# Cognitive Intervention and Its Cultural Components for People with Dementia in Asia: A Systematic Review

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People with dementia in the world is expected to increase to 139 million by the year 2050. Psychosocial approach has become a powerful tool to prevent cognitive decline due to aging effect in older adults. However, there is still lack of evidence on the psychosocial benefits of cognitive intervention on older adults with dementia in Asian countries. Therefore, the aim of this review is to synthesize latest evidence on the psychosocial benefit of cognitive intervention on Asian older adults with dementia. PubMed, Web of Science, and Scopus database have been used to aid the research. This review is limited to studies with randomized controlled trial (RCT) and controlled trial design. Nine randomized controlled trials out of 3897 studies have met the criteria for this review. Result revealed that cognitive intervention program is useful in improving global cognitive functioning of Asian older adults with dementia. Besides, cognitive interventions also significantly improve quality of life, depressive symptoms, and behavioural and psychological symptoms. Cognitive intervention as an alternate to pharmacological approach, can potentially benefit older adults with dementia. Future research should look further on the effects of cognitive intervention to specific cognitive domains such as attention, memory, executive function, and language as well as its usefulness in improving other areas of individuals' functioning.

*Keywords:* dementia, cognitive intervention, Asia, cultural

The increasing number of older adults with dementia is due to rapid aging of the population (Mapelli, Di Rosa, Nocita, & Sava, 2013). Dementia has become one of public health problems that need to be paid attention by healthcare industry. According to statistics in Dementia in Asia Pacific Region (Alzheimer's Disease International & Alzheimer's Australia, 2014), the number of population in Asia was about 4 billion in 2015 meanwhile the number of older adults population aged 60 and above was estimated to be more than 11% of the population. However, the number older adults are expected to increase to quarter of the population in Asia region by year 2050. As the number of older adults increases, the number of people with dementia is also estimated to increase from 23 million in year 2015 to 71 million in 2050.

Dementia should not be seen as simply a diagnosis since the disorder affects various different functioning in individuals including decline in cognition and functions. The cognitive functions include areas of memory and higher cognitive functions such as language, visual-spatial ability, executive function and orientation while the functional impairment is

identified in both basic and instrumental activities (Lai et al., 2019). Dementia is believed to cause by changes in neocortical atrophy, neuron and synapse loss, neurotic plaques, and neurofibrillary tangles, thus it is labelled as neurodegenerative disease (Yu et al., 2015). As the number of dementia population increases due to the arising number of older adult population, effective interventions are necessary to alleviate the symptoms experienced by dementia population.

In general, there are two types of intervention approach used to improve cognitive function in people with dementia which are pharmacology and non-pharmacology intervention (Carrion et al., 2018). Pharmacology intervention uses medication to help assist symptoms of dementia. Examples of medication that are usually prescribed to individuals with dementia are donepezil, rivastigmine, galantamine, and memantine (Ministry of Health Malaysia et al., 2021). To tackle dementia from non-pharmacological approach, different types of cognitive interventions have been developed and introduced to improve or maintain cognitive function such as cognitive training, cognitive stimulation, and cognitive rehabilitation (Clare & Woods, 2004).

The aim of cognitive stimulation is to improve the general cognitive and overall performance of an individual through various mental activities as opposed to cognitive rehabilitation (improve personal goal or targeted approach based on individualized plan) and cognitive training (target specific domain or area for intervention) (Clare & Woods, 2004).

Multi-component intervention which combines various non-pharmacological approaches such as cognitive training, physical exercise, and social group activities has also been widely used to intervene dementia (Young et al., 2018). Cognitive interventions are important to maintain or improve the cognitive functions, quality of life and functional activities as well as to reduce the behavioural and psychological symptoms of individuals with dementia (Berg Weger & Stewart, 2017).

Cognitive intervention for dementia should be culturally sensitive to benefit individuals with dementia (Young, 2018). Linguistic properties, cultures and educational levels should be paid attention to in order to determine the effects of training (Young et al., 2018). For example, if Malaysian order adults are given games that was originally designed for Western people, the benefits of training can be questionable and it may pose more cognitive challenges rather than cognitive stimulation. Therefore, it is important to consider the cultural sensitivity in an intervention content in order to maximize the potential benefits of cognitive intervention (Young, 2018).

Although studies (Caffereta et al., 2021; Garrido-Pedrosa et al., 2017) have examined the usefulness of cognitive intervention in older adults with dementia, there is a limited number of reviews that focus on its psychosocial benefits on Asian population. Therefore, the purpose of this systematic review is to determine the psychosocial benefits of cognitive interventions on Asian older adults with dementia.
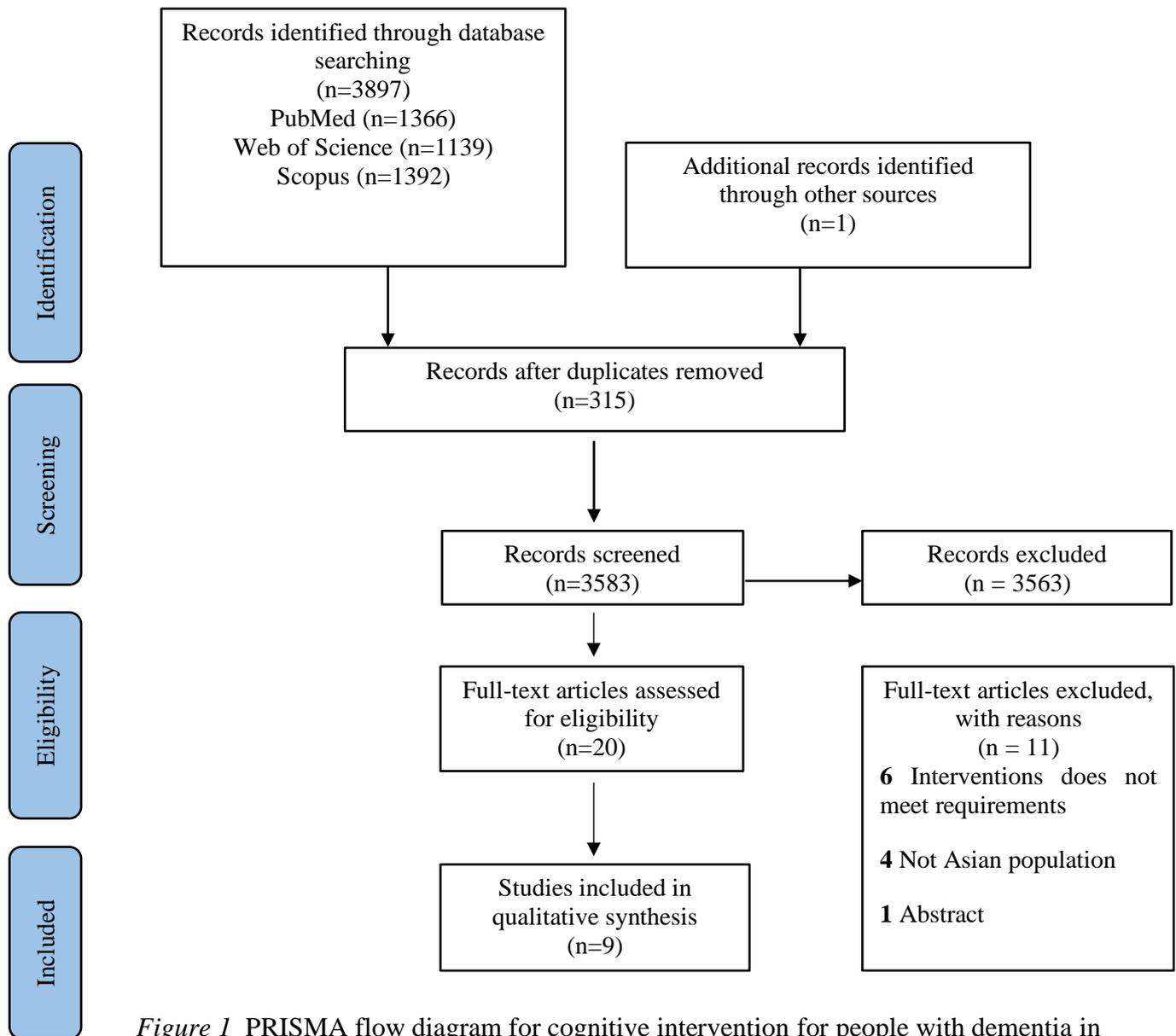
*Figure 1* PRISMA flow diagram for cognitive intervention for people with dementia in Asia

*Table 1*

*PICOT table*

| Keyword | Inclusion |
|---|---|
| Population | Elderly/older adult with dementia |
| Intervention | Cognitive stimulation/Cognitive training |
| Comparison | Any |
| Outcome | Cognitive and functional performance which include quality of life, depression level, activities of daily living, and any outcome that is considered relevant |
| Time Frame | 2010-2020 |

## Method

### Search Strategy

PubMed, Web of Science and Scopus database were used as a part of the search strategy. PICOT format (Table 1) was utilized to indicate the inclusion criteria during the searching process. The key search terms that were used include ("cognitive stimulation" OR "cognitive training" OR "cognitive intervention" OR "cognitive rehabilitation" OR "psychosocial intervention"). The sample population of interest was older adults with dementia, thus the key search terms that were entered using Boolean operators were: dementia AND (older adults OR elderly). The criteria for the outcome was manually filtered throughout the process. Besides, each of the title and abstract were double checked to see if they meet all the inclusion criteria for this systematic review. The literature search was run from year 2010 to 2020.

### Study design

For the purpose of this review, studies with randomized controlled trials (RCT) and controlled trials were included in the selection.

### Population

The participants in those studies should meet the inclusion criteria of (1) receive a score of ten or above on Mini-Mental State Examination, and/or a score of one or two on the Clinical Dementia Rating Scale (CDR); (2) age 60 years old and above; (3) able to communicate, understand instructions, and participate throughout the intervention session; (4) able to hear and see well. Studies were not included if the participants met the exclusion criteria of (1) has major physical disability or illness that may interfere the intervention session; (2) has diagnosis of learning disability.

### Outcome measures

The primary outcome of the studies was global cognitive functioning of older adults with dementia. Other outcome of interests such as quality of life, depressive symptoms, self-esteem and other additional outcomes were also assessed to gain a better understanding of the effectiveness of cognitive intervention on participants from various aspects.

### Data extraction/collection

Data extraction is illustrated in Figure 1. Total of 3897 reviews were retrieved from all three databases and one was identified through other resources. 314 duplicates were removed which resulted to only 3583 reviews being screened. After the abstract was screened according to the inclusion criteria, only nine articles were included in this systematic review.

## Results

### Study Characteristics

The study characteristics and specific elements of intervention have been outlined in Table 2 and Table 3. Eight of the studies were from randomized controlled trial (RCT) while one study used clinical controlled trial. They have been published between year 2013 to 2020. The studies were conducted in various different countries including Japan, (Okamura et al., 2018; Yamanaka et al., 2013), Hong Kong, (Cheung et al., 2018; Lai et al., 2019; Young, 2018; Young et al., 2018) and Korea (Han et al., 2016; Moon & Park, 2020). The characteristics that have been reported in this systematic review includes aim, age of participants, number of participants in intervention and control group, study design, number and length of

sessions conducted, measures, and the outcome measures.

## Participants

The number of participants in the studies varied from 30 to 101 samples with age of 60 and above. Most of the studies (Cheung et al., 2018; Han et al., 2016; Lai et al., 2019; Okamura et al., 2018; Yamanaka et al., 2013; Young et al., 2018) recruited both male and female participants with female as the majority of the participants, one study (Yu et al., 2015) did not report any gender orientation and one study (Moon & Park, 2020) recruited only female participants as their inclusion criteria.

## Administration

The administration of the studies varies from one another. The duration of intervention ranged from five minutes to three hours per day with a frequency of once or twice per week. The total number of intervention sessions ranged from eight to 14 sessions. Out of all studies, three studies (Yamanaka et al., 2013; Young, 2018; Young et al., 2018) conducted 14 intervention sessions, one study (Lai et al., 2019) had 12 sessions, four studies (Cheung et al., 2018; Han et al., 2016; Moon & Park, 2020; Yu et al., 2015) had eight sessions, and one study (Okamura et al., 2018) did not report specific number of sessions completed by the participants.

Different study utilized different principle of cognitive intervention. In this review, two studies (Cheung et al., 2018; Yamanaka et al., 2013) focused on cognitive stimulation therapy, two studies (Lai et al., 2019; Yu et al., 2015) on computerized-cognitive training, one study (Han et al., 2016) on multi-modal cognitive intervention, three studies (Okamura et al., 2018; Young et al., 2018; Young, 2018) on multi-component intervention, and one study (Moon & Park, 2020) focused on digital reminiscence therapy. Three studies

(Lai et al., 2019; Okamura et al., 2018; Yu et al., 2015) reported using computer-based/interned-based/software-based intervention while other studies used paper-based/games/arts in their intervention programs. In terms of mode of delivery, participants in five studies (Cheung et al., 2018; Han et al., 2016; Yamanaka et al., 2013; Young, 2018; Young et al., 2018) received intervention individually while four studies (Lai et al., 2019; Moon & Park, 2020; Okamura et al., 2018; Yu et al., 2015) received intervention in a group of four to 11.

## Effectiveness of Cognitive Interventions

*Effects on cognitive functions*

Cognitive function was the primary outcome for all studies. To measure changes in cognitive functions, MMSE (Han et al., 2016; Moon & Park, 2020; Okamura et al., 2018; Young, 2018; Young et al., 2018; Yu et al., 2015), ADAS-Cog (Lai et al., 2019; Han et al., 2016), MoCA (Cheung et al., 2018; Yu et al., 2015), DRS (Young, 2018; Young et al., 2018) and COGNISTAT (Yamanaka et al., 2013) was used.

Six out of nine studies (Lai et al., 2019; Han et al., 2016; Okamura et al., 2018; Yamanaka et al., 2013; Young, 2018; Young et al., 2018) showed significant improvement in global cognitive functioning of participants in the experimental group compared to the control/placebo group after undergoing intervention indicating effectiveness of their cognitive interventions. Study conducted by Okamura et al. (2018) also revealed that besides showing significant improvement in global cognitive functioning, positive changes was also seen particularly in attention and concentration domains. As for Yu et al. (2015) study, the significant improvement was observed only in MoCA language sub-scale. The efficacy to improve global cognitive functions in

other studies (Cheung et al., 2018; Moon & Park, 2020; Yu et al., 2015) warrant further investigation.

*Effects on other measures – Quality of Life, Depressive Symptoms, and Behavior*

Other than measuring cognitive functions, four studies assessed the quality of life of participant using QoL-AD (Lai et al., 2019; Han et al., 2016; Yamanaka et al., 2013) and DQoL (Young, 2018) assessments. Participants in Yamanaka et al. (2013) and Han et al. (2016) studies demonstrated significant improvement in their quality of life after intervention while another two studies reported no significant effects.

As for depressive symptoms, two studies (Han et al., 2016; Yu et al., 2015) revealed no significant difference on CSDD (Yu et al., 2015) and GDS (Han et al., 2016) as opposed to the intervention conducted by Moon and Park (2020) that resulted in significant reduction in depressive symptoms showed by CSDD.

The effectiveness of cognitive intervention was also assessed on the behavioural and psychological symptoms of participants measured by RMBPC (Han et al., 2016) and NPI (Yu et al., 2015; Moon & Park, 2020). All studies showed that improvement in behavioural and psychological symptoms after cognitive intervention.

*Cultural components of Cognitive Intervention*

Cultural components have been utilized in few studies (Yamanaka et al., 2013; Young et al., 2018; Young, 2018). Cognitive stimulation therapy framework from Western country has been translated and adapted to Japan culture in Yamanaka et al. (2013) study. The sections that were seen unsuitable and unfamiliar to Japanese people has been amended and replaced with more cultured activities, for example from Hangman game to "Shiritori". In other studies, instead of aerobic exercise, "Baduanjin" which is a traditional form of Chinese Qigong exercise was chosen in their physical activity component due to its familiarity in Chinese culture and its usefulness in reducing cognitive decline (Young, 2018; Young et al., 2018).

*Table 2*

*Study characteristics of intervention studies in the dementia population*

| No | Author | Aim | Age | n/condition | Design | No. of session/duration/ format | Measures | Outcome |
|---|---|---|---|---|---|---|---|---|
| 1 | Yamanaka et al. (2013) | To develop and examine the Japanese version of group Cognitive Stimulation Therapy (CST-J) in a single-blind, controlled clinical trial | Mean: 83 | 26/intervention group and 30/control group | Clinical Controlled Trial; Baseline and post-treatment | 14 sessions; twice a week for 7 weeks | Neurobehavioral Cognitive Status Examination (*COGNISTAT*); Mini-Mental State Examination (*MMSE*), Quality of Life – Alzheimer's Diseases (*QoL-AD*); face scale for mood | (1) The intervention group showed significant improvement in cognition compared to control groups. (2) Significant improvement was seen in quality of life and face scale for mood in intervention group. |
| 2 | Yu et al. (2015) | To explore the potential benefits of computer-assisted intervention using touch-screen videogame technology on cognitive function and behavioural symptoms in older adults with mild to moderate dementia | 60 years and above | 16/intervention group (video-game training) and 16/control group (cognitive training) | Randomized Controlled Trial; Baseline, during treatment, and post-treatment | 4 videogames training for intervention group and 4 cognitive activities for control group; 30 minutes/session; 1-2 sessions/week for a total of 8 sessions | Chinese version of MMSE; Montreal Cognitive Assessment (*MoCA*); Category Verbal Fluency Test (*CVFT*); Chinese version of Neuropsychiatric Inventory (*NPI*); Chinese version of Cohen-Mansfield Agitation Inventory (*CMAI*); Chinese version of Cornell Scale for Depression in Dementia (*CSDD*) | (1) Touch-screen videogame training can alleviate behavioural symptoms in order adults with mild-to-moderate dementia. (2) Significant difference can be seen in MoCA language sub-scores. (3) No significant difference in MSSE total score, MoCA attention sub-scores, digit span, and CVFT (4) NPI score reduced significantly |

| 3 | Han et al. (2016) | To develop and evaluate the effect of Multimodal Cognitive Enhancement Therapy (MCET) consisting of cognitive training, cognitive stimulations, reality orientation, physical therapy, reminisce therapy, and music therapy in older people with mild cognitive impairment (MCI) or mild dementia | Mean: 76 | 32/intervention group (MCET) and 32/placebo (mock-therapy) | Randomized Controlled Trial; Crossover Trial; Baseline, end of first treatment period (week 9), and end of second treatment period (week 21) | Two eight-week treatment phases separated by a 4-week wash-out (e.g., crossover); Group therapy of eight participants; three 3-hour sessions per week for 8 weeks | Mini-Mental State Examination *(MMSE)*; Alzheimer's Disease Assessment Scale-Cognitive Subscale *(ADAS-Cog)*; Revised Memory and Behaviour Problems Checklist *(RMBPC)*; Geriatric Depression Scale *(GDS)*; Disability Assessment of Dementia *(DAD)*; Quality of Life in Alzheimer's Disease *(QoL-AD)* | (1) There was a significant improvement in MMSE and ADAS-cog scores of the participants in MCET group compared with mock-therapy group<br><br>(2) There was a significant improvement in RMBPC and QoL-AD scores of participants in MCET group compared with mock-therapy group<br><br>(3) MCET improved cognition, behaviour, and QoL in people with MCI and mild dementia more effectively than conventional cognitive enhancing activities did. |
| 4 | Okamura et al. (2018) | To investigate the efficacy of a combined exercise and cognitive training system that is devised for improvement of attention and concentration, and activities of daily living skills in older adults with dementia | 65 or above | 50/intervention group and 50/control group | Randomized Controlled Trial; Baseline, post-intervention (immediately after). 1-month follow-up, and 3 months follow-up | 5 minutes/session; Once to twice session per week; 6 weeks | Japanese version of Mini-Mental State Examination *(MMSE)*; Trail Making Test Part A *(TMT-A)*; N-type scale for evaluation of activities of daily in elderly *(N-ADL)* | The combined system is effective in increasing attention and concentration and improving cognitive function and activities of daily living in dementia patients. |
| 5 | Young et al. (2018) | To evaluate to effectiveness of an expanded cognitive stimulation therapy (CST) model that combines a CST group and tai chi on improving the cognitive ability of community-dwelling Chinese | 60 or above | 51/intervention group and 50/control group | Randomized Controlled Trial; Baseline and post-intervention | 14 sessions; Twice a week; 60 minutes/session | Chinese Mattis Dementia Rating Scale (DRS); Chinese Mini Mental State Examination (MMSE); | The intervention group was significantly more effective than control group in improving MMSE score after controlling for group differences in age, gender, |

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| | | elderly with mild stage dementia (EwMD) | | | | | education, and having a diagnosis of dementia. |
| 6 | Young (2018) | To evaluate the effectiveness of a multicomponent intervention that combines a cognitive stimulation group and tai chi to reduce cognitive decline among community-dwelling Chinese older adults with probable dementia | 60 or above | 41/intervention group and 39/control group | Multi-center, randomized controlled trial; Baseline and post-intervention | Group sessions; Two sessions/week; 60 minutes/session | Chinese Mattis Dementia Rating Scale (DRS); Chinese Mini Mental State Examination (MMSE); Dementia Quality of Life (DQol) | The score of Dementia Rating Scale and Mini-Mental State Examination of participants in the intervention group has significantly improved than participants in the control group. |
| 7 | Cheung et al. (2018) | To investigate the feasibility and the preliminary efficacy of a Cognitive Stimulating Play Intervention on cognitive functions | 60 or above | 18/intervention group and 12/control group | Randomized Controlled Trial; Baseline and post-intervention | Group sessions; 8 weeks; 45 to 60 minutes per session | Montreal Cognitive Assessment (MoCA); Fuld Object Memory Evaluation (FOME); Modified Verbal Fluency Test | (1) The mean memory storage and retrieval functions were higher in participants in intervention group compared to in control group. (2) There was no significant difference in global cognition measured using Montreal Cognitive Assessment and Verbal Fluency result between intervention group and control group |
| 8 | Lai et al. (2019) | To verify the efficacy of computer-assisted cognitive training in people with early dementia in the local community | 65 or above | 30/intervention group and 30/control group | Randomized Controlled Trial; Baseline, post treatment, and 6 weeks follow-up | 12 individual sessions; 40 minutes each session; twice per week for duration of 6 weeks | Chinese Alzheimer's Diseases Assessment Scale-Cognitive Subscale (*ADAS-cog*); Chinese version of Disability Assessment for Dementia (*CDAD*); Rosenberg Self-Esteem Scale; Quality of Life in | (1) The intervention group showed significant improvement in cognitive function (2) Delayed functional impairment |

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| | | | | | | Alzheimer's diseases (*QoL-AD*) | (3) Significant difference can still be seen after 6 weeks training and sustained over the 6 weeks follow-up period |
| 9 | Moon & Park (2020) | To evaluate the effects of digital reminiscence therapy through a comparison with conventional reminisce therapy and to develop a strategy for designing larger RCTs. | 65 and above | 25/intervention group and 24/control group | Randomized Controlled Trial; Baseline, post-intervention, and 4 weeks follow-up | 30 minutes session; Twice a week in 8 sessions over 4 weeks | Korean version of Mini-Mental State Examination (MMSE-DS); Cornell Scale for Depression in Dementia (CSDD); Korean version of Neuropsychiatric Inventory (K-NPI); Engagement of a Person with Dementia Scale (EPWDS) | (1) Significant reduction in depression in digital RT group<br><br>(2) Significant improvement in engagement in social interactions in digital RT group<br><br>(3) No significant difference in cognition and BPSD |

*Table 3*
*Specific elements of cognitive intervention*

| No | Author (Year) | Country | Participants based | Type of intervention/ domains | Intervention content/programme | Mode of delivery | Training/monitoring/ support/fidelity | Home-work | Cultural Component/ elements | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Yamanaka et al. (2013) | Japan | Participants were recruited from three residential homes and one nursing home in Tokyo area | Cognitive Stimulation Therapy (CST) | The cognitive stimulation therapy – Japanese (CTSJ) was translated and culturally-adapted based on some framework.<br><br>14 different themes were targeted throughout the 14 intervention sessions. The activities include physical games, sounds, childhood, childhood, food, current affairs, faces/scenes, word associations, being creative, categorizing objects, orientation, using money, number games, word games, and team quiz. | Group training | The treatment group was conducted in a small group setting, twice a week with allocation of 45 minutes per session over 7 weeks. The intervention program for each group was conducted in a room where no other residents were present. | No | Yes | Some content in the original manual in the intervention program were modified due to its unsuitability to the Japanese culture. |
| 2 | Yu et al. (2015) | Hong Kong | Participants were recruited from community dementia day care centres, geriatric outpatient clinics, and day hospitals | Computer-assisted Cognitive Training | Computer-assisted video game training that involved four touch-screen video games including (1) Bingo, (2) Connect the dot ultimate (lite), (3) Find difference, and (4) Mosquito splash | Computer-assisted; Individual | Training will last for 30 minutes/session, one to two sessions/week for a total of eight sessions; Sessions will be provided by trained research assistant | No | No | Training duration may be insufficient for transfer of training.<br><br>Measurement of specific cognitive domains may be inappropriate to detect transfer effect to untrained tasks |
| 3 | Han et al. (2016) | Korea | Participants were recruited from dementia clinics of two university hospitals, two | Multi-modal cognitive intervention | Multimodal cognitive enhancement therapy (MCET) includes cognitive stimulation, cognitive training, reality orientation, physical therapy | Group therapy of eight participants | 3-hour sessions/week for eight weeks; Each session consists of 30-minute physical exercise program, 30- | No | No | MCET was developed using "grade-A" recommendations by meta-analysis. |

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|---|---|---|---|---|---|---|---|---|---|
| | | | geriatric hospitals, local dementia prevention centres, and community welfare centres | | adopted from ROM dance, reminiscence therapy, and music therapy | | minute reality orientation program, a 30-minute cognitive training program, a 30-minute break, and a 60-munute program that provides reminiscence therapy, cognitive stimulation, and music therapy in turn<br><br>24-session MCET manual was developed and two-day MCET training program was delivered to the occupational therapists | | |
| 4 | Okamura et al. (2018) | Japan | Participants recruited from dementia day care or residential care | Multicomponent intervention (exercise and cognitive training that targets attention and 5concentration) | The training required patients to drive an arm ergometer to achieve target speed (rotation rate) shown by the moving mark on the display. | Computer-assisted and use of ergometer; Individual | 1 session or more/week; 5 mins/session; duration of each session was set at 5 min | No | No | There was no precise definition on the frequency of training. – lower limit |
| 5 | Young et al. (2018) | Hong Kong | Participants were living at home and were recruited from five district elderly community centres operated by different non- | Multicomponent intervention (cognitive stimulation therapy and tai chi) | Standardized manual for use in CST group intervention was produced and the training content covered reality orientation, food, senses, faces, number games, word association, word games, current events, categorizing objects, and using money. | Group therapy consisting of eight to eleven participants | The CST group was structured and consisted of 14 sessions with two sessions/week, 60 minutes/session. A standardized module was produced | No | Yes | Larger scale randomized controlled studies across various demographic, clinical and cultural background should be conducted to further validate the effectiveness and benefits of expanded |

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|---|---|---|---|---|---|---|---|---|---|---|
| | | | profit organizations | | Besides, participants will practice 8-style taichi named Baduanjin for 15 minutes at the end of each CST group session | | for the use of CST intervention group.<br><br>As for Baduanjin, registered and experienced social workers with more than 2 years of work experience with elderly dementia was assigned to demonstrate and coach participants in practising Baduanjin. | | | CST model, which combines CST group and tai chi |
| 6 | Young (2018) | Hong Kong | Participants were living at home and were recruited from five district elderly community centres operated by different non-profit organizations | Multicomponent intervention (cognitive stimulation therapy and tai chi) | The structure of CST was adapted from UK. The content of cognitive stimulation includes reality orientation, physical games, food, sounds, childhood, senses, faces, number games, word games, current events, categorizing objects, and using money. Participants will be practicing Baduanjin for 15 to 20 minutes at the end of each cognitive stimulation therapy group session | Group therapy consisting of eight to eleven participants | Total of 14 sessions with 2 sessions/week; 60 minutes/session<br><br>Training was given to the social workers who lead the treatment group. They also received tai chi training from the chi master who has 5 years of teaching experience. | No | Yes | Multicomponent intervention benefits more on participants who are older and have lower cognitive functions.<br>-this population usually receive less stimulation at home due to caregivers being overprotective and imposing restrictions. Therefore, the multicomponent intervention stimulated their functioning more. |
| 7 | Cheung et al. (2018) | Hong Kong | Participants were recruited from community day-care centres under | Cognitive stimulating play intervention | The play intervention involves activities compromising 6 elements: (1) visuospatial and fine motor activities (e.g., making handicrafts), (2) | Group-based session consists of 10 to 16 | 45 to 60 minutes/session for duration of 8 weeks | No | No | The play intervention (Cos-Play) was adapted from Play Intervention of Dementia by research team from Canada |

| No | Author | Country | Recruitment | Intervention | Description | Mode | Dosage | | | Findings |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | the same operating organization | | kinesthetic and gross motor activities (e.g., batting a balloon), (3) language and verbal activities (e.g., telling stories), (4) executive function activities (e.g., card games), (5) auditory music and rhythmic activities (e.g., playing percussive musical instruments), and (6) social interaction | participants who were further divided into subgroups of 4 to 6 participants | Facilitators involve 1 coordinator, 1 to 2 staff members of the center, and 2 to 3 trained assistants.<br><br>The activities within the 6 domains will vary to avoid participant's interests and strength from influencing their motivation level | | | The first study to use play concept in cognitive stimulation intervention for people with dementia |
| 8 | Lai et al. (2019) | Hong Kong | Recruited from memory clinic and psychogeriatric out-patient department of a regional mental health centre | Computer-assisted cognitive training | The training program was selected from computer software specifically designed for elderly. It involves training in multiple domains including declarative memory, selective and sustained attention, executive function, financial management, categorization, verbal fluency and digit span | Computer-assisted cognitive training; Individual | 12 individual sessions were offered twice per week for six weeks to each participant | No | No | Computer-assisted cognitive training provides more interactive, user-friendly, and standardized approach compared to conventional cognitive training.<br><br>Optimal duration and intensity of computer-assisted cognitive training remained unclear. |
| 9 | Moon & Park (2020) | Korea | Participants were recruited from day care centres | Digital reminiscence therapy | The intervention involved sharing information on people, events, or things that participants like or dislike. The materials include participants, preferred songs and personal photos. | App-based on tablet PC; Individual | Twice a week in eight sessions over four weeks; Sessions were conducted in a separate program room for each participant at the day care centre. | No | No | No clear evidence that digital reminiscence therapy had an effect on cognition or behavioural and psychological symptoms of people with dementia. |

Nurse interventionists were given a training on how to lead the app-based intervention

### Discussion

The aim of this systematic review is to synthesize the psychosocial benefits of cognitive interventions in older adults with dementia in Asia. In this systematic review, different types of cognitive intervention have been utilized by the studies including cognitive stimulation therapy, computerized cognitive training, multi-modal cognitive intervention, multi-component intervention, and digital reminiscence therapy. From the studies reviewed, regardless of the differences in types of cognitive intervention conducted, it is suggested that cognitive intervention as a whole gives a positive impact on the global cognitive functioning, attention and concentration, quality of life, as well as behavioural and psychological aspects of older adults with dementia.

Since the studies were all conducted in Asia, most of the studies adopted intervention framework from Western countries and later adapted the elements and activities according to their own culture. The cultural element might have contributed to the effectiveness of the intervention. For example, in study conducted by Yamanaka et al. (2013), some activities that were seemed unsuitable to Japanese culture such as crossword puzzle, Hangman word games and many more in the original Cognitive Stimulation Therapy (CST) framework were altered to activities (e.g., Shiritori, detective quizzes, etc.) that are more familiar to Japanese people and therefore increases the efficacy of the Japanese-CST.

Multi-component interventions from studies (Young 2018; Young et al., 2018) from Hong Kong also showed significant effectiveness when they included Baduanjin exercise, a form of traditional Chinese Qigong exercise in their intervention components instead of adopting the normal aerobic exercise that is less preferable by Chinese older adults. It is

important to determine what activities that seem compatible with the culture and population age in order to deliver an effective intervention.

Computerized-cognitive training or internet/software based cognitive training is another form of cognitive intervention that is found to be effective on dementia population. Some studies conducted computerized version of cognitive training alone and some had it combined with other components (e.g., exercise training) through the multi-component intervention. Computer in these studies served as a platform to assist video game training, display the number of rotations of ergometer, and deliver computerized version of cognitive stimulation activities through software. Besides, a study by Moon and Park (2020) has used digital content and Android application to assist reminisce therapy. Two studies (Moon & Park, 2020; Yu et al., 2015) examined the effectiveness of cognitive training that utilized technology (e.g., video game training and digital reminisce therapy) and suggested that technology-based intervention may alleviate behavioural symptoms of older adults with dementia. However, there is still lack of evidence to state that computerized-cognitive training gives positive impact on the global cognitive functioning (Yu et al., 2015) It is also worth to explore the feasibility of computerized cognitive training on older adults (Wild et al., 2012). Besides, future research should also explore on the optimal duration and intensity of computer-assisted cognitive training to ensure the efficacy of its training (Yu et al., 2015).

The effectiveness of intervention might also depend on the duration and intensity of intervention (Yu et al., 2015). Based on current review, many studies carried out up to 14 intervention sessions which seemed optimal for dementia participants. It is suggested that the longer the intervention period, the higher the stimulation received

by dementia participants (He et al., 2019). Besides, there is still lack of research on the effectiveness between group-based and individual-based cognitive intervention. Future studies might want to consider measure if this factor contributes to the efficacy of intervention.

The limitation of this systematic review is that only nine studies were included to evaluate the usefulness of cognitive intervention program for older adults with dementia in Asian countries. The number is too small to draw a concrete conclusion regarding its psychosocial benefits. Besides, since this review include various types of cognitive interventions, the efficacy of intervention might be influenced by the difference in the principles of cognitive intervention used in each study. The type of cognitive intervention included in this review is not fairly distributed therefore make it more difficult to evaluate the usefulness in general. Secondly, most of the studies reviewed only reported general cognitive functioning instead of focusing on the specific cognitive domains. As a result, it is still unclear which specific cognitive domains can benefit from those cognitive interventions.

The present review indicates that cognitive intervention may benefit older adults with dementia. Future review can provide a more comprehensive analysis on the effects of cognitive intervention to specific area of cognitive such as attention, executive function, processing speed, working memory, etc. Besides, it would also be helpful if future review can present a detailed analysis on the effectiveness of cognitive intervention on other areas of functioning such as self-esteem, mood, and motivation.

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