

Is There Anything Special About Intergenerational Approaches to Older People with Dementia? A Review

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Abstract

Background: The recent G8 Dementia summit declaration is evidence of the importance that governments around the world are now attaching to the importance of tackling dementia. It is timely and increasingly important to find effective ways of delaying the progression of dementia. With rising life expectancy, caring for older adults with dementia leads to escalating costs related to long-term care and informal care. Although there is a growing literature on psychosocial interventions for people with dementia, there are few studies taking an intergenerational perspective. This study aims to review the evidence on the impacts of intergenerational activities on older adults with dementia.

Methods: A literature review was performed to explore the effects of intergenerational activities on older people with dementia. The search included English-language publications that reported original data from January 1986 to mid-2014. Studies were published in a peer-reviewed journal with no country restrictions. Supplementary searches were conducted and a narrative synthesis was performed.

Results: Ten studies met the inclusion criteria. Overall, it was found that intergenerational approaches had positive impacts on quality of life, stress, more constructive engagement styles exhibited, reduced agitation, improved cognitive functioning, delayed recall and better social interaction. However, mixed results were shown for effects on depression, self-worth and purpose of life in older people with mild to moderate dementia.

Conclusion: This review suggests that there is potential for the use of interactive programmes across generations as a cost-effective strategy for slowing down the process of cognitive decline by enhancing social capital and promoting well-being for older adults with dementia. More studies combining qualitative and quantitative analyses based on randomised controlled trials are needed for older adults with advanced stage of dementia in various country contexts.

Keywords: Mental health; Older people; Community; Intergenerational activity; Volunteers; School; Dementia

Introduction

The recent G8 Dementia summit declaration is evidence of the importance that governments around the world are now attaching to the importance of tackling dementia [1]. According to the World Health Organisation, it is estimated that 36 million people worldwide are currently living with dementia, costing our global economy US\$604 billion [2]. With rising life expectancy, there is a growing demand for health and long-term care services for people with cognitive impairments including older adults with dementia worldwide. Under budget constraints, there are substantial costs associated with each person living with the disease, as well as their caregivers and societies as a whole. With the increasing severity of dementia, the burden of caring for older adults with dementia leads to escalating costs for health and long term care services, as well as health and economic impacts on family carers who have to take time off work or lose opportunities to engage in other activities to provide care. There are also costs which are difficult to quantify but nonetheless are significant such as the distress and stigma linked to the behavioural and psychological symptoms of dementia (BPSD).

Given the fact that there is no medical treatment for the disease to halt or reverse the course of the disease, and prevention is focused largely on addressing risk factors for vascular dementia, it is increasingly important to find effective ways of delaying the progression of the disease by enhancing the psychological and social dimension of older people's lives. There is growing literature on the effectiveness of non-pharmacological and psycho-social interventions, such as individualised or group-based reminiscence therapies, joint reminiscence sessions

with family members, and Montessori-based activities, stimulating sensorial experiences for adults with dementia [3-6]. However, there are relatively few studies looking at the effects of the programmes from an intergenerational viewpoint. The aim of this study is to review the evidence on impacts of various types of intergenerational activities involving older adults with mild to severe dementia.

Methods

Search strategy

The review search strategy is shown below. It combined Medical Sub-Heading (Mesh) terms with free text words in the US National Library of Medicine's PubMed database. The search was supplemented by scanning relevant citations. ("intergenerational program*") OR (("Intergenerational Relations/epidemiology"[Mesh] OR "Intergenerational Relations/ethnology"[Mesh] OR "Intergenerational

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Relations/statistics and numerical data"[Mesh])) OR ("intergenerational intervention*")

Inclusion and exclusion criteria

Studies published between 1986 and 2014 of randomised controlled trials (RCTs), non-randomised controlled trials, and before and after observational studies were included, using quantitative and/or qualitative and/or a mixed method of evaluation. The intergenerational activities evaluated needed to include participants who were diagnosed with mild to severe dementia, either living in the community independently or in institutionalised settings. The evaluations needed to cover any form of activity between older people with dementia and people from another generation, excluding members of their own family. The evaluations needed to report physical, mental health or psycho-social outcomes. Studies identified had to be published in a peer-reviewed journal and written in English. There was no restriction by country or setting.

Results

Two-hundred and fifty one papers were initially identified. After screening their titles and abstracts, two-hundred and thirty three studies were excluded and eighteen papers were considered potentially relevant. After reading the full texts, twelve studies were excluded as they involved family members or were about fall prevention. Through citation checking of the six remaining studies, four supplementary studies were included in this review. Only two studies included people with severe rather than mild or moderate dementia. Three studies were set in school, three in day care centres and four in long-term residential care facilities. Seven studies were in the US, with one each from Ireland, Japan and Hong Kong.

There were five randomised clinical trials (RCTs), two non-randomised controlled studies including one study with a cross-over design, and three observational studies with pre and post-testing. Three also included qualitative components 5 studies included reminiscence activities, six volunteering activities by either generation, three Montessori-education based activities and four musical activities. Outcomes reported included quality of life, depressive state, stress, cognitive functioning & memory, sense of purpose, usefulness, engagement style, agitation and other behavioural changes.

Description of Studies

In the USA, a before and after pilot study [7] examined an intergenerational program for people with dementia using Montessori education methods. The 12 participants were mostly Jewish, aged 70 to 96 with middle to upper socio-economic status. They were either living in special care units of a nursing home or attending adult day care centres. They acted as instructors to preschool children for 30-45 minutes per week for at least 75 sessions (i.e. 18 months), using the "unconscious learning" process through sensorial experiences such as scent, touch, language, maths and social skills with minimal supervision, and cues/whispers from teachers. Older people with more advanced dementia were paired with those at less advanced stage of dementia. The mean number of successfully Montessori lessons taught was 22.3, ranging from 10 to 39 with an increase over time as they became more familiar with children and the teaching style. The intervention also had a positive impact on older people's engagement styles, reducing apathy (i.e. lack of involvement with one's physical and social environment, staring into space for at least 10 seconds), considered as a key feature of those with dementia.

An observational study from Hong Kong [8] examined the effects of

an intergenerational reminiscence programme linking 51 older people aged 65 and above (mean age of 79) with early dementia with youth volunteers. 80% of the older participants were women and had low levels of formal education. The study also involved 121 young people between 15 and 25. 76% were women and 74% were in higher education facilities including universities. The young volunteers acted as facilitators to encourage older people to discuss their past using props and triggers for three months on a weekly basis with each session lasting one and a half hours. Sessions were held in community settings such as day care centres or the homes of older adults with continuous support from an occupational therapist through communication by emails, telephone contacts and visits to the venues on a regular basis. Outcome measures used included the Quality of Life-Alzheimer's Disease (QoL-AD) and the Chinese version of Geriatric Depression Scale (CGDS).

There were some studies looking at impacts on stress and other psychosocial outcomes such as a sense of self-worth and purpose in life. These included three papers reporting the outcomes of the same US study with a slightly different focus on the findings, based on a randomised controlled trial [9-11]. The first paper [9] assessed the impacts of a structured volunteering intervention on various psychosocial outcomes for 15 older volunteers with mild to moderate dementia. Eight volunteers with a mean age of 85.7 were allocated to an intervention group and seven older people with an average age with 81.4 to the control group. Seven of the eight older volunteers were highly educated with master's and doctorate degrees, while only three people had those degrees in the control group. There was only one man in each group.

These volunteers interacted with preschool children aged five to six in singing, reading and writing for one hour at a kindergarten every other week. In addition, the volunteers also participated in reminiscence group activities (one volunteer to two to three students aged 11 to 14) at an elementary school every other week for a total 20 hours over five months. Older people in the control group received 12 peer-educational workshops, covering various themes such as love, creativity, spirituality and learning with eight homework assignments taking approximately one hour to finish every week. A variety of outcomes were considered such as stress levels on the Beck Anxiety Inventory, cognitive functioning, depression, a sense of purpose and a sense of usefulness. The other two studies [10,11] put more emphasis on qualitative aspects of outcomes using a mixed method evaluation of the same study population. The studies based on a RCT [10,11] used multiple qualitative interview techniques such as focus group interviews and ethnographic observation with older people and their caregivers to further explore findings. In contrast to the quantitative study above [9], they were based on more in-depth study analyses of responses, which were quoted in more detail from individual participants [10,11].

A US controlled study [12] assessed the effects of Montessori-based intergenerational activities on the engagement styles of 19 people with dementia aged 60 to 101 with a mean age of 81 attending an adult day care centre. 14 older adults had Alzheimer's disease, three had vascular dementia and two mixed dementia. 76% were Caucasian and 24% were African American. There were four different components for the intervention. They included an intergenerational intervention where older people served as mentors to young children showing them how to complete tasks in group-based Montessori activities such as small group reading and Bingo. Older people in the control group engaged in regular uni-generational activities offered by the adult day care centre. They consisted of art therapy, musical programmes, and exercise, watching films, playing cards and discussion groups. However,

after nine months only aggregated outcomes were reported so it is not possible to draw a firm conclusion on whether the intergenerational component contributed to the overall effects and/or the extent.

A cross-over controlled study from the USA [13] examined the impacts of intergenerational Montessori-based activities programming on the engagement styles of 14 older Caucasian adults aged 85 to 94 with an average age of 90.29 (93% women), diagnosed with mild to severe dementia (86% Alzheimer's disease) from a special care unit at a skilled nursing home. The study included 15 children aged 2.5 to 5 years from the facility's on-site child care centre. In a cross-over study design, older people were randomly allocated to a group receiving regular unit activities for six months and then intergenerational Montessori-based treatment for another six months. This procedure was repeated in reverse for the second group of participants. The Montessori-based intergenerational activities consisted of singing, physical activity, gardening, interactive discussions and occasional religious events. Engagement styles were measured using the Myers Research Institute Engagement Scale (MRI-ES).

A RCT from Ireland [14] examined the effect of structured education-based reminiscence on the quality of life of older long term care facility residents with an average age of 85.2. 153 people were assigned to intervention group and 151 to the control group. Almost three-quarters were women. The programme explored whether a dementia education programme, including a reminiscence component for staff, could lead to better quality life for Irish older people with mild to moderate dementia. After 22 weeks, depression and self-reported Quality of Life-Alzheimer's Disease (QoL-AD) were assessed.

In addition, other types of behavioural change were explored in a US observational study [15]. The impacts of intergenerational structured musical activities was assessed by looking at whether interaction with children led to any change in the behaviour of older people aged 66 to 95, with a mean age of 85, residing in a nursing facility. The intervention

consisted of weekly music and movement activities such as singing songs and games like tossing balloons together, "hockey pockey" and "hot potato" using a large fabric potato, while they were listening to pre-selected music. Interactive sessions were implemented in two groups of 12 older adults with and without 12 preschool aged children. Each session, facilitated by a recreational music therapist, lasted half an hour every week. Outcomes assessed at six months included agitation and other positive behaviours observed by videotaping and staff.

A wait-controlled study from Japan [16] investigated the effects of activity reminiscence therapy (ART) as "brain-activating rehabilitation." A mixed group of 18 older people, mean age 82.2, with and without dementia waited for the first three months and then for another three months they took part in a structured reminiscence programme. A majority of people (78%) had dementia, the rest were either healthy or had a sub-clinical level of memory problems. The outcomes were compared before and after the intervention. Over 12 weeks, each session lasted for one hour per week, addressing different topics in a structured format using various older-style tools. Through "role-reversal", the older people with dementia taught younger staff about how to use the old tools. The older people with dementia also asked about the names of old tools in group-based activities by taking turns as a leader or co-leader in each session. In this way, everyone was given an equal opportunity to take an active role throughout the courses. For example, activities included how to cook rice with charcoal, how to play traditional games using a beanbag for juggling, showing how to wash with washing board, displaying weaving techniques using silkworm and shuttle, talking about speeches and old textbooks during the imperial age, and demonstrating how to make noodles with knead pot. Each session began by watching a video on the topics to provide a visual reminder for the reminiscence process. Memory was assessed by the Wechsler Memory Scale-Revised (WMS-R), and caregiver burden assessed with the Zarit Caregiver Burden Interview. Table 1 summarises the details of the studies included (Table 1)

Author/year	Name of the study	No. of participants	Duration	Settings	Main outcomes
Camp et al. [7]	An Intergenerational Program for Persons With Dementia Using Montessori Methods	N=12, Mean age=90	18 months	USA Nursing home	Engagement style
Chung [8]	An intergenerational reminiscence programme for older adults with early dementia and youth volunteers	N= 51, Mean age =79	3 months	Hong Kong Community, daycare centre, home	Quality of life, depression
George [10]	Intergenerational volunteering and quality of life	N= 8, Mean age = 85.7 (intervention), N=7. Mean age = 81.4 (control)	5 months	USA Community, School	Stress, quality of life
George and Singer [9]	Intergenerational volunteering and quality of life for persons with mild to moderate dementia	N= 8, Mean age=85.7 (intervention), N=7 with an average age = 81.4 (control)	5 months	USA Community, School	Stress, quality of life
George et al. [11]	Intergenerational volunteering and quality of life	N= 8, Mean age = 85.7 (intervention), N=7. Mean age = 81.4 (control)	5 months	USA Community, School	Stress, depression, cognitive, purpose, and usefulness
Judge et al. [12]	Use of Montessori-based activities for clients with dementia in adult day care	N=9 (intervention), N=10 (control), Mean age=81	9 months	USA Adult day care	Engagement style
Lee et al. [13]	Effects of intergenerational Montessori-based activities programming on engagement of nursing home residents with dementia	N=14, Mean age =90.29	12 months	USA Skilled Nursing home	Engagement style
O'Shea et al. [14]	The impact of reminiscence on the quality of life of residents with dementia in long-stay care	N=153 (intervention), N=151 (control), Mean age= 85.2	22 weeks	Ireland Residential care homes	Agitation, quality of life, depression
Ward et al. [15]	The Effects of Participation in an Intergenerational Program on the Behavior of Residents with Dementia	N=12, Mean age=85	6 months	USA Long-term care residence	Agitation, laughing, touching, head nodding
Yamagami et al. [16]	Effect of activity reminiscence therapy as brain-activating rehabilitation for elderly people with and without dementia	N=18, Mean age=82.2	12 weeks	Japan Day care centre, group home	Cognitive function, delayed recall, memory

Table 1. Summary of the studies included.

Impacts of Intergenerational Activities

This section presents the effects of intergenerational activities on various psycho-social outcomes in terms of quality of life, sense of self-worth & purpose, depression, stress, cognitive functioning, engagement styles, and other behavioural outcomes.

Quality of life

In the Hong Kong study [8], the authors reported that there were significant improvements on the Quality of Life-Alzheimer's Disease scale (QoL-AD). However, the level of significance was not clearly reported. Interestingly, another study [14] showed mixed results, depending on the different methodologies employed. While an intention-to-treat analysis showed a non-significant difference, the findings based on the per-protocol analysis were statistically significant improvements in quality of life ($p=0.04$) [14].

Sense of self-worth and purpose

In a quantitative analysis [9], there were no significant differences in psycho-social outcomes such as a sense of purpose and a sense of usefulness between the intervention and control groups. However, in a mixed method study, the findings from narrative interviews reported more positive changes in sense of purpose, self-worth and relationships [10,11].

Depression

In the observational study, a significant reduction in depression was reported (p -value not reported) when making comparisons between the pre and post-test outcomes [8]. In addition, qualitative analyses in a mixed method study showed more positive responses from the participants. However, the RCT [9] showed no statistically significant change in depression and no significant benefits in depression were also reported in the Irish study [14] and Japanese study [16].

Stress

In three papers based on a single RCT study [9-11], quantitative analyses at follow-up showed a significant reduction in the level of stress in the experimental group, while a significant increase in stress was reported in the control group, compared to baseline ($p=0.048$). Qualitative analyses also showed reduced stress as one of the perceived health benefits, stated by the study participants [10,11]. In the Japanese study included in this review, in terms of caregiver burden, a non-significant change was reported between the intervention and control groups [16].

Cognitive functioning

The Japanese study [16] also reported significant improvements in immediate recall ($p=0.01$) and delayed recall ($p=0.022$), as measured in the Wechsler Memory Scale. In contrast, no significant difference was found in the US volunteering study [9]. In some of the qualitative study analyses in this review, older people mentioned that being with children was a cognitively stimulating experience [10,11].

Engagement styles

In a cross-over trial [13], older adults with dementia showed more constructive engagement during intergenerational programmes, relative to controls ($p<0.001$). Moreover, the experimental group showed more active engagement than the control group ($p<0.006$). There were significant differences between the two groups in self-engagement and non-engagement. Similarly, another study using the

Montessori-methods also reported more constructive engagement in participants, including motor and verbal behaviour, compared to controls [12]. Moreover, in a before and after study [7], there was a reduction in the proportion of people with disengagement from 71% in the early morning to 53% in the late morning following the Montessori methods. In addition, a decrease from 35% to 25% in older people showing disengagement during the entire session was observed. It is worth noting in this study that no case of disengagement was found when the same children and older adults worked together and older people reported no cases of having intimidating, anxious and disruptive behaviours during the 53 sessions. In the Japanese study non-significant changes in disoriented and withdrawn behaviours were reported [16].

Other behavioural outcomes

In addition, when looking at the level of agitation observed by caregivers such as nursing staff on the days when the intergenerational music activities were held, it was found that older adults exhibited lower levels of agitation [15]. However, this difference was not statistically significant. The Japanese study also showed non-significant changes in irritable behaviours and self-care functioning after intervention [16].

Social interaction

In an observational study [15], videotaping and natural observation by staff indicated there were two significant changes between those times when children were present and absent in terms of touching and nodding of heads. It was found that touching was more frequent observed in the presence of children ($p<0.01$), while head nodding, as a cued behaviour response to music activities, was less frequently observed ($p<0.05$) [15]. In addition, qualitative analyses [10,11] found a list of positive benefits such as older people treating young children met through the intergenerational programme as proxy grandchildren, as well as reciprocity and racial harmony. Moreover, Montessori-based teaching activities also showed positive impacts on the social participation of older people with dementia in terms of the increased number of older people completing sessions with children over time [7]. Table 2 presents the quantitative results of the studies and their significance (Table 2)

Discussion

Is it effective?

Overall, it was found that the intergenerational approaches had positive impacts on quality of life, stress, more constructive engagement styles exhibited when children were around, reduced agitation, improved delayed recall, and better social interaction. However, mixed results were shown for depression, self-worth and purpose of life. In a mixed method study [9], a significant reduction in stress was found among older people who participated in the intergenerational programme, in contrast to increased stress among those, who took part in the uni-generational workshop. It is one of the important findings as the more stressed individuals are the higher risk of cognitive decline and raising the risk of dementia [17,18]. It suggests that especially for older people at risk and/or at early stage of dementia, there is a potential chance for interactive sessions between different generations to be more effective than uni-generational support among peers in slowing down the process of cognitive decline and in turn in lowering the risk of developing Alzheimer's Disease in people with sub-clinical symptoms such as forgetfulness and mild cognitive impairment [17-19].

Is there anything special about interactions with children?

Author/year	No. of participants	Significance
Camp et al [7]	N=12, Mean age=90	Reduced disengagement: 71% (am) ->53% (pm) following the Montessori methods. Decreased disengagement during the entire session: 35% ->25%. Significance not reported.
Chung [8]	N= 51, Mean age =79	Improved quality of life using the Quality of Life-Alzheimer's Disease (QoL-AD), but p-value not reported. Reduced depression using the Chinese version of Geriatric Depression Scale (CGDS), but p-value not reported.
George [10]	N= 8, Mean age = 85.7 (intervention), N=7. Mean age = 81.4 (control)	Significantly reduced level of stress by Beck Anxiety Inventory,BAI (p=0.01). No significant differences in cognitive functioning(Mini-MentalState Exam, MMSE), depression (Beck Depression Inventory, BDI), a sense of purpose, and a sense of usefulness(single-itemquestionnaires).
George and Singer [9]	N= 8,Mean age=85.7 (intervention), N=7 with an average age = 81.4 (control)	Significantly decreased level of stress (p=0.007). No significant declines in cognitive functioning, sense of purpose, depression, and a sense of usefulness.
George et al. [11]	N= 8, Mean age = 85.7 (intervention), N=7. Mean age = 81.4 (control)	Significantly reduced level of stress (p=0.01). No significant differences in psych-social outcomes such as a sense of purpose, and a sense of usefulness.
Judge et al. [12]	N=9 (intervention), N=10 (control), Mean age=81	Significantly more constructive engagement (p < 0.004), but no difference in passive engagement.
Lee et al. [13]	N=14, Mean age =90.29	More constructive engagement styles using the Myers Research Institute Engagement Scale (p<0.001). More active engagement (p<0.006).
O'Shea et al. [14]	N=153 (intervention), N=151 (control), Mean age= 85.2	No statistically significant change in depressionusing the Cornell Scale for Depression in Dementia No significant difference in self-reported Quality of Life-Alzheimer's Disease (QoL-AD).
Ward et al. [15]	N=12, Mean age=85	Lower levels of agitation but not significant. More frequent touching observed in the presence of children (p<0.01) Less frequent head nodding (p<0.05)
Yamagami et al. [16]	N=18 , Mean age=82.2	Significant improvements in immediate recall (p=0.01) and delayed recall (p=0.022) using the Wechsler Memory Scale. Non-significant change in caregiver burden by the Zarit Caregiver Burden Interview. Non-significant changes in disoriented and withdrawn behaviours.

Table 2: Summary of the results.

If so, what is more unique about being with children than peers? Although the mechanism is not very clear, it was shown in qualitative interviews [10] from older adult participants and observers that “children don’t know what dementia is and they accept the older people where they are and enjoy the moments.” It indicates that the critical difference in the presence of children and peer adults can be found in children’s attitudes of “acceptance” without any prejudice against age or ethnicity or stereotyping/infantilising the older people with dementia, based on their cognitive ability. Such a non-judgemental environment could play a vital role, leading to therapeutic effects during the encounters with young children, unlike grown-up adults who tend to show negative attitudes including the stigma commonly attached to the symptoms of the mental disorder. This provides an opportunity for older adults with dementia to form genuine friendships in a “non-medicalised” environment. In turn this increases the chances to enhance their social capital in community by taking a constructive and productive role in society, increasing self-worth, and enhancing their status as social beings.

Moreover, another thing that is special about the presence of children is they can serve as props to make older people think about things that have happened in the past. For instance, as mentioned in one of the qualitative analyses [10], when children were around, older people were more likely to recall their early childhood or perceived children as reminding themselves of how they were used to be in their own childhood or their children or grandchildren’s early life. Older people also found it cognitively stimulating when children asked questions about things that they had not thought of or had forgotten for a long-time such as old houses where they used to live in life review sessions. All of these positive stimuli could play an important role in restoring cognitive functioning in the still intact part of their remaining memory repertoire.

Similarly, one study showed the benefits of stimulating early life

experiences. In the Japanese study, “nostalgia” as a result of using old-fashioned tools familiar to older people with dementia, led to effective recall of experiences in their earlier life. The older participants demonstrated to staff how to use old tools, which were unfamiliar to the younger generation staff. Through this role-reversal, they gained a sense of self-worth and a desire to live [16]. This programme had a high attendance rate of 93%. This can be attributed partly to the equal chance given to each older person to take a leading role and contribute more actively to the implementation of each session.

In this study, during the waiting (control) period, there was a significant decrease in self-care functioning during the intervention period. This suggests without exposure to the reminiscence sessions, self-care functioning can deteriorate at a significantly faster rate. However, no significant changes in self-care functioning after the intervention can be interpreted as suggesting that the intervention could at least have contributed to slowing down the process of decline or at worst there was no harm in participating in the programme. In addition, based on a qualitative analysis, participants after the intervention became more motivated and well-prepared, such as making sure that they had their head scarves and aprons when the next session was on how to make noodles (udon). The authors indicated these kinds of positive behaviours could be interpreted as improvements in delayed recall. So it is important to prevent rapid disease progression by intervening early before older people enter into more advanced stages of dementia.

Is it possible to have benefits from peer-support? A study looking at the Montessori-method based intervention [7] showed it was feasible for older people with more advanced, moderate levels of dementia to complete teaching activities with some help, such as cueing from other people with the less advanced mild stage of dementia. However, there is lack of evidence on peer support for people with severe dementia.

Conclusions

Implications for future research

There were some benefits of using multiple methods for research [10,11,15]. It is useful to capture possible contradictory and supplementary findings by using mixed methods such as quantitative and qualitative analyses [10,11]. As shown in an observational study, videotaping and observation sheets were useful for capturing moments of smiling or extending hands as non-verbal positive expressions [15]. It is a common belief to think that a mixed method study alongside a RCT can be resource-intensive in terms of time consumed and financial costs for the implementation. However, one of the greatest advantages can be found when qualitative responses from study participants enrich the meanings or deepen the understanding of possible mechanisms of effects.

Evaluations based on a RCT study design [14] showed mixed results when using different approaches. While the effects, measured using an intention-to-treat analysis were not significant, the results were shown to be significant when taking the per-protocol approach [14]. The study results can be affected by the way missing data is handled and the approach taken to interpret data. Additional sub-group analysis can be helpful to understand under what circumstances a programme would be more effective. One way of minimising discrepancies may be to perform a process evaluation on a regular basis. Through on-going monitoring, it is more feasible to detect potential barriers or facilitators, which would feed into more constructive dialogue for future projects. It is important to devise appropriate incentives for different types of institutions and individuals with diverse needs and capacities.

Limitations

There are several limitations in this review. Due to the heterogeneity of the outcomes, it was not possible to conduct a meta-analysis justifying a narrative review of studies. The search was restricted to Medline and studies published in peer-reviewed journals and written in English. The majority of the studies came from the USA. The transferability of the study findings to European countries and other parts of the world may be an issue. Differences in pre-existing infrastructure, availability of local partnerships in communities and cultural factors can play an important role in introducing and maintaining the programmes.

Implications for policy and practice

Flexibility in designing interventions can be an important element to encourage people to participate in the programmes. In the Hong Kong study, the youth volunteers who had an opportunity to contribute to planning and implementing the programme had low drop-out rates. Similarly, in the Japanese study, attendance rates were very high (93%) throughout the course. This was partly because everyone was given an equal chance to take an active role to lead sessions each week. In this way, no one became isolated in group activities. These activities could have led to an enhanced sense of ownership and belonging, which could keep older people highly motivated. In addition, another study [15] also showed on-going reflections of service users' feedback by incorporating participants' reactions such as replacing risky activities perceived by the participants and staff during the sessions.

There is good evidence on the possibility that intergenerational activities for older people with dementia can be delivered by non-professionals such as lay young or older volunteers. The community-based care model using volunteers would potentially be a cost-effective strategy at the individual as well as societal levels, given the heavy

workload reported by staff, nursing shortages, frequent turn-over and retention problems, which can be barriers to successful implementation.

Of course, it is vital to provide proper training opportunities for people who are willing and able to participate in altruistic activities. The Train-The-Trainer model as shown in Dementia Friends [20] in the UK may help maintain sustainability and the recent work for the Intergenerational Schools Project [21] that is taking place under the Prime Minister's Challenge in the UK could shed a light on the future. In addition, on-going monitoring and support from professional staff such as nurses and occupational therapists is important for quality of care and quality of life in older people with dementia. People who act as volunteers in their early life may also be more likely to be resilient in later life. So this can potentially be a very effective way of promoting well-being from a public health perspective for both young and older people in our society.

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