

Critical Review: Can the Onset of Dementia in Elderly be Prevented or Postponed Through Social Activities?

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Abstract

Age is one of the strongest predictors of cognitive decline such as memory loss and dementia. Challenging the brain through social interactions may help to preserve mental functioning and protect against dementia in the elderly. This critical review examines social engagement as a possible protective factor against the onset of dementia in the old aging. A literature search resulted in the identification of six articles meeting the inclusion criteria. Study designs included longitudinal and cross-sectional cohort studies, as well as an informational review. Overall, findings from this critical review revealed highly suggestive evidence that social participation is strongly associated with the delayed onset or prevention of dementia in the elderly.

Introduction

What exactly is dementia one may ask? Dementia, being the most common type of Alzheimer's disease, is a collective term used to describe various symptoms of cognitive decline that impairs one's ability to remember, think or make decisions while participating in everyday activities (Seidler et al., 2003). Though dementia typically affects older individuals, it is not an element of the normal aging process (Seidler et al., 2003). Alzheimer's disease and other dementias are becoming more prominent with age and often interfere with human quality of life (QoL) (Penninkilampi et al., 2018). As an individual ages, memory functions that are associated with the hippocampus are particularly vulnerable to decline (Dause & Kirby, 2019). Preserving cognitive functions like memory will diminish loss of QoL in the elderly.

Research has shown that changes may occur over the years in the QoL of an individual experiencing cognitive decline. Hoe et al. (2010) unravel the finding that QoL does not necessarily diminish as dementia progresses; rather, it is strongly influenced by the mood of the person with dementia, resulting in a strong relationship between mood and QoL. Bloch (2002) discusses the concept of mood and how it's emphasized as a specific entrance to the subjective and experiences dimensions involved in the complex concepts of QoL, the good life, as well as happiness. Individuals may become less interested in activities and become socially distant with their environment and relationships. Therefore, it is important to consider QoL changes with the elderly experiencing such a cognitive decline.

There have been efforts to develop techniques to mitigate dementia. Some common techniques include having a well-balanced diet, staying physically active, as well as reducing alcohol or substance abuse. Another

way of mitigating effects of cognitive decline includes keeping the mind active and stimulated, which can be achieved through social engagement.

Social engagement is a form of intellectual stimulation, and can come in a variety of forms which include but are not limited to going to restaurants, sporting events, book clubs or other group activities, or visiting friend's or relatives (Krueger et al., 2009). Whether the individual is having to think in a conversation or he/she is attempting to learn a new game online, the ability to challenge oneself mentally may help to build up the brain's ability to cope with cognitive decline of dementia. Social engagement is a way to boost one's mood, which may in turn have a positive effect on QoL and reduce the risks of this type of impairment.

To date, research has shown that a rich social network may decrease the risk of developing dementia (Wang et al., 2002). A social network is a network of social interactions and personal relationships, which can be achieved face-to-face as well as from a distance (e.g. over the phone, online, etc.). As social interaction is important for brain health, one way to postpone or prevent the symptoms of deteriorating memory otherwise known as dementia is through intellectual exercise (*Dementia Care Central*, 2019). The underlying principle of brain plasticity is that through appropriate intellectual stimulation, such as social engagement, a person has the ability to maintain or enhance cognitive function and offset age related decline. Any kind of stimulating activity, either mentally or socially oriented, may be relevant in helping to preserve mental or cognitive functioning in the elderly (Wang et al. 2002).

Having said this, it is important to examine the existing literature to determine whether cognitive decline such

as dementia can be prevented through social engagement.

Objectives

The primary objective of this paper is to critically evaluate existing literature whether social engagement can prevent the onset of dementia in the elderly population.

Methods

Search Strategy

The following online search engines were searched for articles related to the topic of interest: PubMed, Medline, PsychInfo, and Google Scholar. Keywords used for the database search included: [“(dementia”) OR (“cognition”) AND (“Prevention”) OR (“postpone”) AND (“social” OR “social activities” OR “social engagement”)]. Although the reference lists included other relevant articles to the topic, the methods section was limited to systematic review papers.

Selection Criteria

Studies selected for inclusion in this critical review included participants aged 65 and older, recruited from retirement homes and nursing facilities, or from the community. All subjects were examined at baseline prior to the onset of dementia. All studies were required to examine a preventative relationship between social participation and the incidence of dementia.

Data Collection

The literature search generated 6 articles congruent with the above-mentioned selection criteria, including four longitudinal studies (Tomioka et al., 2018; Wang et al., 2002; James et al., 2011; Marioni et al., 2015), an informational review of the literature (Dause & Kirby, 2019), and a cross-sectional study (Krueger et al., 2009).

Results

Tomioka et al. (2018) conducted a 3-year community based longitudinal study to examine whether social participation (SP) is associated with cognitive decline (CD) in older community-dwelling cognitively unimpaired and active adults (65-96 years; n= 6 093, 45.4% men). Self-administered questionnaires were distributed to participants from Nara Prefecture, Japan. A published self-reported cognitive scale was used to measure cognitive status at baseline and 3 years after. CD in relation to SP was examined by gender, and social group involvement was observed in 5 settings: neighbourhood associations, hobby groups, local event groups, senior citizens clubs and volunteer groups. Appropriate statistical analysis revealed that social activities in women were associated with a lower

cognitive decline. At the end of the study, CD was reported in 16.7% of participants. An increase of social interactions in-group settings was associated with prevention of CD in women, but not men. The negative effects of CD were lessened in participants actively involved in neighbourhood gatherings, men at local event groups and women in volunteer groups.

Limitations in this research include the use of dichotomous (presence/absence) scale to assess SP, the use of a self-report measure of CD, and the lack of data regarding physical activity, a variable closely associated with social activity. Strengths of this study include its large participation pool and 3-year follow up period.

Overall, this study provides highly suggestive evidence that participation and interaction in multiple social groups prevents CD, and this effect was observed in women.

Wang et al. (2002) used data from the Kungsholmen Project, a longitudinal population-based study of adults 75 years or older (n=776; 26.8% men) carried out in Stockholm, Sweden (1987-1996) to examine if the engagement in social activities 6 years prior to dementia diagnosis was related to a decreased incidence of dementia. Participant’s information on mental, physical, social, productive and recreational activities at baseline was gathered from the Kungsholmen Project’s database. Cognitive functioning was evaluated using a common mental state measure, and depression was assessed with self-reported symptoms. Participants with dementia (n=123) were identified in the last study stage.

When frequency of participation in social and leisure activities was taken into account from self-reported measures, subjects with higher participation in social, mental and productive activities had decreased incidence of dementia. Daily/weekly participation in each subgroup (mental, physical, social, productive and recreational activities) was independently associated with a lower risk of dementia.

Although this study gathered information on the frequency of participation in activities, the extent to which subjects participated in the activities was unknown. Additionally, specific cognitive domains for preclinical stages of Alzheimer’s disease were not identified during this study. Due to this, it is unknown if cognitive disturbances may have been present in participants 6 years prior to the onset of dementia. Another limitation of this study is that association between dementia and specific personality changes was

not considered, as there is a presence of personality changes during the early stages of Alzheimer's disease.

Overall, this study provides compelling evidence that involvement in mental and social activities acts to prevent the development of dementia in the elderly population.

James et al. (2011) examined the association between social activity and cognitive decline in participants (65years+, n=1138) without dementia who were monitored in an ongoing longitudinal cohort study, the Rush Memory and Aging Project, and were recruited across 40 retirement homes and housing facilities. Participants were followed up to 12 years and covariates such as age, race, sex, education, social network size, chronic conditions, and cognitive and physical activity were tracked through self-reporting. Using appropriate statistical analysis, results showed a reduction in cognitive decline by 70% in socially active participants, in the first follow up at 5 years. A one-point increase in social activity score was related to a 47% decrease in the rate of cognitive decline. As well, through the use of a common mental state measure, the study found that socially active participants had higher levels of global cognition at baseline, and larger social networks than less social active persons.

Study strengths included a long follow-up period (average of 5 years) with yearly observations, and multiple measures of cognitive functioning. As well, this study adjusted for a wide variety of potential confounders, including varying personality types, and other physical or cognitive activities that could possibly reduce cognitive decline. This indicates that social participation is independently related to cognitive decline. Lastly, this study used a large community-based population of elderly individuals without dementia and had a high rate of follow-up (over 94%) from participants. Study limitations included use of a self-report measure of social activity, a mainly white volunteer cohort, and lack of documentation of social activity over the lifespan.

Overall, this study provides compelling evidence that a socially active lifestyle can prevent the onset of dementia in old age.

Dause and Kirby (2019) provided a discussion paper of the existing literature regarding the preservation of cognitive function in old aging through social engagement. Several major lifestyle factors have proven to be effective at combating hippocampal aging including environmental enrichment and exercise. While there is substantial evidence supporting these two factors, a less well-understood factor may also

contribute to healthy cognitive aging: social engagement. Although to date, human intervention studies have rarely focused on enhancing societal activity as an individual variable that can impact memory function, this paper provides a reasonably comprehensive review of the key role of social engagement in preventing old-age cognitive decline in memory. The authors suggest that high levels of social engagement correlate with increased hippocampal function in the elderly. Summed together, lifestyle interventions such as enrichment, exercise, and social engagement present viable opportunities for improving cognitive and physical health in aging humans.

Overall, this informational review provides somewhat suggestive evidence that social engagement is a viable lifestyle factor for preserving cognitive function in the elderly.

Marioni et al. (2015) investigated cognitive decline and risk of dementia by means of social activity through a 20-year prospective cohort study. Four markers of lifestyle activity and self-perception of social relationships (social, physical and intellectual engagement, social network size, satisfaction with social relationships, and perceived understanding) with longitudinal cognitive change and risk of dementia were studied. Participants (aged 65+, n=3777) from 75 civil regions of southwest France were recruited for the study of which 2854 (41% male) were selected. Data was collected at the study baseline in 1988, followed by 1, 3, 5, 8, 10, 13, 15, 17, and 20 years after the baseline assessment. Cognitive ability was assessed using tests of global cognitive function including the Mini Mental State Examination, verbal fluency, abstract thinking, episodic memory and learning, processing speed, and immediate visual memory, all of which were administered at each wave.

Over the 20-year follow up, 783 subjects were given a dementia diagnosis and 2200 died without dementia. In the whole population, associations between increased engagement in social, physical, or intellectual pursuits and increased cognitive ability and decreased risk of dementia (but not decline), and between feeling well-understood and slower cognitive decline were found amongst the participants.

Strengths of the analysis include a large sample size, studying the population over a long period of time, and utilizing an extensive cognitive test battery that was administered at each interview wave. Limitations of the analysis relates to the single time-point (baseline) measure of the social activity variables, which are dynamic in nature. Additionally, some of the variables that were included in the social, physical, and

intellectual engagement measure might have been solitary activities (e.g. gardening), thus being less compatible with the global banner of a social activity.

Overall, this study provides highly suggestive evidence that increased social engagement and is associated with higher cognitive ability and a decreased risk of dementia.

Krueger et al. (2009) examined the association of diverse measures of social engagement (e.g. social network size, frequency of social activity, and level of perceived social support) to level of function in multiple cognitive domains in a cross-sectional study. 838 persons (25% male) without dementia with a mean age of 80.2 years were recruited from subsidized housing facilities and continuous care retirement communities in the Chicago metropolitan area. Social engagement was assessed using a Likert scale, standardized questions, and from the Multidimensional Perceived Social Support questionnaire. Cognitive function was assessed with a battery of 19 performance tests, including the Mini Mental State Examination. To better understand the association between social engagement with multiple cognitive domains, composite measures of episodic memory, semantic memory, working memory, processing speed, and visuospatial memory were examined.

Findings showed that social activity and social support were related to better cognitive function whereas social network size was not strongly related to global cognition. The results confirmed that higher levels of social engagement in old age are associated with increased cognitive function, but the association varies across domains of social engagement.

Strengths of the study included a large sample size and an extensive cognitive test battery. Limitations of the study included recruiting older participants from a selected demographical and geographical area. Additionally, the findings are cross-sectional, resulting in behaviour analysis of a given point in time than over a period of time.

Overall, this study provides suggestive evidence that social engagement, specifically social activity and social support, is associated with higher cognitive ability in persons without dementia.

Discussion

This critical analysis examined the relationship between engagement in social activity and preserving cognitive functioning. Overall, the findings were highly consistent. Five empirical studies provided suggestive to compelling evidence for a relationship between

social engagement and decreased risk of cognitive decline or dementia (Tomioka et al., 2018; Wang et al., 2002; James et al., 2011; Marioni et al., 2015, Krueger et al., 2009).

All studies mentioned in this critical review contained a large participation pool, increasing the generalization of the findings, as well as long follow-up periods. Some shortcomings of this critical review involved the heavy reliance on self-reporting of social activities from the study participants, possibly leading to biases in information gathered. Additionally, studies by Tomioka et al. (2018) and Krueger et al. (2009) provided lack of data on physical activity, which is a closely related variable for social activity.

To summarize, evidence from the above-mentioned studies gives highly suggestive evidence that social participation and intellectual involvement plays a large role in cognitive functioning in the elderly. These findings indicate that an increase in social activity can be a preventative measure for the incidence of dementia in this given population.

Clinical Implications

The findings of this critical review have implications for healthcare professionals and facilities for older adults (retirement homes, nursing facilities, long-term care homes, etc.), as well as the general population. Specifically, healthcare workers can feel reasonably confident suggesting social activities and events for the old aging population as an effective method of promoting maintenance of cognitive health.

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