heterogeneity. The summary tables (Tables 3 and 4) below provide insights into the diversity of samples for the included articles.

Veterans-specific research

Eleven articles focused specifically on veterans. All were published between 2011 and 2021 and drew upon samples from four countries: the United States, Australia, the United Kingdom, and China (see Table 3).

Table 3: Summary of the included Veteran-specific studies

Country of study	**N***	**Age range/average age**	**N**
United States	6	18 and older	1
Australia	2	45 and older	3
United Kingdom	2	45-64 only	4
China	1	65-90 only	3
Study design	**N**	**Race/ethnicity of participants**	**N**
Qualitative	6	White only	1
Quantitative - randomised control trial	1	Non-white (ethnic minority) only	1
Quantitative - cross-sectional	1	Ethnically diverse cohort	3
Mixed methods	2	Ethnicity not specified	6
Sample size	**N**	**Gender of participants**	**N**
Less than 20	1	Men only	2
20-49	3	Mostly (vast majority) men	3
50-99	1	Women only	0
100-199	1	Mostly (vast majority) women	0
200-299	1	Similar numbers by gender	6
300-399	1	Gender-diverse sample[#]	0
400 or more	3		

* N = the number of published articles

[#] Denotes inclusion of trans and non-binary participants

The studies extracted included men and women, aged between 25 and 99 years, and most fell into the specific age ranges specified for this REA. While the age range fell slightly outside our target age range for one study, with a younger 'bottom' age, we included this study due to the average age of participants falling into the 45-64 age group. It was difficult to assess ethnic diversity from the information provided in many of the articles. Most studies either wholly or partly focused on the experiences of men.

The veteran-specific studies extracted included interventions that focused on healthy ageing principles, addressing physical and cognitive health, mitigating risk factors and behaviours, perceptions of healthy ageing, healthy ways to maintain veteran identity, and transitioning to civilian life. Most papers included in this section drew upon a qualitative methodology, although one RCT study was undertaken with veterans.

The study recommendations from the extracted papers were predominantly positive, suggesting that although further research is needed in the Australian context, intervention priorities directly addressing veteran needs for healthy ageing were generally successful.

Insights from non-veteran (general) populations

Research Questions 1 and 4 specifically called for the inclusion of studies into active ageing and healthy behaviours with non-veteran (general) populations. In undertaking the REA, we identified 15 studies undertaken in eight countries: the United States, the Republic of Korea, the United Kingdom, Australia, Israel, Thailand, and Malaysia. One country was not stated. Table 4 summarises significant study design features and sample characteristics of the included articles.

Table 4: Summary of the included non-veteran / general population articles

Country of study	N*	Age range/average age	N
United States	6	18 and older	0
Republic of Korea	2	45 and older	15
United Kingdom	2	45-64 only	0
Australia	1	65-90 only	0
Israel	1		
Malaysia	1		
Thailand	1		
Not stated	1		
Study design	**N**	**Race/ethnicity of participants**	**N**
Qualitative	8	White only	2
Quantitative - randomised control trial	2	Non-white (ethnic minority)	5
Quantitative - cross-sectional	2	only	
Mixed methods	3	Ethnically diverse cohort	3
		Ethnicity not specified	5
Sample size	**N**	**Gender of participants**	**N**
Less than 20	1	Men only	2
20-49	3	Mostly (vast majority) men	0
50-99	5	Women only	0
100-199	2	Mostly (vast majority) women	2
200-299	2	Similar numbers by gender	10
300-399	0	Gender-diverse sample#	0
400 or more	2	No information on gender	1

* N = the number of published articles

# Denotes inclusion of trans and non-binary participants

The studies extracted included men and women aged from 56-96 years of age. These articles varied in terms of study design, with the majority (n=8) employing a qualitative approach. Two used an RCT study design. The included interventions addressed testing of pilot interventions, assessment of specifically targeted exercise programs to promote physical function, interventions designed for cognitive function, perceptions of healthy ageing, coping resources and challenges, the relationship between subjective sleep quality and subjective memory, and preventing loss of independence.

Studies included some diversity in terms of gender and ethnicity, which may relate to the number of studies that were conducted in low- and middle-income countries. General population studies also had more gender-balanced (although not gender diverse) samples.

The study recommendations suggest positive outcomes for the interventions piloted and assessed. Although, specifically for one study that explored subjective sleep quality's relation to subjective memory, more diverse research protocols should be designed to examine treatment effects.

Comparative research including both veteran and non-veteran populations

Two studies reported on comparative research on veteran and non-veteran populations. One, by LaCroix and colleagues (2016), reported on a longitudinal study that tracked U.S. women's health outcomes over time. It sought to understand how health and disability status in later life might vary between veteran and non-veteran populations. While most of their study participants were white, 12% of their sample were women from minority ethnic backgrounds. The authors found that there was considerable variation between the veteran and non-veteran populations, although this varied depending on the particular metric: veteran women were more likely to be physically active and less likely to be overweight but tended to report higher levels of smoking and alcohol consumption as well as lower life satisfaction, life purpose, and social support. These findings highlight the need for special attention to be given to the effects of prior military service on women veterans' health.

Of potential relevance to Australian veterans, Yeung et al. (2019) compared indicators of subjective wellbeing for veterans and non-veterans aged 55-86 years in Aotearoa New Zealand. This longitudinal contextual study included 352 male and female veterans, and 1500 general population members. Due to the sampling strategy (via the electoral roll), the sample approximated the general population, with an oversampling of Māori people. Data gathered included social and health indicators, as well as broader life circumstances information. In general, findings suggested few significant differences in wellbeing between veterans and nonveteran populations; no specific findings were reported based on participant ethnicity. While veterans were more likely to smoke and report chronic conditions, the authors argued for a need to attend to the effects of trauma on purpose in life as a significant indicator of wellbeing.

Article types

Descriptive (contextual) articles

Seventeen of the identified articles were deemed to provide insights into factors, processes or practices that contributed to healthy behaviours during middle and later life, or which clarified understandings of active ageing or healthy ageing.

Table 5: List of the descriptive/contextual articles identified in the REA

Author(s)	Year	Study design information
Barnett, Savic, Forbes, Best, Sandral, Bathish, Cheetham & Lubman	2021	Exploratory qualitative study; veteran population; Australia.
Black & Dobbs	2014	Exploratory mixed methods study; general population; United States
Brewster, McWade, & Clark	2021	Qualitative grounded theory study; veteran population; United Kingdom
Bundy, Daley, Clark, Indorewalla, & O'Connor	2018	Qualitative grounded theory study; veteran population; United States
Cernin, Lysack, & Lichtenberg	2011	Cross-sectional study; general population; United States
Du, Tan, Yi, Zou, Gao, Zhao, & Wang	2015	Cross-sectional study; veterans; China
Dwyer & Hardill	2011	Participatory qualitative evaluation study; general population; United Kingdom
Gordon, Burnell, & Wilson	2020	Narrative qualitative study; veteran population; United Kingdom
LaCroix, Rillamas-Sun, Woods, Weitlauf, Zaslavsky, Shih, LaMonte, Bird, Yano, LeBoff, Washington, & Reiber	2016	Comparative cohort/longitudinal study; veterans and general population; United States
Parsons, Gale, Kuh, & Elliot	2014	Comparative qualitative study; general population; United Kingdom
Romo, Wallhagen, Yourman, Yeung, Eng, Micco, Perez-Stable, & Smith	2013	Qualitative grounded theory study; general population; United States
Rozanova, Noulas, Southwick, & Pietzark	2015	Cross-sectional mixed methods study (analysis of qualitative items); veteran population; United States
Tohit, Browning, & Radermacher	2012	Qualitative thematic analysis study; general population; Malaysia
Tovel & Carmel	2014	Cohort/longitudinal study; general population; Israel

Author(s)	Year	Study design information
Williamson, Riendeau, Stolzmann, Silverman, Kim, Miller, Connolly, Pitcock, & Bauer	2019	Exploratory mixed methods study; veteran population; United States
Wooldridge, Herbert, Hernandez, Dochat, Godfrey, Gasperi, & Afari	2019	Exploratory secondary analysis; veteran population; United States
Yeung, Allen, Godfrey, Alpass, & Stephens	2019	Cohort/longitudinal study; veteran and general population; New Zealand

Intervention articles

A total of eleven interventions were identified in the REA, and are listed alphabetically in Table 6.

Table 6: List of the intervention articles analysed in this project

Author(s)	Year	Study design information
Bartlett, Warburton, Lui, Peach, & Carroll	2013	Pre-and post- evaluation of three pilot intervention studies; general population; Australia
Caspi & Cojocaru	2021	2x2x2 (pre-post; intervention-control; community-residence); general population; location not specified
Chao, Lee, Martinez, Barlow, Chesney, Mehling, & Barnes	2021	Pre-post intervention pilot study; veterans with cognitive impairment or dementia; US
Chung, Kim, Lee, & Park	2020	Retrospective intervention study; general population; Korea
Clemson, Fiatarone, Singh, Bundy, Cumming, Manollaras, O'Loughlin, & Black	2012	Randomised Parallel Trial; veterans as part of a larger study; Australia
Gao, Stone, Hough, Haibach, Marcus, Ciccolo, Kriska, Burkitt, Steenkiste, Berger, & Sevick *	2016	RCT; overweight or obese veterans; US
Joung & Lee	2019	RCT; general population; Korea
Kahwati, Lance, Jones, & Kinsinger *	2011	Program evaluation; overweight or obese veterans; US
Luci, Simons, Hagemann, Jacobs, Bower, Eichorst, & Hilgeman	2020	Observational qualitative pilot study; veterans at risk of suicide; US
Morey, Lee, Castle, Valencia, Katzel, Giffuni, Kopp, Cammarata, McDonald, Oursler, Wamsley, Jain, Bettger, Pearson, Manning, Intrator, Veazie, Sloane, Li, & Parker	2018	Pre-post longitudinal intervention; veteran population; US
O'Connor, Kraft, Daley, Sugarman, Clark, Scoglio, & Shirk	2018	RCT; general population; US

* These papers relate to the same intervention, although they took different evaluation approaches

Review articles

Five review articles were identified during the REA. Two reviews, by Krivanek et al. (2021) and Reich et al. (2020), provide important substantive insights for understanding the research questions and are included in the evidence profile. Three additional reviews (Fogle et al., 2020; Cook & Simiola, 2018; Howell, 2020) provide a broader understanding of definitions of healthy, successful, and active ageing, as well as advancements in the field.

The review by Krivanek et al. (2021) takes stock of the field of successful cognitive ageing, looking at clinical evidence, applied research, and practitioners' guidelines since 2010. The authors highlight the positive effects of physical exercise, cognition/brain health, balanced diets, adequate sleep, and social participation. Reich and colleagues (2020) undertook a systematic analysis of lay definitions of successful ageing across cultures, encompassing 13 countries (from North America, Western Europe, the Middle East, Asia, Oceania). Their findings demonstrate that the concept of successful ageing (SA) is subjective and context/culture-dependent. They found similar notions of what SA entails reported by older people from different countries, such as social engagement and independence, but that the details for attaining them varied accordingly. The most mentioned dimensions of SA across cultures were: i) social engagement ('giving back' to communities, maintaining connections) and ii) positive attitudes on ageing. These were more discussed than independence, physical health, cognitive health, or spirituality. The least mentioned dimension of SA was cognitive health. Spirituality was mostly mentioned by ethnic minorities. The authors show that older people prefer social and psychological criteria of SA over biomedical criteria (Reich et al., 2020). These two reviews are further discussed in the key findings section.

The additional three reviews provide useful contextual insights. Fogle and colleagues' (2020) narrative review, based on studies using a longitudinal cohort of U.S. veterans (National Health and Resilience in Veterans Study), shows that physical and mental health issues were negatively associated with successful ageing, whereas purpose in life, resilience, gratitude, and community involvement were positively associated with successful ageing. The review also highlights that post-traumatic stress disorder (PTSD) is one of the most prevalent mental health issues among veterans, and that suicidality continues to be a top clinical priority for veteran care. The authors suggest that large-scale outreach interventions targeting social connectedness (e.g., life purpose) and protective psychosocial factors (e.g., social engagement) can prevent and treat mental health issues amongst this population.

The second review summarises the research on ageing and traumatic exposure, focusing on posttraumatic stress disorder (PTSD) and veterans (Cook & Simiola, 2018). It shows that research on trauma in later life and its effects remain underexplored, despite evidence on its negative consequences from younger cohorts. This gap is critical because evidence suggests that PTSD symptoms might differ between young and older adults. Additionally, older women are often not included in trauma studies. Existing research reviewed by Cook and Simiola (2018) further suggests that veterans with PTSD are at greater risk of dementia and accelerated cognitive decline, although the mechanisms for

this remain in need of elucidation through future research. The authors highlight the potential influence of an as-yet-unidentified hidden psychological variable, and argue for the need for mental health treatment to manage this (Cook & Simiola, 2018).

The third article offers a metasynthesis of qualitative research on definitions of healthy or successful ageing among people aged 50+ in the Circumpolar North (Howell, 2020). Findings demonstrate that many elements of healthy ageing are similar across populations, including autonomy needs; mental, cognitive, and physical health; purpose in life; healthcare access; social relationships; and community engagement. Older adults in the Circumpolar North also emphasised societal values that respect the experiences of elders, natural environment, and psychosocial resilience (e.g, living in harmony with others). This review contributes to more inclusive and culturally sensitive definitions of successful or healthy ageing, which can inform initiatives that cater to CALD populations.

Key findings

Findings from the REA demonstrate that programs and interventions linking broader dimensions of healthy and active ageing can assist older veterans to have a positive later life. The research suggests that interventions that promote an active physical and cognitive lifestyle not only help prevent and combat mental and physical health decline as they also increase quality of life and well-being in later life. When integrated with the descriptive (non-intervention) article findings, further strategies to promote healthy and active ageing are identified (Caspi & Cojocaru, 2021; Fogle et al., 2020; Gao et al., 2015). These include promoting protective psychosocial characteristics (e.g., purpose in life), social connectedness (e.g., meaningful social connections), and social engagement, as well as healthy physical, mental and cognitive health behaviours. Below, we first outline the intervention-related findings before contextualising these through an integrative analysis of intervention and descriptive studies identified during the REA.

Successful interventions and programs

Our findings show that programs and interventions based on a strength-based approach, which link broader dimensions of healthy and active ageing, can assist veterans aged in middle and later life to have a positive ageing experience. As our analysis (below) shows, most of the interventions reviewed targeted people in later life, when they were aged 60 and above. Our comparative insights for the two age-groups of interest (45-64 years and 65-90 years; Research Questions 1 and 4) were limited because of this: only two of the included intervention papers reported an age group in the 45-60 range. The 'Preventing Loss of Independence through Exercise' (PLIE) study (Chao et al., 2021) included participants from 56-84 years, and the MOVE! Weight Management Program (Kahwati et al., 2011) reporting an average participant age of 57.6 years. While Kahwati et al. (2011) did not report an age range, they reported a standard deviation of 10.7 years, indicating that the majority of participants fell between 46.9 and 68.3 years of age. As we outline below, both of these studies were successful interventions in encouraging the adoption and continuation of healthy behaviours.

A total of eleven interventions were identified in the REA. Of these, five reported strong 'successful' outcomes that met the research criteria; however, only four demonstrated sustained success over (varying periods of) time. Only one study (Morey et al., 2018) was a long-running intervention, which was delivered through the US Department of Veterans Affairs (VA). Chao et al. (2021), which was a pilot evaluation, reported strong

successful outcomes; further research is required to determine the sustainability of the observed outcomes. These five 'successful' interventions are outlined in Table 7 below.

Table 7: Interventions with demonstrated successful outcomes

Authors	Date	Study design	Age	Ethnicity	Gender	Nature of intervention	Nature of outcomes	Quality evaluation (max. 5 stars)
Joung & Lee	2019	RCT; general population; Korea	$\bar{x}$: 70.5 (dance); 71.77 (stretch). No range given.	Korean	Not specified	Creative dance program or stretching program	Improved strength, balance, fitness and mobility	★★★★☆ (4.5 stars) No control group; limited demographic information
Caspi & Cojocaru	2021	2x2x2 (pre-post; intervention-control; community-residence); general population; Not stated	65-97 years	Not specified	Men and women	Self-managed bodily movement (BMSR) program	Improved physical mobility, functional ability, and increased independence	★★★★ (4 stars) Community over-represented; quasi-experimental design; self-reported data
Morey et al.	2018	Pre-post longitudinal intervention; veteran population; US	65-98 years	Majority white	Men and women	Personalised exercise and health promotion program (Gerofit)	Improvements in physical functioning, which are maintained over time; high satisfaction	★★★☆ (3.5 stars) No RCT or experimental design; no control group; limited demographics; no discussion of exclusions

Chao et al.	2021	Pre-post intervention pilot study; veterans with cognitive impairment or dementia; US	56-84 years	Not specified	Men and women	Group movement program (PLIE)	Improvements in cognitive function, self-regulation, wellbeing and social participation; *pilot study*	★★★★ (4 stars) No RCT or experimental design; limited description of measures
Clemson et al.	2012	Randomised Parallel Trial; veterans as part of a larger study; Australia	$\bar{x}$: 83.4 years. No range given.	Not specified	55% women	Balance and Strength training (LiFE)	Significantly improved functional capacity in balance and strength outcomes for frail older people.	★★★★½ (4.5 stars) External randomisation; three-armed intervention; detailed description of measures

An additional five studies (summarised in Table 8) demonstrated initial success immediately after the program (short-term) or in the medium term (6-12 months after the program), but experienced waning in effects over time. This waning effect was partly related to the time since intervention delivery (e.g., Gao et al., 2016; Kahwati et al., 2011). The waning effects are of relevance in answering Research Question 1, which focuses on both *adoption* and *continuation.* Interventions reported in Table 7 (above) address both elements – as the effects continued for some time – while those in Table 8 primarily address *adoption.* Importantly, Chung et al. (2020) indicate the need for ongoing interventions to ensure the continuation of benefits; similarly, the pilot study nature of Luci et al.'s (2020) report suggests potential for longer-term interventions.

Table 8: Interventions demonstrating success, with waning effects over time

Authors	Date	Study design	Age	Ethnicity	Gender	Nature of intervention	Nature of outcomes	Quality evaluation (max. 5 stars)
Gao et al.*	2016	RCT; overweight or obese veterans; US	$\bar{x}$: 63.7; 62.6 control. No range given.	Non-Hispanic white	83% men	Counselling aimed at increasing physical activity participation (VA-STRIDE)	Increased activity levels at short- and medium-term but not sustained in longer-term	★★★★☆ (4.5 stars) People delivering outcome not blinded to the groups; some errors in measuring one outcome
Kahwati et al.*	2011	Program evaluation; overweight or obese veterans; US	$\bar{x}$: 57.6 (s.d. 10.7 years)	Not specified	Men and Women	Weight management program (MOVE!)	Modest yet beneficial short- and medium-term effects in weight loss and mobility	★★★ (3 stars) Limited information on intervention and outcomes; more of a program overview

O'Connor et al.	2018	RCT; general population; US	62-87	98% white	Men	12-week psycho-educational cognitive rehabilitation program (AgeWISE)	Increases in memory contentment and sense of control over memory; differences not statistically significant	★★★☆ (3.5 stars) Pilot study; very small sample size; process was adapted over time; participants not blinded
Chung et al.	2020	Retrospective intervention study; general population; Korea	60 and over	Korean	Men and women	Mobile app trial for insomnia self-management	Improved sleep quality after one week of use; no evidence of long-term benefits.	★★☆ (2.5 stars) No control; no randomisation to groups; subjective outcomes; confounding variables
Luci et al.	2020	Observational qualitative pilot study; veterans at risk of suicide; US	$\bar{x}$: 70.1 years. No range given	68.2% non-Hispanic white	Men	Telephone intervention for people at risk of suicide (SAVE-CLC)	Deemed successful in connecting recently discharged veterans to appropriate services	★★★ (3 stars) Unclear group selection process; some objective outcomes; confounding variables

* These papers relate to the same intervention, although they took different evaluation approaches and drew upon different populations

Table 9 summarises the one intervention study that did not yield any identifiable benefits; however, these results should be interpreted with some caution as the study evaluated three pilot intervention projects. This study, conducted by Bartlett and colleagues (2013) in Southern Queensland, examined three small scale community-led projects that aimed to address loneliness and social connectedness for older people. Although findings were not statistically significant, slight improvements were reported over the course of the intervention evaluation.

Table 9: Interventions not empirically demonstrating success

Authors	Date	Study design	Nature of intervention	Nature of outcomes
Bartlett et al.	2013	Pre-and post-evaluation of three pilot intervention studies; general population; Australia	Study 1: Fitness and community program; age range: 55-80 years; remote area Study 2: Community hub to connect older people; age range: 57-81 years; regional area Study 3: Delivery of social and leisure activities; age range: 63-86 years; urban area	Modest improvements in loneliness and social support scores. No significant outcomes were found, due to the small scale of the projects.

Factors instrumental in intervention or program success

The reviewed studies highlight some key elements that play a role in intervention or program success (Table 10, below). The long-term nature of some interventions, which potentially reflected organisational commitment and resource availability, appeared to play a role in the program's success. The Gerofit program (Morey et al., 2018), which was administered by the United States Department of Veterans' Affairs over two decades, is an example of this commitment.

Equally important was the simplicity of the intervention: the three non-US programs had relatively simple movement and physical activity-based activities as their interventions, which were easy for participants to follow and maintain. This was the case even when the interventions were self-directed (as in the case of Caspi and Cojocaru, 2021); indeed, this may have itself been a driver for sustainability (continuation).

Of the four studies that had short- and medium-term success, similar trends were observed. First, the intervention delivery was time-limited; whether for a matter of weeks or days, this meant that its effects waned as time elapsed following the end of the intervention. For Luci et al. (2020), the pilot intervention may have limited the sustainability of the success, yet it yielded significant benefits in terms of service connection and suicide risk reduction. Second, population characteristics may also have played a role: for example, the VA-STRIDE Program was aimed at a cohort of veterans with specific health needs and who may have had difficulty maintaining healthy behaviour programs in the past; that its effects were not maintained long-term here may have reflected the selection criteria into the program. Finally, the personalised nature of program delivery for some of the interventions in Table 8 may have played a role, as these require more intense human resources and organisational commitment.

Only one study reported very limited success in the intervention. Bartlett et al. (2013) reported that there were anecdotal improvements in reduced social isolation, but this was not borne out in the empirical data. Their intervention consisted of three similar social inclusion community projects, each of which involved different program delivery elements. Furthermore, the pilot nature of these projects may have also undermined its potential for success.

Table 10: Summary of the factors contributing to intervention success

Factors contributing to longer-term success	Factors contributing to medium-term success	Factor that may have limited success to the short-term success
Organisational commitment (longer-term program delivery)	Limited time program delivery	Pilot intervention projects
Available resources for sustainability (including human resources)	Population characteristics	Variability in program delivery
Simplicity of intervention	Personalised or bespoke programs	
Ability to follow and maintain over time		

Barriers to intervention/program success

Aspects that are not well reflected in the successful interventions reviewed speak directly to the unique and specific health needs, outcomes and challenges attached to veterans (AIHW, 2020; Brewin et al., 2011; Finlay et al., 2019). Veterans' health needs differ distinctly from their non-veteran peers (Wells et al., 2018). As the veteran population ages, there is an increased interest in understanding the types of healthy behaviours and interventions that will promote active ageing and wellbeing of this specific population.

Drawing on the intervention studies, we can invert the findings shown in Table 10 to identify factors that may act as barriers to longer-term program success (continuation). First, limited access to social resources may make it difficult for participants to continue engaging with programs when formal supports end. The study by Chung et al. (2020) provided a clear illustration of this. Second, related to this, where there is a lack of standardised procedures, participants may experience reduced self-efficacy in following the program in the longer-term (Caspi & Cojocaru, 2021; Tovel & Carmel, 2013). Third, while bespoke programs are attractive at the point of initiation and can generate medium-term success, they can create challenges for long-term sustainability and people's ongoing engagement (Morey et al., 2018). These three factors underscore the importance of considering continuation and sustainability in program design, to ensure that healthy

behaviours can continue even after the intervention ceases, which will further promote active ageing.

Qualitative measures within the intervention studies provide further insight and detail on the barriers to understanding how interventions can enhance active ageing by promoting healthy behaviours. Bartlett et al. (2013) suggested that community-based models, such as fitness and arts programs or buddy support systems, are beneficial in later life. Nonetheless, they noted that the evaluation of these programs is often limited by methodological issues such as: a lack of planning to include outcome evaluations in the programs' inception, standardised procedures and instruments, as well as adequate training of staff in the data collection process. Likewise, a study with rural older people in England concluded that community initiatives targeting social inclusion ('village services'), including befriending programs, clubs, and warden support, helped address social isolation and loneliness (Dwyer & Hardill, 2011). We found no peer-reviewed studies evaluating the efficacy and effectiveness of specific interventions to address loneliness and social isolation among older veterans.

Interventions that work to address physical, mental illness and/or low social participation

Findings showed strong support for interventions focused on maintaining physical movement as part of active ageing. Various interventions and programs were shown to be beneficial by encouraging movement and physical activity in older people, although this varied between programs. None of the reviewed interventions addressed mental illness as a category distinct from cognitive aspects of ageing; one study addressed sleep, while others included in this category addressed wellbeing in general. These are summarised in Table 11.

Table 11: Nature of intervention compared with targeted outcomes

Nature of intervention	Addresses physical illness	Addresses mental or cognitive wellbeing	Addresses low social participation
Physical activity / movement-based	Creative dance (Joung & Lee, 2019); BMSR program; PLIE program; LiFE program;	PLIE program	BMSR program; PLIE program
Holistic program (movement and wellbeing)	Gerofit program; MOVE! program	Gerofit program	
Psycho-social	VA-STRIDE program Mobile sleep app (Chung et al., 2020)	AgeWISE program SAVE-CLC program	Social inclusion programs (Bartlett et al., 2013)

Of the reviewed studies, only one addressed all of the elements of concern. Chao et al. (2021) reported on a smaller scale pilot study of the PLIE program, which took a holistic movement-based approach to address physical, mental, and cognitive and quality of life. The strong findings indicate great potential for similar holistic interventions and programs.

Contextualising the intervention findings

Some articles included in this REA, especially those relying on the direct perspectives of older people, took a critical approach to the concepts of healthy and active ageing – and successful ageing as well (Reich et al., 2020; Romo et al., 2013; Howell, 2020; Black & Dobbs, 2014; Bundy et al., 2008; Parsons et al., 2014; Rozanova et al., 2015; Tohit et al., 2012; Tovel & Carmel, 2014; Williamson et al., 2019A; Yeung et al., 2019). These studies generally called for a reorientation of these concepts away from bodily capacity and functioning to integrate more social dimensions. In doing so, they called for understandings of 'active ageing' that capture three key elements:

> a) as a set of actions or practices that allow a sense of autonomy, dignity, and efficacy as people move through their life course. Active ageing was less about ageing without illness or frailty and more about positive ageing within those contexts;
>
> b) as related to people's inner, social, and environmental resources and their capacity to use these to deal with stressors and respond to changing life and bodily contexts. This may be understood as related to 'coping' but speaks to broader level mechanisms at play in people's lives; and
>
> c) as an artefact of personal and social identity that highlighted connections throughout the life course - that is, where the experience of ageing was seen as part of a lifelong process, and not something that only happens after a certain age.

Nonetheless, taken together, findings suggest that successful and healthy ageing interventions should be informed by a set of core priorities, namely: 1) address social isolation and loneliness, 2) promote movement and physical exercise, 3) cognitive functioning, 4) quality of life and well-being, 5) consider veteran identity, and 6) reduce risk behaviours and mitigate risk factors. Each of these is discussed below.

Address social isolation and loneliness

The REA results show the need to consider social isolation and loneliness in healthy or active ageing interventions for both veteran and non-veteran populations (Bartlett et al., 2013). In terms of interventions tackling social isolation and loneliness, an evaluation conducted by Bartlett et al. (2013) of Australian programs to tackle these phenomena in

later life suggested that community-based models, such as fitness and arts programs or buddy support systems, are beneficial. Nonetheless, they noted that the evaluation of these programs is often limited by methodological issues due to a lack of planning to include outcome evaluations into the program design, a lack of standardised procedures and instruments, and adequate training of staff in the data collection process. Likewise, a study with rural older people in England concluded that community initiatives targeting social inclusion ('village services'), encompassing befriending programs, clubs, and warden support, help address social isolation and loneliness (Dwyer & Hardill, 2011). We found no peer-reviewed studies evaluating the efficacy and effectiveness of specific interventions to address loneliness and social isolation among older veterans.

The contextual paper by Yeung et al. (2019) comparing older veterans and non-veterans in New Zealand and found no differences between the two groups based on indicators relating to health and ageing, such as loneliness. Nonetheless, loneliness was a main factor impacting the well-being of veterans as they age (Yeung et al., 2019). These findings support prior research demonstrating a high level of loneliness among veterans according to age, disability, and trauma – veterans with limited successful ageing seem at higher risk of loneliness (Yeung et al., 2019). Additionally, a paper, included in this report as context, also demonstrated that loneliness and social isolation were the main issues affecting British older veterans (Brewster et al., 2021). It is important to emphasise here that while social isolation and loneliness have comparable negative health outcomes in later life, from depression to dementia, they are different issues and concepts (Neves et al., 2019; 2021). Yet, both these issues are important and are considered social determinants of health, contributing directly to healthy or active ageing (Neves et al., 2019).

Movement and physical activity

Exercise provides a wide range of physical, cognitive, mental, and other health benefits for midlife and older people. In one of the contextual papers, Wooldridge et al. (2019) suggests the importance of programs combining health and behavioural domains. Indeed, many of the articles contained in the REA supported maintaining physical movement as an important aspect of active ageing. The literature highlighted various interventions and programs that have shown to be beneficial in encouraging movement and physical activity in older people. For instance, a randomised control trial by Joung & Lee (2019) found that creative dance improves fitness, dynamic balance and mobility and may contribute to healthy ageing. The research suggests that combining a creative activity with a physical one serves a dual purpose of assisting older people in adapting to age-related psychological and physical changes, but also assisting in improved mobility

and cognitive function. A further intervention for older people that are showing positive results is the Body Management in Safe Ranges (BMSR) program (Caspi & Cojocaru, 2021). This program is a self-managed program to aid in physical mobility and improving functional abilities. The 82 participants in the program were grouped into those living in the community and those living in retirement homes to assess if living arrangements had any impact on the efficacy of the program. The program improved physical mobility of participants and encouraged self-management and self-efficacy of their physical health. Participants reported improvements in their physical abilities and condition, which enhanced their day-to-day functional abilities and resulted in increased independence, irrespective of age or living environment. Both groups reported improvements in self-management and self-efficacy, with higher rates reported in residential settings. At the same time, general feelings (quality of life) improved in the community group while social motivation reduced in the residential group. These findings should be interpreted in light of the COVID-19 pandemic, when the post-evaluation research was conducted.

Some programs have shown success when the interventions are personalised to the participants' lifestyle, goals, and abilities. For instance, the 'Gerofit' program in the US is targeted towards older veterans that are at risk of premature functional decline, because of deconditioning or chronic disease (Morey et al., 2018). The staff in the program work individually with participants to develop a personalised program that will encourage maintained mobility and is suitable to their specific circumstances. The program has been shown to maintain physical functioning and wellbeing, five and 10 years after the initial intervention (Morey et al., 2018). Likewise, the VA-STRIDE program in the U.S. provides a personalised physical activity program and counselling that is based on participants' medical conditions and their baseline abilities (Gao et al. 2016). Participants are sent regular feedback on their progress that highlights where the participants were doing well and the areas that they could improve upon. This program was found to successfully increase the physical activity of older veterans. Another program in the US has shown short term positive results but the benefits waned in the longer term. A weight loss program called MOVE! has been operating for veterans in the US since 2006 (Kahwati et al. 2011). This program has shown effective short-term weight loss and increased mobility in veterans; however, the program is only delivered to a small proportion of veterans that attend VHA medical centres.

The evidence from these interventions shows promising results in encouraging physical movement in later life. However, there are some considerations of these studies if utilising them to develop programs that are appropriate for Australian veterans. Translating such findings for Australian veterans needs to recognise that their experience

of military service may be considerably different to those of veterans overseas. In addition, political context is also important and shapes the available social, psychological, economic and cultural support. These studies were either undertaken in specific cultural contexts, focusing primarily on white populations (for example, in the US, in Morey et al., 2018); have shown minor improvements in physical health (e.g., Kahwati et al., 2011); or have not demonstrated long-term impacts (e.g., Gao et al., 2016). Findings from culturally diverse settings demonstrate the benefit of developing locally coherent and acceptable interventions. For example, dance was not used in western settings, but has been shown to generate significant positive outcomes in Korea (Joung & Lee, 2019). Tailoring programs to the target population should be a main consideration in intervention design.

Cognitive functioning

Cognitive functioning is a central aspect of active ageing and can be linked, in some cases, to physical wellbeing and activity. For example, in a comprehensive review of cognitive ageing, Krivanek & colleagues (2021) found that there is growing consensus amongst major health organizations about recommendations to mitigate cognitive decline and promote healthy cognitive ageing, from regular physical activity to treatment of cardiovascular risk factors. Different types of physical exercise have been shown to benefit cognitive function in older people. The evidence for healthy cognitive ageing supports activities, such as a heart-healthy diet, smoking cessation, regular social engagement, limiting alcohol use, stress management, and getting adequate sleep (Krivanek et al., 2021).

Beyond the healthy behaviours identified in the review, some interventions have been shown to affect cognitive function. For example, the Aging Well through Interaction and Scientific Education (AgeWISE) program in the U.S. is a 12-week cognitive program designed to 'provide psychoeducation to older adults about the ageing brain, lifestyle factors associated with successful brain ageing, and strategies to compensate for age-related cognitive decline' (O'Connor et al., 2018, p.419). The program impacted positively on ageing participants' sense of control in improving their memory and overall memory contentment.

In a review used as a contextual paper, Cook & Simiola (2018), found that there is significant evidence of the link between PTSD, dementia, and 'accelerated ageing'. The research pointed to older people with PTSD not receiving timely and appropriate mental health treatment, which has cognitive implications in later life. However, there is less research into older adults that have suffered trauma (whether they go on to develop

PTSD or not) and this has broad implications for the health and wellbeing of older veterans as they age.

Quality of life and wellbeing

The ageing process may involve declines (Sullivan et al., 2020). However, the 'declines' do not necessarily impact on quality of life and overall wellbeing of older people. Quality of life and wellbeing measures are evident in the perceptions of older people that are contained in the contextual papers that we reviewed. For instance, Tovel & Carmel (2014) found that when older people are empowered to make independent decisions about their wellbeing, their quality of life improves even if their health and functioning declines. Likewise, in their study of older people with late-life disabilities, Romo et al. (2012) found that the participants enjoyed a sense of wellbeing and considered they had aged successfully, despite their disability. Much of the contextual literature in the REA highlighted the importance of understanding and harnessing older persons' perceptions of healthy ageing (e.g., Rozanova et al., 2015; Cernin et al., 2011). Ageing is a process rooted in sociocultural context and so there is variation in the way older adults define and experience healthy ageing (Howell & Peterson, 2020). Importantly, active and healthy ageing involves subjective criteria that may not always align with medical or professional views. Understanding the subjective view of older people about what constitutes active ageing, can help inform the development of appropriate interventions. A key point articulated in the contextual literature is about empowering older people to make decisions about their health, wellbeing, and quality of life.

Veterans are more likely to smoke than their non-veteran counterparts (Sullivan et al., 2020). In one of the contextual papers, Ladusingh and Ngangbam (2016) argued that smoking has a deterrent effect on wellbeing. However, in the literature contained in the REA, there were not any interventions that provided evidence of smoking cessation in midlife and older veterans.

Insomnia and inadequate sleep have wide-ranging impacts on health and wellbeing. Lack of sleep has been shown to influence negative mental health; increase mortality and psychiatric comorbidities; impact cognitive function; and impact overall wellbeing with insomnia increasing in prevalence and severity as a person ages (Perach et al., 2019). Furthermore, poor sleep quality and insomnia and nightmares are commonly reported side effects in the veteran population with PTSD (Beck et al., 2017). Although sleep quality is a concern of older veterans, within the REA, only one paper discussed an intervention to address it. While not addressing veterans specifically, research by Chung et al. (2020) found that older people utilising a mobile phone app to aid sleep reported

improved sleep quality after one week of use. However, there was no evidence of the long-term benefits of utilising the app.

Consider veteran identity

Joining military service involves a process of socialisation into military culture that leads to the development and assimilation of particular military identities (Barnett et al., 2021; Brewster et al., 2020). While a military identity can contribute to a sense of connection among veterans, it can change over time and result in both positive and negative outcomes (Barnett et al., 2021; Brewster et al., 2020). An Australian study into veterans' experiences of transition from military to civilian life found the relevance of identity and related social status (Barnett et al., 2021). For older veterans with a strong military identity and reduced interaction with civilian groups after service, there was no need to form a new civilian identity to function in civil society, as they did not require employment or education after military service (Barnett et al., 2021). For other veterans, integrating into civilian groups can be challenging and isolating, as veteran identity can also be *othering*, separating from civilian life (Barnett et al., 2021; Brewster et al., 2020). Yet, evidence has further demonstrated that as veterans age, military and veteran identities can be vital psychosocial dimensions, becoming central to their construction of themselves as older people (Brewster et al., 2020). Those who are able to combine a military and civilian/family social identity, have more stable transitions and civilian re-integrations characterized by a heightened sense of belonging (Barnett et al., 2021).

Research has demonstrated that some veterans may not utilise health and social services, because they may view seeking help as a sign of personal failure (Rozanova et al., 2015). However, veterans may be more receptive to services that are run by other veterans as they have a mutual understanding, which may mitigate hesitancy and resistance. Studies suggest that veterans are more likely to take part in peer support programs run by veterans than in non-veteran programs (Barnett et al., 2021; Brewster et al., 2021). Focusing on the positive aspects of veterans' identities and lives can help improve mental health (Williamson et al., 2019A). Being in the military gave veterans' meaning and purpose, so undertaking activities in civilian life that 'give back to the community' and rely on a strong ethic of service may be particularly beneficial (Barnett et al., 2021).

The articles included above are contextual material, because they help contextualize why the literature highlights the importance of veterans connecting with other veterans (Bundy et al., 2018). This knowledge on identities is useful to inform the design and implementation of interventions to promote healthy or active ageing. There is strong

identification of veterans with military peers and military visual culture (e.g., veteran badge), which has positive effects on well-being and social connectedness (Bundy et al., 2018; Barnett et al., 2021; Brewster et al., 2020). Additionally, being a veteran can also provide existing social networks that may not be available to non-veterans and can, thus, be leveraged to support identities linked with healthy and active ageing (Bundy et al., 2018).

Reduce risk behaviours & mitigate risk factors

Research shows that targeting risk factors, such as smoking or physical inactivity, can help prevent and mitigate illnesses and diseases in later life, contributing to healthy or active ageing (Krivanek et al., 2021; LaCroix et al., 2016). For instance, a recent review of evidence on successful cognitive ageing highlighted the scientific consensus on the importance of physical activity, cognitive stimulation, healthy diets, and smoking cessation to reduce the risk of cognitive decline and dementia (Krivanek et al., 2021). But there is also evidence supporting limiting alcohol consumption, appropriate sleep, and social engagement (Krivanek et al., 2021). Adopting "these brain-healthy behaviors can improve cognition, reduce the risk of brain injury or dysfunction, and augment overall wellbeing and quality of life for cognitively normal older adults" (Krivanek et al., 2021, p. 874).

In fact, a study – used in this report as 'context' – comparing veteran and non-veteran women concludes that healthy survival was linked, for both groups, with modifiable risk factors: non-smoking, healthy body weight, higher physical activity, and fewer depressive symptoms (LaCroix et al., 2016). The study found that women veterans were significantly more likely to be smokers or past smokers, to consume alcohol, and report lower levels of life satisfaction, quality of life, life purpose, and social support; but they were less likely to be obese, overweight, physically inactive or depressed when comparing with non-veteran women (LaCroix et al., 2016). Nonetheless, the same risk factors predicted healthy survival in both groups (LaCroix et al., 2016).

Discussion

There are unique and specific health needs, outcomes, and challenges attached to veterans, differing distinctly from non-veteran peers (AIHW, 2020; Brewin et al., 2011; Finlay et al., 2019; Wells et al., 2018). While serving, veterans may generally have good physical and mental health with the support and structure provided by the Australian Defence Force (ADF) (AIHW, 2020). After transitioning from service, veterans may enter civilian life successfully. However, some veterans face an elevated risk of mental illness, alcohol, drug use, and other health-related issues (Elbogen et al., 2012). As the veteran population ages, there is increased interest in understanding the types of healthy behaviours and interventions that will promote active ageing and wellbeing of this specific population. Many of the challenges to active ageing faced by veterans may be addressed by appropriate support and intervention pre- and post-transition and years after discharge.

This section includes a brief summary of the REA literature, research gaps, the REA limitations and strengths, and implications.

Summary

The articles included in the REA cover the understanding of active ageing; healthy behaviours for midlife and older adults; and core issues related to the active ageing of veterans. By identifying several existing interventions to support and sustain healthy behaviours in individuals, this REA can assist in the design, implementation, and planning of interventions to support veterans to age actively.

Active ageing

Active and healthy ageing highlights the need to focus on supportive environments and the creation of opportunities for middle- and older adults to maintain functional capacity, social participation and wellbeing as they grow older (WHO, 2020). Active ageing has several related concepts and terms such as healthy ageing, successful ageing, positive ageing, productive ageing and many others (Tohit et al., 2012). In the literature, these terms are sometimes used interchangeably but can also represent divergent concepts. Perspectives on what constitutes healthy and active ageing differ between countries and cultures and between medical professionals and laypeople (Reich et al., 2020). While the understanding of active ageing differs depending on temporal and special contexts, in

general, the active ageing literature emphasises social connection, physical movement, agency, and cognitive functioning. As such, active ageing can improve wellbeing and quality of life (Caspi & Cojocaru, 2021). Importantly, active and healthy ageing involves subjective criteria that may not always align with medical or professional views.

Healthy behaviours for midlife and older adults

Healthy behaviours for midlife and older adults have a range of physical, mental, and psychosocial benefits (Krivanek et al., 2021). For example, exercise provides a wide range of physical, cognitive, mental, and other health benefits. Maintaining physical movement is an important aspect of active ageing. Various interventions have been shown to be beneficial to older people. For example, research by Joung & Lee (2019) found that creative dance improves fitness, dynamic balance and mobility that may contribute to healthy ageing.

Cognitive functioning is an important aspect of active ageing and is related to physical wellbeing and activity. In a comprehensive review of cognitive ageing, Krivanek et al. (2021) found that there is growing consensus amongst major health organizations about recommendations to mitigate cognitive decline and promote healthy cognitive ageing, such as regular physical activity and treatment of cardiovascular risk factors. Some interventions have been shown to affect cognitive function. For example, a program in the US called AgeWISE impacted positively on ageing participants' sense of control in improving their memory (O'Connor et al., 2018).

Interventions that support the healthy ageing of veterans have shown some promising results but would need to be implemented on a larger scale and with an Australian veteran cohort to understand their efficacy.

Veterans

Many of the challenges to active ageing faced by veterans may be addressed by appropriate support pre- and post-transition and years after service. While there is much research about active ageing more generally, less is known about the active ageing of veterans. There are specific health risks and vulnerabilities that are unique to veterans, thus, interventions that promote healthy behaviours in veterans need to be tailored to this specific cohort.

Research has demonstrated that some veterans may not utilise health and social services because they may view seeking help as a sign of personal failure (Rozanova et al., 2015, p. 750). However, veterans may be more receptive to services that are run by other veterans as they have a mutual understanding which may mitigate the resistance. For example, evidence has shown that veterans are more likely to take part in peer-support type programs than non-veteran programs (e.g., Barnett et al., 2021; Brewster et al., 2021). The literature highlighted the importance of veterans connecting with other veterans (e.g., Bundy et al., 2018). This is particularly important as loneliness and social isolation were identified during the co-design workshop as risks to the active ageing of veterans. These psychosocial factors are critical in understanding veterans' ageing (Lahav et al., 2020).

Focusing on the positive aspects of veterans' lives can help improve mental health (Williamson et al., 2019). Strengths-based approach programs and interventions can assist older veterans to have a good later life experience. Therefore, interventions that enhance veterans' sense of purpose in life and social connectedness may have broader health benefits (Yeung et al., 2019).

Research Gaps

At the first co-design workshop of this project (21/09/2021), the DVA team highlighted several areas of interest regarding the needs of Australian veterans and active ageing interventions to inform our review. However, the REA did not find appropriate evidence in the literature on some of these key areas of interest. We have identified a range of research gaps, which are discussed below. These areas were reinforced as key priority areas for future research at the second co-design workshop (16/02/2022).

Diversity

The Australian veteran community is diverse and with varied needs. There was interest from DVA in understanding the evidence from interventions for healthy ageing that work with diverse cohorts including but not limited to gender, race/ethnicity, and sexuality. While some of the literature (e.g., Brewster et al., 2021) acknowledged the heterogeneous nature of veterans, few of the interventions in the REA targeted at veterans utilised diverse comparative factors in the evaluation. Although several studies from the U.S. included race and gender in the descriptions of participants (e.g., Morey et al., 2018; amongst others), these studies did not include these factors in their evaluation and analysis of the interventions. Future Australian research would benefit from

exploring active ageing interventions and the impact on diverse cohorts of Australian veterans. The interventions that support the healthy ageing of veterans included in the REA have shown some promising results but would need to be implemented on a larger scale and/or with an Australian veteran cohort to understand their efficacy and cultural appropriateness. It is important to recognise the diverse experiences of veterans and ensure that clinical research and interventions account for that diversity in program delivery (Gordon et al., 2020). Diverse veteran profiles and circumstances, such as cultural needs and disabilities, should inform the design and deployment of interventions, including engaging end-users since its inception to understand their subjective motivations and personal contexts (Williamson, 2019A). A clear gap in the research surveyed, mainly in the Australian literature, was an exclusion of First Nations veterans and those from culturally and linguistically diverse (CALD) backgrounds.

Social Connectedness and Engagement

Social connectedness was a key issue identified in the co-design workshop since loneliness and social isolation were identified as risks to the active ageing of veterans. An evaluation conducted by Bartlett et al. (2013) of Australian programs to tackle these phenomena in later life suggested that community-based models, such as fitness and arts programs or buddy support systems, are beneficial. Furthermore, Mavandadi et al. (2015) argue that the quality of a relationship can influence healthy and unhealthy behaviours. That is, that positive encouragement and persuasion from a trusted social connection can increase the likelihood of engaging in healthy behaviours. However, the REA found no peer-reviewed studies evaluating the efficacy and effectiveness of specific interventions to address loneliness and social isolation among older veterans. This gap in the literature highlights the need for further research into specific interventions for Australian veterans that enhance social connectedness (i.e., meaningful social connections).

The literature on the non-veteran population suggests broader communities and families accompany and support members throughout the healthy ageing process. Community and family support will assist with improvement to the quality of life, reduce long term health effects, both cognitive and physical, along with addressing social isolation and mitigating risk factors associated with determinants of unhealthy ageing. However, further research into the impact of the family (including pets) on encouraging healthy behaviours in Australian veterans would be useful when designing new programs and interventions.

The literature within the REA highlighted the importance of veterans connecting with other veterans (e.g., Bundy et al., 2018). As veterans age, there may be more of a need to connect with other veterans (Brewster et al., 2021, p. 1994). The evidence from the

literature suggests that peer support programs run by veterans can improve social support and positive community reintegration (e.g., Barnett et al., 2021; Brewster et al., 2021). Although the current literature does not include interventions that address the social connection of veterans, future research should look to interventions that specifically address the social connection of older veterans by utilising peer support or veteran operated programs.

Recruitment and Adherence

The evidence suggests that personalised programs and individualised support may result in successful outcomes in healthy ageing-related interventions. However, many of the interventions, particularly the scientific articles from the U.S., are targeted at cohorts of veterans that are already engaged in veteran healthcare services. There is limited evidence demonstrating techniques encouraging veterans to participate in active ageing programs or evidence outlining what motivates veterans to take part in these interventions or in healthy behaviours when they are not involved in existing healthcare programs. Future research would benefit from exploring what motivates Australian veterans to participate in programs and interventions to improve their health and what techniques can be utilised to advertise these programs through veteran and non-veteran networks. Research into how online capabilities can be utilised to reach veterans who may not be involved in existing veteran networks would be beneficial. Online spaces and mobile phone apps have been used in a variety of health contexts (e.g., Chung et al., 2020), however, further research into how healthy ageing programs could utilise these technologies to encourage long-term healthy behaviours could enhance active ageing and health programs. Very few of the interventions included in the REA demonstrated sustained or long-term health benefits to participants involved in health interventions (except Morey et al., 2018). Further research into how and why Australian veterans make choices about healthy behaviours and how they can be empowered to maintain these behaviours in the long-term would create an important evidence base for future health interventions targeted at veterans. Developing and implementing interventions by professionals that enhance self-efficacy and target quality of life and wellbeing would also be valuable. Further, interventions should also focus on the role of transitions (transition out of the military and transitions through the ageing process) and the potential losses that may occur to enhance coping strategies for preserving and developing identity, resources, and accessibility to healthy ageing.

Reluctance and / or barriers to participation in healthy behaviours

The extracted literature is limited in terms of outlining barriers or factors that may deter participation in – and success of – healthy or active ageing interventions (e.g., including attrition issues) as well as their long-term success and sustainability. This gap is not limited to this area of research but to scientific interventions in general due to the reluctance of reporting negative results or failures because of scientific journals' preference for positive or significant results – commonly known as the 'positive publication bias' or 'positive results bias' (Ekmekci, 2017; Neves et al., 2021; Mlinarić et al., 2017).

Nonetheless, the review still sought to tease out limitations and provide critical insights that require further investigation. In particular, when we focus on veterans, contextual research has shown that some may not utilise health and social services, since seeking help is perceived as a weakness, but that peer-to-peer programs delivered by other veterans can be successful (Rozanova et al., 2015; Barnett et al., 2021; Brewster et al., 2020). Veteran identity and related services are vital because being a veteran means having specific social networks that can be used to develop, implement, and assess healthy and active ageing programs (Bundy et al., 2018).

Another factor that can address reluctance to participate in healthy behaviours and enhance participation and sustainability of interventions is to consider linking modalities of care (Kahwati et al., 2011): for example, one study suggests that combining physical activity programs with expert counselling can enhance adherence and outcomes (Gao et al., 2016); another study has shown that providing education and tailored resources about an intervention can increase adherence (Chung et al., 2020).

Specific behaviours/issues

There are health needs of veterans that differ from non-veteran peers (AIHW, 2020; Wells et al., 2018). For example, veterans face an elevated risk of mental illness, alcohol, and drug use, and other health-related issues (Elbogen et al., 2012). Veterans are also more likely to smoke than their non-veteran counterparts (Sullivan et al., 2020). However, the literature contained in the REA did not provide evidence for interventions that encourage smoking cessation or reduce drug and alcohol use in midlife and older veterans. Further research into interventions that target these specific behaviours of Australian veterans should also consider specific mental and physical health needs.

Insomnia and inadequate sleep have wide-ranging impacts on health and wellbeing (Perach et al., 2019). Although sleep quality is a concern of older veterans, within the

REA, only one paper (Chung et al., 2020) discussed a short-term intervention on a non-veteran population to address this concern. Research into appropriate interventions to improve the sleep quality of Australian veterans should consider the specific health and lifestyle of veterans, particularly impacts of mental health and disability on sleep.

While there was evidence in the literature about the effect of trauma on ageing (see the review by Cook & Simiola, 2018), the literature in the REA did not consider the life course of trauma and the impact that this may have on healthy ageing. Experiences of trauma throughout childhood may impact mental and physical health later in life. Understanding the influence of trauma experienced by veterans in other circumstances beyond the military experience would build an evidence base for mental health interventions that address the holistic health needs of veterans.

Finally, programs and interventions drawing on a broader definition of healthy or active ageing and on a capability approach to well-being rather than a deficit one can be more successful regarding efficacy, efficiency, and continuity (Yeung et al., 2019, Tovel et al., 2014). As evidenced in the literature, older people prefer psychosocial understandings of healthy, successful, or active ageing than biomedical ones (Reich et al., 2020). Further integrating cultural and social competency in ageing programs development and implementation as well as a life course perspective can enhance program effectiveness (Clemson et al., 2012; Bundy et al., 2018; Dwyer and Hardill, 2011; Tohit et al., 2012; O'Connor et al., 2018; Romo et al., 2013; Howell et al., 2020; Reich et al., 2020; Krivanek et al., 2021).

REA Limitations & Strengths

In addition to the research gaps identified above, this REA is limited by design, which can amplify those gaps. For example, we focused on healthy or active ageing, although the literature includes interventions on 'isolated' behaviours or dimensions that could be considered if we were searching separately for the many components that integrate the concepts above, such as technological, educational or spiritual needs.

This review was also limited by the dependence on veteran studies from North America, which cannot be generalised across countries due to the specificities of that region, mainly in what concerns military and sociocultural circumstances. Furthermore, most literature is based on male veterans, with very few studies focusing on women veterans. Other visible omissions in the literature relate to the lack of i) rural or regional settings, ii) longitudinal designs or long-term assessment of interventions, and iii) life-course approaches. These would be critical to offer insights into sustainability and long-term effects.

Nonetheless, our REA process was leveraged by including diverse ageing frameworks and by integrating two groups: veterans and non-veterans. This provided knowledge on similarities and differences between the groups, which can be essential knowledge to inform interventions in later life that respect different identities (e.g., military vs. civilian) and lived experiences. Being able to include interventions that were not only evaluated through randomised controlled trials (RCTs) allowed us to map different program types and outcomes. This inclusion of different research designs in evaluation and implementation science follows scientific calls to overcome the over-reliance on RCTs due to their known issues with ecological validity and inability to capture complex interventions – a focus on high-quality mixed methods and qualitative research can provide richer and contextualised data of 'in-situ' and 'out-of-the-lab' contexts (Marchal et al., 2013; Gates & Dyson, 2016; Hopman et al., 2016; Smeets et al., 2021). This 'turn' to Realist Evaluations (RE) that go beyond traditional experimental evaluation research designs have contributed to this review.

Finally, while our final dataset includes a small number of Australian studies, they were of high quality when compared to research in other regions. This demonstrates the potential of supporting research with veterans in Australia.

Implications

Overall, our findings have the following implications for program development and research:

- Consider broader definitions of healthy and active ageing that include middle and later life perspectives (e.g., older people's understandings).
- Employ a strengths-based or capability model that is not based on a deficit approach to ageing and health.
- Involve veterans in co-design and implementation of interventions.
- Incorporate peer-led interventions and programs that enhance the needs, identity, and aspirations of veterans.
- Personalise interventions, integrating psychosocial contexts and overcoming the one-size-fits-all model.
- Develop 'comprehensive' interventions, engaging with more than one component of healthy or active ageing.

Additionally, our findings show a set of research gaps that are useful to guide future research directions (see Figure 4).

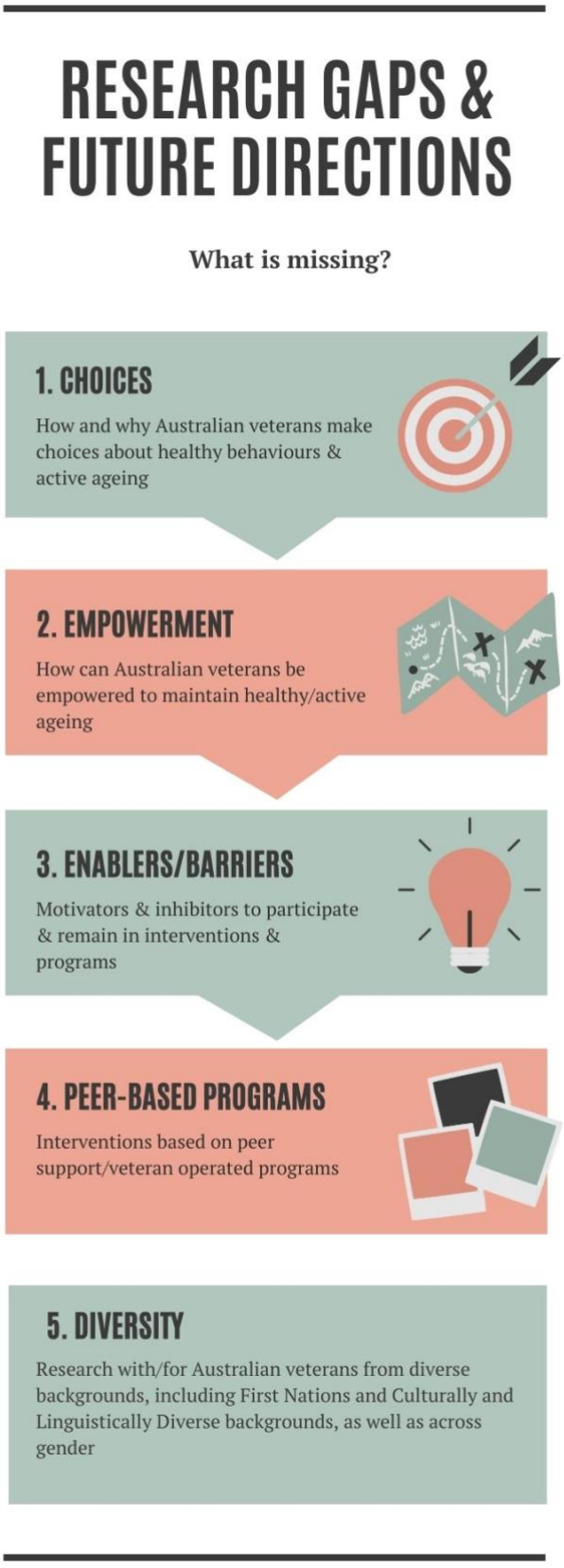


Figure 4. Research Gaps Display

Conclusion

Active and healthy ageing requires supportive environments and opportunities for middle- and older adults to maintain functional capacity, social participation, and wellbeing as they grow older (WHO, 2020). The concepts of healthy and/or active ageing – and of 'successful ageing' – guided our review, but several studies called for their redefinition. Research shows the need to overcome strict biomedical criteria by including social dimensions, such as engagement and connectedness, and more diverse understandings of ageing. For example, older people who live with comorbidities and disabilities feel alienated by concepts that suggest they cannot age well or actively.

The articles included in the REA cover the understanding of active ageing; healthy behaviours for midlife and older adults; and core issues concerning active ageing of veterans. By identifying interventions to support and sustain healthy behaviours in individuals, this REA can inform the design, implementation, and planning of interventions to assist veterans to age actively. For instance, findings demonstrate that programs and interventions drawing on a strength-based approach that links broader dimensions of healthy and active ageing – from active physical and cognitive lifestyle to purpose in life – can support a positive later life for veterans.

In particular, the evidence suggests that interventions should consider the following core priorities: 1) address social isolation and loneliness, 2) promote movement and physical exercise, 3) cognitive functioning, 4) quality of life and well-being, 5) consider veteran identity, and 6) reduce risk behaviours and mitigate risk factors. Through a gap analysis, we also identified several key areas that would warrant further research to support the active ageing of Australian veterans, from cultural factors to family and community networks. Taken together, the evidence and the existing gaps allowed us to outline a set of implications for program development and evaluation that can assist the DVA in assessing its current initiatives and plan for future programs.

References

Australian Institute of Health and Welfare (2018). A profile of Australia's veterans 2018, Cat. no. PHE 235. Canberra: AIHW.

Australian Institute of Health and Welfare (AIHW) 2020, *Health of veterans*, viewed 3 May 2021, https://www.aihw.gov.au/reports/australias-health/health-of-veterans

Barnett, A., Savic, M., Forbes, D., Best, D., Sandral, E., Bathish, R., Cheetham, A., & Lubman, D. I. (2021). Transitioning to civilian life: The importance of social group engagement and identity among Australian Defence Force veterans. *Australian & New Zealand Journal of Psychiatry*, 000486742110468-000486742110468. https://doi.org/10.1177/00048674211046894

Bartlett, H., Warburton, J., Lui, C.-W., Peach, L., & Carroll, M. (2013). Preventing social isolation in later life: findings and insights from a pilot Queensland intervention study. *Ageing and Society, 33*(7), 1167-1189. https://doi.org/10.1017/S0144686X12000463

Bartram, D. J., Sinclair, J. M., & Baldwin, D. S. (2010). Interventions with potential to improve the mental health and wellbeing of UK veterinary surgeons. *Vet Rec*, *166*(17), 518-523. https://doi.org/10.1136/vr.b4796

Beck, D., Cosco Holt, L., Burkard, J., Andrews, T., Liu, L., Heppner, P., & Bormann, J. E. (2017). Efficacy of the Mantram Repetition Program for Insomnia in Veterans With Posttraumatic Stress Disorder: A Naturalistic Study. *ANS Adv Nurs Sci*, *40*(2), E1-E12. https://doi.org/10.1097/ANS.0000000000000144

Black, K., & Dobbs, D. (2014). Community-dwelling older adults' perceptions of dignity: core meanings, challenges, supports and opportunities. *Ageing and Society*, *34*(8), 1292-1313. https://doi.org/10.1017/S0144686X13000020

Bokhour, B. G., Fix, G. M., Gordon, H. S., Long, J. A., DeLaughter, K., Orner, M. B., Pope, C., & Houston, T. K. (2016). Can stories influence African-American patients' intentions to change hypertension management behaviors? A randomized control trial. *Patient Educ Couns*, *99*(9), 1482-1488. https://doi.org/10.1016/j.pec.2016.06.024

Breslin, G., Haughey, T. J., Donnelly, P., Kearney, C., & Prentice, G. (2017). Promoting mental health awareness in sport clubs. *Journal of public mental health*, *16*(2), 55-62. https://doi.org/10.1108/JPMH-08-2016-0040

Brewin, C. R., Garnett, R., & Andrews, B. (2011). Trauma, identity and mental health in UK military veterans. *Psychological Medicine*, *41*(8), 1733-1740. https://doi.org/10.1017/S003329171000231X

Brewster, L., McWade, B., & Clark, S. J. A. (2021). A point of connection? Wellbeing, the veteran identity and older adults. *Ageing and Society*, *41*(9), 1984-2005. https://doi.org/10.1017/S0144686X20000161

Bundy, B. C., Daley, R. T., Clark, E. L., Indorewalla, K., & O'Connor, M. K. (2018). Perceptions of Cognitive Aging Among Older Veterans. *GeroPsych*, *31*(4), 185-193. https://doi.org/10.1024/1662-9647/a000188

Canada, K. E., & Peters, C. (2017). "They Teach You How to Weather the Storm, but They Don't Teach You How to Dance in the Rain:" Veterans' Perspectives on the Pathways to Criminal Justice Involvement. *Journal of Qualitative Criminal Justice & Criminology*. . https://doi.org/https://doi.org/10.21428/88de04a1.3acc12f1

Caspi, D., & Cojocaru, D. (2021). Intervention of a Physical Movement Program "Body Management in Safe Ranges" Enhances Self-Management in Aging. *Revista de Cercetare si Interventie Sociala*, *72*, 248-248. https://search.proquest.com/docview/2517780981?accountid=12528&bdid=10223&_bd=uUeYKIqo5WIsq7N5GaiIKehXuTk%3D

Cernin, P. A., Lysack, C., & Lichtenberg, P. A. (2011). A Comparison of Self-Rated and Objectively Measured Successful Aging Constructs in an Urban Sample of African American Older Adults. *Clinical Gerontologist*, *34*(2), 89-102. https://doi.org/10.1080/07317115.2011.539525

Chang, B.-H., & Sommers, E. (2013). Acupuncture and relaxation response for craving and anxiety reduction among military veterans in recovery from substance use disorder: Acupuncture and Relaxation Response for Reducing Craving. *The American journal on addictions*, *23*(2), 129-136. https://doi.org/10.1111/j.1521-0391.2013.12079.x

Chao, L. L., Lee, J. A., Martinez, S., Barlow, C., Chesney, M. A., Mehling, W. E., & Barnes, D. E. (2021). Preventing Loss of Independence through Exercise (PLIÉ): A Pilot Trial in Older Adults with Subjective Memory Decline and Mild Cognitive Impairment. *Journal of Alzheimer's Disease*, *82*(4), 1543-1557. https://doi.org/10.3233/JAD-210159

Chung, K., Kim, S., Lee, E., & Park, J. Y. (2020). Mobile App Use for Insomnia Self-Management in Urban Community-Dwelling Older Korean Adults: Retrospective Intervention Study. *JMIR mHealth and Health*, *8*(8), e17755-e17755. https://doi.org/10.2196/17755

Clemson, L., Fiatarone Singh, M. A., Bundy, A., Cumming, R. G., Manollaras, K., O'Loughlin, P., & Black, D. (2012). Integration of balance and strength training into daily life activity to reduce rate of falls in older people (the LiFE study): randomised parallel trial. *BMJ*, *345*(aug07 1), e4547-e4547. https://doi.org/10.1136/bmj.e4547

Cook, J. M., & Simiola, V. (2018). Trauma and Aging. *Current Psychiatry Reports*, *20*(10), 93-93. https://doi.org/10.1007/s11920-018-0943-6

Covidence systematic review software, V. H. I., Melbourne, Australia. Available at www.covidence.org.

Dai, B., Zhang, B., & Li, J. (2013). Protective Factors for Subjective Well-being in Chinese Older Adults: The Roles of Resources and Activity. *Journal of Happiness Studies, 14*(4), 1225-1239. https://doi.org/10.1007/s10902-012-9378-7

Dale, H., Brassington, L., & King, K. (2014). The impact of healthy lifestyle interventions on mental health and wellbeing: a systematic review. *Mental health review journal*, *19*(1), 1-26. https://doi.org/10.1108/MHRJ-05-2013-0016

Damschroder, L. J., Lutes, L. D., Kirsh, S., Kim, H. M., Gillon, L., Holleman, R. G., Goodrich, D. E., Lowery, J. C., & Richardson, C. R. (2014). Small-changes obesity treatment among veterans: 12-month outcomes. *Am J Prev Med*, *47*(5), 541-553. https://doi.org/10.1016/j.amepre.2014.06.016

Department of Veterans Affairs (2018). Transition Taskforce: Improving the Transition Experience. https://www.dva.gov.au/sites/default/files/transition-taskforce-improving-the-transition-experience.pdf

Du, W. J., Tan, J. P., Yi, F., Zou, Y. M., Gao, Y., Zhao, Y. M., & Wang, L. N. (2015). Physical activity as a protective factor against depressive symptoms in older Chinese veterans in the community: result from a national cross-sectional study. *Neuropsychiatr Dis Treat*, *11*, 803-813. https://doi.org/10.2147/ndt.S80295

Dunifon, R. E., Musick, K. A., & Near, C. E. (2020). Time with Grandchildren: Subjective Well-Being Among Grandparents Living with Their Grandchildren. *Social Indicators Research, 148*(2), 681-702. https://doi.org/10.1007/s11205-019-02206-9

Dubbert, P. M., Morey, M. C., Kirchner, K. A., Meydrech, E. F., & Grothe, K. (2008). Counseling for Home-Based Walking and Strength Exercise in Older Primary Care Patients. *Arch Intern Med*, *168*(9), 979-986. https://doi.org/10.1001/archinte.168.9.979

Dwyer, P., & Hardill, I. (2011). Promoting social inclusion? The impact of village services on the lives of older people living in rural England. *Ageing and Society*, *31*(2), 243-264. https://doi.org/10.1017/S0144686X10000851

Elbogen, E. B., Johnson, S. C., Wagner, H. R., Newton, V. M., & Beckham, J. C. (2012). Financial well-being and postdeployment adjustment among Iraq and Afghanistan war veterans. *Mil Med*, *177*(6), 669-675. https://doi.org/10.7205/MILMED-D-11-00388

Ekmekci P.E. (2017). An increasing problem in publication ethics: Publication bias

and editors' role in avoiding it. *Medicine, Health Care and Philosophy*, 20(2), 171-178.

Feldman, S., & Hanlon, C. (2012). Count Us In: The Experiences of Female War, Peacemaking, and Peacekeeping Veterans. *Armed Forces & Society, 38*(2), 205-224. https://doi.org/10.1177/0095327x11410859

Finlay, A. K., Owens, M. D., Taylor, E., Nash, A., Capdarest-Arest, N., Rosenthal, J., Blue-Howells, J., Clark, S., & Timko, C. (2019). A scoping review of military veterans involved in the criminal justice system and their health and healthcare. *Health Justice*, *7*(1), 1-18. https://doi.org/10.1186/s40352-019-0086-9

Fogle, B. M., Tsai, J., Mota, N., Harpaz-Rotem, I., Krystal, J. H., Southwick, S. M., & Pietrzak, R. H. (2020). The National Health and Resilience in Veterans Study: A Narrative Review and Future Directions. *Front Psychiatry*, *11*, 538218. https://doi.org/10.3389/fpsyt.2020.538218

Fritzell, J., Lennartsson, C., & Zaidi, A. (2021). Trends and Inequality in the New Active Ageing and Well-Being Index of the Oldest Old: a Case Study of Sweden. *Journal of Population Ageing, 14*(1), 5-22. https://doi.org/10.1007/s12062-020-09264-9

Gao, S., Stone, R. A., Hough, L. J., Haibach, J. P., Marcus, B. H., Ciccolo, J. T., Kriska, A. M., Burkitt, K. H., Steenkiste, A. R., Berger, M. A., & Sevick, M. A. (2016). Physical activity counseling in overweight and obese primary care patients: Outcomes of the VA-STRIDE randomized controlled trial. *Prev Med Rep*, *3*, 113-120. https://doi.org/10.1016/j.pmedr.2015.12.007

Gates, E., & Dyson, L. (2017). Implications of the Changing Conversation About Causality for Evaluators. *The American journal of evaluation*, *38*(1), 29-46. https://doi.org/10.1177/1098214016644068

Gobin, R. L., Green, K. E., & Iverson, K. M. (2015). Alcohol Misuse Among Female Veterans: Exploring Associations With Interpersonal Violence and Mental Health. *Substance Use & Misuse, 50*(14), 1765-1777. https://doi.org/10.3109/10826084.2015.1037398

Gordon, K., Burnell, K., & Wilson, C. (2020). Outside the Military "Bubble": Life After Service for UK Ex-armed Forces Personnel. *Frontiers in Public Health*, *8*. https://doi.org/10.3389/fpubh.2020.00050

Greaves, C. J., & Farbus, L. (2006). Effects of creative and social activity on the health and well-being of socially isolated older people: outcomes from a multi-method observational study. *J R Soc Promot Health*, *126*(3), 134-142. https://doi.org/10.1177/1466424006064303

Haddaway, N. R., Pritchard, C. C. & McGuinness, L. A. (2021). PRISMA2020: R package and ShinyApp for producing PRISMA 2020 compliant flow diagrams. *Zenodo.* http://doi.org/10.5281/zenodo.4287834

Hoggatt, K. J., Harris, A. H. S., Washington, D. L., & Williams, E. C. (2021). Prevalence of substance use and substance-related disorders among US Veterans Health Administration patients. *Drug Alcohol Depend, 225*, 108791. https://doi.org/10.1016/j.drugalcdep.2021.108791

Hopman, P., de Bruin, S. R., Forjaz, M. J., Rodriguez-Blazquez, C., Tonnara, G., Lemmens, L. C., Onder, G., Baan, C. A., & Rijken, M. (2016). Effectiveness of comprehensive care programs for patients with multiple chronic conditions or frailty: A systematic literature review. *Health Policy*, *120*(7), 818-832. https://doi.org/10.1016/j.healthpol.2016.04.002

Howell, B. M., & Peterson, J. R. (2020). "With Age Comes Wisdom:" a Qualitative Review of Elder Perspectives on Healthy Aging in the Circumpolar North. *Journal of Cross-Cultural Gerontology*, *35*(2), 113-131. https://doi.org/10.1007/s10823-020-09399-4

Huffman, K., Sloane, R., Peterson, M., Bosworth, H., Ekelund, C., Pearson, M., Howard, T., Pieper, C., & Morey, M. (2010). The impact of self-reported arthritis and diabetes on response to a home-based physical activity counselling intervention. *Scandinavian Journal of Rheumatology*, *39*(3), 233–239.

Iasiello, M., Bartholomaeus, J., Jarden, A., & van Agteren, J. (2018). Maximising the Opportunity for Healthy Ageing: Online Mental Health Measurement and Targeted Interventions. *Stud Health Technol Inform*, *246*, 111-123.

Joung, Hee J., & Lee, Y. (2019). Effect of Creative Dance on Fitness, Functional Balance, and Mobility Control in the Elderly. *Gerontology*, *65*(5), 537-546. https://doi.org/10.1159/000499402

Kahwati, L. C., Lance, T. X., Jones, K. R., & Kinsinger, L. S. (2011). RE-AIM evaluation of the Veterans Health Administration's MOVE! Weight Management Program. *Translational Behavioral Medicine*, *1*(4), 551-560. https://doi.org/10.1007/s13142-011-0077-4

Kim, H. J., Min, K.-B., & Min, J.-Y. (2021). Healthy aging predicts mortality risks: Results from the Korean longitudinal study of aging (2006–2014). *Archives of Gerontology and Geriatrics, 94*, 104333. https://doi.org/https://doi.org/10.1016/j.archger.2020.104333

Kleespies, P. M., AhnAllen, C. G., Knight, J. A., Presskreischer, B., Barrs, K. L., Boyd, B. L., & Dennis, J. P. (2011). A study of self-injurious and suicidal behavior in a veteran population. *Psychological Services, 8*(3), 236–250. https://doi.org/10.1037/a0024881

Kondo, K., Low, A., Everson, T., Gordon, C. D., Veazie, S., Lozier, C. C., Freeman, M., Motu'apuaka, M., Mendelson, A., Friesen, M., Paynter, R., Friesen, C., Anderson, J., Boundy, E., Saha, S., Quiñones, A., & Kansagara, D. (2017). Health Disparities in Veterans: A Map of the Evidence. *Med Care, 55 Suppl 9 Suppl 2*, S9-s15. https://doi.org/10.1097/mlr.0000000000000756

Krivanek, T. J., Gale, S. A., McFeeley, B. M., Nicastri, C. M., & Daffner, K. R. (2021). Promoting Successful Cognitive Aging: A Ten-Year Update. *Journal of Alzheimer's Disease*, *81*(3), 871-920. https://doi.org/10.3233/JAD-201462

LaCroix, A. Z., Rillamas-Sun, E., Woods, N. F., Weitlauf, J., Zaslavsky, O., Shih, R., LaMonte, M. J., Bird, C., Yano, E. M., LeBoff, M., Washington, D., & Reiber, G. (2016). Aging Well Among Women Veterans Compared With Non-Veterans in the Women's Health Initiative. *The Gerontologist*, *56*(Suppl 1), S14-S26. https://doi.org/10.1093/geront/gnv124

Ladusingh, L., & Ngangbam, S. (2016). Domains and Determinants of Well-Being of Older Adults in India. *J Cross Cult Gerontol, 31*(1), 89-111. https://doi.org/10.1007/s10823-016-9279-z

Lahav, Y., Stein, J. Y., Hasson, R., & Solomon, Z. (2020). Impostorism, subjective age, and perceived health among aging veterans. *Soc Sci Med, 258*, 113082. https://doi.org/10.1016/j.socscimed.2020.113082

Le, D. D., Quashie, N. T., & Prachuabmoh, V. (2019). How Does Self-Rated Health Differ among Older Vietnamese Men and Women? *Journal of Population Ageing, 12*(1), 69-93. https://doi.org/10.1007/s12062-018-9223-9

Lee, E. E., Depp, C., Palmer, B. W., Glorioso, D., Daly, R., Liu, J., Tu, X. M., Kim, H. C., Tarr, P., Yamada, Y., & Jeste, D. V. (2019). High prevalence and adverse health effects of loneliness in community-dwelling adults across the lifespan: role of wisdom as a protective factor. *Int Psychogeriatr, 31*(10), 1447-1462. https://doi.org/10.1017/s1041610218002120

Lee, L. O., James, P., Zevon, E. S., Kim, E. S., Trudel-Fitzgerald, C., Spiro, A., 3rd, Grodstein, F., & Kubzansky, L. D. (2019). Optimism is associated with exceptional longevity in 2 epidemiologic cohorts of men and women. *Proc Natl Acad Sci U S A, 116*(37), 18357-18362. https://doi.org/10.1073/pnas.1900712116

Luci, K., Simons, K., Hagemann, L., Jacobs, M. L., Bower, E. S., Eichorst, M. K., & Hilgeman, M. M. (2020). SAVE-CLC: An Intervention to Reduce Suicide Risk in Older Veterans following Discharge from VA Nursing Facilities. *Clinical Gerontologist*, *43*(1), 118-125. https://doi.org/10.1080/07317115.2019.1666444

Makaroun, L. K., Taylor, L., & Rosen, T. (2018). Veterans Experiencing Elder Abuse: Improving Care of a High-Risk Population About Which Little Is Known. *J Am Geriatr Soc, 66*(2), 389-393. https://doi.org/10.1111/jgs.15170

https://doi.org/10.1007/s10823-016-9296-yhttps://doi.org/10.1007/s10823-016-9296-y

Marchal, B., Westhorp, G., Wong, G., Van Belle, S., Greenhalgh, T., Kegels, G., & Pawson, R. (2013). Realist RCTs of complex interventions – An oxymoron. *Soc Sci Med*, *94*, 124-128. https://doi.org/10.1016/j.socscimed.2013.06.025

Marini, C. M., Fiori, K. L., Wilmoth, J. M., Pless Kaiser, A., & Martire, L. M. (2020). Psychological Adjustment of Aging Vietnam Veterans: The Role of Social Network Ties in Reengaging with Wartime Memories. *Gerontology, 66*(2), 138-148. https://doi.org/10.1159/000502340

McCaskill, G. M., Bowen, P. G., Lee, L. T., Burgio, K. L., Leeper, J., & Clay, O. J. (2019). Influence of Diabetes-Related Support on Aerobic Activity Among Older African Americans With Type 2 Diabetes. *International journal of aging & human development, 89*(3), 279-293. https://doi.org/10.1177/0091415018796602

McClendon, J., Essien, U. R., Youk, A., Ibrahim, S. A., Vina, E., Kwoh, C. K., & Hausmann, L. R. M. (2021). Cumulative Disadvantage and Disparities in Depression and Pain Among Veterans With Osteoarthritis: The Role of Perceived Discrimination. *Arthritis Care Res (Hoboken), 73*(1), 11-17. https://doi.org/10.1002/acr.24481

Mlinarić, A., Horvat, M., & Šupak Smolčić, V. (2017). Dealing with the positive publication bias: Why you should really publish your negative results. *Biochemia medica*, *27*(3), 447-452.

Morey, M. C., Lee, C. C., Castle, S., Valencia, W. M., Katzel, L., Giffuni, J., Kopp, T., Cammarata, H., McDonald, M., Oursler, K. A., Wamsley, T., Jain, C., Bettger, J. P., Pearson, M., Manning, K. M., Intrator, O., Veazie, P., Sloane, R., Li, J., & Parker, D. C. (2018). Should Structured Exercise Be Promoted As a Model of Care? Dissemination of the Department of Veterans Affairs Gerofit Program. *Journal of the American Geriatrics Society*, *66*(5), 1009-1016. https://doi.org/10.1111/jgs.15276

Neves, B. B., Sanders, A., & Kokanović, R. (2019). "It's the worst bloody feeling in the world": Experiences of loneliness and social isolation among older people living in care homes. *J Aging Stud*, *49*, 74-84. https://doi.org/10.1016/j.jaging.2019.100785

Neves, B.B., Waycott, J., & Maddox, A. (2021). When Technologies are Not Enough: The Challenges of Digital Interventions to Address Loneliness in Later Life. *Sociological research online*, 136078042110292. https://doi.org/10.1177/13607804211029298

Niemelä, K., Leinonen, R., & Laukkanen, P. (2011). The effect of geriatric

rehabilitation on physical performance and pain in men and women. *Archives of Gerontology and Geriatrics, 52*(3), e129-e133. https://doi.org/https://doi.org/10.1016/j.archger.2010.09.006

O'Connor, M. K., Kraft, M. L., Daley, R., Sugarman, M. A., Clark, E. L., Scoglio, A. A. J., & Shirk, S. D. (2018). The Aging Well through Interaction and Scientific Education (AgeWISE) Program. *Clinical Gerontologist*, *41*(5), 412-423. https://doi.org/10.1080/07317115.2017.1387212

O'Donnell, M., Metcalf, O., & Varker, T. (2016). What are effective interventions for adjustment disorder? A Rapid Evidence Assessment. Report prepared for the Australian Government Department of Veterans' Affairs. Phoenix Australia - Centre for Posttraumatic Mental Health.

Ouslander, J. G., Griffiths, P. C., McConnell, E., Riolo, L., Kutner, M., & Schnelle, J. (2005). Functional Incidental Training: A Randomized, Controlled, Crossover Trial in Veterans Affairs Nursing Homes. *J Am Geriatr Soc*, *53*(7), 1091-1100. https://doi.org/10.1111/j.1532-5415.2005.53359.x

Parsons, S., Gale, C. R., Kuh, D., & Elliott, J. (2014). Physical capability and the advantages and disadvantages of ageing: perceptions of older age by men and women in two British cohorts. *Ageing and Society*, *34*(3), 452-471. https://doi.org/10.1017/S0144686X12001067

Perach, R., Allen, C. K., Kapantai, I., Madrid-Valero, J. J., Miles, E., Charlton, R. A., & Gregory, A. M. (2019). The psychological wellbeing outcomes of nonpharmacological interventions for older persons with insomnia symptoms: A systematic review and meta-analysis. *Sleep Med Rev*, *43*, 1-13. https://doi.org/10.1016/j.smrv.2018.09.003

Poulin, J., Deng, R., Ingersoll, T. S., Witt, H., & Swain, M. (2012). Perceived Family and Friend Support and the Psychological Well-Being of American and Chinese Elderly Persons. *Journal of Cross-Cultural Gerontology, 27*(4), 305-317. https://doi.org/10.1007/s10823-012-9177-y

Reich, A. J., Claunch, K. D., Verdeja, M. A., Dungan, M. T., Anderson, S., Clayton, C. K., Goates, M. C., & Thacker, E. L. (2020). What Does "Successful Aging" Mean to you? — Systematic Review and Cross-Cultural Comparison of Lay Perspectives of Older Adults in 13 Countries, 2010–2020. *Journal of Cross-Cultural Gerontology*, *35*(4), 455-478. https://doi.org/10.1007/s10823-020-09416-6

Rice, V. J. B., & Schroeder, P. J. (2019). Self-Reported Sleep, Anxiety, and Cognitive Performance in a Sample of U.S. Military Active Duty and Veterans. *Mil Med, 184*(Suppl 1), 488-497. https://doi.org/10.1093/milmed/usy323

Romo, R. D., Wallhagen, M. I., Yourman, L., Yeung, C. C., Eng, C., Micco, G.,

Perez-Stable, E. J., & Smith, A. K. (2013). Perceptions of Successful Aging Among Diverse Elders With Late-Life Disability. *The Gerontologist*, *53*(6), 939-949. https://doi.org/10.1093/geront/gns160

Rozanova, J., Noulas, P., Southwick, S. M., & Pietrzak, R. H. (2015). Perceptions of Determinants of Successful Aging Among Older U.S. Veterans: Results from the National Health and Resilience in Veterans Study. *The American Journal of Geriatric Psychiatry*, *23*(7), 744-753. https://doi.org/10.1016/j.jagp.2014.09.006

Sandman, N., Valli, K., Kronholm, E., Ollila, H. M., Revonsuo, A., Laatikainen, T., & Paunio, T. (2013). Nightmares: Prevalence among the Finnish General Adult Population and War Veterans during 1972-2007. *Sleep, 36*(7), 1041-1050. https://doi.org/10.5665/sleep.2806

Satre, D. D. (2015). Alcohol and Drug Use Problems Among Older Adults [https://doi.org/10.1111/cpsp.12104]. *Clinical Psychology: Science and Practice, 22*(3), 238-254. https://doi.org/https://doi.org/10.1111/cpsp.12104

Shahnazari, M. P. R. D., Ceresa, C. M. R. D., Foley, S. P. R. D., Fong, A. R. D., Zidaru, E. R. D., & Moody, S. M. D. A. (2013). Nutrition-Focused Wellness Coaching Promotes a Reduction in Body Weight in Overweight US Veterans. *J Acad Nutr Diet*, *113*(7), 928-935. https://doi.org/10.1016/j.jand.2013.04.001

Smeets, R. G. M., Hertroijs, D. F. L., Mukumbang, F. C., Kroese, M. E. A. L., Ruwaard, D., & Elissen, A. M. J. (2021). First Things First: How to Elicit the Initial Program Theory for a Realist Evaluation of Complex Integrated Care Programs. *The Milbank quarterly*. https://doi.org/10.1111/1468-0009.12543

Stefanovics, E. A., Gavriel-Fried, B., Potenza, M. N., & Pietrzak, R. H. (2020). Current drinking patterns in US veterans with a lifetime history of alcohol use disorder: Results from the National Health and Resilience in Veterans Study. *Am J Drug Alcohol Abuse, 46*(6), 784-794. https://doi.org/10.1080/00952990.2020.1803893

Sullivan, J.L., Engle, R.L., Shin, M.H., Davila, H., Tayade, A., Bower, E.S., Pendergast, J., Simons, K.V. (2021) Social Connection and Psychosocial Adjustment among Older Male Veterans Who Return to the Community from VA Nursing Homes. *Clinical Gerontology*. *44*(4), 450-459. http://doi.org/10.1080/07317115.2020.1812141

Suzuki, A., Efird, J. T., Redding, T. S. t., Thompson, A. D., Jr., Press, A. M., Williams, C. D., Hostler, C. J., & Hunt, C. M. (2021). COVID-19-Associated Mortality in US Veterans with and without SARS-CoV-2 Infection. *Int J Environ Res Public Health, 18*(16). https://doi.org/10.3390/ijerph18168486

Taylor, S. S., Hughes, J. M., Coffman, C. J., Jeffreys, A. S., Ulmer, C. S., Oddone, E. Z., Bosworth, H. B., Yancy, W. S., Jr., & Allen, K. D. (2018). Prevalence of and characteristics associated with insomnia and obstructive sleep apnea among veterans with knee and hip osteoarthritis. *BMC Musculoskelet Disord, 19*(1), 79. https://doi.org/10.1186/s12891-018-1993-y

Tohit, N., Browning, C. J., & Radermacher, H. (2012). 'We want a peaceful life here and hereafter': healthy ageing perspectives of older Malays in Malaysia. *Ageing and Society*, *32*(3), 405-424. https://doi.org/10.1017/S0144686X11000316

Tovel, H., & Carmel, S. (2014). Maintaining Successful Aging: The Role of Coping Patterns and Resources. *Journal of Happiness Studies*, *15*(2), 255-270. https://doi.org/10.1007/s10902-013-9420-4

Wells, Y. D. R. (2018). Healthy and Active Ageing in the Veteran Population and Factors or Interventions That Achieve Positive Effect: A Rapid Evidence Assessment. Technical Report. *Report prepared for the Department of Veterans' Affairs. Melbourne: La Trobe University.*

Williams, R., Allen-Collinson, J., Hockey, J., & Evans, A. (2018). 'You're Just Chopped Off at the End': Retired Servicemen's Identity Work Struggles in the Military to Civilian Transition. *Sociological Research Online, 23*(4), 812-829. https://doi.org/10.1177/1360780418787209

Williamson, A. K., Riendeau, R. P., Stolzmann, K., Silverman, A. F., Kim, B., Miller, C. J., Connolly, S. L., Pitcock, J., & Bauer, M. S. (2019A). An Exploratory Analysis of Self-Reported Protective Factors against Self-Harm in an Enrolled Veteran General Mental Health Population. *Military Medicine*, *184*(11-12), e738-e744. https://doi.org/10.1093/milmed/usz111

Williamson, V., Harwood, H., Greenberg, K., Stevelink, S. A. M., & Greenberg, N. (2019B). The impact of military service on the mental health of older UK veterans: A qualitative study [https://doi.org/10.1002/gps.5131]. *International Journal of Geriatric Psychiatry, 34*(10), 1412-1420. https://doi.org/https://doi.org/10.1002/gps.5131

Wooldridge, J. S., Herbert, M. S., Hernandez, J., Dochat, C., Godfrey, K. M., Gasperi, M., & Afari, N. (2019). Improvement in 6-min Walk Test Distance Following Treatment for Behavioral Weight Loss and Disinhibited Eating: an Exploratory Secondary Analysis. Int J Behav Med, 26(4), 443-448. https://doi.org/10.1007/s12529-019-09796-1

World Health Organization. (2001). Health and ageing: a discussion paper. In (Preliminary version ed.). Geneva: World Health Organization.

World Health Organisation (2020). Ageing: Healthy ageing and functional ability, https://www.who.int/westernpacific/news/q-a-detail/ageing-healthy-ageing-and-functional-ability

Worley, M. J., Tate, S. R., & Brown, S. A. (2012). Mediational relations between 12-Step attendance, depression and substance use in patients with comorbid substance dependence and major depression. *Addiction*, *107*(11), 1974-1983. https://doi.org/10.1111/j.1360-0443.2012.03943.x

Yeung, P., Allen, J., Godfrey, H. K., Alpass, F., & Stephens, C. (2019). Risk and protective factors for wellbeing in older veterans in New Zealand. *Aging & Mental Health*, *23*(8), 992-999. https://doi.org/10.1080/13607863.2018.1471584

Appendix A: Detailed search strategy

The search strategy outlined here is presented for **Medline (OVID)**, and was initially undertaken on 14/10/21. Publication date limits were added in the final step. Below, we have added notes on how these terms were transformed for the other databases. The yielded results from individual searches are shown in Table 3 in the report.

1. Healthy AND (ageing OR aging) = 33708
2. active AND (ageing OR aging) = 13925
3. successful AND (ageing OR aging) = 5817
4. Positive AND (ageing OR aging) = 21740
5. Capacity AND (ageing OR aging) = 15465
6. well AND (ageing OR aging) = 54943
7. Combined (1-6, OR) = 118974

8. healthy AND (behavior* OR behaviour*) = 68461
9. Physical activity = 105746
10. healthy AND (eating OR diet OR nutrition) = 57156
11. healthy AND ('life style*' OR lifestyle*) = 21219
12. Behavior* OR behaviour* = 1536556
13. Mental OR emotional OR cognitive = 921012
14. Risk AND (reduction OR reduc*) = 495744
15. voluntar* OR volunteer* = 279272
16. risk AND (manage* OR mitigat*) = 287225
17. learn* AND education* =103596
18. Health AND (prevent* OR promot*) = 682570
19. loneliness OR isolati* OR inclus* = 1464060
20. post-trauma* = 58556
21. (Behavior* OR Behaviour*) AND (problem* OR disruptive OR dangerous OR hazardous OR addictive) = 156435
22. addict* = 65676
23. Alcohol AND (consumption OR drinking OR habit* OR abuse OR dependence OR addiction OR disorder OR misuse) = 151380

24. (Tobacco OR cigarette*) AND (consumption OR smok* OR dependence OR disorder) = 120725
25. drug* AND (illegal OR illicit OR addict*) = 61872
26. sleep AND (disturbance* OR event* OR disruption*) = 35484
27. (Social OR public OR politic* OR civic) AND (particip* OR engagement) = 213512
28. Combined (8-27, OR) = 5230614

29. veteran* OR military OR servic* OR soldier* OR 'armed forces' OR troop* OR defence = 1115293
    a. veteran* OR military OR soldier* OR 'armed forces' OR troop* OR defence = 153196

30. age* OR elder* OR aging* OR older OR aged OR middle-age* OR 'middle age*' OR midlife OR 'mid life' OR mid-life = 11998041

31. Social determinant* = 10872
32. educat* OR income OR race OR ethnic* OR cultur* OR CALD OR poverty OR famil* OR household OR marital OR gender OR sex OR sexualit* OR LGB* = 4743967
33. Combined (31-32, OR) = 4747781

34. Intervention* OR Program* = 1806210

35. 33 AND 34 = 593296

36. Combined (7 AND 28 AND 29 AND 30) = 3446 *(no SDOH)*
    a. Combined (7 AND 28 AND 29 AND 30)

37. Combined 33 AND 36 = 1717 *(with SDOH)*

38. Combined 34 AND 37 (with interventions/programs) = 746

Total included abstracts (line 36) = 3446

With date limits (2010-2021) = 2367

Some notes

PsycInfo (Ovid)

- Used Medline strategy

Sociological abstracts (Proquest)

- Used Medline strategy

Eric (Proquest)

- Used Medline strategy

Web of Science (ISI)

- Used Medline strategy

Cinahl Plus (EBSCO)

- Used Medline strategy
- Had the following options: exclude results from Medline, include studies with humans only, and in English.

Academic Search Complete (EBSCO)

- Limited to **not** search in full text - otherwise search without intervention balloons to **2,234** and with intervention **971,** yet on hand searching these, they are largely irrelevant

Anthropology Plus (EBSCO)

- No hits in the combined search.
- No hits by excluding the SDOH.
- Excluding veterans (active ageing, healthy behaviours, and age) **8 Results**
- Two results by excluding active ageing - Not relevant results
- Go back to the active ageing results (**29)** and imported those.

Embase

- Used Medline strategy

Scopus

- Combined search without intervention came up with 1 article.
- Then, tried several combinations to see what could be done:
- Without veterans: **302**

- Without age: **16** results (only 2 relevant findings)
- Tried the combined search with only veteran or military or soldier instead of the full search terms: **2** results.