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Non-Pharmacological Interventions to Reduce Geriatric Mental Health Challenges in India: A Systematic Review

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[1]**ABSTRACT**

***Background*:** Geriatrics make up the majority of India's population, creating a range of difficulties in care and therapy. Numerous mental health issues are faced by the geriatric population in India affecting the older population in India, which can have a negative influence on their quality of life and raise healthcare expenditures. The issue is further exacerbated by the fact that the older population in India is unaware of and stigmatized by mental health disorders
***Objective**:* To determine non-pharmacological interventions to reduce geriatric mental health challenges in India.
Methods: A systematic search was conducted on the platforms like PubMed, EMBASE, and Google Scholar databases in order to identify studies in the English language which were published between May 2018 and May 2023. The study specifically focused on randomized controlled trials that assessed non-pharmacological interventions for geriatric mental health issues, with a target population of individuals aged 60 and above. In the study, primary data sources were online databases, and the search was restricted to the last five years and these review articles were manually screened for additional relevant studies.
Results: 18 articles were finalized at the end using a PRISMA flow chart and interpreted results supporting that non-pharmacological practices like yoga, meditation, and exercise have been proven to have positive effects on the mental health of older people. The interventions mentioned in the study improve cognitive performance, reduce anxiety and sadness, and enhance mood and memory and also lowers the risk of dementia and age-related cognitive decline, leading to a higher quality of life for seniors. ***Conclusion:*** The systematic review identified effective interventions like cognitive training, exercise, music therapy, and lay counselor interventions. Community-based implementation and expanding geriatric mental health services are recommended to improve the well-being of older adults in India.
Keywords: Geriatric; mental health; non-pharmacological programs; India; old age

INTRODUCTION

The geriatric population in India is increasing, and with this mental health problems are commonplace among them. Despite the increasing burden, there has been constrained literature on non-pharmacological interventions that might help lessen mental fitness troubles in the aged. Older adults 60 years of age and older make up the population of this study. Non-pharmacologic interventions for older adults' mental health are the main emphasis of this study's interventions.Some examples of interventions stated within the summary encompass yoga, meditation, exercising, mindfulness schooling, tune remedy, and oriented counseling afterward

Cognitive stimulation remedy and psychosocial interventions that target social assistance, counseling, and group sports

are effective in improving mental health in older people (Katiyar et al.,2020). Interventions that include cognitive behavioral remedies and reminiscence remedies have proven promising outcomes in enhancing mental health results in older populations providing effective alternatives to medication-based approaches (Girdhar et al., 2019). These challenges can significantly affect the quality of life of the aged and lead to an increase in healthcare charges. Research indicates that quite a few nonpharmacological interventions, along with psychosocial support and community-based interventions have verified efficacy in enhancing mental health effects in this population (Barbui et al., 2020). The goal is to find effective non-pharmacological interventions that could improve the mental health of India's senior population.

This study aims to cope with this gap within the literature through a systematic review of randomized controlled trials that study non-pharmacological interventions for geriatric mental health challenges in India. The beneficiaries are the older community, their households, and healthcare professionals. The

findings of the study may additionally lead to the development of interventions and programs that improve the mental well-being and quality of life of the older population in India. **METHODS**

DATA COLLECTION

This is a qualitative non-experimental study, aimed to evaluate geriatric mental health challenges in India and interventions for improving their mental health using PubMed and Google Scholar databases to search for studies published in English between May 2018 and May 2023. The keywords used for searching were, “geriatric, mental health, non-pharmacological programs, India, old age”. Conference and meeting abstracts or posters were excluded from the literature search. Duplicate articles were screened and removed, and the remaining full-text articles were reviewed against inclusion criteria based on the title and abstract. The study discussed the challenges faced by geriatric mental health in India and explored potential interventions. Randomized controlled trails (RCTs) were used to evaluate the effectiveness of therapies and their components.

ELIGIBILITY CRITERIA

Our study included only randomized controlled trials that evaluated non-pharmacological and psychosocial interventions for geriatric mental health challenges. The study population considered geriatric ranged above 60 years of age. This study was anticipated to acknowledge these programs and recommend them to the geriatric population of

India, expecting an improvement in the mental health of the said population. All the searches for primary data were performed online and within the last five years.

INCLUSION CRITERIA

The study focused on assessing the challenges related to geriatric mental health in India. PubMed and Google Scholar databases were searched to select articles published in English only from 2018 to the present, using key terms such as geriatric mental health, challenges, geriatric mental health India, and challenges for geriatric mental health. Only RCTs that discussed non-pharmacological interventions to improve geriatric mental health were included. In addition to the identified articles, additional articles were obtained by manually searching the reference lists of the identified articles and book chapters and recent review articles.

EXCLUSION CRITERIA

During the literature search, abstracts and posters from conferences and meetings were excluded. Additionally, articles published outside the selected time frame, papers without full-text articles available, and papers lacking proper or sufficient information on the research problem were excluded. **ASSESSMENT OF RISK BIAS**

Various tools were available to evaluate bias risk, and the Cochrane Collaboration was the one used in our study as it recommended a simple assessment of low-risk, high-risk, or uncertain risk. The evaluation referenced all works according to APA style to respect the authors' intellectual property, and multiple articles and papers from various regions were included to avoid regional bias. Publication bias was prevented by rejecting papers that supported the same ideas. (See Table 2 for Risk of Bias Assessment and Table 3 for Critical Appraisal of each article).

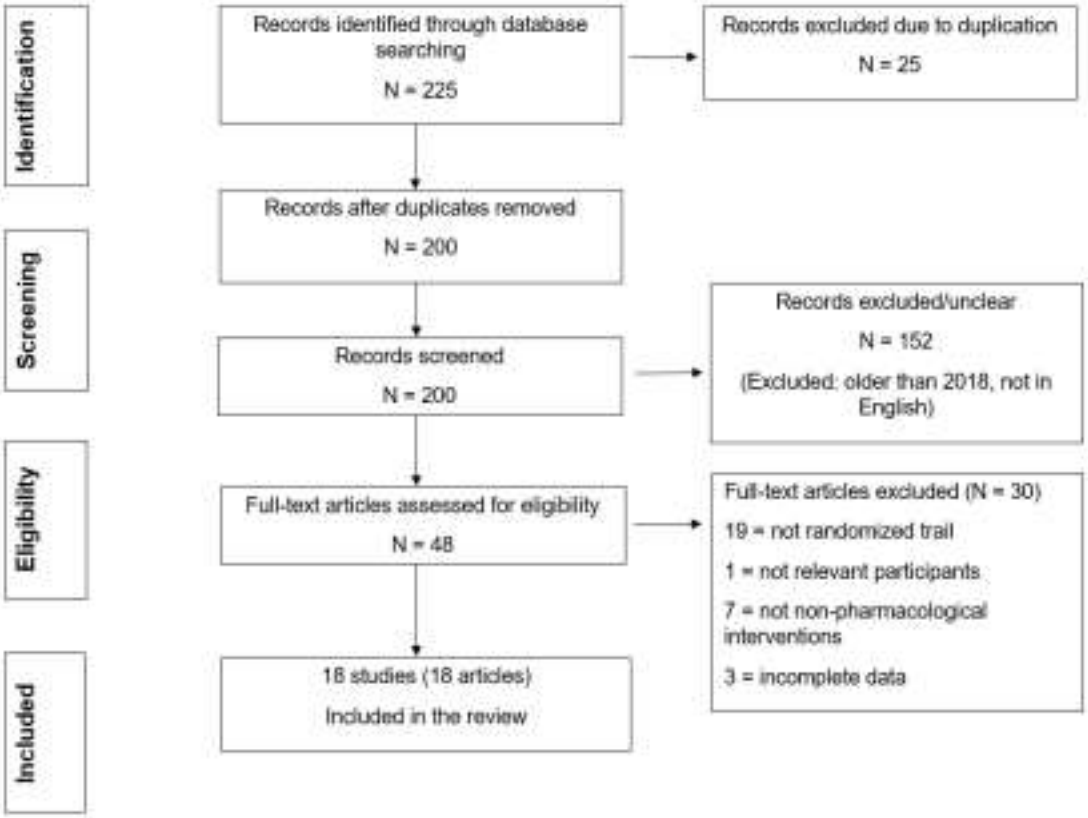

Figure 1. PRISMA Flow Diagram

RESULTS

This gathering of 18 articles explores numerous methods to improve the mental health and well-being of elderly adults (See Table 1 for a summary of findings from each article and Table 4 for further details). The studies include randomized controlled trials and clinical trials that tested interventions such as meditation, Pilates exercise, yoga, progressive muscle relaxation, exercise and horticultural programs, peer companionship, implementation science, and lay counselor intervention.

A study discovered that doing meditation or practicing a foreign language can improve brain and mental health in older adults. Another study discovered that Pilates exercise can remarkably increase cheerfulness and reduce depression in elderly women. A third study observed the effectiveness of yoga and light exercise in encouraging healthy aging and wellbeing in older adults, concluding that both interventions enhanced complete wellbeing, but yoga was better in reducing anxiety and depression symptoms.

Additionally, a randomized clinical trial revealed that progressive muscle relaxation can improve mental health in older women. Another study found that exercise and horticultural programs improved depressive symptoms and

memory difficulties in older adults. Peer companionship was also found to be an effective intervention for enhancing mental health in older adults in primary care.

Other studies investigated implementing science and music intervention. The former pointed to implementing geriatric mental health interventions and found that interventions led to improvements in depression and anxiety symptoms. That showed group music intervention was effective in reducing depression in elderly people in nursing homes.

Lastly, lay counselor intervention was found to be effective in averting most depression in elderly adults residing in low- and middle-income countries. In summary, these studies suggest that a wide array of interventions can be beneficial in encouraging mental health and welfare in older adults, counting physical exercise, meditation, peer companionship, and lay counselor intervention. These interventions may be predominantly noteworthy for older adults who may experience social loneliness or insufficient access to mental health care.

Table 1 - Summary of Findings

Articles	Study Selection and Literature Review
Poisnel et al. (2018)	This randomized controlled trial called the Age-Well study examined the effects of two interventions, meditation, and foreign language training, on the brain and mental health of older adults. Outcomes included changes in cognitive performance and to evaluate the results, brain structure and function, psychological well-being, physical health, sleep quality, and inflammatory markers Neuroimaging, cognitive testing, questionnaires, and biological markers were used.
Ravari et al. (2020)	The study aimed to investigate the effect of Pilates exercise on happiness and depression in elderly women. 60 elderly women were randomly assigned to either an experimental or control group. The primary outcomes were changes in happiness and depression scores, measured using the Oxford Happiness Inventory and Beck Depression Inventory.
Hidalgo, J. L., et al.. (2021)	To compare the effectiveness of physical exercise with that of treatment with antidepressant drugs routinely used in clinical practice, in terms of decreasing depressive symptomatology in patients aged ≥65 years who present with clinical criteria of a depressive episode. randomized clinical trial in a primary care setting. A total of 347 patients aged ≥65 years with a clinically significant depressive episode were randomized to participate in a supervised physical exercise program or to receive antidepressant treatment by their general practitioners. Although improvement was initially similar in both treatment groups, Antidepressant treatment was better in the medium term, despite giving rise to a larger number of adverse effects.

Gökşin, İ.,et al. (2021)	This randomized clinical trial inspected the influence of progressive muscle relaxation (PMR) on the mental well-being of elderly women. The results established that PMR intervention pointedly improved depression levels and adaptation to old age unlike tothe control group. The study advocates that PMR can be an operative non-pharmacological intervention for improving mental well-being in elderly women, highlighting its ability to address depression and promote better adaptation to the challenges of aging. These findings bring into line with previous research supporting the aids of relaxation techniques, including PMR, in enhancing psychological outcomes among older adults. More research needs to be done with a larger sample size to give a general demographic perspective.
Makizako et al. (2019)	This randomized controlled trial study which investigated the effects of exercise and horticultural programs on depressive symptoms and memory problems in older adults. The study enlisted 294 participants aged 65 years or older who reported depressive symptoms and mild memory problems in which the primary outcome change in depressive symptoms, followed by changes in memory function, physical function, and cognitive function, and concluded that exercise and horticultural programs may be effective interventions.
Conwell et al. (2021)	This randomized controlled trial evaluated the effectiveness of peer companionship for improving mental health among older adults in primary care. The study is done on adults aged 60 years and above who were seeking care at primary care clinics for depression, anxiety, or other mental health concerns in which the participants were randomized to receive either usual care (UC) or peer companionship (PC) for the period of 6 months. The primary outcome was the severity of suicidal ideation as measured by a continuous score on GSIS. The Secondary outcomes included changes in depressive symptoms, anxiety symptoms, feelings of belonging, and burdens, and concluded that the PC group had significantly greater improvement in PHQ-9 scores compared to the UC group. This study suggests that peer companionship may be an effective intervention to improve mental health outcomes among older adults in primary care.
Cieślikj et al.(2023)	This study investigated the effectiveness of an immersive virtual reality (IVR) intervention in treating depression and anxiety symptoms in elderly women. The intervention combined elements of Erickson's psychotherapy, relaxation techniques, and Japanese garden aesthetics. Sixty women with depressive symptoms participated and were randomly assigned to either the IVR group or the control group. Both groups received eight low-intensity general fitness training sessions, while the IVR group additionally received eight VR-based relaxation sessions. In this article the primary outcome measure was the geriatric depression scale whereas the secondary measure outcome was the Hospital Anxiety and Depression Scale which showed that the IVR group experienced a significant reduction compared to the other control group, indicating a positive impact on depression and anxiety symptoms. This study suggests that IVR interventions incorporating psychotherapy, relaxation, and garden aesthetics can effectively alleviate the severity of mental health symptoms in elderly women.

Articles	**Study Selection and Literature Review**

Yu et al. (2022)	In this article the study investigated the effects of group music intervention on depression among elderly people in nursing homes in which 63 participants were randomly assigned to either a music intervention group or to a control group in which the primary outcome measure was the Geriatric Depression Scale which showed that the music intervention group had a significant reduction in Geriatric Depression Scale scores compared to the control group. In conclusion, the author mentioned that group music intervention can be an effective and feasible intervention to improve depression among elderly people in nursing homes.
Dias, A., et al. (2019)	In this study a randomized clinical trial was conducted to examine the effect of a lay counselor intervention on preventing major depression in older adults living in low- and middle-income countries. The study included 181 participants who were 60 years or older with no major depressive disorder at baseline. The intervention group received up to six sessions of problem-solving therapy delivered by trained lay counselors over three months, on the other hand, the control group received usual care. The primary outcome was the incidence of major depression at 6 and 12 months after enrollment. It was concluded that the intervention is a feasible and effective way to prevent major depression in older adults living in low- and middle-income countries.
Scazufca, M., et al. (2022)	The study was a two-arm, parallel-group, cluster-randomized controlled trial to evaluate the effectiveness of a task-shared, collaborative care psychosocial intervention in improving depressive symptomatology among older adults in a socioeconomically deprived area of Brazil. The primary outcome was the change in depression symptomatology score from baseline to 12 months, assessed using the Geriatric Depression Scale.
Choi, N. G., et al. (2020)	The study is a randomized clinical trial that compares the effectiveness of telehealth treatment by lay counselors versus clinicians on depressive symptoms among older adults who are homebound. The participants were 277 homebound older adults who were randomly assigned to receive telehealth treatment by lay counselors or clinicians. There was no significant difference found in depressive symptoms. However, the study did find that the lay counselor group had better treatment adherence and higher satisfaction with treatment than the clinician group.
Biasutti, M., et al. (2021)	The article "Music Training Improves Depressed Mood Symptoms in Elderly People: A Randomized Controlled Trial" by Biasutti and Mangiacotti (2021) found that the experimental group aged 62 years and older had a significant reduction in depressive symptoms and improved cognitive functioning and quality of life. However, the study has limitations such as a small sample size of 45 participants and a relatively short intervention period.
Gómez-Soria, I., Ferreira et al. (2023)	This article was published in 2023 consisting of 337 older adults who were randomly assigned to either an intervention group or a control group and found that the cognitive stimulation program had a positive effect on cognitive function and mood in older adults, especially in those with lower baseline cognitive function. The authors concluded that the cognitive stimulation program shows a positive correlation to improve cognitive function and mood in older adults, especially those with cognitive impairment.
Chatterjee, P., Kumar et al. (2022)	The aim of this article was to evaluate the effect of a multimodal intervention (computer-based cognitive training, diet and exercise) compared to health awareness on cognitive function and other outcomes in older adults with subjective cognitive impairment. The study included 60 participants and it was concluded that the multimodal intervention showed promising results in improving cognitive function and other outcomes.

Sadler et al. (2018)	This study investigated the effectiveness of cognitive behavior therapy for older adults with insomnia and depression which included 72 participants aged 60 years and above who were randomly assigned to receive either CBT or treatment as usual TAU in which the primary outcome was changed in depressive symptoms, while secondary outcomes included changes in insomnia severity and quality of life. In conclusion, CBT significantly reduced depressive symptoms and insomnia severity compared to TAU, suggesting that CBT may be an effective treatment option for older adults with comorbid depression and insomnia.
Han et al. (2018)	The article is related to Complementary Therapies in Medicine "Reduced stress and improved physical functional ability in elderly with mental health problems following a horticultural therapy program" was published in 2018 in which 28 elderly participants with mental health problems were randomly assigned to either a horticultural therapy group or a control group and the results exhibited that the horticultural therapy group had significantly reduced stress and improved physical functional ability compared to the control group, but apparently, there were no significant differences in terms of depression symptoms.

Articles	**Study Selection and Literature Review**
Sandra Saldivia, Carolina Inostroza et al. (2019)	This article "Effectiveness of a group-based psychosocial program to prevent depression and anxiety in older people attending primary health care centers" was published in 2019 in which the study population consisted of 340 older adults who were randomly assigned to the intervention group or the control group and found that the intervention group had a lower incidence of depression and anxiety as compared to the control group also the use of its randomized controlled trial design, of validated outcome measures, and high retention rate of participants give further strength to the study.
Souad Bakloutia et al. (2022)	This article is a randomized controlled trial that investigated the effect of a web-based Hatha yoga intervention on psychological distress and sleep quality in older adults, which involved 160 community-dwelling older adults aged 60 years and above who reported the symptoms of psychological distress and poor sleep quality in which the intervention group received eight web-based Hatha yoga sessions over a period of four weeks, in which the primary outcomes were psychological distress and sleep quality. In conclusion, the study found that the Hatha yoga intervention significantly improved psychological distress and sleep quality compared to the control group.

Table 1: This table provides the overall study selection and literature review for all 18 articles. It mainly shows the key information and summarized findings from each of the articles included in the systematic review.+

Table 2 - Risk Bias Assessment

	D1	D2	D3	D4	D5	Overall
Poisnel et al. (2018)						
Ravari et al. (2020)						
Hidalgo, J. L., & SotosJ. R. (2021)						
Gökşin, İ.,et al. (2021) **Makizako et al. (2019)** **Conwell et al. (2021)**						
Cieślikj et al.(2023)						
Yu et al. (2022)						
Dias, A., et al. (2019)						
Scazufca, M., et al. (2022)						

Choi, N. G., et al. (2020)						
Biasutti, M., et al. (2021)						
Gómez-Soria, I., Ferreira et al. (2023)						
Chatterjee, P., Kumar et al. (2022)						
Sadler et al. (2018)						
Han et al. (2018)						
Sandra Saldivia, Carolina Inostroza et al. (2019)						
Souad Bakloutia et al. (2022)						

Domains:

D1: Bias due to randomisation.

D2: Bias due to deviations from the intended intervention.

D3: Bias due to missing data.

D4: Bias due to outcome measurement.

D5: Bias due to selection of reported results.

Judgment:

High Risk of BIas	Moderate Risk of BIas	Low Risk of Bias

Table 2 : Out of 18 articles, 17 present with an overall low bias and only one article with overall moderate risk bias. Altogether, this shows a low-risk bias selection of the articles chosen hence making the research trustworthy

Table 3 - Critical Appraisal

Authors	Poisnel et al. (2018)	Ravari et al. (2020)	Hidalgo, J. L. etal. (2021)	Gökşin, İ.,et al. (2021)	Makizako et al. (2019)	Conwell et al.(2021)	Cieśli kj et al.(2023)	Yu et al. (2022)	Arti. Dias, A., et al. (2019)	Scazufca, M., et al. (2022)	Choi, N. G., et al. (2020)	Biasutti, M., et al. (2021)	Gómez-Soria et al. (2023)	Chaterjee et al. (2022)	Santorini et al. (2018)	Han et al. (2018)	Sandra Saldivia et al.(2019)	Souad Baklouti et al. (2022)
Did the study address a clearly focused research question?	CT	N	Y	Y	Y	Y	Y	CT	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Was the assignment of participants to interventions randomised ?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Were all participants who entered the study accounted for at its conclusio	Y	Y	N	y	N	N	Y	Y	Y	Y	Y	Y	Y	CT	Y	Y	Y	Y

n?																		
Were the participants 'blind' to intervention they were given?	Y	N	N	N	Y	N	Y	N	CT	CT	N	N	CT	CT	CT	N	N	CT
Were the investigators 'blind' to the	N	N	N	N	N	N	Y	Y	N	N	Y	N	CT	CT	CT	N	N	CT

intervention theywere givingto participants ?																		
Were the people assessing/ analysing outcome/ s 'blinded' ?	N	N	N	N	CT	N	Y	CT	Y	Y	Y	CT	CT	CT	N	N	Y	CT
Were the study groups similarat thestart of the randomised controlled	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

trial?																		
Apart from the experiment al intervention , did eachstudy group receive the same level ofcare (were they treated equally)?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	CT	CT	CT	CT	Y	Y
Were the effects of intervention reported comprehen sively?	Y	CT	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	CT	Y	Y	Y	Y
Was the precision of the estimate of the intervention or treatment effect reported?	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Do the	Y	Y	Y	Y	Y	CT	Y	Y	Y	CT	Y	Y	CT	CT	CT	CT	Y	Y

benefits of the experiment al intervention outweigh the harms and costs?																		
Can the results be applied to your local population/ in your context?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	CT	CT	Y	Y
Would the experiment al intervention provide greater value to the people in your care than any of the existing interventi on s?	CT	CT	Y	CT	N	N	Y	Y	CT	CT	CT	Y	Y	N	CT	CT	CT	CT

Table 3: Details of the CASP Tool used to assess studies included for review { Details: Y: Yes, N: No, CT: Can't Tell}. There are 154 Yes, 38 No, and 42 Can't Tell. This showcases that the majority of the article is of good quality and can be trusted.

DISCUSSION

Recent studies highlight how non-pharmacological techniques like yoga, meditation or exercise can positively impact the mental health of the elderly. Through consistent physical activity, older adults can enhance their overall cognitive function while experiencing a reduction in feelings of anxiety or depression. Meanwhile, yoga and meditation practices

regularly demonstrate improvements in stress management skills along with better mood regulation and memory performance amongst elderly individuals known to struggle with said areas showing marked improvements through these interventions. Accessing such treatments has also shown potential for protecting against risks associated with age-related cognitive decline or dementia; hence integrating these interventions can contribute towards a more satisfactory lifestyle both emotionally & physically.

These studies offer insightful information on the relationship between various interventions given and mental health. The majority of research shows a solid beneficial relationship between physical activity and mental health in the senior population, despite variations in study designs and physical activities. Exercise may lessen the chance of developing depression, anxiety, and cognitive decline in addition to enhancing general well-being and quality of life (Makizako et al., 2019). Exercise can be beneficial in its various forms; Yoga is seen to be an effective treatment for elderly individuals struggling with mental health issues (Belam, 2020) and pilates has demonstrated major improvements in psychological and mental health-related factors, including emotional health, life satisfaction, quality of life, and perception of health (Pereira et al., 2022). Physical activity does not just limit itself to exercise, it can be perceived in a different way like the practice of horticulture can benefit senior citizens' social, mental, and even physical well-being (Yun et al., 2023).

Interventions can go beyond programs that involve a kind of physical activity and still show a positive effect on mental health. One non-physical non-pharmacological strategy that has been proven to be successful in treating depression in the geriatric population is music therapy (Dhippayom et al., 2022), which can be done regardless of whether being actively or passively applied (Yu et al., 2022). Symptoms of depression in those who received cognitive stimulation training have been shown to be improved (Del Carmen Carcelén-Fraile et al., 2022). Counseling also aids to support the mental health of the geriatric population, through various ways such as lay counseling (Connolly et al., 2021) or even done remotely

like tele-delivery (Choi, Caamano, et al., 2020). Studies indicate that loneliness could serve as a contributing risk factor for deteriorating mental health conditions experienced by senior citizens. This newfound knowledge

underscores why it is crucial to consider the overall welfare of elderly persons holistically (Losada et al., 2012). Companion-focused interventions have indicated value in elevating seniors' spirits and combatting loneliness (Conwell et al., 2021). By bringing together complementary interventions, mental health, and well-being can be promoted and enhanced among this demographic (Kim, 2015).

Many studies found effectiveness in the geriatric population regarding their mental health and improving their quality of life. These can be applied to the population in our research especially the studies such as the effectiveness of cognitive study therapy (Gómez-Soria et al., 2023), multimodal intervention program published in PloS One in 2022 (Chatterjee et al., 2022), a group-based psychosocial program to prevent depression and anxiety in older people (Saldivia et al., 2019), music intervention on depression (Yu et al., 2022) and so on. These therapies have been shown to be effective in lowering depression in the older population (Yu et al., 2022) as well as in enhancing psychological well-being, sleep quality (Poisnel et al., 2018), and adaptation to aging (Gökşin & Aşiret, 2021). Older people in India can benefit from these non-pharmacological measures by improving their mental health.

The data obtained have several limitations. Language bias was evident as only English-language papers were gathered for our study. We were not able to collect as much research as we could as the time period chosen for our study was from 2018 to 2023 in which a few years were lost to the pandemic. Some findings may not be as generalizable to different populations because some participants were chosen based on their geographic location (Scazufca et al., 2022) and also due to the limited sample size.

The performance bias that persons were literate and educated is another drawback because it may not be representative of the overall population. (Poisnel et al., 2018). The staff members and participants weren't blinded (Conwell et al., 2021). Some studies failed to note any unfavorable outcomes or potential dangers connected to the intervention. It may not be completely correct to rely just on self-reported metrics.

CONCLUSION

The modern review has recognized a number of non-pharmacological interventions for geriatric mental fitness demanding situations in India. The reviewed studies reveal that diverse interventions, which include cognitive training,

exercising, track therapy, and lay counselor interventions, were powerful in enhancing intellectual fitness effects in older adults. Furthermore, the results propose that enforcing geriatric intellectual health services in community settings can be an effective manner to enhance the mental fitness and well-being of older adults.

RECOMMENDATION

Based on the evidence offered within the contemporary evaluation, it is encouraged that policymakers and healthcare vendors prioritize the implementation of non-pharmacological interventions for geriatric mental fitness demanding situations. Additionally, network-based interventions and offerings, which include peer companionship applications and complete geriatric interventions, ought to be improved to reach a much broader audience of older adults in India. Future studies should recognize the effectiveness of those interventions in distinct populations and settings, in addition to exploring the boundaries of the implementation of geriatric mental health services in India.

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APPENDIX

Table 4

#	Article Title	Authors	Year of Publication	Country	Study Aim	Population	Result/Outcome
1	The Age-Well randomized controlled trial of the Medit-Ageing European project: Effect of meditation or foreign language training on brain and mental health in older adults	Poisnel G, Arenaza-Urquijo E, Collette F, Klimecki OM, Marchant NL, Wirth M, de La Sayette V, Rauchs G, Salmon E, Vuilleumier P, Frison E, Maillard A, Vivien D, Lutz A, Chételat G	2018	Across United Kingdom	To evaluate an 18-month preventive meditation-based intervention addressing the attentional and emotional aspects of aging in order to promote geriatric mental health and wellbeing.	137 cognitively unimpaired older adults	The intervention had no discernible effect on the volume of the anterior cingulate cortex or insula. They also demonstrate the favorable behavioral effects of meditation, which were not significantly reflected in the volume or perfusion of the targeted brain regions.

2	The effect of Pilates exercise on the happiness and depression of elderly women: a clinical trial study	Ravari A, Mirzaei T, Bahremand R, Raeisi M, Kamiab Z.	2021	Southern Iran	To investigate the effects of Pilates on elderly women's levels of depression and happiness.	60 elderly women	Participants in the intervention groups at the end of the first and second months had considerably higher mean happiness and sadness scores than those in the control group.
3	Effectiveness of Physical Exercise in Older Adults With Mild to Moderate Depression	Hidalgo, J. L., & Sotos, J. R	2021	Spain	A randomized clinical trial in a primary care setting to investigate the effectiveness of physical exercise as a treatment for mild to moderate depression in older adults.	Total of 347 patients aged ≥65 years with a clinically significant depressive episode	Both antidepressants and physical activity, carried out in group sessions, are capable of decreasing depressive symptomatology among persons aged ≥65 years diagnosed in primary care with mild-to-moderate depressive disorder. Although the resulting improvement in depressive symptoms was initially similar for both treatment options, antidepressants was superior in the medium term. Despite the fact that adverse

							effects were significantly greater in the AT group, both interventions were found to be satisfactory by the participants and favorably affected their self-perceived health status.
4	The effect of progressive muscle relaxation on the adaptation of elderly women to depression and old age: a randomised clinical trial	Gökşin, İ., & Aşiret, G. D.	2021	Turkey	It was aimed to evaluate the effect of progressive muscle relaxation (PMR) exercises on the depression level of elderly women and their adaptation to old age.	The sample consisted of 49 elderly women (21 intervention and 28 controls) from a family health centre ages 65 and above.	As a result of the PMR exercises performed for 8 weeks, it was determined that there was a statistically significant difference in the mean Geriatric Depression-15 Scale and Assessment Scale of Adaptation Difficulty for the Elderly scores of the women in the intervention group compared to the control group (P < 0.05).

5	Exercise and Horticultural Programs for Older Adults with Depressive Symptoms and Memory Problems: A	Hyuma Makizako, Kota Tsutsumi mot o, Takehiko Doi, Keitaro	2019	Obu city, a suburb of Nagoya, Japan	To investigate the efficacy of exercise and horticultural interventions	294 participants. Independent, community-dwelling adults aged	Neither exercise nor horticultural activities led to reduced depressive
	Randomized Controlled Trial	Makino, Sho Nakakubo , Teresa Liu-Ambrose, Hiroyuki Shimada			for community-dwelling older adults with depressive symptoms and mild memory decline	>\= 65 years with presence of depressive symptoms .	symptoms. Only the exercise intervention showed improved memory functioning effects
6	Peer Companionship for Mental Health of Older Adults in Primary Care: A Pragmatic, Nonblinded, Parallel-Group, Randomized Controlled Trial	Yeates Conwell, M.D. , Kimberly A, Van Orden, Ph.D., Deborah M. Stone, Sc.D., M.S.W., M.P.H., Carol Podgorski, Ph.D., Kimberly A. Kaukeinen, Xin Tu, Ph.D.	2021	Western New York State.	To determine whether peer companionship delivered by an aging services agency to socially-disconnected older adult primary care patients was associated with improvement in suicidal ideation depression,	Adult primary care patients ages 60 years or older	TSC was superior to CAU for improving depression, anxiety, and perceived burden, but not suicidal ideation.

					anxiety, and psychological connectedness.		
7.	Immersive virtual reality as support for the mental health of elderly women: a randomized controlled trial	Błażej Cieślik, ,Karolina Juszko, Pawel Kiper & Joanna Szczepańska Gieracha	2023	Japan	This study aimed to evaluate the effectiveness of an immersive virtual reality (IVR) intervention that incorporated Japanese garden aesthetics, relaxation, and elements of Erickson's psychotherapy in alleviating depression and anxiety symptoms	age 60–85 years and a 30-item Geriatric Depression Scale (GDS-30) score of < 10 or a Hospital Anxiety and Depression Scale (HADS) score of < 8.	This study compared the effectiveness of Interactive Virtual Reality (IVR) intervention with group relaxation in elderly women. IVR was found to be significantly more effective in reducing depression and anxiety symptoms. The therapeutic aspects of Ericksonian psychotherapy and Japanese garden aesthetics contributed to the positive mental health outcomes.

					among elderly women		
8	Effects of Group Music Intervention on Depression for Elderly People in Nursing Homes	Ai-Ling Yu, Shu-Fen Lo, Pei-Yu Chen, and Shiou-Fang Lu	2022	Northern Taiwan	The aim is to to examine the effects of group music intervention on depression for elderly people in nursing homes	65 or above living in the nursing home for at least more than 1 month; and presenting normal or mild cognitive impairment.	The results show that the group music intervention may effectively reduce the depression scores for elderly people in nursing homes
9	Effect of a Lay Counselor Intervention on Prevention of Major Depression in Older Adults Living in Low and Middle-Income Countries: A Randomized Clinical Trial	A., Azariah, F., Anderson, S. J., Sequeira, M., Cohen, A., Morse, J. Q., Cuijpers, P., Patel, V., & Reynolds, C. F.,	2019	Goa, India	To evaluate the effectiveness of a lay counselor intervention in preventing major depression among older adults living in low- and middle-income countries	181 older adults (aged 60 years and above) with subsyndroma l depressive symptoms at rural and urban primary care clinics in Goa, India	The DIL intervention is effective for preventing episodes of major depression in older persons with subsyndromal symptoms.

10	A task-shared, collaborative care psychosocial intervention for improving depressive symptomatology among older adults in a socioeconomically deprived area of Brazil (PROACTIVE): a pragmatic, two-arm, parallelgroup, cluster-randomised controlled trial	Scazufca, M., Nakamura, C. A., Seward, N., Moreno-Agos tino, D., van de Ven, P., Hollingworth, W., Peters, T. J., & Araya, R.	2022	São Paulo, Brazil	To evaluate the effectiveness of a task-shared, collaborative care psychosocial intervention for improving depressive symptomatology among older adults living in a socioeconom ically deprived area of São Paulo, Brazil.	Adults aged 60 years or older registered with one of the participating FHTs and identified with clinically significant depressive symptomatology ([PHQ9] score ≥10)	The intervention group had a significantly greater reduction in depressive symptomatology compared to the control group at the 12 months assessment.
11	Effect of Telehealth Treatment by Lay Counselors vs by Clinicians on Depressive	Choi, N. G., Marti, C. N., Wilson, N. L., Chen, G. J., Sirrianni, L.,	2020	United States	To compare the effectiveness of telehealth treatment	277 individuals aged 50 years or older who were	The participants who received tele-BA by lay counselors achieved statistically and
	Symptoms Among Older Adults Who Are Homebound: A Randomized Clinical Trial	Hegel, M. T., Bruce, M. L., & Kunik, M. E.			delivered by lay counselors versus clinicians on depressive symptoms among older adults	homebound and experiencing moderately severe to severe depressive symptoms.	clinically meaningful changes in depressive symptoms.

					who are homebound.		
12	Music Training Improves Depressed Mood Symptoms in Elderly People: A Randomized Controlled Trial	Biasutti, M., & Mangiacotti, A.	2021	Residential center for elderly people in Castelfranco Veneto, Italy	to investigate the effects of music training on the depressive symptoms of elderly people.	45 people aged 62 to 95, healthy or with cognitive impairment	Music training had a positive impact on depressed mood symptoms, general cognitive functions, and social–cognitive functions in aged participants.
13	Effects of cognitive stimulation program on cognition and mood in older adults, stratified by cognitive levels	Isabel Gómez-Soria , Chelo Ferreira , Bárbara Oliván Blázquez , Alejandra Aguilar-Latorre ,Estela Calatayud	2023	Northeastern Spain	To evaluate the effects of a personalized adapted CS program in older adults on global cognition, neuropsychol ogical constructs, activities of daily living (ADLs), and mood.	337 participants	The study showed that the cognitive stimulation program led to significant improvements in cognitive function also it led to significant improvements in mood

14	Effect of Multimodal Intervention (computer based cognitive training, diet and exercise) in comparison to health awareness among older adults with Subjective Cognitive Impairment (MISCI-Trial)	Prasun Chatterjee , Deepa Anil Kumar , Sana Naqushbandi , Preeti Chaudhary 1, Preetika Khenduja , Swati Madan , Sobia Fatma , Maroof A Khan , Vishwajeet Sing**h**	2022	India	To investigate the effect of multimodal intervention on the cognitive functions of older adults with subjective cognitive impairment (SCI)	60 subjects were randomized	The study found that adherence to the intervention was high, with the majority of participants completing at least 80% of the prescribed intervention activities.

15	Cognitive behavior therapy for older adults with insomnia and depression: a randomized controlled trial in community mental health services	Sadler, P., McLaren, S., Klein, B., Harvey, J., & Jenkins, M.	2018	Victoria, Australia	To investigate whether cognitive behaviour therapy was effective for older adults with comorbid insomnia and depression in a community mental health setting, and explore whether an advanced form of cognitive behaviour therapy for insomnia produced better outcomes compared to a standard form of cognitive behaviour therapy for insomnia	72 older adults participated	The study found that CBT was effective in treating insomnia and depression in older adults who were receiving community mental health services. Participants who received CBT had significant reductions in symptoms of insomnia and depression, as well as improvements in sleep quality and daytime functioning, compared to those who received treatment as usual. These effects were maintained at a 6-month follow-up assessment. The study also found that CBT was well-tolerated by participants, with no adverse events reported. These results suggest that CBT is a safe and effective treatment option for older adults with insomnia and depression in

							community mental health setting
16	Reduced stress and improved physical functional ability in elderly with mental health problems following a horticultural therapy program	Han, A. R., Park, S. A., & Ahn, B. E.	2018	Suwon, South korea	This study aimed to determine the effects of a plant cultivation -ba sed horticultur al therapy program for elderly people with mental health problems.	28 elderly Korean people with mental health problems participate d	The study found that the horticultural therapy program was effective in reducing stress and improving physical functional ability in elderly individuals with mental health problems. In the horticultural therapy group, the cortisol levels decreased significantly from before to after

							the horticultural therapy program, and the post-test scores for
							six subtests of the Senior Fitness Test improved significantly. No significant improvements were seen in either measure in the control group.
17	Effectiveness of a group-based psychosocial program to prevent depression and anxiety in older people attending primary health care centres: a randomised controlled trial	Sandra Saldivia1, Carolina Inostroza1,2, Claudio Bustos1, Paulina Rincón2, Joseph Aslan2, Vasily Bühring2, Maryam Farhang2, Michael King3 and Félix Cova2	2019	Chile	To find the effectiveness of a group-based psychosocial program to prevent depression and anxiety in older people attending primary health care centers.	340 Individuals aging between 65-80	The intervention is designed based on previous research and will be rigorously evaluated for effectiveness. The results will be published in scientific journals and made available to the public. This program has the potential to improve public mental health and contribute to

							a global strategy for improving the quality of life of older people in Latin America.
18	The effect of web-based Hatha yoga on psychological distress and sleep quality in older adults: A randomized controlled trial	Souad Bakloutia, Feten Fekih-Romdhanec, Noomen Guelmamie, Tore Bonsaksseng, Hana Baklouti, Asma Aloui, Liwa Masmoudi, Nizar Souissi, Mohamed Jarraya	2022	Tunisian	To explore the effect of a web-based Hatha yoga program on psychological and quality of sleep in older adults who self-isolated at home during the initial stage of the COVID 19 outbreak.	160 participants	The results showed that the Hatha yoga group had significantly lower scores in depression, anxiety, and stress, and better sleep quality compared to the control group. The frequency of individuals experiencing good sleep quality increased, while the frequency of individuals experiencing poor sleep quality decreased after the Hatha yoga intervention.