Original Article

Interventions For Memory Retention Among Dementia Patients: Systematic Review

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Abstract

There is increasing prevalence of dementia patients worldwide. Contemporary cognitive interventions and brain exercises have been adapted to encourage independent cognitive functioning. Novel interventions involving physical and mental faculties are experimented on dementia patients to retain their memory. The primary objective of this review is to identify interventions either cognitive or motor that aimed at improving or maintaining cognitive functioning (especially memory) of dementia patients. Cochrane Library, Medline, CINAHL, PubMed and Google Scholar databases were searched from 2001 to 2023. Two researchers reviewed the potential studies individually for eligibility. Randomized control trials on interventions for dementia patients were included if they clearly described objectives, users and functioning. A systematic review of the studies was carried out. Fifteen studies met the inclusion criteria, and 14 different interventions were identified. With the increasing magnitude of the problem it is necessary to delay the onset and progression of memory decline and promote cognitive functioning. This review is expected to conclude what may work better to preserve the memory of people.

Key words: Dementia patients, memory, intervention, Cognitive functioning

INTRODUCTION

Globally, there are over 55 million people living with dementia as per Alzheimer's Disease International 2020 report.[1] According to the Dementia in India 2020 report an estimated 5.3 million Indians aged >60 years had dementia in 2020.[2] There are over 10 million new cases of dementia each year worldwide, implying one new case every 3.2 seconds. Therefore, dementia is considered as the greatest global challenge for health and social care in the current century, making it of great importance to assess the effectiveness of conducted therapies.[3]

Dementia is a chronic progressive syndrome that negatively impacts the person's cognitive functioning, memory, thinking, orientation, language, and emotional control.[1] Dementia is a term that describes a variety of symptoms affecting a person's cognitive functioning. Common early signs of dementia include memory loss and confusion. The person with dementia may be aware of and frustrated by the changes taking place, such as difficulty recalling recent events, making decisions or processing what was said by others. Poor comprehension skills are typically at the centre of this disorder and relate in part to poor working memory.[4] Poor comprehension is only one of many communication deficits in the individual with dementia.[5]

The aim of non-pharmacological or behavioural interventions is to improve or at least maintain the individual's cognitive function, enable the person to continue to perform usual activities of daily living, and/or address behavioural symptoms that often accompany memory impairment.[6] There is no currently available cure for dementia.[7] Research findings support the belief that intellectual engagement and

physical activity improve one's cognitive functioning thereby providing support for interventions that are non-pharmacologic and are focused on the individual's capabilities. Contemporary cognitive interventions and brain exercises are being adapted to encourage independent cognitive functioning. Therapies like art therapy, music therapy, activity therapy, complementary therapy, aromatherapy and others have been researched on dementia patients to evaluate their effectiveness. Novel interventions involving physical and mental faculties are being experimented on dementia patients so that their memory could be retained.

A research study conducted by Elisa Ciaramelli et al. has confirmed that the PQRST memory exercise is effective to promote new learning in patients with mild memory impairment, and shown that patients may benefit even from the alternate versions of the procedure requiring higher levels of self-initiation. Improving dementia patients' cognitive functioning can delay hospitalization and reduce the costs for national health care and improve patients' and carers' well being.[7] The present systematic review aims to identify randomized clinical trials of interventions among patients with dementia and to provide recommendations for future research.

MATERIAL AND METHODS

Search strategy

To collect relevant reviews Sage journals, Cochrane Database of Systematic reviews, MEDLINE, PUBMED and CINAHL from 2000 to 2023 were searched. The search terms included 'dementia', 'cognitive functioning', and 'memory', non-pharmacological intervention 'and 'randomized control trial. These terms were combined with a further search term pertaining to memory retention. Following this, two reviewers independently evaluated an assigned subset of articles using previously developed data extraction forms and quality appraisal tools. Each specific item on the quality appraisal tool was openly discussed to reach consensus.

Inclusion Criteria

1. Studies that reported on intervention regarding cognition-oriented strategies for dementia patients.
2. Only RCTs were considered.
3. Studies that were a full-length article published in a peer-reviewed English language journal.

Exclusion Criteria

1. Incomplete studies with vague concluding evidence.
2. Studies involving memory interventions on patients other than dmentia.

DATA EXTRACTION AND QUALITY ASSESSMENT

Data extraction was performed by two reviewers using SEO which provides information on research studies including randomized control trial, correlational studies and other types of researches**.** After the independent evaluation, two reviewers met to discuss the article. One reviewer assessed quality criteria and a second checked for accuracy. Disagreements were resolved by consensus. Then, two investigators independently extracted the data from each selected study using a structured data extraction form.

Sample	Dementia patients
Exposure	Interventions for cognitive functioning/memory retention
Outcome	Results obtained after implementation of memory improving interventions on dementia patients

RESULTS

By following the search strategy, approximately 3196 records were identified through database searching, 74 were duplicates were removed. Subsequently 3030 articles were removed after analysing the abstracts and non-availability of full texts. Finally, 92 full-text articles were assessed for eligibility by applying the inclusion/exclusion criteria, whereby 77 articles were excluded after analyzing the full

articles (not an RCT [n=46], not on dementia samples [n=31]. Finally, 15 trials were included in the study.

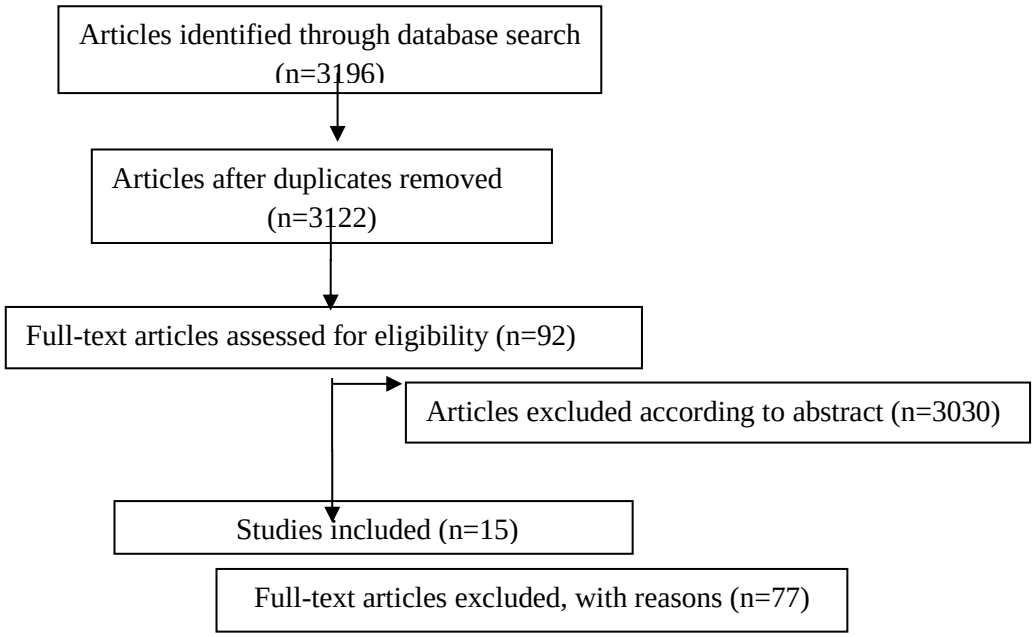

Fig. 1: PRISMA FLOW DIAGRAM OF SELECTION OF ARTICLES FOR INCLUSION IN THE REVIEW

Table. 1: CHARACTERISTIC OF TRIALS

First Author, year [Ref.]	Study design	Setting	Sample Size	Intervention	Outcome
Moore Stephanie, 2001 [8]	RCT	Irvine, California	25	Memory training program including name-face rehearsal, effortful recall and a significant event technique.	The standardized measures of cognitive change showed variable and modest effects for the memory training program. Patient scores improved on the scales after receiving training.
Galante E, 2007 [9]	RCT	Italy	11	Computer-based cognitive intervention	Results suggest that computer based cognitive decline is effective at least in delaying the continuous progression of cognitive impairment.
Mapelli Daniela, 2013 [10]	RCT	Italy	180	Cognitive stimulation	The results revealed that after 8 weeks only the patients in the experimental group exhibited an improvement in terms of a decrease in dementia severity.
Kimberley S. Van Haitsma, 2013 [11]	RCT	Pennsylvania	180	Individualized Positive Psychological Interventions	The individualized positive psychological intervention group and control group experienced similar benefits. The study results provide partial support for the hypotheses.
Orrell Martin, 2014 [12]	RCT	London, Essex and Bedfordshire	236	Maintenance cognitive stimulation therapy	The intervention group indicated significant benefits for self-rated quality of life, proxy-rated quality of life, Dementia Quality of Life scale and Activities of daily living.
Kim Hwan-Hee, 2015 [13]	RCT	Republic of Korea	12	Experience based group therapy	Cognitive function, physical function and psychological health improved through experience-based group therapy.
Sanchez A, 2016 [14]	RCT	Spain	22	Multisensory Stimulation versus Individualized music sessions	Results suggest that Multisensory Stimulation could have better effects on anxiety symptoms and dementia severity in comparison with individualized music sessions in elderly patients with severe dementia.
Whitlatch Carol J, 2017 [15]	RCT	Northern Ohio	25	Support, Health, Activities, Resources, and Education Program (SHARE)	Compared to controls, participants in the SHARE group increased the number of services they used during the intervention period. Caregivers in the SHARE group showed greater satisfaction than the control group on four of the five dimensions.

Orrell M, 2017 [16]	RCT	United Kingdom	356 pairs of dementia patients and their carers	Individual Cognitive Stimulation Therapy	There was no evidence that **iCST** has an effect on cognition or QoL for people with dementia. However, participating in **iCST** appeared to enhance the quality of the care giving relationship and caregivers' QoL.
Liu I-Ting, 2020 [17]	RCT	Taiwan	80	Exercise training	An intensive 4-week exercise program, whether it be a strength or aerobic training, is evidenced to bring significant benefits to elderly patients with dementia.
Kim DeokJu, 2020 [18]	RCT	P city, South Korea	35	Recollection-based occupational therapy	The experimental group presented improved cognitive functions, reduced depression, and enhanced quality of life; the two groups showed a statistically significant difference in every category.
Clarkson Paul, 2022 [19]	RCT	England and Wales	468	Dementia Early-Stage Cognitive Aids New Trial (DESCANT)	DESCANT memory aid did not maintain independence in the activities of daily living with no improvement in other outcomes for people with dementia or carers.
Baker F A, 2022 [20]	RCT	Melbourne, VIC, Australia	318	Group Music Therapy versus Recreational Choir singing	The results of this study support implementing recreational choir singing as a clinically relevant therapeutic intervention.
Palomares Maria Jimenez, 2022 [21]	RCT	Spain	58	Occupational therapy Cognitive training program versus Conventional Occupational therapy	Study findings indicate that Occupational therapy based on cognitive training shows positive effects on the maintenance of global cognitive state of institutionalized older adults with dementia.
Orgogozo Jean-Marc, 2022 [22]	RCT	France	321	Pharmacological intervention - Memantine	Results of this study reveal that Memantine 20mg/d improved cognition consistently across different cognitive scales, with at least no deterioration in global functioning.

Moore Stephanie et al. (2001) investigated the effect of Memory training on cognitive ability in patients with dementia. Twenty-five patients with mild to moderate AD and their caregivers, who served as controls, participated in a 5-week memory training programme, with a 1 month follow up. Participants were taught strategies that included name–face rehearsal, effortful recall, and a significant event technique. Intervention efficacy was assessed on task specific tests, administered on a weekly basis, and general cognitive measures obtained at the first and last sessions of the intervention. During the memory training pro- gramme patients showed improved performance on the recall of names and faces, recognition memory after effortful processing of information, and significant events ($p < .05$). Controls consistently performed better than the AD group, making few errors. Standardised measures for the AD group improved on the Kendrick Digit Copy and had lower scores on the Geriatric Depression Scale ($p < .05$). Caregivers also rated patients higher on the Memory Function Questionnaire (MFQ) ($p < .05$).

Galante E. et al (2007) carried out a single blind randomized controlled study on the efficacy of computer cognitive rehabilitation in patients with mild cognitive decline. Preliminary data on 11 patients with diagnosis of Alzheimer's Disease (AD) and mild cognitive decline randomly assigned to treatment (a) or control (b) condition (i.e. specific vs. aspecific treatment). The specific treatment (a) consisted in a cycle of 12 individual sessions of computer exercises, while the control condition (b) consisted in sessions of semi-structured interviews with patients, conducted with the same frequency and time period as (a). Cognitive, behavioural and functional assessment was performed by an expert evaluator, blinded to the patients' group allocation. Preliminary results show a significant performance decline only in the control group at the 9-month follow-up compared to both baseline and the 3-month follow-up.

Mapelli D. et al (2013) explored the effective outcomes of a structured cognitive stimulation treatment to improve cognition and behavioral symptoms in people with dementia (PWDs), using a randomized controlled clinical trial. Thirty PWDs were divided into three groups: experimental (treated with cognitive stimulation), placebo (treated with occupational therapy), and control (continuing with the usual activities of the nursing home). Assessment, at baseline and after a period of 8 weeks, was performed using the Clinical Dementia Rating Scale, activities of daily living, Mini-Mental State Examination, Esame Neuropsicologico Breve 2, Geriatric Depression Scale and Behavioral Pathology in Alzheimer's Disease Scale. Only the experimental group improved its performance in cognitive tests ($p < 0.05$) and showed a significant decrease in behavioral symptoms ($p < 0.01$) after the treatment.

Haitsma K S V. et al. (2013) tested the effectiveness of individualized activities, led by certified nursing assistants (CNAs), to increase positive and reduce negative affect and behavior among nursing home residents with dementia. Nursing home residents with mild to advanced dementia ($N = 180$) were randomly assigned to usual care (UC, $n = 93$) or 1 of 2 experimental conditions. Residents in the attention control group (AC, $N = 43$) participated in standardized one-to-one activities with their CNAs. Individualized Positive Psychosocial Intervention (IPPI) participants ($n = 44$) received a CNA-led activity matched to their interests and ability. Outcomes were residents' positive and negative affect and verbal and nonverbal behavior. The IPPI and AC groups experienced similar benefits—more pleasure, alertness, engagement, positive touch, and positive verbal behavior—compared with UC. The AC group displayed more anger, uncooperativeness, and very negative verbal behavior than UC or IPPI.

Orrell Martin et al (2014) evaluated the effectiveness of maintenance cognitive stimulation therapy (CST) for people with dementia in a single-blind, pragmatic randomised controlled trial including a substudy with participants taking acetylcholinesterase inhibitors (AChEIs). The participants were 236 people with dementia from 9 care homes and 9 community services. Prior to randomisation all participants received the 7-week, 14-session CST programme. The intervention group received the weekly maintenance CST group programme for 24 weeks. The control group received usual care. Primary outcomes were cognition and quality of life. For the intervention group at the 6-month primary end-point there were significant benefits for self-rated quality of life (Quality of Life in Alzheimer's Disease (QoL-AD) $P = 0.03$). At 3 months there were improvements for proxy-rated quality of life (QoL-AD $P = 0.01$, Dementia Quality of Life scale (DEMQOL) $P = 0.03$) and activities of daily living ($P = 0.04$). The intervention subgroup taking AChEIs showed cognitive benefits (on the Mini-Mental State Examination) at 3 ($P = 0.03$) and 6 months ($P = 0.03$).

Kim Hwan-Hee (2015) investigated the effect of experience-based group therapy consisting of cooking and physical activities for elderly people with mild dementia on their cognitive and physical function, as well as on their psychological symptoms. The subjects of this study were 12 older adults with mild dementia (3 males, 9 females; 76.75 ± 3.61 years) who voluntarily consented to participate in the study. In total, 12 subjects received experience-based group therapy for 2 hours per session once per week, totaling 10 sessions. Cognitive function was evaluated using the Mini Mental State Examination-Korean (MMSE-K), and physical function was evaluated using the Geriatric Physical health condition measurement Tool (GPT). The Geriatric Depression Scale Korean Version (GDS-K) and Geriatric Quality of Life-Dementia (GQOL-D) were used to measure psychological symptoms. There were significant differences between the MMSE-K, GPT, GDSK, and GQOL-D scores of before and after group therapy.

Sanchez A. et al. (2016) compared the effects of a multisensory stimulation environment (MSSE) and individualized music sessions on agitation, emotional and cognitive status, and dementia severity in a sample of institutionalized patients with severe dementia. Twenty-two participants with a diagnosis of severe or very severe dementia were randomly assigned to two groups: MSSE and individualized music sessions. Both groups participated in two 30-min weekly sessions over 16 weeks. Outcomes were agitation (Cohen-Mansfield Agitation Inventory, CMAI), mood (Cornell Scale for Depression in Dementia, CSDD), anxiety (Rating Anxiety in Dementia, RAID), cognitive function (Severe Mini-Mental State Examination, SMMSE), and the overall severity of dementia (Bedford Alzheimer Nursing Severity Scale, BANS-S). They were assessed at baseline (pre-trial), in the middle (mid-trial), at the end of the intervention (post-trial), and 8 weeks after the intervention (follow-up). Patients in the MSSE group showed significant improvement in their RAID and BANS-S scores compared with the individualized music group post- versus pre-trial. With regard to agitation, there was improvement during the intervention in both the MSSE and individualized music groups in the CMAI total score after 16 weeks of intervention, with no significant differences between the groups.

Whitlatch Carol J et al. (2017) conducted a study to test the effectiveness of the Support, Health, Activities, Resources, and Education Program. This six-session psycho-educational program provides dyadic counseling for individuals in the early stages of dementia and their family caregivers. Persons with early stage dementia (n ¼ 128) and their caregivers (n ¼ 128) were randomly assigned either to Support, Health, Activities, Resources, and Education Program or a control condition. Intervention efficacy was evaluated for completion of a care plan, use of services, dyadic relationship functioning, participant well-being, and program satisfaction. Dyads in the treatment condition were able to construct a balanced care plan and increased their use of services. Dyadic functioning improved for one dimension (decreased emotional disruptions). Compared to the control condition, satisfaction with the intervention was higher for caregivers enrolled in Support, Health, Activities, Resources, and Education Program on four of five dimensions and one dimension for persons with dementia.

Orrell M et al. (2017) evaluated the effectiveness of a home-based, caregiver-led individual cognitive stimulation therapy (iCST) program in (i) improving cognition and quality of life (QoL) for the person with dementia and (ii) mental and physical health (well-being) for the caregiver. A single-blind, pragmatic randomised controlled trial (RCT) was conducted. Three hundred fifty-six people with mild to moderate dementia and their caregivers were recruited from memory services and community mental health teams (CMHTs). Primary outcomes were cognition (Alzheimer's Disease Assessment Scale–cognitive [ADAS-Cog]) and self-reported QoL (Quality of Life Alzheimer's Disease [QoL-AD]) for the person with dementia and general health status (Short Form-12 health survey [SF-12]) for the caregiver. Secondary outcomes included quality of the caregiving relationship from the perspectives of the person and of the caregiver (Quality of the Carer Patient Relationship Scale) and health-related QoL (European Quality of Life–5 Dimensions [EQ-5D]) for the caregiver. At the post-test (26 wk), there were no differences between the iCST and TAU groups in the outcomes of cognition (mean difference [MD] = −0.55, 95% CI −2.00–0.90; p = 0.45) and self-reported QoL (MD = −0.02, 95% CI −1.22–0.82; p = 0.97) for people with dementia, or caregivers' general health status (MD = 0.13, 95% CI −1.65–1.91; p = 0.89). However, people with dementia receiving iCST rated the relationship with their caregiver more positively (MD = 1.77, 95% CI 0.26–3.28; p = 0.02), and iCST improved QoL for caregivers (EQ-5D, MD = 0.06, 95% CI 0.02–0.10; p = 0.01).

Liu I-Ting et al (2020) investigated whether strength or aerobic training can offer significantly more benefits with regarding the activities of daily living of elderly patients with dementia as well as to determine the effects of exercise on cognition, depression, and biochemical markers. A volunteer sample of participants (NZ80) whose scores on the Mini-Mental State Examination were between 15 and 26 were included. The participants were randomly assigned to perform either strength or aerobic training for a total of 4 weeks. After completion of the program, a significant improvement in the patients' Barthel Index, Mini-Mental State Examination, Montreal Cognitive Assessment, and plasma monocyte chemotactic protein-1 levels in the strength-training group was observed. For the patients who had received aerobic training, their serum brain-derived neurotrophic factor also improved significantly. However, the degree of improvement regarding these outcome measures did not achieve significant statistical difference between the 2 groups.

Kim DeokJu et al (2020) organized a recollection-based occupational therapy program: a nonpharmacological intervention consisting of five categories of activities (physical, horticultural, musical, art, and instrumental activity of daily living; IADL) and applied it to those having a mild stage of Alzheimer's disease. 35 dementia patients were randomly divided into experimental group and control group. The experimental group participated in a total of 24 sessions—five times per week for one hour per session—while the control group took part in regular activities offered by the existing facilities. The experimental group presented improved cognitive functions, reduced depression, and enhanced quality of life; the two groups showed a statistically significant difference in every category.

Clarkson Paul et al (2022) investigated effects of memory aids and guidance by dementia support practitioners (DSPs) for people in early-stage dementia through a pragmatic, randomised controlled trial. 468 samples were randomised to a DSP with memory aids or to usual care plus existing dementia guide. Mean 6 months BADLS Score increased to 14.6 (SD: 10.4) in intervention and 12.6 (SD: 8.1) in comparator, indicative of greater dependence in the activities of daily living. Adjusted between-group difference was 0.38 (95% CI: −0.89 to 1.65, p=0.56). Though this suggests greater dependency in the intervention group the difference was not significant.

Baker F A et al (2022) implemented a 2×2 factorial cluster-randomised controlled trial to determine whether group music therapy (GMT) is more effective than no GMT with standard care, or recreational choir singing (RCS) is more effective than no RCS with standard care, for reducing depressive symptoms and other secondary outcomes in people with dementia with mild to severe depressive symptoms living in residential aged care. Care home units with at least ten residents were allocated to GMT, RCS, GMT plus RCS, or standard care, using a computer-generated list with block randomisation (block size four). The protocolised interventions were delivered by music therapists (GMT) and community musicians (RCS). The primary endpoint, available from 20 care home units (214 residents), suggested beneficial effects of RCS (mean difference –4·25, 95% CI –7·89 to –0·62; p=0·0221) but not GMT (mean difference –0·44, –4·32 to 3·43; p=0·8224).

Palomares Maria Jimenez et al (2022) assessed the effects of an occupational therapy cognitive training program on the cognitive function of institutionalized older adults with dementia. Methods: The study was a pilot randomized clinical controlled trial. A total of 58 participants with major neurocognitive disorder or dementia were randomized to the occupational therapy cognitive training program group or to the conventional occupational therapy group twice a week for 5 weeks. Measures were taken at baseline (week 0), after 5 weeks of treatment (week 5), and after 6 weeks of follow up (week 12). A value of $p < 0.05$ was considered as statistically significant. There were no statistical differences between groups in the LCMT global scores at baseline or after the intervention at week 5. However, the analysis of the specific cognitive areas assessed in the Lobo's Cognitive Mini Test indicated that that the intervention group significantly improved comprehension of verbal commands and praxis ($p = 0.021$).

Orgogozo Jean-Marc et al (2022) examined the efficacy and tolerability of memantine, an uncompetitive N-methyl-D-aspartate antagonist, in the treatment of mild to moderate vascular dementia. 321 patients received 10 mg/d memantine or placebo twice a day; 288 patients were valid for intent-to-treat analysis. Patients had to meet the criteria for probable vascular dementia and have a Mini-Mental State (MMSE) score between 12 and 20 at inclusion. The 2 primary end points were the cognitive subscale of the Alzheimers Disease Assessment Scale (ADAS-cog) and the

global Clinician's Interview Based Impression of Change (CIBIC-plus). After 28 weeks, the mean ADAS-cog scores were significantly improved relative to placebo. In the intention-to-treat population, the memantine group mean score had gained an average of 0.4 points, whereas the placebo group mean score had declined by 1.6 points, ie, a difference of 2.0 points (95% confidence interval, 0.49 to 3.60). The response rate for CIBIC-plus, defined as improved or stable, was 60% with memantine compared with 52% with placebo (P=0.227, intention to treat). Among the secondary efficacy parameters, which were analyzed in the per-protocol subset, MMSE was significantly improved with memantine compared with deterioration with placebo (P=0.003). The Gottfries-Brane-Steen Scale intellectual function subscore and the Nurses' Observation Scale for Geriatric Patients disturbing behavior dimension also showed differences in favor of memantine (P=0.04 and P=0.07, respectively).

DISCUSSION

Presently, dementia is considered as one of the most prominent health problems. Therapies for memory retention are being researched very frequently. But the results are not satisfactory to a greater extent. Memory impairment can be prevented and its progression can be reduced but it cannot be treated completely. Various interventions, be pharmacological or non-pharmacological have been experimented on dementia patients with a view to improve cognition. The aim of the study was to systematically review the existing evidence of the effect of intervention or therapy on dementia patients.

The systematic review shows that using memory training program, cognitive stimulation, experience-based therapy and regular exercise are more effective than other interventions. Some interventions like DESCANT memory aid and Individualized Positive Psychological Intervention were not effective. The evidence in these studies cannot be considered as effective because most studies assessed a large battery of cognitive measurements and only found an effect on some of the measurements. Also, the length of the trial place important part during analysis. In present systematic review the length of trial for studies is not specified which may alter the effectiveness of a particular intervention.

Most studies included in this review had some limitations that increased the possible risk of bias. However, studies included in this review are randomized control trial, so one could rely upon the efficacy of a particular intervention. In sum, evidence shows that engagement in activities whether cognitive or motor will help dementia patients to perform cognitive functions. Cognitive stimulation helps in reducing dementia-related cognitive impairments to a certain extent.

BIAS ASSESSMENT

A systematic review of published studies is limited by the fact that it excludes unpublished data and this may result in publication bias.

LIMITATION OF THE STUDY

Individual interest and financial constrains bias may be a limitation of this type of study although some observations suggest that this was not substantial. Subjective measurements by an individual of their own interests cannot be standardised by any yardstick other than the individual themselves.

CONCLUSION

Fifteen articles with fourteen different types of interventions to improve cognitive function of dementia patients were identified in this systematic review. The analysis shows that intervention differs from each other in terms of features, functions and implementation. Out of fourteen interventions, two interventions did not have positive outcome on dementia patients. However, mixed intervention might be the most appropriate exercise for people with dementia. Besides, cognitive stimulation and physical activity seem to be most promising strategies for enhancing the memory. Some traditional methods like diary keeping, crossword puzzles solving are also effective but the reviewer could not access the research studies examining effectiveness of such traditional interventions.

REFERENCES

1. World Health Organization. Dementia factsheet (2019). Available online at: https://www.who.int/news-room/factsheets/detail/dementia
2. Kumar, C.T.S., Shaji, K.S., Varghese et.al. (eds) Dementia in India 2020 (Alzheimer's and Related Disorders Society of India, 2019).
3. Livingston G, Sommerlad A, Orgeta V, Costafred SG, Huntley J, Ames D, Cooper C. Dementia prevention, intervention and care. Lancet 2017; 390:2673-2734.
4. Almor A, Kempler D, MacDonald MC, Anderson ES, Tyler LK. Why do Alzheimer patients have difficulty with pronouns? Working memory, semantics, and production in Alzheimer's Disea. Brain and Language. 1999; (67): 202-227.
5. DijKstra K, Bourgeois MS, Allen RS, Burgio LD. Conversational coherence: discourse analysis of older adults witj and without dementia. Journal of Neurosciences. 2004; 17(4):263-283.
6. Alzheimer's Association. Alzheimer's disease facts and figures. Alzheimers Dement. 2016; 12(4):459-509.
7. Gauthier S. Advances in the pharmacotherapy of Alzheimer's disease. CMAJ 2002; 166:616-623.
8. Graff MJ, Adang EM, Vernooij-Dassen MJ, Dekker J, Jonsson L, Thijssen M, Rikkert MGO: Community occupational therapy for older patients with dementia and their caregivers: cost effectiveness study. BMJ 2008; 336:134-138.
9. Moore, S Sandman, CA McGrady, K et al. Memory training improves cognitive ability in patients with dementia. Neuropsychological rehabilitation, 2001, 11 (3/4), 245–261.
10. E. Galante, G. Venturini, C. Fiaccadori. Computer-based cognitive intervention for dementia: preliminary results of a randomized clinical trial. G Ital Med Lav Erg 2007; 29:3.
11. Daniela Mapelli, Elisa Di Rosa, Rosaria Nocita, Donatella Sava. Cognitive Stimulation in Patients with Dementia: Randomized Controlled Trial. Dement Geriatr Cogn Disord Extra 2013; 3:263–271.
12. Van Haitsma, K.S., Curyto, K., Abbott, K.M., Towsley, G.L., Spector, A., & Kleban, M., (2015). A randomized controlled trial for an individualized positive psychosocial intervention for the affective and behavioral symptoms of dementia in nursing home residents. Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 70(1), 35–45.
13. Martin Orrell, Elisa Aguirre, Aimee Spector, Zoe Hoare, Robert T. Woods, Amy Streater, Helen Donovan, Juanita Hoe, Martin Knapp, Christopher Whitaker and Ian Russell. Maintenance cognitive stimulation therapy for dementia: single-blind, multicentre, pragmatic randomised controlled trial. The British Journal of Psychiatry (2014) 204, 454–461.
14. Hwan-hee Kim. Effects of experience-based group therapy on cognitive and physical functions and psychological symptoms of elderly people with mild dementia. J. Phys. Ther. Sci. 2005; 27: 2069–2071.
15. Alba Sánchez, Ana Maseda, M. Pilar Marante-Moar, Carmen de Labra, Laura Lorenzo-López and José Carlos Millán-Calenti. Comparing the effects of multisensory stimulation and individualized music sessions on elderly people with severe dementia: a randomized controlled trial. Journal of Alzheimer's Disease. 2016. 52(1):303–315.
16. Whitlatch et al. The Support, Health, Activities, Resources, and Education program for early stage dementia: Results from a randomized controlled trial. Article in Dementia · November 2017; DOI: 10.1177/1471301217743033
17. Orrell M, Yates L, Leung P, Kang S, Hoare Z, Whitaker C, et al. (2017) The impact of individual Cognitive Stimulation Therapy (iCST) on cognition, quality of life, caregiver health, and family relationships in dementia: A randomised controlled trial. PLoS Med 14(3): e1002269. https://doi.org/10.1371/journal.pmed.1002269
18. Liu I-Ting et al. The Therapeutic Effects of Exercise Training on Elderly Patients with Dementia: A Randomized Controlled Trial Article in Archives of Physical Medicine and Rehabilitation · February 2020 DOI: 10.1016/j.apmr.2020.01.012
19. Kim DeokJu. The Effects of a Recollection-Based Occupational Therapy Program of Alzheimer's Disease: A Randomized Controlled Trial. Hindawi Occupational Therapy International Volume 2020, Article ID 6305727, 8 pages https://doi.org/10.1155/2020/6305727
20. Clarkson P, Pitts R, Islam S, et al. J Neurol Neurosurg Psychiatry 2022;**93**:1001–1009.
21. Felicity A Baker et al Clinical effectiveness of music interventions for dementia and depression in elderly care (MIDDEL): Australian cohort of an international pragmatic cluster-randomised controlled trial. www.thelancet.com/healthy-longevity **Vol 3 March 2022.**
22. Jiménez-Palomares, M.; González-López-Arza, M.V.; Garrido-Ardila, E.M.; Montanero-Fernández, J.; Rodríguez-Domínguez, T.; Rodríguez-Mansilla, J. Effects of a Cognitive Stimulation Program in Institutionalized Patients with Dementia. J. Pers. Med. **2022**, 12, 1808. https://doi.org/10.3390/jpm12111808.