



Systematic Review

Non-pharmacological Therapy for the Elderly to Prevent Dementia through Cognitive Stimulation Therapy: A Systematic ReviewMartha Lowrani^{1,3}, Retno Indarwati¹ and Pudji Lestari²¹ Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia² Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia³ Institute of Health Science (STIKes) William Booth, Surabaya, Indonesia**ABSTRACT**

Introduction: Dementia is the most prevalent disease in older people and it has become the largest global public health priority. Not only does it cause a progressive loss of independent functioning, a decline in the cognition of people with dementia and family restlessness but it also leads to an enormous social and economic burden. The aim of this study was to describe the non-pharmacological therapy that is commonly used and to show the significantly effect that it has in terms of preventing cognitive decline in the elderly with dementia.

Methods: The literature review approach was used with a cross-sectional framework. Data was taken using a checklist and observations that were modified from the key words used to search Scopus databases. The 20 final articles were published from 2010 to 2019. The data was analyzed through a comparative study

Results: There are several interventions based on cognitive stimulation therapy including clock-drawing, board games, story-telling, musical therapy, bright light therapy, aromatherapy, touch therapy, gardening, brain gym, modality therapy etc. From the study, it was found that cognitive stimulation therapy is suitable in all conditions, is easy to implemented and it significantly improved the cognitive and executive functioning of the elderly with dementia.

Conclusion: Nowadays, most studies concern alternative approaches that are non-invasive, cost-effective, safe and easy to implement. Cognitive stimulation therapy can be the best choice. It is expected that further research is needed to find other tools for scoring the intervention that is most suitable for all.

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INTRODUCTION

Ageing populations represent a great challenge to the health and social care systems. Dementia is one of the most common age-related disorders and with the number of cases expected to double every 20 years, governments worldwide are being urged to make dementia a clinical and research priority (Millán-calenti et al., 2016). Previous reviews have investigated the potential impact of cognitive stimulating leisure activities on cognitive decline and the risk of dementia (Iizuka et al., 2019). However,

this review seeks to a) pool data from studies on cognitively stimulating leisure activities in a series of meta-analyses, b) to assess the impact on cognition and risk of dementia in later life and c) to determine what are the treatments or non-pharmacological actions that people can do to prevent cognitive deterioration especially among the elderly with dementia. As limited effective treatment alternative for dementia are currently available, the identification of risk or protective factors, especially modifiable factors, could provide potential or prevent the disorder. However, evidence on the modifiable

preventive factors of dementia is still limited. Among the proposed protective factors, leisure activities are studied for non-pharmacological therapy (Review, 2016). Leisure activities can be defined as the voluntary use of free time for activities outside of the daily routine. It is the one of the major components of a healthy lifestyle.

The use of board games as a cognitive stimulation activity has grown in recent years which has drawn the attention of researches in the field of geriatrics. However, studies on the application of board games as an intervention and for the assessment of older adults have been scarce. More evidence-based research is therefore required to verify if playing board games can be a valid non-pharmacological treatment in social work (Ching-teng, 2019).

This paper has 3 specific aims as follows: 1) to review the literature on the non-pharmacological therapies used to manage cognitive decline and social interactions in the elderly with dementia over the 10 years, 2) to assess the specific effectiveness of each non-pharmacological; therapy and 3) to provide evidence-based recommendations about the use of specific therapies and future research on this topic.

MATERIALS AND METHODS

Data source and search strategy

A systematic review of the literature published over the past 10 years (January 2009 to June 2019) was performed. Scopus electronic database was searched using the following keywords: cognitive stimulation therapy; prevent dementia; elderly and non-pharmacological therapy. Several interventions that were noticed by the author were based on cognitive stimulation therapy inclusive of clock-drawing, board-games, story-telling, musical therapy, light therapy, aromatherapy, touch therapy, gardening, brain gym, modality therapy etc.

Inclusion and exclusion criteria

Some of the included original scientific articles in English met the following criteria.1) Population: elderly with dementia (60 years of age or older). This was reported using a validated measurement via MMSE or a medical diagnosis of dementia. 2) Intervention: non-pharmacological interventions aimed at managing cognition. 3) Type of experimental design: RCT comparing cognition before and after the interventions. 4) Outcome: only studies exploring non-pharmacological interventions for cognitive stimulation as a primary outcome (measured quantitatively and with a validated scale) or studies including sufficient information to determine the effect of non-pharmacological interventions on cognition were included. 5) Type of study: only original articles were included. Abstracts, reviews, descriptive studies, studies based on descriptive studies, studies based on the description of a protocol and studies based on the perspective of the authors, books, short surveys, observational studies,

comments on an article and conference abstracts were excluded.

Data extraction

The studies were synthesized according to the following characteristics: author and year, title, methods (design, sample, variables, instruments, analysis) and results. A narrative synthesis approach was performed to examine the results. More details have been given in the APPENDIX in Table 1, namely a summary of the non-pharmacological therapies given to the elderly to prevent dementia in the form of cognitive stimulation therapy.

RESULTS

The early literature search obtained 1015 articles. All came from a Scopus database search engine. The 20 articles reviewed are relevant to the theme and they were adjusted for the inclusion and exclusion criteria and keywords needed. There following points were made:

Benefits of Cognitive leisure activity

There were 20 studies from a systematic review that came from 3 electronic databases: PubMed, PsycINFO, and PsycARTICLES. The articles said that some intervention are related to the activities done in leisure time including arts, writing, board games, reading, handicrafts, crossword puzzles and learning computer skills (Iizuka et al., 2019). From the research findings, these activities can increase the cognition of the elderly because they trigger new learning and their intellectual and effective communication abilities. There was also a cohort study that explained that a higher level of education can be good for maintaining cognition and memory function. There are some positive relationships between the participation of the elderly in their leisure time and doing activities to prevent dementia as shown by their increased cognitive test performance (Matyas et al., 2019).

Multidimensional stimulation therapy (MST)

Activity programs that work in groups are based on cognitive stimulation such as occupational, recreation and physical exercise / psychomotorics. These have been known to increase the cognition of persons with dementia as showed by the behavior aspect and some cognitive function (Farina et al., 1949).

Cognitive stimulation therapy (CST)

A randomized controlled trial as part of a quantitative scientific research reported that CST provides significant statistical data that shows that it can increase cognition and that it can decrease the on depression of dementia patients. It can also reduce the dependency of elderly people on the activities of daily living (ADL) (Filipa, Cardoso, & Rosa, 2014). Another perspective held by a descriptive study said that there are practical guidelines that recommend that interventions are easy to adopt in any culture.

The CST structure means that it will be more effective and accepted by other cultures (Aguirre, Spector, & Orrell, 2014).

Gaming activity or board game activity

The cognition of the elderly could be increased through board game activities. Conventional or

modern gaming is still effective at improving cognitive function because there are words skills, language and attention skill involved in technology engagement, known as the visuo-perspective (programming, caring) (Cecilia, Giacomo, & Vittorini, 2015).

Other satisfying results show a significantly increase in the cognitive function of the intervention

Table 1. Summary of the non-pharmacological therapies for the elderly to prevent dementia through cognitive stimulation therapy

No	Research Title and Author	Country	Metode (Desain, Sampel, Variabel, Instrumen, Analisis)	Result
1	Optimal non-pharmacological management of agitation in Alzheimer's disease: Challenges and solutions (Millán-calenti et al., 2016)	Spain	D : Descriptive review S : Not mentioned V : I : Challenges and solutions D : Optimal non-pharmacological management of agitation in Alzheimer's disease I : Systematic review of 754 studies A : Randomized controlled trials (RCTs)	From 754 studies, 8 studies were found that matched the inclusion criteria. Music therapy is optimal to use to provide therapy for agitated patients with moderate and severe dementia, both for an individual and i groups. Bright light therapy didn't have a significant result in terms of reducing agitation but it did decline the need for baby-sitting to help with their daily needs. Touch therapy was effective at reducing physical non-aggressive behavior but it is inappropriate to be given to those who are physically aggressive with verbally agitated behaviors. Melissa oil aromatherapy and behavioral management techniques are not as good as a placebo/pharmacology to manage the agitation of dementia.
2	Can cognitive leisure activity prevent cognitive decline in older adults? A systematic review of intervention studies (Iizuka et al., 2019)	Japan	D : Descriptive S : 20 Studies V : I : Cognitive leisure activity D : Cognitive decline I : Search of 3 electronic databases: PubMed, PsycINFO, and PsycARTICLES A : PRISMA collection of the data	Some of the interventions related to the activities: arts, writing, board games, reading, handicrafts, a crossword puzzle and learning computer skills. The results found there to be a cognitive function increase and an increase in the elderly cognition through activities done in their leisure time. This was because there were new things learnt that triggered intellectual and effective communication between older people.
3	Meaningful activities for improving the well-being of people with dementia: beyond mere pleasure to meeting their fundamental psychological needs (Review, 2016)	London, UK	D : Narrative Peer review S : Not mentioned V : I : Meaningful activities for improving well-being and meeting their fundamental psychological needs D : People with Dementia (PwD) I : Database search using PubMed and PsycINFO A : Aforementioned theories	The life review therapy and life story work was chosen as important to review including spiritual/religious activity, the need to prepare for the last minute of death, intergenerational activities, the need to be always looks good and putting on a creative performance activity during leisure time.
4	Effect of board game activities on cognitive function improvement among older adults in adult day care centers (Ching-teng, 2019)	Taiwan	D : Quasi-experimental study S : 82 subjects, 2 group V : I : Effect of board games D : Cognitive function I : Questionnaire A : SPSS 22.0, a paired T-test	Good results seem to be more satisfied in the intervention groups than in the control groups in terms of increasing cognitive function. The board game activity that was frequently done in a nursing home was really effective. In the board game, the elderly learn to take the initiative, there is a recreation effect, planning and strategy is required and it is an adaptation where there is a winner and loser.

No	Research Title and Author	Country	Metode (Desain, Sampel, Variabel, Instrumen, Analisis)	Result
5	Continuing education for the prevention of mild cognitive impairment and Alzheimer's-type dementia: A systematic review and overview of systematic reviews (Matyas et al., 2019)	Austria	D : Systematic review, Cohort study S : 459 participants V : I : Continuing education prevention D : Mild cognitive impairment and Alzheimer's-type dementia I : Identified 4933 citations from 6 databases from January 1990 to April 2018 A : Published studies and grey literature	The prospective cohort study found matching inclusion criteria, where the level of education had a significant effect on language and memory ability. Better executive memory function in a given period was reported. SR showed a consistency when it was reported that there was a positive relation between a stimulating leisure activity able to prevent dementia and increasing cognitive test performance.
6	Multi-dimensional Stimulation Therapy (MST): The Practical Protocol (Farina et al., 1949)	Italy	D : Deskriptif S : Not mentioned V : I : MST D : Practical protocol I : Intervention / stimulation A : -	The activity program driven in a group was much more effective at cognitive stimulation than when done individually. The activities were: occupational therapy, recreation, sports, physical or psychomotoric. These are known to bring increase the cognition of people with dementia people in the behavior aspect.
7	The effect of cognitive stimulation among nursing home elders: A randomized controlled trial (Filipa et al., 2014)	Portugal	D : Quantitative S : 56 patients V : I : Effect of cognitive stimulation D : - I : Two groups (intervention and control) A : -	CST had a significant impact on increasing cognition but it is still unknown if it was effective or not at healing depression. This is because there was not enough statistical data and there was no change in the self-dependency.
8	Guidelines for adapting cognitive stimulation therapy to other cultures (Aguirre et al., 2014)	London, UK	D : Descriptive perspective S : Not mentioned V : I : Adapting CST D : Other cultures I : Formative method for adapting psychotherapy (FMAP) A : -	Guideline protocols that can be recommended in a practical culture because the included CST structure is both suitable and effective and easily accepted in other cultures.
9	Influence of Gaming Activities on Cognitive Performance (Cecilia et al., 2015)	Italy	D : Quantitative S : 67 elderly (60-85 yo) V : I : Gaming activity D : Cognitive performance I : Questionnaire A : MANOVA	The performance of cognition in the elderly at a nursing home can be increased through board games or a technology instrument. Board games are a classic method but still effective when used to increase cognition because there are word processing skills, language skills, an attention need that is close to a technology instrument and visuo-perceptive ability (visual duty: <i>Programming, Caring</i>).

group related to the activity of board gaming in the elderly. This is because a lot of this type of recreation is a new experience that takes initiative, planning, organizing and adaptation when it comes to winning or losing (Ching-teng, 2019).

Brain activity

The reasons behind brain exercise were to prevent cognitive decline: in a high population of the elderly, as adults we need to maintain and increase our cognitive function to prevent the neuroplasticity brain process (Reichman, Fiocco, & Rose, n.d.).

No	Research Title and Author	Country	Metode (Desain, Sampel, Variabel, Instrumen, Analisis)	Result
10	Exercise the brain to avoid cognitive decline: examining the evidence (Reichman et al., n.d.)	Canada	D : Deskriptif S : 7010 healthy adults 283 with Alzheimer's disease V : I: Exercise the brain D : Avoid cognitive decline I : Systematic review, search engine A : -	The rationale of brain exercises was to prevent the cognitive decline that comes from the greater population of the elderly. The aging process has always been linked with the deterioration of cognitive function in healthy older people and it can also be increasingly preventive regarding dementia in the elderly. Hopefully adults have the ability to maintain and increase their cognitive function during the increase in age to prevent the neuroplasticity process.
11	The effects of an expanded cognitive stimulation therapy model on the improvement of cognitive ability among the elderly with mild stage dementia living in a community – a randomized waitlist controlled trial (Young et al., 2018)	Hong Kong	D : Quantitative research, RCT S : 101 elderly individuals with mild stage dementia (EwMD) V : I : The effect of an expanded cognitive stimulation therapy model on the improvement of cognitive ability D : Elderly with mild dementia I : Questionnaire: The Chinese Mattis Dementia Rating Scale (DRS) and the Chinese Mini Mental State Examination (MMSE) A: ANCOVA demonstration	This scientific research showed the effectiveness of the model-expanded CST on increasing cognitive ability in the EwMD community. In a group, the intervention showed more significant results than the control group, even though there were differences in age status, gender, education and the level of dementia.
12	Application and interpretation of functional outcome measures for testing individuals with cognitive impairment (S), Wayne, 2018)	Las Vegas, Nevada	D : Descriptive study S : Not mentioned V : I : Application and interpretation of functional outcome measures D : Cognitive impairment I : Subjective examination; MMSE; FAST; BCRS; GDS tools A : Descriptive	To identify the tools that can be used to screen for cognition level for use with functional clients with dementia. It is very important for practitioners that they can be able to teach and show their client some easy exercises that are interactive and involve communicating.
13	Effectiveness of weekly cognitive stimulation therapy for people with dementia and the additional impact of enhancing cognitive stimulation therapy with a career training program (Jacobi et al., 2014)	London, UK	D : Descriptive study S : Three communities V : I: Effectiveness of weekly CST D: Therapy for PwDs I: Measurement standard cognition, QoL, Quality of Relationship with Career A : RCT	There is no benchmark that showed in the 3 groups. When doing the follow up, there were no significant differences at all between the PwDs. Giving CST should be doing regularly, not only once a week (weekly CST) so then the results will be accurate data that can support <i>evidence-based practice</i> .
14	Would older adults with mild cognitive impairment adhere to and benefit from a structured lifestyle activity intervention to enhance cognition? A cluster randomized controlled trial (Lam et al., 2015)	Hong Kong	D : Cluster randomized controlled trial S : 555 clients of which 250 are female V : I : Benefit from a structured lifestyle activity intervention D: Older adults with MCI I : Questionnaire A : Deskriptif	Structured lifestyle activity interventions were not associated with changes in everyday functioning. Higher adherence was associated with a greater improvement in cognitive score. Factors that enhance adherence should be specially considered in the design of psychosocial interventions for older adults with cognitive decline

No	Research Title and Author	Country	Metode (Desain, Sampel, Variabel, Instrumen, Analisis)	Result
15	Leisure activities, cognition and dementia (Wang et al, 2012)	Stockholm, Sweden	D : Systematic review S : Not mentioned V : I : Leisure activities, cognition D : Dementia I : Systematically summarized, articles published in English from 1991 to March 2011, with a total of 52 articles A : Longitudinal studies, observational studies and interventional studies.	The relationship between mental activity and dementia risk was found to be very strong in the observational study but there was inconsistency in the clinical trial. Current evidence concerning the beneficial effect of other types of leisure activity on the risk of dementia is still limited and inconsistent. There should be standardized leisure activities in terms of frequency, intensity, duration and the type of activity in addition to the cognitive test batteries. The definition of cognitive decline needs to be harmonized/standardized.
16	Development of 6 Arts, a culturally-appropriate multimodal non-pharmacological intervention for dementia (Wong et al, 2015)	Hong Kong	D : Using 6 arts as a framework S : 263 people with dementia V : I : Development of the 6 arts, a culturally-appropriate multimodal non-pharmacological intervention D : Dementia I : Intervention activity databases A : Scoring system used to assess intensity level	The 6 arts was operationalized through the development of an intervention activity database, a scoring system for intensity level and a service delivery model for application in a dementia day center.
17	Playing board games, cognitive decline and dementia: A French population-based cohort study (Dartigues et al., 2013)	Paris, France	D : Prospective population-based study S : 3675 participants V : I : Playing board games D : Cognitive decline, Dementia I : MMSE and GDS A : Cohort with a 20 year follow up	From 3675 non-dementia participants at baseline, 32.2% reported regular board game playing. Later on, 840 participants developed dementia during the 20 year follow up. The risk of dementia was 15% lower in the board game players than in the non-players after adjustment for age, gender, education and other confounding factors. A possible beneficial effect of board game playing on the risk of dementia could be mediated by less cognitive decline and less depression in the elderly board game players.
18	Cerebral changes improved by physical activity during cognitive decline: A systematic review of MRI studies (Haeger et al., 2019)	Aachen, Germany	D : Systematic review S : The highest sample size (n=100) via MRIs V : I : Cerebral changes improved by physical activity D : Cognitive decline I : Search of PubMed database A : Descriptive	
19	Psychosocial interventions for people with dementia: A synthesis of systematic reviews (Mcdermott et al, 2018)	London, UK	D : Systematic intervention with a psychosocial focus S : Not mentioned V : I : Psychosocial intervention D : People with Dementia (PwD) I : Database search from January 2010 - February 2016 found 197 studies A : Synthesis / systematic review	Cognitive stimulation that had been done in a group consistently showed an increase in the areas of cognitive function, social interaction and quality of life. This study highlights the importance of group activities to increase the social integration of people living with dementia. There was some authentic proof that multi-component exercises of a good intensity will be able to increase physical function, global cognition and daily activity skills.

No	Research Title and Author	Country	Metode (Desain, Sampel, Variabel, Instrumen, Analisis)	Result
20	Cognitive therapy for dementia patients: A systematic review (Article, 2018)	Barcelona, Spain	D : Descriptive Systematic Review S : Not mentioned V : I : Cognitive therapy D : Dementia patient I : Review using several bibliographical databases (January 2009 to December 2017) A : Pre-specified selection criteria, data extraction, and a methodological quality assessment.	The results from reality orientation trials showed a minor effect in cognitive assessments while skills training trials and mixed trials showed contradicting effects on cognition. Effects related to other outcomes (e.g. daily functioning, depression, language) were limited or not found. Skills training trials and mixed trials seem to affect cognitive impairment in a positive way, although the results are inconclusive.

Non-pharmacological management of dementia

A descriptive review of 754 studies found 8 that suitable according to the inclusion criteria. Music therapy is known as the best optimal intervention used to calm agitated persons with dementia. Musical therapy through listening is more effective on an individual basis than in groups. Others interventions like bright light therapy and touching therapy are still not observed because of the need for them to be used in an appropriate time and situation (Millán-calenti et al., 2016)

DISCUSSION

Efficacy of board games at improving older adult cognitive function

Regarding health-related cognitive function, the results imply the board game activities may possibly improve their abilities related to cognitive function. Playing board games could be a particularly relevant way to preserve cognition and to prevent cognitive decline or dementia. It could be recommended for older adults living in adult day care centers (Young et al., 2018)

Delivering manual CST frequently or twice a week may be necessary to provide the required "dose" to combat the natural deterioration of dementia and to have a positive effect (SJ, Wayne, 2018).

Pursuit of new leisure activities

Opportunities to engage in new social and leisure activities not only provides pleasure in the moment but it is also an opportunity to maintain a good quality of life and sense of well-being (Jacobi, Donovan, Orrell, Stott, & Spector, 2014). Daily routine activities can't be significant when it comes to changing the score of the cognitive status in daily activity. They should have a structured lifestyle activity intervention in the time set aside for leisure (Lam, Chan, Leung, & Fung, 2015). Social activities may offer a stimulating social environment that involves not only dealing with complex and challenging social issues but also physical movement and information processing (Wang, Xu, & Pei, 2012).

There are some difference in the design and development of cognitive stimulation therapy based on the culturally-appropriate approaches to dementia intervention such as when adopting and maintaining a health behavior. This includes the utilization of non-pharmacological interventions that often require motivation in addition to an understanding of the associated benefits (Wong et al., 2015). Playing board games is a common stimulating leisure activity among elderly people globally because people of all ages, especially participants older than 60 in the general population, still like and enjoy playing board games and have reported regularly doing so. The rate of activity remained high even in an old age participant with cognitive deficit. Cohort data with a 20 year follow up showed that board game players have a 15% lower risk of developing dementia than non-players (Dartigues et al., 2013). For another explanation, there was a study that observed the results of Magnetic Resonance Imaging (MRI). A total of 23 MRI studies focused on physical activity and cognitive decline met the inclusion criteria. In addition, 13 studies reported on participants with MCI, 8 studies on participants with early AD and one study on participants with subjective memory loss. There were 12 intervention studies of different durations (range 3-6 months) and frequency (range 2-5 sessions per week). Among the intervention studies, 9 studies applied aerobic exercise, 2 applied resistance training and 1 applied multi-component exercise (Haeger, Costa, Schulz, & Reetz, 2019). From this study, we also learnt about the benefit and importance of physical exercise in the decline and potential risk of dementia.

CONCLUSION

Knowing that every individual has different needs, interests and abilities, a person-centered approach will need to be adopted when working with people with dementia. Facilitating people to continue to engage in their cherished hobbies and to carry out activities that are important to them will help people to adjust to their growing deterioration regarding their capabilities. For example, a person with a

passion for sport or gaming strongly desires to continue with that activity not only for the pleasurable feeling but to help them keep in contact with their passion and therefore to maintain a sense of control/purpose and memory function (Review, 2016). The implication of this systematic review was that exercise for people with dementia to improve their physical and cognitive functions, ADL skills and behavioral and psychological symptoms will be the best non-pharmacological therapy that can be prevent dementia. It can also increase the psychosocial interaction between dementia patients through the provision of frequent stimulation-based cognitive therapy (Mcdermott et al., 2018), (Article, 2018).

CONFLICT OF INTEREST

There is no conflict of interest between the authors.

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REFERENCES

- Aguirre, E., Spector, A., & Orrell, M. (2014). *Guidelines for adapting cognitive stimulation therapy to other cultures*. 1003–1008.
- Article, R. (2018). *Cognitive Therapy for Dementia Patients: A Systematic Review*. 1–26. <https://doi.org/10.1159/000490851>
- Cecilia, M. R., Giacomo, D. Di, & Vittorini, P. (2015). *Influence of Gaming Activities on Cognitive Performances*. 67–72. <https://doi.org/10.1007/978-3-319-19632-9>
- Ching-teng, Y. (2019). Social Work in Health Care Effect of board game activities on cognitive function improvement among older adults in adult day care centers. *Social Work in Health Care*, 0(0), 1–14. <https://doi.org/10.1080/00981389.2019.1656143>
- Dartigues, J. F., Foubert-samier, A., Goff, M. Le, Viltard, M., Amieva, H., Orgogozo, J. M., ... Helmer, C. (2013). *Playing board games, cognitive decline and dementia : a French population-based cohort study*. 1–8. <https://doi.org/10.1136/bmjopen-2013-002998>
- Farina, E., Critelli, R., Villanelli, F., Fioravanti, R., Mantovani, F., & Sardini, L. (1949). *MULTIDIMENSIONAL STIMULATION THERAPY: THE PRACTICAL PROTOCOL*. 3(1).
- Filipa, D., Cardoso, B., & Rosa, A. I. (2014). *The Effect of Cognitive Stimulation on Nursing Home Elders: A Randomized Controlled Trial*. 157–166. <https://doi.org/10.1111/jnu.12072>
- Haeger, A., Costa, A. S., Schulz, J. B., & Reetz, K. (2019). NeuroImage : Clinical Cerebral changes improved by physical activity during cognitive decline : A systematic review on MRI studies. *NeuroImage: Clinical*, 23(March), 101933. <https://doi.org/10.1016/j.nicl.2019.101933>
- Iizuka, A., Suzuki, H., Ogawa, S., Kobayashi-cuya, K. E., Kobayashi, M., Takebayashi, T., & Fujiwara, Y. (2019). *Can cognitive leisure activity prevent cognitive decline in older adults? A systematic review of intervention studies*. 1–14. <https://doi.org/10.1111/ggi.13671>
- Jacobi, N., Donovan, H., Orrell, M., Stott, J., & Spector, A. (2014). *Effectiveness of weekly cognitive stimulation therapy for people with dementia and the additional impact of enhancing cognitive stimulation therapy with a carer training program*. 2143–2151.
- Lam, L. C., Chan, W. C., Leung, T., & Fung, A. W. (2015). *Would Older Adults with Mild Cognitive Impairment Adhere to and Benefit from a Structured Lifestyle Activity Intervention to Enhance Cognition?: A Cluster Randomized Controlled Trial*. 1–18. <https://doi.org/10.1371/journal.pone.0118173>
- Matyas, N., Aschenberger, F. K., Wagner, G., Teufer, B., Auer, S., Gisinger, C., ... Klerings, I. (2019). *Continuing education for the prevention of mild cognitive impairment and Alzheimer ' s-type dementia : a systematic review and overview of systematic reviews*. 1–10. <https://doi.org/10.1136/bmjopen-2018-027719>
- Mcdermott, O., Charlesworth, G., Hogervorst, E., Stoner, C., Moniz-cook, E., Spector, A., ... Moniz-cook, E. (2018). *Psychosocial interventions for people with dementia : a synthesis of systematic reviews*. 7863. <https://doi.org/10.1080/13607863.2017.1423031>
- Millán-calenti, J. C., Lorenzo-lópez, L., Alonso-búa, B., Labra, C. De, González-abraldes, I., & Maseda, A. (2016). *Optimal nonpharmacological management of agitation in Alzheimer ' s disease : challenges and solutions*.
- Post, M. (2014). Definitions of quality of life: what has happened and how to move on. *Topics in Spinal Cord Injury Rehabilitation*, 20(3), 167–180.
- Reichman, W. E., Fiocco, A. J., & Rose, N. S. (n.d.). *Exercising the brain to avoid cognitive decline : examining the evidence*.
- Review, P. (2016). *Meaningful activities for improving the wellbeing of people with dementia : beyond mere pleasure to meeting fundamental psychological needs*. 136(2), 99–108. <https://doi.org/10.1177/1757913915626193>
- SJ, Wayne, romero rm baumgart. (2018). *Application and Interpretation of Functional Outcome Measures for Testing Individuals With Cognitive Impairment*. 34(1), 13–35. <https://doi.org/10.1097/TGR.0000000000000171>
- Wang, H., Xu, W., & Pei, J. (2012). Biochimica et Biophysica Acta Leisure activities , cognition and dementia ☆. *BBA - Molecular Basis of Disease*, 1822(3), 482–491. <https://doi.org/10.1016/j.bbadis.2011.09.002>

- Wong, G. H. Y., Ng, C. K. M., Lai, C. K. Y., Lee, M. N. Y., Lum, T. Y. S., Jiang, N., ... Wu, J. Y. M. (2015). *Development of Six Arts , a Culturally Appropriate Multimodal Nonpharmacological Intervention in Dementia*. 55(5), 865–874. <https://doi.org/10.1093/geront/gnu102>
- Young, D. K., Ng, P. Y., Kwok, T., Ho, F., Cheng, D., Mak, V., ... Kwok, T. (2018). *The effects of an expanded cognitive stimulation therapy model on the improvement of cognitive ability of elderly with mild stage Dementia living in a community — a randomized waitlist controlled trial*. 7863(May). <https://doi.org/10.1080/13607863.2018.1471586>
- Yusra, A. (2011). Hubungan antara dukungan keluarga dengan kualitas hidup pasien diabetes mellitus tipe 2 di poliklinik penyakit dalam rumah sakit umum pusat fatmawati Jakarta. *Tesis*.