REVIEW ARTICLE

Prevalence of Depression Among Elderly Population in India - A Systematic Review & Meta-Analysis

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ABSTRACT

Background: Depression among the elderly is a global public health concern, impacting quality of life and overall well-being. However, there is a lack of recent systematic reviews or meta-analyses on its prevalence in India. This study aims to update this information through a systematic review and meta-analysis.

Methods: The study utilized the Geriatric Depression Scale (GDS) as a screening tool for depression among individuals aged 60 and older in India, utilizing electronic databases for community-based cross-sectional studies from inception to date. Pooled prevalence with 95% CI was performed using R statistical software.

Results: 23 community-based cross-sectional studies were included representing 13 Indian states, meeting the inclusion criteria. The combined prevalence of depression among the elderly was estimated to be 47% (95% CI: 0.39; 0.55), with significant heterogeneity observed among studies (I^2=98%, p<0.01). The study underscores the considerable depression issue among India's elderly population, emphasizing the urgent need for tailored mental health interventions.

Conclusion: The meta-analysis reveals a high prevalence of depression among India's senior population, highlighting the need for targeted public health initiatives to address this growing crisis and support the mental health needs of the elderly.

Keywords: Elderly, Depression, Quality of life, Mental health, Systematic review

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INTRODUCTION

Because of its devastation, Depression is a major mental health issue. It is the second most common disease worldwide and has the potential to manifest as a disability-related disorder.[1] An estimated 300 million individuals worldwide suffer from depression, which is a significant public health issue since it is one of the risk factors for suicide. It lowers a person's quality of life and, if addressed, can worsen and have an impact on general health.[2] The Western Pacific and South East Asian regions account for over half of these. According to estimates, the prevalence of depression is 4.4% worldwide and is higher in women (5.1%) than in men (3.6%)[3], and depression is expected to rank first by 2030 in terms of disability-adjusted life years (DALYs) in the worldwide burden of disease[4]. Additionally, those in the elderly age range have a higher prevalence.[3] According to projections made by the World Health Organisation (WHO), the percentage of elderly individuals worldwide who are over 60 would increase from 11% to 22% between 2000 and 2050.[5] This is an estimated growth from 900 million to 2 billion people in absolute terms. Comparably, it is anticipated that between 2015 and 2050, the percentage of elderly people in Asia will rise from 11.6% to 24.6%.[3] While the majority of senior people will have decent mental health, many are also more likely to suffer neurological illnesses, substance use disorders, and other health concerns like diabetes, hypertension, osteoarthritis, hearing loss, and reduced vision.[6]

It is predicted that the proportion of elderly people in India will rise from 8% in 2015 to 19% in 2050.[3] According to the majority of recent studies, the prevalence of depression is far higher and varies from state to state and district to district, ranging from 24 to 62%. Numerous risk factors have been identified that increase an individual's likelihood of developing depression relative to others. These include gender, economic disadvantages, social disadvantages (education, genetics, exposure to violence), and chronic illnesses.[7] Whereas, comorbid conditions, loneliness, and a lack of financial and personal autonomy are additional significant factors that highlight the increased incidence of mental health disorders among the elderly. Despite being the world's second-most populous old country, India is still relatively unknown as a possible hazard due to geriatric depression. Due to the frequent misperception that depression is a treatable disorder rather than a normal component of ageing, it is likely underdiagnosed and undertreated.[8] In addition to lowering quality of life, depression also affects the prognosis of other chronic illnesses, which makes disability worse.[9] Studies have evaluated the existence of depression using a variety of scales and tools and the quality of life is enhanced when depression is detected early and treated so the Planning of public health interventions requires an estimation of the burden of depression among the elderly.[4] Previously published meta-analysis (Pilania et al., 2019)[1] showed high prevalence of depression among Indian elderly population, and they have included the studies which have assessed depression with various different assessing tools, where we have included the studies used only GDS. Since there is no recent update on the prevalence of depression among elderly after the covid-19 pandemic, we can expect the prevalence might be increased, so this current systematic review and meta-analysis is done to update the current status of depression prevalence among Indian elderly.

METHODOLOGY

Protocol: This systematic review is reported in accordance with the PRISMA checklist 2020 [Figure 1].[10] The PROSPERO registration was done during covid pandemic and it got auto rejected due to the priority claims.

Information sources and search strategy: We explored through electronic databases (MEDLINE/ PubMed, Scopus, Google scholar and Science Direct) to find articles in English published during the last decade. The publications from the inception 2012 to till date (January) 2024 were included. The search technique comprised the terms "geriatrics," OR "old age," OR "elderly," AND "depression," OR "depression scale," OR "geriatric depression scale" AND "India." Published reviews and reference lists of retrieved publications were searched manually.

Eligibility criteria: The comprehensive and shortened versions of the Geriatric Depression Scale (GDS) which were utilised in the studies to report the prevalence of depression. The GDS is a valid and dependable self-rating depression screening tool for elderly population than other tools.[11] It contains 15 items (GDS-15) and 30 items (GDS-30), which are both reliable instruments for evaluating depression in the elderly.[12]

Inclusion criteria: Studies that are cross-sectional and community-based, involving participants 60 years of age and older, and reporting on the prevalence of depression.

Exclusion criteria: Studies carried out in particular populations, like individuals with chronic illnesses; studies carried out in particular environments, such as hospitals and assisted living facilities; Research that reported using a screening tool other than the GDS to identify depression and research that did not report using the screening tool.

Data extraction (selection and coding): Relevant studies were extracted from the databases by two independent authors (SP, MK). After screening all the relevant papers, we selected the most recent article with the most information. Following selection, an Excel (Microsoft) was used to extract the data based on the following information; First author & year of publication, study location, setting (state: rural and

urban), sample size, sampling method, study design, assessment tool, study duration, prevalence percentage, and quality score from each study.

Strategy for data synthesis: R statistical software (version 4.0.2) was used for conducting meta-analyses with the *metaprop* package. Pooled estimate of the prevalence of depression in the elderly were calculated to estimate the effect size with random effect model.[13] Heterogeneity between observed and expected treatment effects across the studies was assessed using the χ2-based Cochran Q, prediction interval (PI), and I2 statistics.[14] To evaluate potential bias, a funnel plot was constructed, considering studies numbering ten or more with Egger test.[15]

RESULTS

Literature search: We have identified total of 20,540 publications through electronic data bases, of which 4,603 were duplicates are removed. Further publications were identified through reference lists or other sources. The attempt is made to get the missing data by contacting the authors and to download full article by accessing the journal websites, which ever was not available are excluded for the analysis. Title and abstracts of the 37 potential publications were screened, only 26 articles met the full text appraisal and met all inclusion criteria and included for the Meta analysis [Table 1].

4,603 Duplicates were removed as they were identical and others did not match the eligibility. 597 were removed as they were not relevant to our study. 331 were not retrieved as they were not visible completely for screening, and it was not possible to identify the study's concept, data, and other information.

Study characteristics: The Characteristics of the studies included were in the table 1. Twenty-six cross sectional community-based studies met the inclusion criteria, they were identified from 15 different states of India; selected studies were done from the inception to till date 2024 (January), ranging with the sample size of 100 to 7200 elderly population from rural and urban areas. 5 studies from Tamil Nadu,[1,16-19] 4 from Karnataka,[7,20-22] 1 from Rajasthan,[5] 2 from West Bengal,[24,25] and Uttar Pradesh,[3,26] and 1 each from Punjab,[27] Maharashtra,[28] Puducherry,[2] Jammu & Kashmir,[8] Kerala,[6] Andra Pradesh,[29] Bihar,[30] Gujarat,[31] Odisha,[32] 2 from Haryana [4,33] and one study included population among south India, [34] All the studies included samples above 60 years of age (both genders), with the total number of participants 14855, and the depression was assessed using Geriatric depression scale (GDS-full/Short versions).

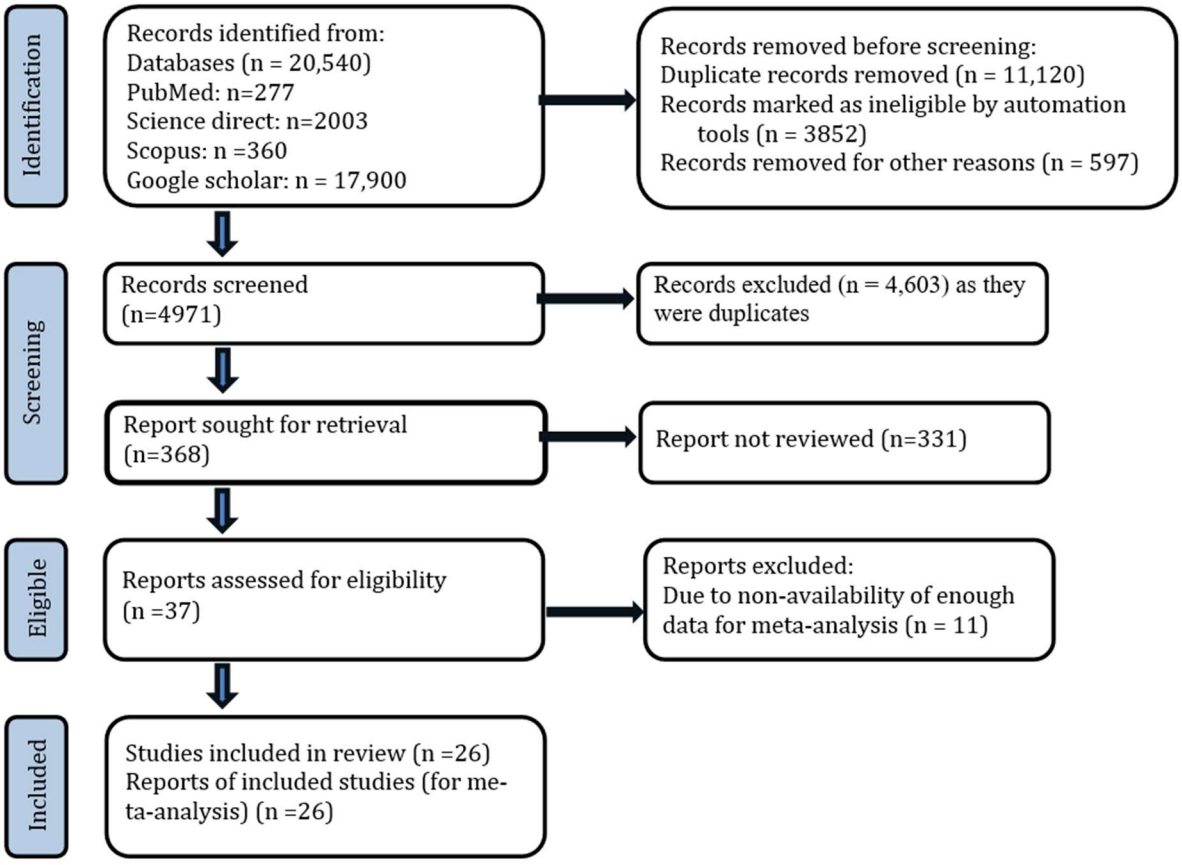

Figure 1: A PRISMA diagram (2020) illustrating the search strategy for the review

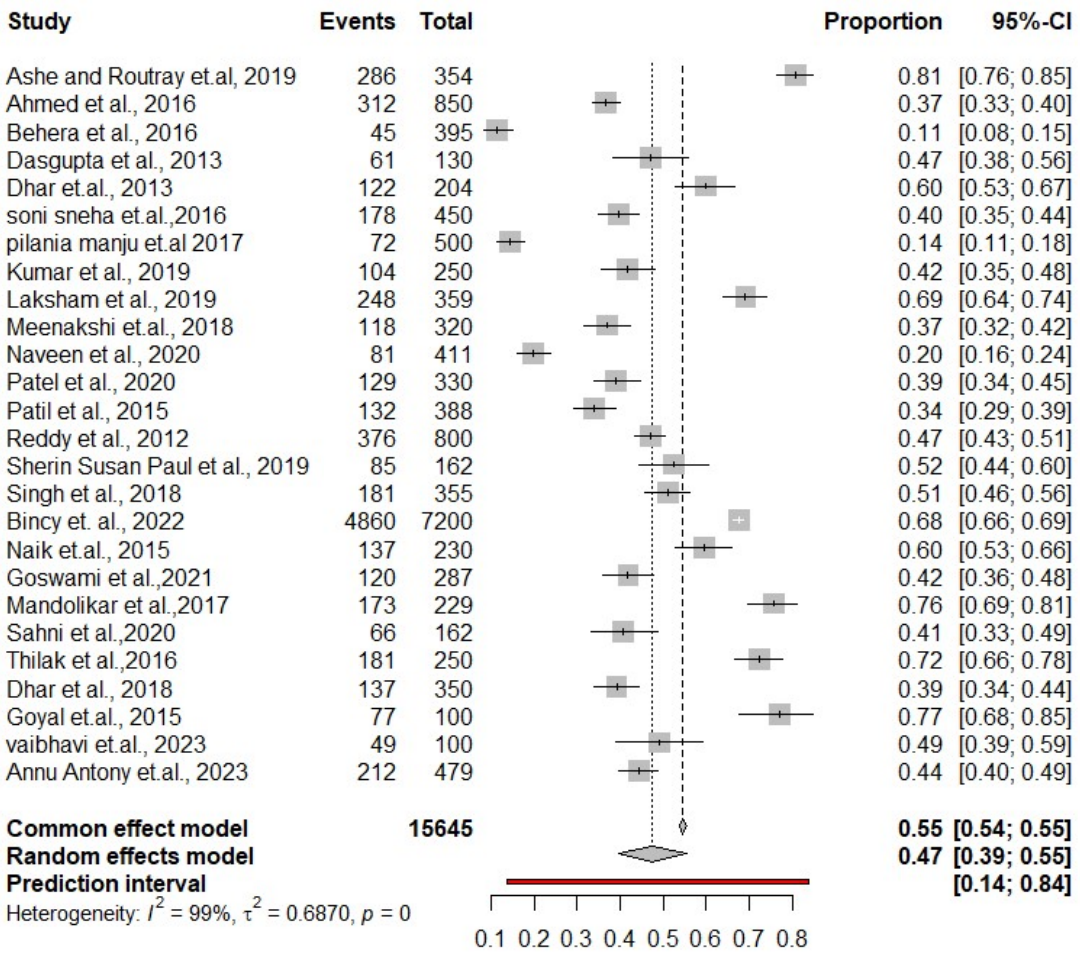

Figure 2: Forest plot chart estimated the prevalence of Depression among elderly in India, Included studies 2012-2021

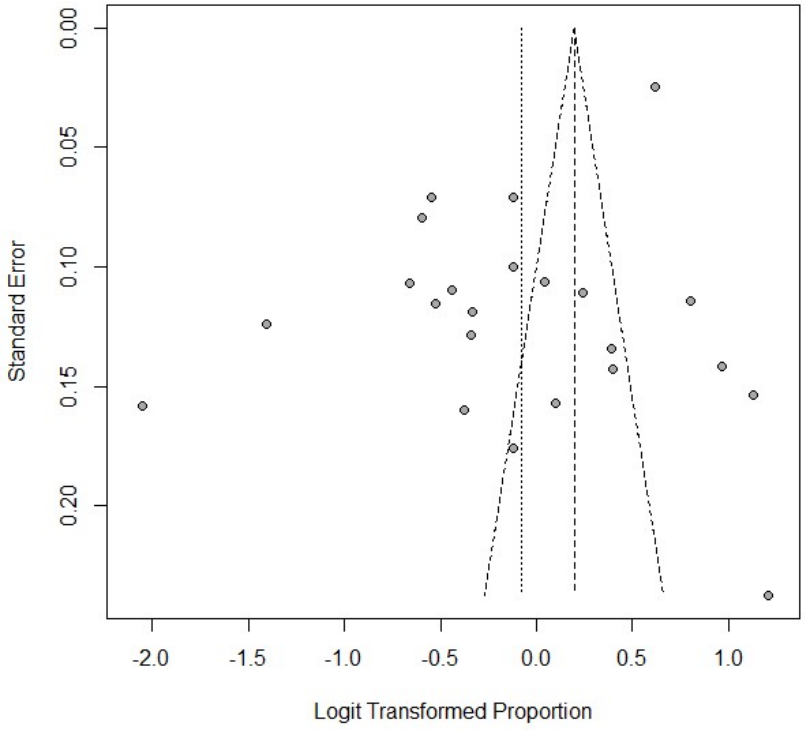

Figure 3: Funnel plot and Egger's test of publication bias

Table 1: Study and sample characteristics

S.no	Author	State	Study Setting	Age (years)	Sample size	Sampling method	Study design	Assessment tool	Study duration	Prevalence	Quality score
1	Bincy K et al.[1] (2021)	Tamil Nadu	Rural	≥60	7200	Multistage stratified Random sampling	A community-based CSS	GDS-15	July 2016 to May 2018	67.5%	7
2	Dhar R et al.[20] (2018).	Karnataka	Urban slum	60-69	350	Systematic Random sampling	A community-based CSS	GDS-30	June to Nov 2016	39%	7
3	Patil SD et al.[21] (2015).	Karnataka	Rural	≥60	388	Systematic Random sampling	A community-based CSS	GDS-30	Jan 2014 – Jun 2014	34.0%	6
5	Naik PR & Nirgude AS[34] (2015)	South India	Rural	60-70	230	Systematic Random sampling	A CSS	GDS-30	N/R	59.6%	7
6	Ahmed MS et al.[22] (2016)	Karnataka	Urban	≥60	850	Systematic Random sampling	A community-based CSS	GDS-15	Jan to Dec 2014	36.7%	7
7	Reddy NB et al.[16] (2012)	Tamil Nadu	Rural	≥60	800	Proportionate sampling	A community-based CSS	GDS-15	June 2011 & Jan 2012	47.0%	4
8	Paul NSS et al.[43] (2019)	Tamil Nadu	Rural	60-86	162	Multi-staged cluster sampling technique	A community-based CSS	GDS-SF 15	N/R	52.5%	6
9	Goyal A & Kajal KS[27] (2014).	Punjab	N/R	≥60	100	Convenience sampling method	A CS study	GDS-30	N/R	77%	4
10	Goswami S et al.[28] (2017)	Maharashtra	Rural	≥60	290	Convenience sampling technique	A CS study	GDS-30	Oct to Nov 2015	41.7%	6
11	Laksham KB et al.[2] (2019)	Puducherry	--	≥60	359	Systematic random sampling	A community-based CSS analytical	GDS-SF	Feb 2017	69%	5
12	Naveen KHS et al.[3] (2020)	Uttar Pradesh	Rural	≥60	411	Multistage random sampling method	A community-based CSS	GDS-15	N/R	19.7%	7
13	Sahni B et al.[8] (2020)	Jammu & Kahmir	N/R	≥60	162	Convenience sampling technique	A cross-sectional study	GDS-15	July- Aug 2018	40.7%	5
14	Behera P et al.[4] (2016)	Haryana	Rural	≥60	395	Simple random sampling	A community-based CSS	GDS-H-30	N/R	11.4%	6
15	Dasgupta A et al.[24] (2014)	West Bengal	Urban	≥60	130	Stratified, random	Descriptive, community-based CSS	GDS-15	Sept to Nov 2013	46.9%	7
16	Thilak SA et al.[6] (2016)	Kerala	Rural	≥60	250	A convenient sampling method	A CSS	GDS-15	April - May 2016	72.4%	7
17	Mandolikar RY et al.[7] (2017)	Karnataka	Urban	≥60	229	The systematic random sampling method	A CSS	GDS-30	Oct to Dec 2015	75.5%	7
18	Meenakshi JR[18] (2018)	Tamil Nadu	N/R	≥60	320	Stratified disproportionate sampling method	A descriptive study	GDS-30	N/R	37%	7
19	Patel M et al.[5] (2020)	Rajasthan	Rural & Urban	≥60	330	Simple random sampling	A community-based CSS	GDS-15	March to May 2019	56%	7
20	Singh A et al.[26] (2018)	Uttar Pradesh	Urban	≥60	355	Multistage random sampling	A community-based CSS	GDS-30	Jan 2017 to Dec 2017	50.1%	7
21	Dhar G.[25] (2013).	West Bengal	N/R	≥60	204	Systematic random sampling	A community-based CSS	GDS	N/R	59.8%	5
22	Kumar S et al.[29] (2013)	Andra Pradesh	Rural	≥60	400	Proportionate sampling	A community-based CSS	GDS-15	N/R	47.0%	4
23	Buvneshkumar M et al.[17] (2018)	Tamil Nadu	Rural	≥60	690	Cluster sampling	A cross-sectional study	GDS-30	July 2014 to July 2015	35.5%	7
24	Soni S et al.[30] (2016)	Bihar	Rural	≥60	450	Multistage sampling technique	A community-based CSS	GDS-15	Jan 2013 to Dec 2013	39.6%	7
25	Parmar V et al.[31] (2023)	Gujarat	Rural	≥60	100	Non-probability convenient sampling technique	A cross-sectional descriptive study	GDS- 30	N/R	49%	6
26	Antony A et al.[32] (2023)	Odisha	Rural	≥60	479	Probability proportional to the size sampling	A community-based CSS - multistage.	GDS-15	Aug 2020 to Sep 2022	44.4%	7
27	Pilania M et al.[33] (2017)	Haryana	Rural	≥60	500	randomly selected using a random number table	A community-based CSS	GDS- 30	Oct 2012 to Aug 2013	14.4%	7

N/R- Not reported, GDS – Geriatric depression scale, CS Study – Cross sectional study

Table 2: Newcastle-Ottawa Scale for the included studies

Study	Selection	Comparability	Outcome	NOS score
Bincy K et al.[1] (2021)	****	*	**	**7**
Dhar R et al.[20] (2018)	****	*	**	7
Patil SD et al.[21] (2015)	****	*	*	6
Parmar V et al.[31] (2017)	****	*	*	6
Naik PR & Nirgude AS[34] (2015)	****	*	**	7
Ahmed MS et al.[22] (2016)	****	*	**	7
Reddy NB et al.[16] (2012)	***	-	*	4
Paul NSS et al.[43] (2019)	***	*	**	6
Goyal A & Kajal KS[27] (2014)	**	*	*	4
Goswami S et al.[28] (2017)	***	*	**	6
Laksham KB et al.[2] (2019)	***	-	**	5
Naveen KHS et al.[3] (2020)	****	*	**	7
Sahni B et al.[8] (2020)	***	-	**	5
Behera P et al.[4] (2016)	***	*	**	6
Dasgupta A et al.[24] (2014)	****	*	**	7
Thilak SA et al.[6] (2016)	****	*	**	7
Mandolikar RY et al.[7] (2017)	****	**	**	7
Meenakshi JR.[18] (2018)	****	*	**	7
Patel M et al.[5] (2020)	****	*	**	7
Singh A et al.[26] (2018)	****	*	**	7
Antony A et al.[32] (2023)	****	*	**	7
Pilania M et al.[33] (2023)	****	*	**	7
Soni S et al.[30] (2016)	****	*	**	7
Dhar G[25] (2013)	***	*	*	5
Kumar S et al.[29] (2013)	***	-	*	4
Buvneshkumar M et al.[17] (2018)	****	*	**	7

Star (*) = item present. Selection criteria have four components and outcome has two components. Maximum 5 star (*) for the Selection, maximum 1 star (*) for Comparability, and maximum 3 stars (*) for Outcome components.

Prevalence of depression in the elderly: The total pooled estimate of the prevalence of depression with random effect model in the elderly was 47% (95% CI: 0.39; 0.55) [Figure 2]. The meta-analysis reveals significant heterogeneity among studies, with a tau^2 value of 0.68 and an I^2 statistic of 98.5%. This indicates substantial variability in treatment effects. The prediction interval, ranging from 0.14 to 0.84, highlights the uncertainty in true treatment effects and the need for cautious interpretation.

Quality assessment: We evaluated the quality of cross-sectional studies using the Adapted New Castle Ottawa Scale, assigning quality scores to each study based on the following criteria: representativeness, sample size, comparability, non-response, ascertainment of outcome, and statistical analysis. 26 studies were evaluated for quality (26 datasets are regarded as 26 studies included for analysis), The range of the study's quality scores (Qs) varied from 4 to 7. There are 3 low-quality studies (score <5) and 19 medium-quality (score ranging from 5 to 7) studies [Tables 1 and 2]. There were fourteen studies with Qs 7,[1,3,5-7,17,18,20,22,24,26,30,32,33] six studies with Qs of 6,[4,19,21,23,28,31] three with Qs 5[2,8,25] and three with Qs 4.[16,27,29]

Publication bias: The linear regression test of funnel plot [Figure 3] asymmetry yielded a significant result (t = -2.76, p = 0.01), indicating potential publication bias. The bias estimate was -6.43 (Egger test: SE = 2.34), suggesting an asymmetric distribution of studies around the mean effect size.

DISCUSSION

Summary of the evidence: This meta-analysis provides the overall estimates of the prevalence of depression from 26 community-based studies. In the senior population of India, we discovered that the combined prevalence of depression reached 55%. In order to support older people's mental health, it is imperative that the scope of services be improved on a regular basis. A previously published meta-analysis from India (Pilania et al., 2019) with 56 community based studies reported that the Indian elderly depression prevalence as 34.4% (95% CI: 29.3-39.7)[9] which is little lower than our findings, that may be due to inclusion of various other depression assessing tools in their study (GDS, CES-D, HDRS, PHQ, WHO TRS, Goldberg & Bridges scale, BDI-G, MDIPC v2.2.) in that GDS and CES-D screening tool showed higher prevalence; where our study included only GDS to avoid ambiguity. The other recently published meta-analysis (Cai, H., et al., 2023) discussing the global prevalence of depression among elderly with 55 studies and 59,851 individuals shown the overall prevalence of depression as 35.1% (95% CI 30.2–40.4%), and found that over a third of elderly populations have depression globally.[35] A meta-analysis assessing prevalence of depression symptoms in Chinese older adults (Li, D., et al., 2014) with 81 studies with 88,417 individuals of which 21,129 cases were depressed, and reported the pooled prevalence as 23.6% (95% CI: 20.3-27.2%) which is simi-

lar to previous findings of China.[36] Recent meta-analysis of China (Tang, T., et al., 2021) with 81 studies and 261,697 individuals estimated prevalence of depression among older adults as 20.0% (95% CI, 17.5-22.8%).[37] Another study from Hong-Kong China (Chi, I., et al., 2005) found prevalence of depression among older men as 11.0% and older women 14.5%, which is similar to the findings of other countries, including the United States, England, and Finland.[38] A study from Australia (Pirkis, J., et al., 2009) estimated the prevalence of depression among older adults with 22,251 population reported as 8.2% (95% CI = 7.8-8.6%).[39] Another study assessed the risk factors of geriatric depression among Bangladeshi people (Disu, T. R., et al., 2019) with the 168 individuals and reported prevalence as 36.9%.[40]

Future direction: The data of prevalence of depression among elderly shows that those who receive less social support are likely to be depressed.[34] So, the elderly people's mental health is more important since it enhances their quality of life. Due to the high rate of depression and the growing proportion of the elderly in India, there is a need for mental health services and resources. Potential community health workers and new-age technologies may be helpful. Furthermore, the recently launched ambitious Ayushman Bharat initiative by the Indian government presents a significant opportunity to address mental health problems through the national health protection scheme and health and wellness institutes.[9] Still the Government must ensure futuristic community improvement and assess any gaps in geriatric care. The gaps should be focused are: vaccination, which is not covered by the national immunisation programme; mobile health care units; palliative care homes; daycare centres (for group exercise, wholesome meals, recreational activities, and income-generating activities); necessity for NGOs and private health care institutions; and the utilisation of health care services in India vary with states.[41] Rural India receives less use of India's healthcare resources than urban areas because of differences in disease prevalence, socioeconomic status, knowledge, and practice. Access to geriatric health centres is another issue that affects rural populations. Health policies and programmes must be adjusted for rural populations in order to address these problems, and each state should create an ageing care plan that is unique to its own area.[41] Recently the global interest is focusing yoga practices. It has been shown older individual's symptoms of depression were considerably alleviated by yoga. For senior citizens residing in communities and institutions, the results were comparable.[42] And most important the Government should support social science research in elder care to develop appropriate regulations and programs in India, as demographics are changing, necessitating a shift in research, thinking, and policy development to adapt to these changes.[43]

Limitations

Studies from many other states and union territories (UTs) of India did not exist and the majority of studies were conducted in the southern and few in northern regions of the country. The screening tool (GDS) was the only tool used to assess depression; a combined diagnosis with the assistance of a psychiatrist will be helpful in estimating the actual magnitude of depression and determining whether non-pharmacological and pharmacological interventions are necessary.

Conclusion

According to this meta-analysis, although estimates varied greatly across the nation, the overall prevalence of depression among India's senior population was 55%. Although the numbers have limits, they will help policy makers and researchers quantify the demand more accurately in the future. The necessity of establishing the degree of depression is further emphasized to support public health initiatives aimed at addressing this increasing crisis.

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