REVIEW OF LITERATURE

Review in study has been taken from various sources like journals, internet sources, and electronic databases like Science Direct, Google Scholar, Pub Med, etc., to gain insight and gather information about the chosen problem in this research.

The literature review has been structured under the following headings:

- ❖ Prevalence of decline cognitive functions in elderly

- ❖ Problems related to decline cognitive functions in elderly

- ❖ Need and development of Cognitive Stimulation Program

- ❖ Benefits of Cognitive Stimulation Program

- ❖ Effectiveness of Cognitive Stimulation Program on cognitive functions and quality of life among elderly.

Prevalence of decline cognitive functions in elderly

A community-based cross-sectional study was carried out to identify the prevalence as well the causes of the decline in cognitive functions and depression in North India by Kumari et al. The tool used in the study was MMSE for screening cognitive decline scores whereas for measuring the depression the Geriatric Depression Scale was used, and the data were analysed using the SPSS software. In this study outcome prevalence of cognitive impairment and geriatric depression were 36% and 29.1%, respectively. It also states that geriatric depression and cognitive

impairment were strongly co-related with each other. Further, it was concluded that almost one-third of the elderly had depression (29.1%) as well as cognitive impairment (36%) which makes diagnosis of cognitive impairment very crucial and also justified the needs to assist as well as ensure appropriate care and support on geriatric mental health care.[33]

A survey was carried out in the suburban community areas of Shanghai to identify the high prevalence and low awareness of mild cognitive impairment. This survey was done on 925 samples and in the study outcome the prevalence rate of mild cognitive impairment was found to be 29.8%. Yang et al. concluded that the prevalence of mild cognitive impairment in the Shanghai suburban community was at its peak, but the information and awareness of decline in cognitive functions were poor.[34]

A home-to-home community-based survey done by Kumar et al. concluded that early diagnosis is essential for cognitive impairment. In this survey the investigators estimated the prevalence of senior citizens of more than 50 years of age by a simple random sampling method and the outcome of cognitive impairment in these elderlies was found to be 14%. From the study they also found that marital status, female gender, educational status, and growing old age of more than 70 years, are arithmetically significant threat factors for decline in cognitive functioning.[35]

In the year 2020, Khanna & Metugad carried out a cross-sectional study on 770 elderly, more than sixty years of age, living in two urban health centres of Belagavi District, with the purpose of finding out the prevalence and problems related with

cognitive impairment. This was found to be 8.4% in the population studied. The study investigators also identified the problems as well as the pressure on caregivers to provide health care. In the study the risk factors found were female sex, advancing age, unmarried, poor educational status, unemployed, living alone, and poor economy. Moreover, among sixty-five care-providers, 67.7% were carrying mild-to-moderate pressure to provide care to the cognitively impaired old aged, and they also considered it stressful for them. As per the results of the study, it is critical to identify the elderly for any kind of mental illness while planning geriatric health care. The growing age group and female gender must be given extra consideration, being more prone to poor cognitive functioning.[36]

In China, a cohort study by Kuang et al. was done to identify the prevalence of decline in cognitive functioning in the population aged 65 years and more. Cognitive impairment in the study was estimated by MMSE in the Chinese language. According to the study, result prevalence rate was 11% and positively associated factors with cognitive impairment were a growing age, poor educational status, living in rural areas, unmarried, a deficit in a variety of physical and mental activities, having a stroke, visual and hearing deficiency, as well as living with disability.[37]

Patnode in 2020 carried out an assessment for cognitive impairment in the elderly with the purpose of comprehensively reviewing the testing validity of cognitive assessment tools and the effectiveness and loss of modalities to cure cognitive impairment in senior citizens of more than 65 years of age. The assessment

was done of 287 research studies with more than 280,000 elderlies. The best instrument found was MMSE with a complete sensitivity measure of 0.89 (95% CI, 0.85–0.92). The basic conclusion of the study was that an advanced diagnosis of cognitive impairment can improve the patient as well as the health status of the caregiver.[38]

A study was carried out by Verma et al. intending to identify the prevalence as well as the correlation of poor cognitive functioning among patients of elderly ages residing with non-communicable diseases (NCDs). Cognitive status of 297 sufferers of chronic disease, from two communities attending the community health centre clinics, were measured using the Hindi format of the Mini-Mental Scale. In the outcome of the study more than one-fourth total of candidates was having poor cognitive functioning. Outcome of the investigation also concluded that elderly with non-transferrable diseases had more prevalence of poor cognitive functioning.[39]

Another systematic study was conducted to look into the evidence of poor cognitive functioning, in terms of its prevalence and incidence globally, among people who were more than fifty years dwelling in the community gatherings. A number of systematically planned searches were performed in the study by Pais from January 2019 to January 2020 by using online research literature reviewing sites like PubMed and Medline. The study reviewed eighty research studies and papers. The outcome of the study was that the estimated prevalence ranged from 5.1% to 41% with a median score of 19%. Further, except for inclusion age there were no

statistically significant effects found on cognitive functions. It was concluded that there is homogenization and a clear picture of what cognitive impairment actually is and what it actually composes of and accounts for; additionally, there is an important need to filter the correct epidemiological knowledge of its existence.[40]

A cross-sectional study in the town areas Chitradurga was done in the second to fourth month of year 2019. Sample in the study were elderly, of age equal to or greater than sixty years. Participant prevalence was 58.9% among the total of 280 chosen candidates. In the study, Kathari et al. used a standardized approach priory tested formalized questionnaire that constitutes basic socio proforma, the Mini Mental State Examination (MMSE) scale, as well as depression scale for the elderly. Study outcome was 33.6% and 60% identified as a prevalence rate of decline in cognitive abilities and depression among elderly. Variables revealing a notifiable correlation with decline in cognition in the study were male gender, older age group, marital status, poor socioeconomic status, living with combined families, and illiteracy.[41]

Ren et al., highlighted cognitive impairment prevalence and also dispersal of its risk factors in the dwellers who are senior more than sixty years, not suffering from any cardiac or nervous system-related disease conditions, in the downtown north areas of China. The elderlies were examined using the MMSE scale. In the analysis they found the negative impact of decline in cognitive functioning on the lives of the elderly. The common risk factors counted for poor cognitive functioning

were poor educational status and central obesity. The common causative factor in the multivariate analysis was increasing age.42

As per Subjective Cognitive Decline—A Public Health Issue—CDC (Feb-2019), prevalence of poor cognitive functioning was 11.1%, or one among nine elderlies. The prevalence of subjective cognitive decline among gold agers who were sixty-five years and older was found to be higher at 11.7%, as compared with the young old age category which was at 0.8%. On the basis of gender, the prevalence rate of poor cognitive functioning was 11.3% among males as differentiated to 10.6% among females.[43]

Singha et al. undertook a cross-sectional investigation to look pick out gender variation in cognitive decline among elderly in India. They also measured the impact of various factors which may create a difference in male and females in relation to the cognitive health. They carried out this investigation in six states from 2007–2008 on a total of 6548 participants. Various variables like household, health behavior, and individual and status-level characteristics were considered for assessing and identifying the gender variation in cognitive health. Decline of cognitive functioning was found to be worse among females than males. This study also verified and stated that the current status of women's knowledge deprivation in mental well-being was a central feature of sex difference in cognition among geriatrics in our nation.[44]

Remya et al. undertook a community-oriented cross-sectional study on 100 gold agers in Thrissur's Adat Panchayat from first month to fourth month of year

2016. Research details were gathered with the help of a priory tested questionnaire, that was the Mini Mental State Examination, basic socio-demographic proforma, own reported physical assessment, as well as a mini nutritional assessment scale. In the study, the occurrence of poor cognitive functioning plus undernutrition in elderly was estimated at about 55% as well as 12% individually. Also, the variables revealed a significant correlation with MMSE measures. The measures were age of elderly, female gender, elderly from below poverty line families, financial dependence, marital status, and also those who were having sleep difficulties. Relationship between poor cognitive functioning and nutritional level was statistically notable at p<0.001. The result of the study determined that there was a connection between poor cognitive ability and weak nutritional level. Consequentially, it is necessary to monitor gold agers for nutritional deficit along with the assessment of cognitive impairment.[45]

Problems related to decline cognitive functions in elderly

A meta-analysis and comprehensive review on problems due to decline in cognitive abilities in elderly was done. John et al. synthesized and reported the relation between decrement in cognitive status and affective problems in old age. In this multi-level meta-analysis, total of 34 studies (n=71,244) met the standard criteria as per the STROBE checklist, and depression was shown to be significantly correlated as a main problem with a decline in cognitive status. The result of the investigation also recommended the need for regular assessment of the cognitive

functions as there will be a particular risk of greater cognitive decline and also, the elderly suffer a number of problems.[46]

Kazaui et al., in Japan undertook a study on the various distinctions between psychological symptoms and behavior-related problems of elderly due to declining cognitive abilities. In the study the aim was to make use of data from a Japan multicenter study, to elucidate the variation in twelve types of Behavioral and Psychological Symptoms of Dementia (BPSDs) by the severity of the condition of the sufferer. It also aimed to formulate charts indicating the occurrence, severity, and caregiver-related distress due to the decline in cognitive functioning. A neuro-psychiatric inventory (NPI) has been completed including 1091 samples and the noted behavioral problems were anxiety, depression, apathy, as well as disturbances in sleep and aberrant motor behavior. In Lewy body dementias, the problems identified were restlessness, disturbances in sleep, irritable mood, disinhibition, and euphoria.[47]

A study done by Prince et al. highlighted the latest international trends in falling cognitive functions abilities' prevalence, incidence and problems due to this. Main goal of the investigation was to identify an extend in number of problems faced by gold agers who are at risk. The common issue identified was that these elderlies become dependent upon others. The result of the study done in East Asian countries, also revealed that the incidence of decline in cognition was increasing along with deteriorating cardiac-related diseases which was making the elderly dependent on others.[48]

Kumar et al. undertook a work to assess the problems and variation in the cognitive ability of elderly. They included a total of 7,150 participants who were aged 50 and above. The result of the investigation reported that with the decline in cognitive functions, the quality of life was reduced by seven percent among these senior residents. Study outcomes also claimed that there were various physical and psychological problems in the elderly due to the decline in cognitive abilities. Direct and significant relationship was identified in between poor cognition and the quality of life of senior occupants in India.[49]

Kedar & Vispute in 2016 revealed that the elderly with declined cognitive abilities had a number of issues. They recommended that there is a marked need for primary researches in the cognitive areas clinically which deal with the increased rate of decline in cognitive functioning, its causes, diagnosis, and treatment. In a growing country like India, consideration must be given to such research topics. There is a need to fill the research gap, in the area of the difference between information already available, and that further needed, in order to build up activities and services. This research study throws light on the scientific work concluded on cognitive decrement so far, as well as the future requirement for considering the investigations in different necessary fields such as its epidemiological factors, diagnostic and measurement methods, and psycho-behavioral signs and symptoms.[50]

Vassilaki et al. analyzed declining cognitive related problems in 2,176 older inhabitants aged 70–89 years, among which half were male and half were female and eighty-seven percent were having two or more chronic health conditions, which they

categorized as "cognitively normal". Cognitive decline was measured using psychological tests. In this study, 583 persons emerged as having mild cognitive impairment or dementia. The investigator also identified the coupling of chronic factors like arthritis and high blood pressure, with cognitive functions, and stated that there was high possibility or risk in the progression of cognitive problems for those who had four or more other chronic problems.[51]

A community-based single-time study, was done on 225 rural elderly participants who were recruited with systematic random sampling. Using the Mini Mental State Examination in Hindi, cognitive decline among the study participants was measured. Outcome of the study revealed a 16% prevalence of decline in cognitive status. A number of socio-demographic variables such as age, gender, literacy and marital status were also found to have a consequential relationship with the prevalence of cognitive impairment. Furthermore, cognitive impairment was found correlated to various socio-demographic factors in approximately 1/6th of the elderly. The authors, Marrof et al., highlighted that there is a need to prioritize care and therapy for the vulnerable population related to stimulating their cognitive power by enhancing the present facilities and also by reflecting light of awareness to utilize these services.[52]

A longitudinal study done in 2013 in London by Rossor et al., identified issues related with Alzheimer's disease, and decrease in cognitive functioning. A sample size of 142 patients was taken and various issues were noted in these elderly due to decline in cognitive abilities. Among this low self-esteem was found common. Also,

the results showed that 15 people were affected with Alzheimer's disease, 72 people were at threat of developing hereditary Alzheimer's disease, whereas 55 people were not.[53]

A study was tested by Betty et al. to identify the unfulfilled requirement of elderly with decline in cognitive abilities and their formal caregivers, residing in the community. A cross-sectional testing was undertaken on 254 participants having poor cognitive functioning and 246 informal caretakers with the purpose to find out how often unfulfilled needs are in the group. The unmet demands were 7.7 ±4.8 in dementia patients and 4.6±2.3 in carers, according to the findings.[54]

A detailed investigation was performed in 2013 by Raina et al., in India, Himachal Pradesh, on assessing the risk and issues for decline cognitive ability across populations. Aim of this project was to investigate the occurrence of dementia in tribe elders. Phase-wise detailed cross-sectional survey of two phases was done in which all residents were aged 60 or more. The findings demonstrate that no one above the age of 60 developed dementia, despite the fact that dementia is common in this age group in other parts of India. Geographical, phenotypic, and hereditary factors may all have a role in regional and ethnic differences in dementia.[55]

Zhuang et al. undertook a demographic survey in town areas of the Shanghai on 3,176 total residents aged 55 and above as participants. MMSE in Chinese language was employed and each individual was directly interviewed to screen their cognitive functioning. Per the result of the investigation, a prevalence of 8.38% was found for

both sexes in which males and females were 9.21% and 7.93%, respectively. They also stated that there were various issues related with declined cognitive status which include factors on living styles, social factors, and genetic factors. This study confirmed that the geriatric population had a high prevalence of cognitive impairment which leads to a number of personal and social problems for them.[56]

A cross-sectional investigation on issues and occurrence rate of decline cognitive functions along with its correlation with depression was done by Giri et al. in the year 2011–2012. In the study total of 538 Chinese residents participated and their cognitive abilities were screened by the MMSE. Depression was identified by using the depression scale of geriatrics having a total 30 items. In the examination, prevalence of cognitive deterioration was found to be 12.6% along with several independent predictors for the cognitive impairment, which were female gender, those who were poor in academics with growing age, and those having depression. Moreover, it was also concluded that cognitive decline and depression were complementary in geriatrics and were the main problems. Further, the vulnerability of cognitive decline was higher with growing age.[57]

Banerjee et al., investigated the declining cognitive abilities of the elderly and also evaluated the quality of life consequences for them. Investigator identified policies and services for people with declining cognition and also for their family carers. The study's goal was to develop an internationally applicable paradigm for assessing the quality of life with its possible impact on policies as well as services for dementia in elderly and those with falling cognitive functions and their

caregivers. This investigation done on 312 samples, showed that cognitive functioning is a very important component; therefore, cognitive rehabilitation programs have to be implemented to build up cognitive health.[58]

A retrospective cohort research investigation on the relationship between severity of falling cognitive functions by Thoits et al., recommended lifestyle changes. This study concluded that early assessment of decline is needed so that immediate care necessary for the cases and the nation can be planned. In this project a total of 110 samples were randomly chosen. The instrument used to rule out decline in cognitive health was Montreal Cognitive Assessment Scale and neuropsychological examination. One of the outcomes of the research reveals that 78.9% of cases had moderate to severe decline, of which 75.8% required lifestyle modifications, because cognitive decline has a adverse impact on the personal and social life of the elderly.[59]

Weston et al. undertook a single time investigation on 498 patients in the California Alzheimer's disease research centers in 2006-09. The mean age was 75.4 years and the maximum number of cases were females of the white race. In total 392 samples were of the amnestic type and 106 were non-amnestic types. Using the MMSE, mild cognitive impairment cases were identified. These individuals had amnestic low-level cognitive impairment along with trouble with the memory tasks. The output of the investigation indicated that there is a mild functional shortfall in

persons with mild cognitive decline and this also varies with the category of decrement.[60]

A cross-sectional cohort study on cognitive decline assessment in primary care areas of Portland, US, was conducted on 553 samples of age 75 years or more. Boise in this study stated that 29.7% were having a mild level cognitive impairment, 43% individuals were cognitively impaired, and 13.7% had severe impairment of cognitive functions. Additionally, 18% of them showed proof of clinically evaluated dementia. The study outcome also stated that cognitively impaired elderly experienced an adverse-effects in their life.[61]

Need and Development of Cognitive Stimulation Program

A three-phase technique study was done by Stonner in 2020 to test and develop a formal intervention plan for cognitive stimulation therapy (CST). The technique was implemented by utilizing a solid framework for intervention. It has been tested and verified in 3 nations (Brazil, India, and Tanzania) which differ in areas of economy and health-care systems. Total 5 intervention schemes for CST were identified and research gaps in each scheme were assessed. Intervention techniques and plan of action were structured for health-care providers, stakeholders, gold agers with Alzheimer's and their caregivers, as well as a multinational group of clinicians and researchers. This new technique known as CST can play an effective role, as a solid framework for intervention for all those with declining cognitive abilities. However, CST needs to be structured properly with all basic activities,

ensuring an accurate number of timely sessions, and also ensuring the cost-effectiveness or health care affordability, health equity, and healthcare access.[62]

An intervention-based study by Apostolo et al. developed and assessed the cognitive stimulation therapy on variables such as promotion of self-care in cognitive decline. They undertook the study fueled by an urge to give a defendable answer to the developing increment in the prevalence of age-based decline in cognitive status in the elderly. This is much needed in a situation where globally the ageing population is rising. This study recommended cognitive stimulation therapy as novel practice with various tasks, activities, and games which are helpful in elderly self-care as well as in victorious aging.[63]

A systematic review done by Niederstrasser et al. on the prevention of cognitive decline and dementia highlighted that the geriatric population is growing globally, and the prevalence rate of cognitive deterioration and dementia with growing age is also elevating at a higher speed. Furthermore, currently, there is no such influential and magical medical treatment which can decrease the risk and prevent it. However, there is hope with cognitive activity programs which were found to be fruitful. In the review it was suggested that cognitive intervention activities can be given week wise by including various sessions of different tasks. Further, the reviewer has discussed their practical uses in both ways—individual as well as group-based.[11]

Herrera from School of Economics and Political Science, London, wrote a report in 2016, on the development of Cognitive Stimulation Therapy (CST). They also summarized its validation related to its practical cost. As per this report, there are various interventions and strategies to assist sufferers of falling cognitive status. In the crux of report, they declare CST as one of the best, in aspects related to its practicability and feasibility. It is found to be one of the most economically suitable therapeutic strategies. The National Institute for Health Clinical Excellence (NICE)– Social Care Institute for Excellence (SCIE) guidelines, published in 2006, in United Kingdom, endorsed CST as a group-based program that is fruitful for elderly having mild to moderate dementia.[64]

Khan et al. carried out a review on cognitive stimulation therapy in which they focused on its development, instructions, maintenance, and application in clinical trials. The review stated that worldwide there are around 35 million people, who are victims of dementia, and more than fifty percent of them had decline in cognitive functioning. The efficacy of both cognitive rehabilitation and cognitive training has been analyzed by randomized controlled trials (RCTs) on such individuals. Through the review, evidence was shown that cognitive stimulation is an effective non-pharmacological multicomponent strategy used for victims having Alzheimer's dementia. Its application and implementation were also strongly recommended by the RCTs.[65]

Benefits of Cognitive Stimulation Program

A randomized controlled trial assessed the advantages of cognitive stimulation therapy on about 236 cases having mild to moderate level of cognitive decline. Gold agers were recruited as participants in this study, adopting the stratified sampling technique. In the interventional group, they were given stimulation therapy for 7 weeks and they were followed up till 6 months. The study result was found to be moderately effective till the 6 months follow-up. The further maintenance program was also assessed for its cost benefits. In this study evidence were found for the economic benefits of the cognitive stimulation program. Also, the investigators Amico et al., declared that the program offered was not only cost-effective, but it also enhances cognition and overall quality of life.[66]

Orell et al. undertook a randomized controlled investigation to estimate the impact as well as monetary benefits of cognitive stimulation program on elderly having decline in cognitive status. In this investigation, intervention was given by a caregiver for 30 min, thrice a week for more than 25 weeks. The Alzheimer's Disease Assessment Scale-Cognition (ADAS-Cog) tool was utilized to weigh the cognition and the QOL-AD scale was utilized for assessing quality of life in the recruited participants. Outcomes of the investigation indicated a favorable impact of the cognitive stimulation program.[67]

A systematic review highlighted the factors pertaining to cognitive stimulation in elderly. In this review, memory was targeted as cognitive functions. In in 9 out of 14 studies, in order to improve the cognitive functions, quality of life, and

self-esteem in the elderly, cognitive stimulation techniques were recommended. Among the techniques used in these studies, the popular ones were face-name connections or associations, imaginary exercises called mental imagery, pairing things or objects called paired associations, and the loci method. This review done by Tardif et al., estimated that there was a positive result of the CST program on the variable measures which were included by the different studies in the review.[68]

Teng et.al., undertook a cross sectional study on 205 participants with the objective to identify whether quality of life (QOL) was deceased in cases with mild level of cognitive decline. They also identified association between scoring of QOL, cognition, neuropsychiatric and functional items in declined cognitive functioning. Participant and informant scores on the QOL-AD scale were used to analyze the quality of life in both sample and informant group. In the crux of study, it was observed that there was significant decrease in QOL in mild cognitive decline and this was also associated with neuropsychiatric manifestations. They found that implementation of cognitive stimulation therapy focusing on activity-based routine tasks on cognition can enhance QOL scoring in cases of mild cognitive impairment.[69]

A research study in Bohemia region was done by Bures et al. on 81 participants of age 60 years and above, with the goal to identify the benefits of cognitive-training on the subjective perception of wellbeing. Samples were recruited by randomization process. The MMSE was used for assessment of decline in

cognitive functioning, and to measure the score for perception of well-being, the self-rated well-being WHO index was utilized. Two groups of participants were formed one group of cognitive training and another one as leisure time activity or control group. Total for 8 weeks 24 sessions of cognitive training were given. The outcome proves that gold agers with cognitive training measure shows increase mean of 73.48 when differentiated with participants in non-cognitive training group with mean of 64.13 in regard to cognitive functioning. Also, the outcome of study, demonstrated that the participants in the study group had also improved psychological well-being score.[70]

A quasi-experimental research was carried out in Spain, with the goal to diagnose the impact of cognitive stimulation program on the psychological wellbeing of gold agers above age of 65 years. In the research, Castel et al. recruited total 176 cases. Cognitive score was measured by mental state questionnaire, whereas for psychological wellbeing score, the psychological wellbeing index, which has total 22 items, was used. Study samples were classified into 2 groups— one with 123 cases as cognitive stimulation group and another with 53 cases as the non-therapy group. As per planned modules of the CST program, cognitive stimulation was given in two sessions per week to the study group; whereas no therapy has been given to the comparative group. Study outcomes showed that post program, members of the interventional category group had immensely built-up more in their score at mental wellbeing as compared with non-therapy group ($p<0.001$). It was thus concluded that the cognitive stimulation program has an

important impact in the building up of psychological well-being score of gold agers with mild level of cognitive impairment.[71]

Elena et al., did a study on the impact of an individual's personal characteristics while analyzing short and long-term advantages of cognitive stimulation therapy in individuals having mild level to moderate level of cognitive decline. Total 123 of participants suffering with dementia were recruited. Data collection was done as pre-test, then immediate post-test after accomplishing the therapy, and then 3 months later. Among the various variables studied, it was found that general cognitive functioning and language, routine activities, quality of life, growing years, mood plus behavior, literacy status, and basic pre-test cognitive ability score in mood (depression), as well as other behavior related factors, were predictors of any small- and long-term advantages. The outcome of study showed that among various personal characteristics, literacy status and age, have a major impact on the advantages of the program.[72]

Effectiveness of Cognitive Stimulation Program on cognitive functions and quality of life among elderly

In 2021, a study was conducted by Cintia on effectiveness of cognitive stimulation virtual therapy on elderly who were suffering with declining cognitive functions, and were also isolated, during the COVID-19 pandemic. In the study 20 gold agers were recruited who had mild level of cognitive decline. They were classified into two groups. One group of 10 given a half yearly program, with 2 sessions in one

week of the cognitive stimulation therapy in virtual mode. In contrast, another group with same number of participants was involved in alternative activities. Tools used in the study were the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) form and the Quality of Life (QOL) scale. Post-session increased measurement scores advocated the efficiency of the cognitive stimulation therapy in online mode to the elderly with cognitive decline, who were isolated in pandemic. Progressive change was also found in working memory (short term) and perceived quality of life of gold agers with cognitive decline. Effectiveness of the cognitive stimulation virtual therapy was also noted on mood level, anxiety, as well as on sleep quality of the elderly studied.[73]

In a randomized clinical study, Yu-Chun et al. investigated the effect of the Individual Cognitive Stimulation Therapy (ICST) program on gold agers with Alzheimer's disease (AD), with the aim of identifying the worth of the individual program on cognitive functions and QOL of these gold agers patients. Total 38 individuals suffering with mild level of AD were taken. A 90 minutes cognitive stimulation session was given to the experimental group, which was repeated up to 3 times weekly over 24 weeks. The results of the study were assessed before and after 24 weeks using the MMSE, Montreal Cognitive Assessment (MoCA), and Activities of Daily Living (ADL) tools. From the study results, it was noted that cognitive stimulation therapy had a constructive effect on the cognitive ability and improvement in quality of life. Outcomes of the study also stated that it has the potential to serve as a preventive measure to be implemented at the earliest

possible.[74]

A randomized control trial was undertaken by Peri et al. who utilized neighborhood senior centers (SCs) to research the scientific gap in the execution of a multi-domain program for the prevention of dementia. In this study, a multi-domain program was given twice week to elderly who were at risk of declining cognitive functioning. The execution and assessment were for 24 weeks. In this investigation intervention package incorporated strategies like double-task exercises, and cognitive structured teaching. Main aim of this study was to identify the reach of program, its effectiveness, adaptability, and execution. The study mainly focused on constitutes of intellect, quality of life, and physical ability. After twenty-four weeks, the measurements showed no markable difference between groups in the cognitive status, QOL, and in the tested parameters of blood. However, after 24 weeks, improvement was observed in physical functions of the elderly in the intervention group. This research study also stated that a multi-domain program for elderly who have decline or are at danger of having cognitive impairment may be implemented at SCs to benefit the inhabitants of such centers.[75]

Park et al. carried out a study by using a pre-test–post-test research methodology in one group to trace out the building up of the older people's cognitive abilities after providing a multicomponent cognitive stimulation program (MCSP). The multicomponent cognitive therapy was implemented for 10 weeks and was found effective on improving cognitive abilities in gold agers; but its impact varied

among the different groups of young old age (65- 75 years) and old-2 age (more than 75 years) groups.[76]

A cross-sectional study was carried out to evaluate the impact of bodily activity or physical capability on the elderly's self-determination, as well as on their psychological health. The investigation done in 2019 was carried out by Park et al., who also explored socio-demographic forecasting factors of physical activity and vitality among elderly residing in two dissimilar types of residence. In the study outcomes physical functioning and mental health activity in elderly were found to be correlated with their quality of life. Among the socio-demographic factors their age, literacy status, marital status, and count of diseases were identified to be correlated with vitality.[77]

In a comparative study and randomized trial on 40 participants, Ren et al. deployed cognitive stimulation therapy for 23 participants and used a controlled group of 27 participants to whom reminiscence therapy was given. The study outcome reflected cognitive stimulation therapy as a treatment tool against reminiscence therapy. Thus, as per study cognitive stimulation therapy is it is considered as non-pharmacological approach with no risk treatment but there is need to explore other competitive alternatives as well.[78]

Apostolo et. al. analyzed the impression of cognitive stimulation therapy (CST) on cognitive status and depressive symptoms among residents in a nursing home. The study's findings justified deployment of cognitive stimulation therapy in nursing

homes. In addition to the impact on old-age independence and autonomy, it also indicated that this therapy may provide monetary benefit by cutting the direct cost incurred due to the cognitive fragility of the elderly.[79]

A quasi-experimental study was investigated by Sipollo et al. on impact of cognitive stimulation therapy (CST) as an intervention on demented older persons' cognitive abilities. The interventional and non-interventional groups were assigned at random to two nursing homes. A simple random sample procedure was adopted and 27 demented older persons with dementia were selected from each nursing home. The interventional group given a CST program for three days a week for total five weeks. The non-study group given a standard medical treatment. According to the findings, CST had an influence on the cognitive abilities of demented older persons. Before the intervention, there was no marked variation between the experimental and non-experimental group (p=0.161). The average cognitive ability score in the interventional group was significantly greater after the CST program than before (p<0.001). Therefore, in demented elderly persons, CST can increase cognitive capacity. This study recommended that nurses and health care teams need to use CST to help elderly with decline in cognitive abilities, and also recommended that this study should be replicated for other levels and types of dementia in the future.[80]

A quasi-experimental research to assess the ability of the cognitive stimulation therapy in cases with poor cognitive ability based on their cognitive level was done by Gurung & Upendra, using purposive sampling, in which 50 dementia

patients were recruited. Participants' cognitive abilities were assessed by the Montreal Cognitive Assessment (MoCA) and after assessment the participants were administered cognitive stimulation therapy, which consisted of 14 sessions of diverse exercises spread out over a 4 weeks period. The investigators used the same technique to conduct a post-test on the day 7 post-intervention. In the study result of the t-test was 3.82 at the 0.05 level. So, per the study results, it was stated that in patients with decline in cognitive functions, cognitive stimulation therapy is demonstrated to be effective.[81]

Bajpai et al. conducted a randomized controlled trial research project on building up memory and daily living routine activities in individuals having early Alzheimer's disease. A comparison was done in the study to evaluate the impact of memory stimulation activities by combining it with donepezil medication versus only donepezil in patients with early cognitive decline. For 2 months, total 21 participants in the combination therapy group received standard doses of donepezil medication as well as weekly intervention sessions for memory stimulation activities. In contrast, 22 participants of the non-combination therapy group received only standard doses of donepezil medication. Both groups were assessed using the MMSE. The combination therapy group scored four points higher than the non-combination therapy group highlighting the efficiency of memory stimulation activities.[82]

Sharma evaluated the correlation among cognitive level and QOL in elderly. Convenience sampling was used to choose 129 males and females aged 60–75 who

had cognitive impairment. The MoCA was utilized to determine cognitive functioning levels. The QOL-AD scale was adapted to measure the QOL. In result a modest positive connection was found r=0.465 and p<0.05. According to the findings, older persons' cognitive abilities and quality of life are moderately correlated.[83]

Piras et al. worked on the efficacy of cognitive stimulation therapy on vascular dementia. Total 35 participants of senior age were allocated in the study. Of these, one group of 21 participants were chosen to be a part of the cognitive stimulation program which included 14 sessions. The second was the active control group including 14 participants who were given a different intervention. Various factors like cognitive functioning, mood, behavior, functional daily living activities, and QOL were identified. In outcome of this study, participants of the group who attended the Cognitive Stimulation Therapy-Individual Training (CST-IT) program revealed maximum refinement in their general cognitive abilities. Tools used in the study were MMSE for diagnosing cognitive ability and the second was Alzheimer's Disease Assessment Scale. An additional outcome of the study was a positive inclination identified in immediate working memory and perceived quality of life.[84]

Samuel et al. undertook a cross-sectional investigation with the objective of assessing declining cognitive functioning along with evaluating need of CST, on the basis of residence classification in Chennai. Total 499 elderly participants in three categories were taken, out of which 173 were home-based community-citizens, 176 were in paid-homes, whereas, 150 were free-home residents. Additionally, they also

located the independent correlation between decline in cognitive functions and health-based quality of life (QOL) among these gold agers. They found that 42.7% elderly without a home had declined cognitive status, and it had significant negative impact on health-based QOL. Further, they stated that there is immense need of the CST type program because cognitive impairment related disability and health-based QOL was poor in these age-category scenarios.[85]

A comparative study was done by Young et al. to identify the impact of an extended model of cognitive stimulation therapy (CST) as an intervention which constituted the cognitive stimulation therapy along with tai chi therapy. It was done by using waitlist-controlled trial design on elderly who were at mild stage of dementia. The intervention group was given a planned CST followed by tai chi therapy twice weekly, with 14 whole sessions during the entire project period. Waitlist control participants were given intervention as usual at the beginning stage and later stage followed by expanded CST intervention or model. Altogether, the candidates had mean 20.67±2.30 as a basic mini mental state measure. The repeated analysis test ANCOVA depicted that the participants of the study group were significantly more effectual when contrasted with the other group in improving the Mini Mental State Examination score. This investigation recommended more exploration about this intervention model across culture and also in communities.[86]

A randomized controlled investigation with single blind on 68-participants having dementia and along with their care providers was done by Cove et al. They studied the influence of cognitive stimulation therapy given once a week to dementia

diagnosed individuals, and also investigated the auxiliary effect of cognitive stimulation therapy supplemented with an instructional training program for the care givers of such individuals. These two groups were contrasted against a third wait-listed control group. In this research, the samples were randomized to one of three conditions—1) cognitive stimulation therapy alone, 2) cognitive stimulation therapy along with training of caregivers, and 3) wait list control. In the study, the intervention was given in twice a week-sessions till 14 weeks by dividing it in to various sessions. Each session had a different component. Various variables such as cognition, quality of life, and quality of bond with their care-giver were assessed by standardized tool. The result of the investigation indicated that there was a remarkable difference among all the three groups before and after the follow up.[87]

Aguirre et al. carried out a study on 85 elderly persons with decline in cognitive functions, along with their family caregivers. All participants underwent the CST intervention twice a week for 7 weeks. The elderly and caregivers of the family were evaluated prior to as well as after completing the cognitive stimulation program, and they were also followed up at 3 and 6 months after completing the CST program. When assessing the first phase which was an open trial, a difference in between pre- and post-CST groups was found only in the elderly. The study result did not confirm any advantage of the intervention on family caregiver groups.[88]

Hall et al. carried out a single group pre- and post-test design study on total 34 cases having mild to moderate dementia. The motive of this project was to

determine the advantages of cognitive stimulation therapy on neuropsychological mechanisms on particular cognitive domains as well as on the neuropsychological processes. A manualized 7-week CST program was used in the study and assessment was done by using a battery of neuropsychological tests. On computing the outcome, a substantial improvement between pre-and post-cognitive stimulation therapy group was observed.[89]

Woods et al. carried out a Cochrane review, which included fifteen trials having a total number of 718 cases. The studies reviewed supported that stimulation of cognition has a valuable influence on memory as well as on thinking, of the participants suffering from dementia. Data were meta-analyzed and a clear, persistent advantage on functioning of cognition was found to be related to cognitive stimulation. Furthermore, on the basis of few researches, it was evident that the persons with dementia who participated, appeared to be having a refined standard of life and feeling of wellness. Investigators from this Cochrane review, supported that cognitive stimulation refines cognitive ability in people having cognitive impairment and diagnosed with dementia.[90]

Fernadez et al. analyzed the effectiveness of the cognitive stimulation program on the quality of life of the elderly, as well as they discovered that the elderly people were unavoidably concerned for the psychological changes they undergo because of their age. Objective of this study was to see how the cognitive stimulation program affected total 53 elderly having age associated memory decline. Additionally, this study also identified the association between changes in cognitive

status and the differentiation in the perceived quality of life of the gold ager in two categories—one with the CST and another as a non-intervention group. The outcome noted the remarkable difference in the interventional group, as well as demonstrated significant refinement in cognitive ability and quality of life perception.[91]

An investigation on cognitive stimulation approach for senior residents having cognitive impairment of mild level was contrasted with normal members of similar age group. The observation was done on 12 sufferers with MCI and 12 individuals with normal cognitive functions. Both the groups were given the cognitive stimulation program. A comparison between the groups reflects the effectiveness of the program as the sufferers showed more beneficial outcomes differentiated with the normal non-interventional group. Wenisch et al. concluded that CST is a non-pharmacological intervention which is both economical and beneficial for improving the cognitive deterioration in geriatric individuals.[92]

A study was conducted by Knapp et al. on cost benefits of cognitive stimulation therapy for the individuals suffering with dementia. The focus of the investigation was to evaluate the cost-impact of the CST. For assessment 91 participants were given the intervention twice per week for 8 weeks, while the other 70 were given their normal care. The findings suggest that interventional therapy improves level of cognitive ability and quality of life in gold agers, with no significant cost differences across the groups. Under acceptable assumptions, CST is likely to be more effective economically than traditional treatment.[93]

Summary: This chapter includes review of related research on the decline in cognitive abilities of elderly as well as prevalence of this decline. The chapter has included studies on efficacy of the cognitive stimulation program and particularly its impact on building cognitive abilities and improving quality of life among elderly.