



# Enhancing Older Adults' Wellbeing and Quality of Life through Purposeful Activity: A Systematic Review of Intervention Studies

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**Title: Enhancing Older Adults' Wellbeing and Quality of Life through Purposeful  
Activity: A Systematic Review of Intervention Studies**

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## **Abstract**

**Background and Objectives:** Population aging represents a significant challenge for health and social care services. Older adults who engage in activities that offer a sense of purpose have significantly better physical and psychological health outcomes. However, age-related functional limitations and losses of social roles can present barriers to engaging in purposeful activity, especially for those older adults within the ‘oldest old’ age range (i.e. 80 years and over). This review aimed to determine the nature and effectiveness of purposeful activity interventions in older adults, aged  $\geq 80$  years, with respect to wellbeing and quality of life outcomes.

**Research Design and Methods:** Three databases were searched from their inception to April 2020. The search yielded 8,916 records, which resulted in eight eligible studies.

**Results:** The interventions were divided into two groups: (1) interventions that gave participants a specific functional role, such as volunteer or mentor (n=5); (2) interventions that supported participants to develop a new skill (n=3). The quality of the evidence was variable. The strongest evidence was for interventions that assigned a functional role, which appeared to be somewhat effective in improving wellbeing outcomes.

**Discussion and Implications:** There is preliminary evidence that purposeful activity interventions, particularly those that involved taking on a functional role, can improve wellbeing and quality of life outcomes in older adults aged 80 years and over. These findings have implications for professionals and carers to support older adults to access more purposeful social roles, and create opportunities for helping and reciprocation.

**Key Words:** *Meaningful activity; psychosocial; oldest old; volunteering; social role*

## **Background and Objectives**

The process of ageing is highly heterogeneous, with a significant level of variation in older adults' physical, social, and psychological domains of functioning (Cosco, Howse & Brayne, 2017). For example, research has demonstrated that older adults can function successfully despite declining physical health and chronic disease pathology (Depp & Jeste, 2006; Depp, Vahia & Jeste, 2010), whereas some older adults without chronic conditions can exhibit high levels of disability (Verropoulou & Tsimbos, 2017). This suggests that, although disease conditions and physical impairments are related to an individual's level of functioning in later life, they are not sufficient to fully explain the causes of disability.

The main pathway of the Disablement Model (Femia, Zarit & Johansson, 2001; Verbrugge & Jette, 1994) proposes that disability is predicted by functional impairments (i.e., dysfunctions in bodily systems such as cardiovascular, neurological, musculoskeletal, and pulmonary systems), which, in turn, lead to functional limitations, such as poor mobility. However, this pathway to disability is moderated by psychosocial factors and internal resources, such as social support, quality of life and emotional wellbeing. A test of the model in 203 participants aged 80 and over indicated that modifying psychosocial factors, such as social integration and depression, significantly affected the disablement process (Femia, Zarit & Johansson, 2001). Given such findings, and the growing recognition of the reciprocal relationship between physical and psychological health (e.g., An & Jang, 2018; Ohrnberger, Fichera & Sutton, 2017), interventions that seek to promote increased psychological wellbeing and quality of life in older adults are clearly warranted.

Researchers have attempted to understand the factors that may contribute to improved quality of life and wellbeing in later life, in order to address the changing needs of older populations. It has been proposed that maintaining a sense of purpose may facilitate resilience against adverse life events and stress, which may offer some insight into how and why certain people remain healthy over time and age successfully (McKnight & Kashdan, 2009). For example, there is evidence to suggest that older adults who engage in activities that provide them with a sense of purpose tend to have significantly better physical and psychological health outcomes than those who do not (Irving, Davis & Collier, 2017; Kim et al., 2013). A sense of purpose in older age can be cultivated from numerous sources, including the pursuit of personal goals or plans, structured community engagement, adopting meaningful social roles, and participation in activities that provide a sense of achievement or facilitate feelings of usefulness (e.g., Heaven et al., 2013; Irving, Davis & Collier 2017). For example, previous studies have demonstrated that volunteering is associated with better self-reported health ratings in older adults (Morrow-Howell, Hinterlong, Rozario, & Tang, 2003), increased life satisfaction (Van

Willigen, 2000), personal independence (Morrow-Howell et al., 2003) and even decreased mortality rates (Konrath, Fuhrel-Forbis, Lou, & Brown, 2012; Shmotkin, Blumstein, & Modan, 2003). Furthermore, a recent systematic review demonstrated that older adults who appraised themselves as having a higher sense of purpose had significantly better overall physical health, lower cognitive impairment, reduced depression and engaged in more preventative health behaviours (Irving, Davis & Collier, 2017). This suggests that purposeful activity may represent a modifiable factor that has the potential to protect against some of the challenges of ageing.

Despite the promising benefits of engagement in purposeful activity, older adults can experience great difficulty maintaining a sense of purpose due to age-related losses of independence and relationships, and the experience of physical, cognitive and sensory impairments, which may prevent them from performing activities that previously provided a sense of purpose (Bronk, 2014; Pinguart, 2002; Sarvimaki & Stenbock-Hult, 2000). These barriers are particularly pertinent to the ‘oldest old’ (those aged  $\geq 80$ ), who typically have a greater number of risk factors for disability (e.g., chronic conditions and functional impairments) than older adults aged between 65 and 80 (e.g., Fortin et al., 2005; Landi et al., 2010). This represents a key challenge for health care professionals and social care providers when attempting to engage the oldest old in interventions that aim to promote purposeful activity.

Within the current literature, there is no systematic review of the nature and effectiveness of studies that have implemented a purposeful activity intervention in the oldest old. As well as providing researchers and practitioners with an idea of the types of intervention that have been developed for this population, such a review is needed in order to determine how effective such interventions could be in improving older adults’ wellbeing and quality of life. Therefore, the aims of the present review were, (1) to ascertain what types of purposeful activity interventions have been implemented with older adults in the oldest old age range (i.e. aged  $\geq 80$ ) within the existing research literature; (2) to determine whether these interventions significantly improved wellbeing and quality of life outcomes in the oldest old.

## **Research Design and Methods**

A protocol for this review was submitted to PROSPERO (the International prospective register of systematic reviews) on 7<sup>th</sup> Jan 2020, when only the preliminary searches had started, but the registration process was not completed. A copy of the information submitted to PROSPERO

is available on request. The manuscript was written in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist ([www.prisma-statement.org](http://www.prisma-statement.org)).

### *Inclusion and Exclusion Criteria*

To be included in the review, reports had to be published in the English language and conform to the following criteria:

1. The study sample was comprised of older adults within the ‘oldest old’ age-range. This was operationalised as having a sample with a mean age of 80 years or above (United Nations (UN) agreed cut-off for the ‘oldest old’ population; UN, 2017). There were no exclusion criteria relating to the presence of cognitive impairment or other health conditions, or the setting in which participants lived, i.e., both community-dwelling older adults and those residing in residential care homes were eligible for inclusion.

2. The study included an intervention in which participants were supported to engage in purposeful activities. Purposeful activities were defined as activities with clearly discernible goals or aims that offer a sense of directionality towards a specific outcome (e.g., Pierce, 2001; Schulenberg & Melton, 2010), such as learning a new skill or volunteering to help others. Interventions comprising of activities where the primary aim was solely to enhance participants’ enjoyment or pleasure, such as, attending social clubs, arts and crafts, reading and walking, were not included. If the intervention was not explicitly labelled or described as being a ‘purposeful activity’ in the study, but was considered by the primary reviewer to match the definition, then the study was shared with another member of the review team so that a consensus decision could be made. This approach was adopted in order to minimise the omission of relevant studies because of differences in terminology or reporting style (Heaven et al., 2013).

3. The study included at least one standardised measure of quality of life or wellbeing, including mood and life satisfaction: both components of subjective wellbeing (Brown & Astell, 2012), as well as clinical depression and anxiety scales. Both self-report and observer-rated measures were eligible for inclusion.

Whilst we originally intended to limit the review to studies published as journal articles, the low number of eligible studies identified through our preliminary searches led us to expand the scope of the review to also include work published in PhD theses.

### *Search Strategy*

A systematic literature search was performed in three electronic databases (Ovid Medline, PsycInfo, and CINAHL) between October and April 2020. The search strategy was initially developed for the Ovid database and subsequently adapted to fit other databases, as appropriate. Search terms related to the population (e.g., older adult\* OR senior citizen\* OR care home\*), presence of an intervention (e.g., interven\* OR program\* OR treatment), the focus of the intervention (e.g., purposeful activit\* OR volunt\* OR role\*) and the outcome (e.g., quality of life OR well-being OR life satisfact\*) were combined with the Boolean operator 'AND'. See supplementary table 1 for the full list of search terms.

The database search results were exported into Endnote reference management software to organise the search and remove duplicates. After 314 duplicates were removed, the search yielded 8,916 records. The titles and abstracts of these records were first screened by the first author to identify and exclude those that clearly did not meet the inclusion criteria. A second reviewer, independent from the research team, also screened 10% (N=892) of records from the initial search by title and abstract, in order to ensure reliability of the screening process. As the level of agreement was high (98%,  $k = .70$ ) the remaining 90% of records were screened by just the first author.

A total of 8799 records were excluded during this initial screening phase, leaving 117 records to be reviewed at full-text level. All of these were independently reviewed against the inclusion criteria by the first author and the second reviewer. Authors of study reports were contacted in cases where insufficient information was available to determine eligibility. A high level of consistency between reviewers was attained (99% agreement,  $k = .86$ ), and all discrepancies were resolved through discussion between the two reviewers and the other study authors. One hundred and nine records were excluded at this stage, leaving eight that were deemed eligible for inclusion. Reference lists and citations of these included studies were then searched for any additional studies that may have met the inclusion criteria, but no eligible studies were identified. Figure 1 illustrates the selection of studies through the different phases of the systematic search.



Insert Figure 1 about here

### *Data Extraction*

Data relating to each of the fields listed in Table 1 were extracted by the first author.

### *Quality Assessment*

The methodological quality of all included studies was assessed using the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool for Quantitative Studies (Thomas, Ciliska, Dobbins & Micucci, 2004), which has previously demonstrated good reliability and validity (Armijo-Olivo, Stiles, Hagen, Biondo, & Cummings, 2012; Thomas, Ciliska, Dobbins, & Micucci, 2004). Consistent with more recent systematic reviews (Degnan et al., 2018; Safavi, Berry, & Wearden, 2017), the tool was adapted to include a component assessing the quality of analysis, which took into account factors such as the power and appropriateness of the analyses. This adapted version of the EPHPP therefore included the following seven components: (1) selection bias, (2) study design, (3) confounders, (4) blinding, (5) data collection, (6) data analysis, and (7) withdrawals and drop-outs. Each component was rated as either ‘strong’, ‘moderate’ or ‘weak’. The scores were averaged to provide a total score, and each study assigned an overall quality rating.

The first author and a second, independent, reviewer independently performed quality ratings for all eight studies. There was a satisfactory level of agreement for overall quality ratings (75%;  $k=0.50$ ). Discrepancies were discussed with the wider research team, and a final decision was reached for each study.

### *Evidence Synthesis*

There was a marked level of heterogeneity within the methodologies, interventions, and outcome measures across studies, which meant that a meta-analysis was not appropriate. A narrative synthesis of the evidence (Mays, Roberts, & Popay, 2001) was therefore conducted instead. This evidence synthesis took into consideration the characteristics and quality of each study, as well as the findings. Following the guidelines of Popay et al., (2006), the evidence synthesis had three key stages: (1) The studies were organised into logical categories: in this case, i.e., intervention types; (2) The main findings from each study were presented (i.e., within-study synthesis; see Table 1); (3) Differences in study characteristics and potential

sources of bias were integrated, and the range of effects were described (i.e., cross-study synthesis).

## **Results**

Eight publications (seven journal articles and one PhD thesis) were included in the review. Four of the studies described in the publications were conducted in the United States (Yuen, 2003; Yuen et al., 2008; George & Singer, 2011; Klinedinst & Resnick, 2016), one in Canada (Kiyota, 2009), one in Croatia (Kosmat & Vranic, 2017), one in Italy (Sollami et al., 2017), and one in Belgium (Van Malderen et al., 2017). Collectively, the interventions covered a 14-year period, from 2003 to 2017. There were five individually or cluster randomised-controlled trials (George & Singer, 2011; Kiyota, 2009; Kosmat & Vranic, 2017; Sollami et al., 2017; Van Malderen et al., 2017; Yuen et al., 2008); one controlled clinical trial (Yuen, 2003) and one uncontrolled cohort study (Klinedinst & Resnick, 2016). Sample sizes of the included studies ranged from 10 (Klinedinst & Resnick, 2016) to 88 (Van Malderen et al., 2017). All studies were conducted with participants residing in residential care homes, nursing homes and/or assisted-living facilities i.e., community-dwelling older adults were not participants in any study. All interventions were delivered within a single site, except one which was conducted across three separate nursing homes (Van Malderen et al., 2017).

### *Intervention Types*

Studies were grouped according to two broad intervention types; (1) interventions that assigned participants a specific functional role; (2) interventions that taught participants a new skill. Five studies evaluated an intervention that assigned participants a specific functional role, which were: becoming mentors to assist pre-school children with their reading and writing in an inter-generational volunteering program (George & Singer, 2011); becoming volunteers for local charitable organisations (VIP; Klinedinst & Resnick, 2016); becoming a member of a nursing home steering committee (PAR; Van Malderen et al., 2017); and acting as mentors to English as a Second Language (ESL) students to help them improve their conversational skills (Yuen, 2003; Yuen et al., 2008). Three studies evaluated an intervention that trained participants in the development of a new skill, which were: learning to dance (Kosmat & Vranic, 2017); learning how to care for and train a dog (Sollami et al., 2017); and learning how to undertake indoor gardening (Kiyota, 2009). Table 1 below outlines the study characteristics and main findings, grouped according to intervention type.

Insert Table 1 about here

### *Quality Assessment*

Global quality ratings (Table 1) ranged from weak to strong, with the most common global rating being ‘moderate’ (50%). Two studies (George & Singer, 2011; Yuen et al., 2008) were rated as ‘strong’ (25%) based on factors including a robust study design, control for a range of potential confounding variables, and high study retention rates. Two studies (Sollami et al., 2017; Yuen, 2003) were rated as ‘weak’ (25%), partly due to a lack of reported information to ascertain whether particular criteria were fulfilled and high drop-out rates. Many studies did not include sufficient information regarding whether potential confounding variables were controlled for, or whether researchers had been blind to group allocation. Quality ratings for each component of the EPHPP can be found in Supplementary Table 2.

### *Evidence Synthesis*

#### *Interventions that assigned a specific functional role*

Collectively, the studies in this group demonstrated some evidence in favour of functional role interventions having a positive effect on wellbeing outcomes (see Table 1). Specifically, four of the five studies in this group showed evidence of an increase in at least one wellbeing outcome in the intervention group; one study showed no significant effects in any group; and no study showed evidence of the intervention causing a reduction in wellbeing. Of the four interventions showing positive effects: one (George & Singer, 2011) showed a significant effect of a school-child mentoring programme on just one of the two outcome measures. Moreover, although the quality of this study was rated as strong, the very small sample of just 15 participants across two groups increases the risk of both false positive and false negative results. The study by Yuen (2003) showed a significant improvement in life satisfaction for participants involved in a mentoring programme for students learning English as a second language that was not seen in the control group. However, this study was rating as being of weak quality; had a small sample size of just 18 participants across two groups; and used a passive (usual care) rather than an active control, making it difficult to precisely determine what the active ingredient(s) of the intervention were. A subsequent study by the same group (Yuen et al., 2008) was rated as being of strong quality. However, the significant improvement in global wellbeing seen in the intervention group was also found in the passive (usual care) control group, suggesting that the intervention itself had limited or no specific effect. Finally,

the study by Van Maldern et al. (2017), investigating the effects of being part of a participatory action research group, had a larger sample size, and was rated as being moderate in quality. However, the significant effect seen in this study was also seen in the active (but not passive) control condition, which comprised of a weekly reminiscence group. Thus, whilst the intervention seemed to be effective, there was no evidence that it was any more effective than the reminiscence activities. The one study that showed no significant effects (Klinedinst & Resnick, 2016) was rated as being of moderate quality, but comprised of just a single group of ten participants, resulting in low power and an inability to distinguish any effects of the intervention from unrelated issues.

In sum, whilst there is some evidence that interventions in this group could be at least as effective as other types of intervention as improving wellbeing, the strength of these conclusions is limited by a relative lack of power and/or comparisons against appropriate passive and active control groups in the studies.

#### *Interventions that trained participants in a new skill*

Three studies evaluated interventions that trained participants in a new skill (Kiyota, 2009; Kosmat & Vranic, 2017; Sollami et al., 2017). Only one study, in which participants learnt to care for, train, and play with a therapy dog, demonstrated significant findings (Sollami et al., 2017). Whilst these effects were observed across all five wellbeing outcome measures, the quality of the study was rated as low, and the intervention was compared to a passive (usual care) rather than an active control group. As such, it is difficult to determine which element(s) of the intervention were responsible for any improvements seen. Neither of the other two studies showed any significant pre-post intervention changes in wellbeing in any of the intervention or control groups. These interventions, which involved learning to care for house plants (Kiyota, 2009) and a group dance training programme (Kosmat & Vranic, 2017), were both rated as being of moderate quality, but still had relatively small sample sizes of 29 (spread across three groups) and 24 (across two groups), respectively. In sum, conclusions about the effectiveness of this group of interventions are currently limited by the lack of good quality, and well-powered studies.

## **Discussion and Implications**

This review presented an overview of the nature of purposeful activity interventions that have been evaluated within the ‘oldest old’ age group of older adults, as well as a synthesis of

evidence of their effectiveness. We identified two broad groups of intervention: (1) interventions that assigned participants a specific functional role, including becoming a volunteer or a mentor to others; (2) interventions that trained participants to develop and practice a new skill, such as learning indoor gardening or dance. There was at least some evidence that both types of intervention could be effective at improving wellbeing. However, whilst the strength and quantity of evidence was greatest for interventions involving a specific functional role, conclusions about the effectiveness of both types of intervention were limited by a lack of high-quality, well-powered studies, with appropriate control conditions.

Evidence for the effectiveness of those interventions in which participants adopted a functional role is consistent with other types of studies in a wider range of populations. For example, a cross-sectional study using national survey data from 2,867 participants demonstrated that older adults who reported that they engaged in a formal helping role, such as volunteering, had significantly better self-perceived health and higher life satisfaction than those who did not (Van Willigen, 2000). Interestingly, evidence also suggests that the motives underlying volunteering appear to be important, both in terms of volunteer retention (Kritz et al., 2020) as well as the health benefits gained. For example, a longitudinal study examining the effects of self-reported volunteering and older adults' mortality risk found that those who volunteered for self-oriented reasons had a mortality risk similar to non-volunteers (Konrath, Fuhrel-Forbis, Lou, & Brown, 2012). However, those who volunteered for other-oriented reasons, i.e., a motive that included the desire to help another person in need, had a significantly decreased mortality risk, even after controlling for factors such as age and health-risk behaviours (Konrath et al., 2012). Thus, it has been suggested that when volunteering is altruistically motivated, this may contribute to a sense of deep and lasting well-being originating from having a purpose that is 'bigger than the self', which may regulate any potential stress or burnout associated with the volunteering itself, resulting in a positive impact on overall health (e.g., Piliavin & Siegl, 2007).

Whilst we were able to categorise the interventions into two broader groups, it is important to recognise that there was still considerable heterogeneity within each group, as well as some overlap between them. The heterogeneity was seen in the intensity and duration of interventions, as well as in the nature of the intervention and the outcome measures used to assess wellbeing, which further detracts from the strengths of conclusions that can be drawn. The complexity of the interventions also makes it difficult to identify what the active ingredients of any particular intervention might be. Thus, even for those studies that had active control groups, it is not possible to determine the extent to which any changes were due to the

specific element under investigation, rather than other factors. To address these issues, future studies should aim to include active control groups, and also examine the mediating effects of the variables hypothesised to underlie any effects, such as self-perceptions of ageing (Huo, Soederberg Miller, Kim & Liu, 2020), an increase in sense of purpose, or mastery of a new skill. A review of qualitative studies of these types of interventions could also provide subjective insights into the associated mechanisms and outcomes.

Whilst this review focussed on a specific age range of adults, aged 80 years and over, this ‘oldest-old’ group represent a highly heterogeneous population, with a wide range of, often unique, support needs (e.g., Cosco, Howse & Brayne, 2017). Indeed, within the studies reported in this review, some samples were comprised of participants who had been diagnosed with dementia (e.g., George & Singer, 2011) or had mild cognitive impairments (e.g., Klinedinst & Resnick, 2016); whereas others had no known cognitive impairment (e.g., Kosmat & Vranic, 2017). The level of physical functioning and support needs of participants was also variable between studies. For example, some studies were comprised of participants residing in nursing homes, who typically require a higher level of care due to poorer functioning (e.g., Kiyota, 2009; Sollami et al., 2017), whereas others resided in assisted-living facilities with less complex support needs and a greater level of independence. For example, participants in the dance intervention needed to have a reasonable level of mobility and no physical health conditions that could have precluded their participation in the program (Kosmat & Vranic, 2017). Evidence suggests that the more heterogeneous the population, the more difficult it is both to detect and to understand the intervention effects (e.g., Ferrucci et al. 2004). Furthermore, this heterogeneity facilitates the need for interventions to be individualised and tailored to the needs of each recipient (e.g., adapted to match their functional level), which in turn can lead to difficulty understanding the components or combination of components underlying the effect, or lack thereof (Freedman et al., 2006). Future studies, with larger sample sizes, could address this by examining the moderating effects of key demographic characteristics and baseline variables.

Despite the heterogeneity of participants in the studies, it is notable that the participants of all studies were based in residential care settings. As such, the findings, and indeed the interventions, may not be generalizable to community-dwelling adults of the same age range. Future research should therefore seek to develop, and evaluate, interventions that are suited to community-dwelling populations.

The overall quality of studies presented within the current review was variable. However, certain aspects of the criteria may have been difficult to achieve in psychosocial

intervention studies with the oldest-old. For example, where there were high withdrawal rates, this was often due to unavoidable reasons, such as participant illness and death. In addition, the blinding of participants to the intervention aims may not always have been possible due to participants needing to have understood the nature of the intervention in order to demonstrate capacity to provide informed consent and meaningfully participate. However, for many of the quality assessment criteria that were not fulfilled, the reason was lack of reporting and insufficient information contained within the study reports. For example, the consideration of key confounding variables was consistently under-reported. In order to improve the quality of research in this area, there is a need for more robust studies with greater adherence to reporting standards, such as the Consolidated Standards of Reporting Trials (CONSORT; Begg et al., 1996).

#### *Limitations of the Review Methods*

There were some limitations of the current review. First, due to the lack of consensus regarding a definition of ‘purposeful activity’, as well as a lack of consistency with which relevant interventions are described within the literature, it was difficult to develop a search strategy that was sufficiently sensitive. To address this, we implemented a broad search strategy and carried out inter-rater reliability checks to ensure accurate and rigorous screening. However, it is still possible that relevant studies may have been missed. Second, whilst one unpublished doctoral dissertation was identified (Kiyota, 2009), an exhaustive search of the grey literature was not undertaken. Unpublished research is more likely to report null findings (e.g., Emerson et al., 1990), therefore the possibility of publication bias within this review must be acknowledged. Finally, only studies that were published in English were included in this review, which may have resulted in relevant studies published in other languages being overlooked.

#### *Implications for Policy and Future Research*

Whilst it is acknowledged that the conclusions from this review are tentative due to a lack of strong evidence, the most compelling evidence was for those interventions that provided a functional role. Based on this, it is recommended that long-term care facilities should consider offering opportunities for residents to engage in volunteer and mentoring activities in addition to the recreational activities typically offered in such settings. To achieve this, it may be beneficial for long-term care facilities to form links with established community groups and third-sector organisations in order to identify appropriate roles for their elderly residents. Staff

members and carers would be instrumental in identifying community-based organisations that could appropriately support residents to participate in volunteering activities, and in addressing potential barriers to engagement. It would also be useful to monitor the longer-term impact of these opportunities on residents' health, wellbeing, and quality of life in order to inform future health policy in this area.

The review demonstrated that the evidence for the effectiveness of skills-based training interventions for improving the psychological wellbeing and quality of life for the oldest-old was sparse. However, the potential benefits of these interventions should not be disregarded. Considerably more research is needed to explore the different contingencies of skills training interventions for the oldest-old. As a starting point, it is recommended that future research in this area should be service-user informed, for example, by conducting qualitative interviews with the oldest-old as an initial step to ascertain what types of activities or skills they would be interested in receiving formal training in, and how the training may need to be adapted to meet their needs.



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Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram depicting the systematic search process.

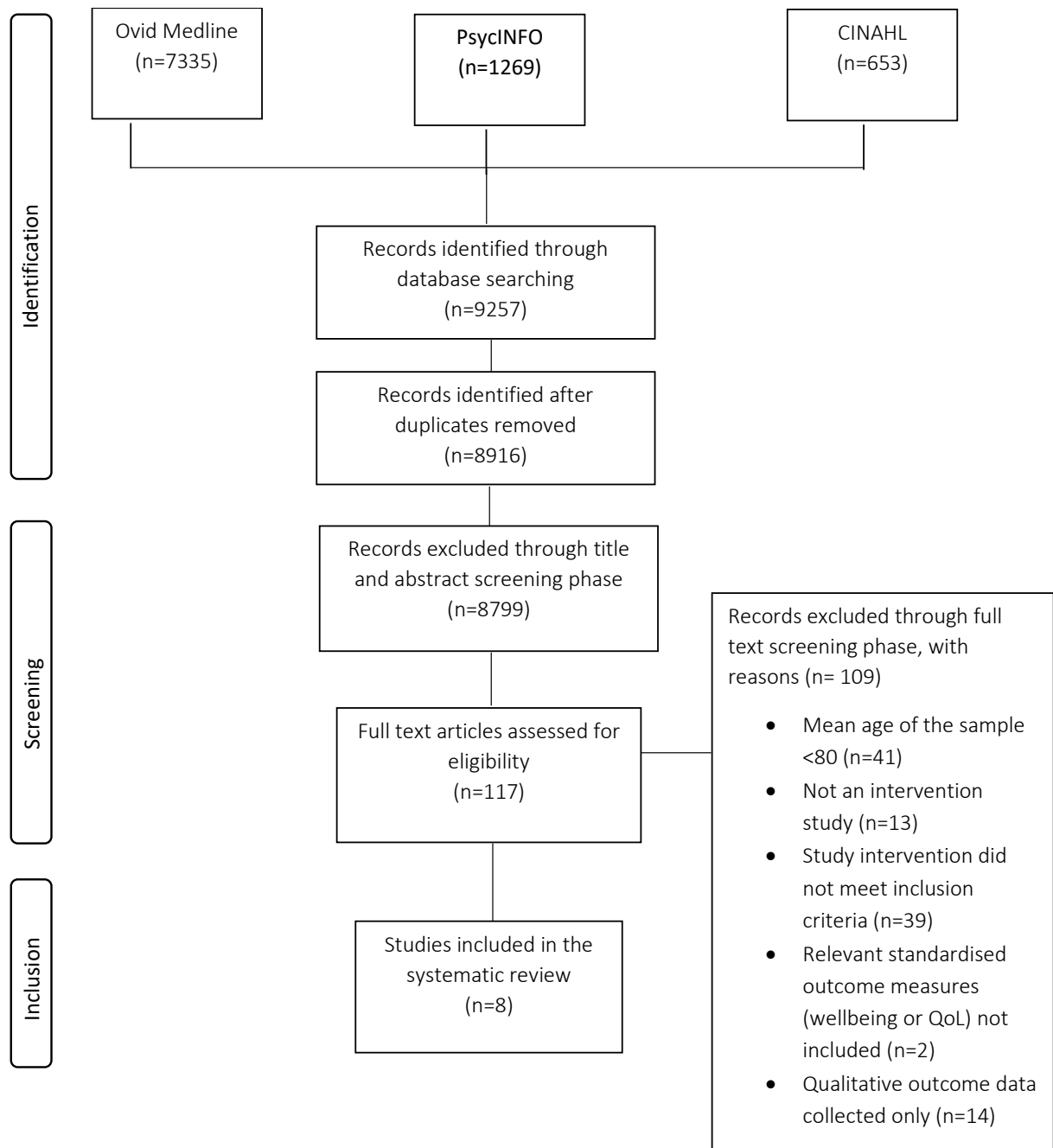


Table 1. Characteristics of included studies.

Author, Year, Country	Study Aim(s)	Sample	Study Design	Intervention	Control Condition	Relevant Outcome Measures	Main Findings	Global Quality Rating
<b>Interventions that assigned participants a specific functional role</b>								
<b>George &amp; Singer (2011)</b>  <b>USA</b>	To determine whether inter-generational volunteering enhanced quality of life	15 older adults with dementia from an assisted living (AL) facility	RCT	Mentored pre-school children for an hour a week over 5 months	Attended 8 peer education seminars called “Successful Aging” for a total of 12 hours	Beck Anxiety Inventory; (BAI); Beck Depression Inventory; BDI)	The decline in anxiety of 2.50 points in the intervention group was significantly different to the 3.14 point increase in anxiety in the control group (p<0.05).  There was no significant difference between the groups in the change in depression scores (0.5 point increase for intervention group; 2.57 point decrease in control group).	Strong

<p><b>Klinedinst &amp; Resnick (2016)</b></p> <p><b>USA</b></p>	<p>(1) To establish feasibility of volunteering program</p> <p>(2) To evaluate impact on wellbeing</p>	<p>10 assisted living (AL) residents</p>	<p>Cohort study</p>	<p>Volunteering in Place (VIP) program between 1-3 days per week over 6 months</p>	<p>N/A</p>	<p>Depression (PHQ-9); Purpose in Life (Ryff's Scales of Psychological Well-Being); Dispositional Resilience Scale; AL Resident Life Satisfaction Tool</p>	<p>No significant effects on any outcome at 3- or 6-mth follow-ups</p>	<p>Moderate</p>
<p><b>Van Malderen et al., 2017</b></p> <p><b>Belgium</b></p>	<p>To examine the effects of Participatory Action Research (PAR) within a nursing home on quality of life</p>	<p>88 residents from 3 nursing homes</p>	<p>Cluster RCT</p>	<p>Weekly Participatory Action Research group sessions over 6 months, where residents worked with a staff member and researcher to identify ways of improving the nursing home.</p>	<p>Active Control: weekly group reminiscence sessions over 6 months</p> <p>Passive Control: usual care</p>	<p>Quality of Life using The Anamnestic Comparative Self-Assessment scale (ACSA)</p>	<p>The increase in ACSA score from baseline to 6-month post-test was significantly greater in the intervention and active control groups than in the passive control group. However, there were no significant differences in the amount of change experienced in the intervention group compared to the control groups.</p>	<p>Moderate</p>

<p><b>Yuen (2003)</b> <b>USA</b></p>	<p>To evaluate the impact of participation in an altruistic activity on wellbeing</p>	<p>18 care home residents</p>	<p>Controlled clinical trial</p>	<p>One-on-one mentoring conversational skills to English as a Second Language (ESL) students in an hour session for 1-3 weeks</p>	<p>Usual care</p>	<p>The Life Satisfaction Index-A (LSI-A)</p>	<p>After controlling for baseline score, the mean life satisfaction score of the intervention group was significantly higher than the control group 1.5-2 months after baseline. In addition, the intervention group showed a significant pre-post improvement in LSI-A score, whereas no significant change was found in the control group.</p>	<p>Weak</p>
<p><b>Yuen et al., 2008</b> <b>USA</b></p>	<p>To investigate the effect of a volunteer activity on wellbeing</p>	<p>28 care home residents</p>	<p>RCT</p>	<p>One-to-one mentoring conversational skills to ESL students in an hour twice per week for 12 weeks</p>	<p>Usual care</p>	<p>The Geriatric Depression Scale; Life Satisfaction Index-A</p>	<p>A multivariate global statistical test of combined effects of the two relevant outcome measures plus a measure of self-rated health showed significant increases in both groups from baseline to post-intervention, and from baseline to 3-month follow up. However, there were no significant differences between the groups.</p>	<p>Strong</p>

**Interventions that trained participants in the development of a new skill**



<b>Kiyota (2009)</b> <b>Canada</b>	To determine whether caring for house plants improved wellbeing	29 nursing home residents	Cluster RCT	Learned how to care for house plants and carried out various activities to grow and care for plant over 6 weeks	Passive Interaction Group: exposed to house plants in the communal area  Control Group: no exposure	Geriatric Depression Scale	No statistically significant differences in levels of depression in any group across the intervention period	Moderate
<b>Kosmat &amp; Vranic (2017)</b> <b>Croatia</b>	To evaluate the impact of a dance intervention on wellbeing and cognitive functioning	24 care home residents	RCT	Group dance training program; learned choreography with dancing instructor for 45 mins per week over 10 weeks	Met with the researcher in small groups for 45 mins per week over 10 weeks to discuss various topics	Satisfaction with Life Scale (SWLS); General Self-Efficacy Scale	For satisfaction with life, there was a marginally significant group x session interaction ( $p = .058$ ). Post-hoc analysis showed that this was due to a significant decline in the control group from post-test to 5-month follow-up.  Neither group showed a significant change in self-efficacy over time.	Moderate
<b>Sollami et al., 2017</b> <b>Italy</b>	To ascertain the effectiveness of pet therapy in improving well-being	28 nursing home residents	RCT	Animal assisted intervention, in which participants ; learned to perform activities with a therapy dog, including giving commands, and playing with and	Usual care	Short-Form Geriatric Depression Scale; Apathy Evaluation Scale; Quality of Life in Dementia Scale; Hamilton Anxiety Scale (HAM-A); UCLA Loneliness Scale.	Significant improvements were seen in the intervention group for all outcome measures from pre to post-intervention. The amount of change was significantly greater in the experimental group than the control group for each variable.	Weak

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taking care of it,  
over 16 twice-  
weekly, one-  
hour sessions

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## Supplementary Table 1: Full list of systematic review search terms

1. exp "Aged, 80 and over"/ or exp Aged/ or exp Aging/ or older adult\*.mp.
2. senior citizen\*.mp.
3. exp Frail Elderly/
4. dementia.mp. or exp Dementia/
5. exp Nursing Homes/ or exp Homes for the Aged/ or nursing home\*.mp.
6. care home\*.mp.
7. long-term care facilit\*.mp. or exp Long-Term Care/
8. exp Residential Facilities/ or residential care\*.mp.
9. retirement home\*.mp.
10. oldest\*.mp.
11. senior\*.mp. or exp Senior Centers/
12. elder\*.mp.
13. Frailty/ or frail\*.mp.
14. geriatric\*.mp. or exp Geriatric Assessment/ or exp Geriatric Psychiatry/ or exp Geriatric Nursing
15. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14
16. intervention.mp.
17. program\*.mp. or exp Program Evaluation/
18. therap\*.mp.
19. treatment.mp. or exp Therapeutics/
20. exp Evaluation Studies as Topic/ or evaluat\*.mp.
21. effectiveness.mp. or exp Comparative Effectiveness Research/
22. exp Treatment Outcome/ or randomised controlled trial\*.mp. or exp Randomized Controlled Trials as Topic/
23. exp Cohort Studies/ or cohort stud\*.mp.
24. 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23
25. meaningful activit\*.mp.
26. purposeful activit\*.mp.
27. role\*.mp.
28. meaning\*.mp.
29. 27 and 28
30. purpose\*.mp.
31. 27 and 30
32. social\*.mp.
33. 27 and 32
34. exp Volunteers/ or volunt\*.mp.
35. vocation\*.mp.
36. exp Rehabilitation, Vocational/
37. exp Occupational Therapy/
38. exp Animal Assisted Therapy/
39. life purpose.mp.
40. purpose in life.mp.
41. sense of purpose.mp.
42. 25 or 26 or 29 or 31 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41
43. 15 and 24 and 42
44. quality of life.mp. or exp "Quality of Life"/
45. well-being.mp.

46. wellbeing.mp.
47. psychological wellbeing.mp. or exp Adaptation, Psychological/
48. exp Personal Satisfaction/ or life satisfaction.mp.
49. satisfaction with life.mp.
50. mood.mp. or exp Affect/
51. happiness.mp. or exp Happiness/
52. 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51
53. and 52
54. limit 53 to ("all aged (65 and over)" and English)

Supplementary Table 2. Quality Assessment of included studies

EPHPP Section Ratings (strong/moderate/weak)								
Author, Year	Selection Bias	Study design	Confounders	Blinding	Data collection	Analysis	Withdrawals and dropouts	Global Rating
<b>Interventions that assigned a specific functional role</b>								
<b>George &amp; Singer (2011)</b>	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong	<b>Strong</b>
<b>Klinedinst &amp; Resnick (2016)</b>	Moderate	Moderate	Weak	Moderate	Strong	Moderate	Strong	<b>Moderate</b>
<b>Van Malderen et al., 2017</b>	Moderate	Strong	Strong	Moderate	Strong	Moderate	Weak	<b>Moderate</b>
<b>Yuen (2003)</b>	Moderate	Strong	Weak	Moderate	Strong	Moderate	Weak	<b>Weak</b>
<b>Yuen et al., 2008</b>	Moderate	Strong	Strong	Moderate	Strong	Moderate	Moderate	<b>Strong</b>
<b>Interventions that trained participants in a new skill</b>								
<b>Kiyota (2009)</b>	Moderate	Strong	Weak	Moderate	Strong	Moderate	Moderate	<b>Moderate</b>
<b>Kosmat &amp; Vranic (2017)</b>	Moderate	Strong	Weak	Moderate	Strong	Moderate	Strong	<b>Moderate</b>
<b>Sollami et al., 2017</b>	Moderate	Strong	Weak	Moderate	Strong	Strong	Weak	<b>Weak</b>