Review Article

Is anxiety a public health problem among older adults in India: Results from a systematic review and meta-analysis

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Abstract

For medical fraternity, health system and policymakers to undertake effective countermeasures, a comprehensive assessment of the prevalence of anxiety among older adults is required; hence, we conducted a systematic review and meta-analysis using data pooled from surveys across the country. The search strategy was developed using medical subject headings (MeSH) terms and free-text keywords. We searched PubMed and Scopus for articles to report the prevalence of anxiety among older adults. The appraisal tool for cross-sectional studies was used for quality assessment. Prevalence from different studies was pooled together using the inverse variance heterogeneity method. Sensitivity analyses were performed to assess the impact of included studies' methodological quality on pooled results and to investigate potential causes of heterogeneity. Twenty-three studies were included in this systematic review. The overall pooled estimate of the prevalence of anxiety in older adults was 18.7% (95% CI: 2.4, 38.8). The studies had a high degree of heterogeneity. Publication bias was assessed using a Doi plot which showed an luis furuya-kanamori (LFK) index of 1.21 indicating minor asymmetry. Like other parts of the world, India has witnessed a rise in the number of elderly due to lower fertility rates, higher life expectancies and a shift in illness patterns from communicable to non-communicable. The number of elderly people suffering from diseases of mental health is expected to rise dramatically. This review consolidates the existing evidence to showcase anxiety as an upcoming public health problem requiring due focus from policymakers and health systems.

Keywords: Anxiety, meta-analysis, older adults, prevalence, systematic review

Introduction

Anxiety disorders, which include generalized anxiety disorder (GAD), obsessive–compulsive disorder, panic disorder, phobias, social anxiety disorder and post-traumatic stress disorder, are a category of mental diseases characterized by feelings of anxiety and fear. It is more of chronic than an episodic problem. In 2015, anxiety disorders were predicted to

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affect 3.6% of the global population.[1] According to the World Mental Health Survey (WMHS), the lifetime prevalence of anxiety disorders varies from 3% to 19% in various nations. The 12-month prevalence of anxiety disorders was estimated to be 3.41% in India based on data from the WMHS 2005.[2]

GAD is characterized by a continuous sense of anxiety or dread that can disrupt daily life. It is not the same as worrying about things or feeling anxious as a result of stressful life circumstances. For months, if not years, people with GAD endure regular anxiety.

According to the 2011 census in India, 8.6% of the population was above the age of 60 years compared to only 5% in 1961.[3] This demonstrates the natural demographic momentum toward an ageing population. Anxiety affects people of all ages, but it is particularly prevalent in older adults. Loss or diminution of self-esteem, loss of friends and family, changes in daily life or living environment, loss of physical independence and chronic diseases, fear of death, and lack of social support are all factors that make older adults more vulnerable to stress and anxiety.[4,5]

Efforts to alleviate social isolation and social disconnection could help to prevent emotional illnesses. Reduced quality of life, impairment, increased need for health services, and higher mortality is all-important and negative outcomes of anxiety; thus, early detection and appropriate treatment would reduce these consequences.

For policymakers to undertake effective countermeasures, a comprehensive assessment of the prevalence of anxiety among older adults is required; hence, we conducted a systematic review and meta-analysis to provide a summary estimate from across the country.

Methodology

We used the preferred reporting items for systematic reviews and meta-analyses criteria to conduct a systematic review and meta-analysis.[6] This is registered in the PROSPERO database (International Prospective Register of Systematic Reviews) (CRD42022299069).

Online databases like PubMed and Scopus were searched for MeSH terms and free-text keywords. There were no language constraints when searching the databases (PubMed and Scopus). For each database, a search query was created. For PubMed—((‘Aged’[Mesh] OR ‘Middle-Aged’[Mesh] OR Geriatric OR Elderly)) AND (‘Anxiety’[Mesh] OR Anxiety) AND (India OR India*) and for Scopus—(TITLE-ABS-KEY (geriatric OR Elderly OR aged) AND TITLE-ABS-KEY (anxiety) AND TITLE-ABS-KEY (India)) was used. In case of any discrepancy, the decision was made by mutual consensus by the third author. An additional search was done by looking through the cross-references of the identified studies. Rayyan platform was used to catalogue and screen the retrieved articles.[7]

Inclusion criteria

The inclusion criteria were as follows: (1) participants aged 60 years and above, and (2) studies that reported the prevalence of anxiety.

Exclusion criteria

The exclusion criteria were as follows: (1) interventional studies, (2) reviews, (3) non-Indian studies, (4) case reports, (5) case-control studies, (6) qualitative studies and (7) animal studies.

Two authors independently screened the titles and abstracts and reviewed the full text of articles meeting the inclusion criteria. Following the selection of eligible studies, a data extraction table was made, including author (year of publication), study location and setting, study design, sample size, age, screening tool and anxiety prevalence.

Assessment of risk of bias

The appraisal tool for cross-sectional studies (AXIS) was used for quality assessment.[8] The risk of bias was classified as high risk (study reported sufficient data for quality assessment but did not fulfil the criteria for the quality item), low risk (study reported sufficient data for quality assessment and fulfilled the criteria for the quality item) or unclear (study reported incomplete data for the quality item). The tool comprises 20 questions under different domains namely introduction, methods, results, discussion and others. Each of the 20 questions received a one-point score in the AXIS tool for each right response. There are five domains namely introduction, methods, results, discussion and other. The introduction includes the aims and objectives of the study. Methods include the study design, sample size, categorizing and addressing the non-responders, statistical methods and precision estimates. Results include an adequate description of basic data, concerns about non-response bias and the internal consistency of the results. Discussion includes justification of conclusion and the limitations of the study. And lastly, the ‘other’ category includes funding sources, conflict of interest and ethical approval.

Strategy for data synthesis

Meta-analysis was done using Meta XL software.[9] The effect size of interest for this study was the prevalence of anxiety among the older adult population. Prevalence from different studies was pooled together using the inverse variance heterogeneity method. Heterogeneity between studies was examined using the I^2 statistic for heterogeneity. Publication bias was assessed by DOI plot and LFK index. The DOI plot visualizes asymmetry, whereas the LFK index detects and quantifies asymmetry of study effects in DOI plots.[10] Statistical significance was set at a P value of 0.05.

Results

We retrieved 2,404 articles in total (records identified through PubMed searching were 1,682 and through Scopus searching were 722) [Figure 1]. About 441 duplicate publications were excluded. Another 1,940 records were excluded due to reasons like the studies were not about older adults ($n = 1,090$), not about anxiety ($n = 283$), trials ($n = 268$), reviews ($n = 142$), non-Indian studies ($n = 78$), case reports ($n = 43$), case-control studies ($n = 16$), qualitative studies ($n = 15$) and animal studies ($n = 5$). Finally, we included 23 studies[11-34] with a total of 24,733 participants, the smallest sample size being 45,[18] and the largest being 9,848.[28] Table 1 summarizes the basic characteristics of the studies that were chosen. The majority of the studies were community-based. Only five studies were hospital-based.[14,25,26,32,34] All the studies have described the number of male and female distribution of the respondents. GAD-7 is the most frequent tool used in the included studies, followed by HAM-A, GA, SPAS, and other scales for anxiety.

Prevalence of anxiety in older adults

The overall pooled estimate of the prevalence of anxiety in older adults was 18.7% (95% CI: 2.4, 38.8) [Figure 2].

There was significant heterogeneity between the studies ($I^2 = 99.5$). Therefore, we used the inverse variance heterogeneity model for estimating the prevalence of anxiety in older adults.

Sub-group analysis

India can be divided into six zones—northern zone, central zone, eastern zone, western zone, southern zone and north-eastern zone.[35,36] We found the pooled prevalence of anxiety in older adults as 29.1% (95% CI: 7.0, 54.4; I^2: 98.6%; n: 8 studies) for the northern zone, 20.5% (95% CI: 18.2, 23; I^2: 0%; n: 3 studies) for the central zone, 52.1% (95% CI: 39.8, 64.3; I^2: 84.2; n: 2 studies) for the eastern zone, 6.4% (95% CI: 3.4, 10.3; n: 1 study) for the western zone (only one study was available in literature in this region), 5.9% (95% CI: 0.00, 17.6; I^2: 98.5%; n: 6 studies) for the southern zone and no studies were available for the north-eastern zone. On sub-group analysis, we found that there was a significant difference between the prevalence of anxiety among older adults in different zone of India. The highest prevalence was seen in the eastern zone and the lowest prevalence was seen in the southern zone. There were no studies found in the north-eastern zone. Pooled prevalence in the zone-wise distribution of states is also presented in the map of India [Figure 3].

Publication bias

The studies had a high degree of heterogeneity ($I^2 = 99.5\%$). Publication bias was assessed using a DOI plot which showed an LFK index of 1.21 indicating minor asymmetry [Figure 4].

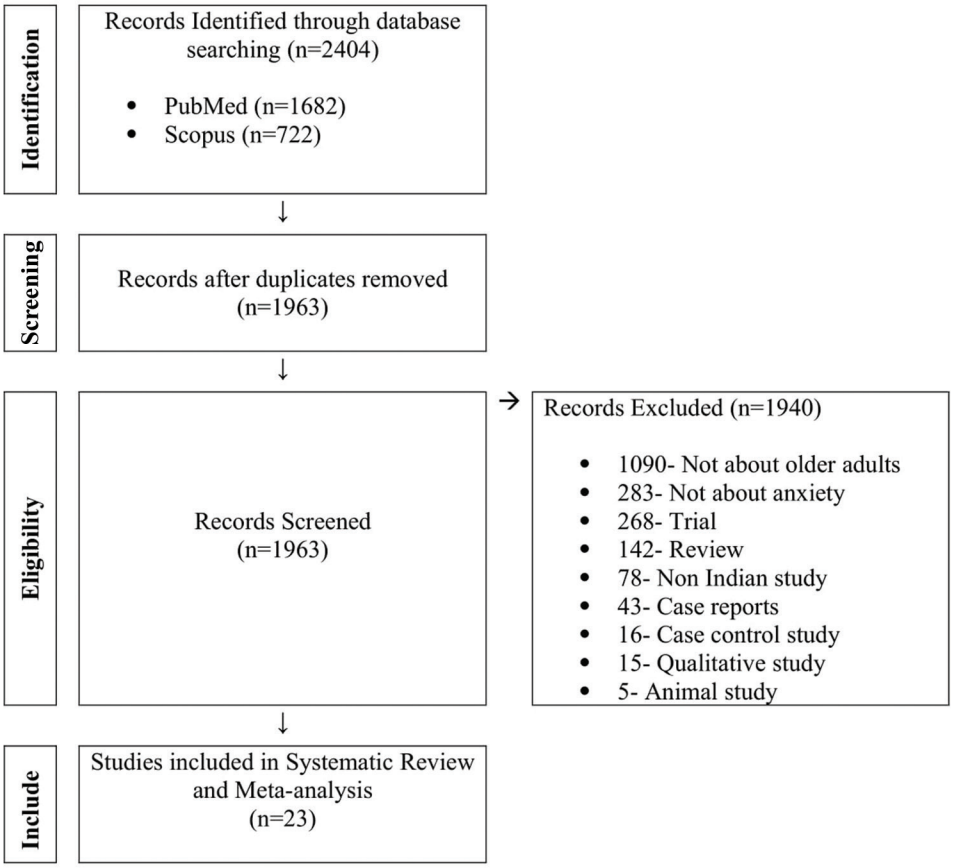

Figure 1: PRISMA flowchart of selected studies

Table 1: Characteristics of the studies selected for systematic review

Author, year of publication/Place of study	Study setting	Patient characteristics	Screening tool	Prevalence of anxiety (%)
Ramachandran *et al.*,[11] 1981/Madras	Community based, urban	181 (M=84, F=97)	Clinical diagnosis	1.10
Tiwari *et al.*,[12] 1998/Uttar Pradesh	Community-based, rural	488	Clinical diagnosis	20.38
Tiwari[13] 2000/Lucknow	Community-based, rural	561 (M=290, F=271)	ICD-9	20.98
* Sood *et al.*,[14] 2006/Amritsar	Hospital-based	528	Psychogeriatric assessment scale, clinical diagnosis	4.54
*Seby *et al.*,[15] 2011/Maharashtra	Community based, urban	202 (M=102, F=100)	GA	6.40
Boralingaiah *et al.*,[16] 2011/Karnataka	Community-based, urban	526 (M=207, F=319)	GHQ-28	3.40
*Prina *et al.*,[17] 2011/Latin America, India, China (*Prevalence of anxiety for India have been used*)	Based on 10/66 dementia research groups' population-based programme, urban and rural	2,003	GMS, AGECAT	3.00
Tiwari *et al.*,[18] 2012/Lucknow	Old-age homes	45 (M=20, F=25)	SPAS	13.33
Nair *et al.*,[19] 2015/Karnataka	Community-based, rural	366 (M=170, F=196)	GA	10.66
Bhardwaj *et al.*,[20] 2017/Delhi	Community-based, urban	101 (M=59, F=42)	HAM-A	54.00
*Vancampfort *et al.*,[22] 2017/China, Ghana, India, Mexico, Russia, South Africa (*Prevalence of anxiety for India have been used*)	Based on a World Health Organizations' study on the SAGE survey (anxiety correlated with physical activity)	2,052	A particular question	21.30
Nagoor *et al.*,[23] 2018/Andhra Pradesh	Community-based, rural	415 (M=199, F=216)	Perception of the participant	7.20
Nayak *et al.*,[24] 2018/Odisha	Community-based, urban	244 (M=117, F=127)	GAD-7	57.30
Grover *et al.*,[25] 2018	Hospital-based (hospital-based and depression)	83 (M=38, F=45)	GAD-7	72.30
Verma *et al.*,[26] 2019/Punjab	Hospital-based, rural	320	GAD-7	38.70
Patel *et al.*,[27] 2020/Rajasthan	Community-based, rural, and urban	330 (M=134, F=196)	GAD-7	55.80
Bhandari *et al.*,[28] 2020/Punjab, Himachal Pradesh, West Bengal, Orissa, Maharashtra, Kerala, Tamil Nadu	Based on BKPAI survey data 2011, rural and urban	9,848 (M=4,669, F=5,179)	GHQ-12	34.80
Das *et al.*,[29] 2020/West Bengal	Community-based, rural	180 (M=109, F=71)	GAD-7	45.00
Sinha *et al.*,[30] 2020/India	Based on National Mental Health Survey, urban	5,590 (M=2,852, F=2,738)	MINI adult version 6	3.31
*Garg *et al.*,[31] 2021/Rajasthan	Online through Google forms (anxiety due to COVID)	162 (M=100, F=62)	GAD-7	49.00
Kumar *et al.*,[32] 2021/New Delhi	Hospital-based (anxiety due to COVID)	106 (M=58, F=48)	HAM-A	22.60
Das *et al.*,[33] 2021/Chandigarh	Community-based, urban (anxiety due to COVID)	92 (M=59, F=33)	GHQ-12, GAI	8.70
Geetha *et al.*,[34] 2021/Kerala	Hospital-based (dermatology patients)	310 (M=173, F=137)	HADS	43.20

*All studies have age ≥60 years except Seby *et al.*, Prina *et al.*, Garg *et al.*, Vancampfort *et al.* and Sood *et al.* These studies have considered age ≥65. GAD-7—Generalised anxiety disorder-7, HAM-A—Hamilton anxiety rating scale, GA—generalized anxiety scale, BKPAI—Building a knowledge base on population ageing in India, GHQ-12—General Health Questionnaire 12, GHQ-28—General Health Questionnaire 28, GMS—Geriatric Mental State Examination, AGECAT—automated geriatric examination for computer-assisted taxonomy, SAGE—study on global aging and adult health, COVID—corona virus disease, MINI—Mini-International Neuro-Psychiatric Interview, ICD-9—International Classification of Diseases, ninth revision, SPAS—Survey Psychiatric Assessment Schedule, GAI—Geriatric Anxiety Inventory Hindi version, HADS—Hospital Anxiety and Depression Scale

Sensitivity analysis

Sensitivity analyses were performed to assess the impact of included studies' methodological quality on pooled results and to investigate potential causes of heterogeneity. On excluding a study by Pravat Bhandari *et al.*,[28] pooled estimate of the prevalence of anxiety falls to be 10.2%, and on excluding a study by Prina *et al.*,[17] pooled estimate of the prevalence of anxiety falls to be 20.5%.

Risk of bias

Low risk of bias was seen for items describing the clarity of objectives of the study, reference population, statistical significance, and justification of discussion and conclusion. The highest risk of bias was seen for addressing and categorizing non-responders and unclear bias for response rate concerns about non-responder bias [Figure 5].

Discussion

In this systematic review and meta-analysis, the overall prevalence of anxiety among older adults in India was found to be 18.7% (95% CI: 2.4, 38.8) (I^2 = 99.5) (n = 23). Similar to our study, a research by Swapna Madasu shows the prevalence of anxiety disorders in adolescents as 16.6%.[37] These results imply that older adults have higher levels of anxiety than adolescents. The higher prevalence of anxiety among older adults (18.7%) in contrast to adolescents (16.6%) raises the issue of what possible reasons could be causing age-related differences in anxiety rates. The possible reasons may be life transitions that are more common in the elderly population, such as retirement, health issues or social isolation, may have an impact on this. Differences in culture and generation may also be important, influencing how anxiety is perceived and manifested in different age groups.

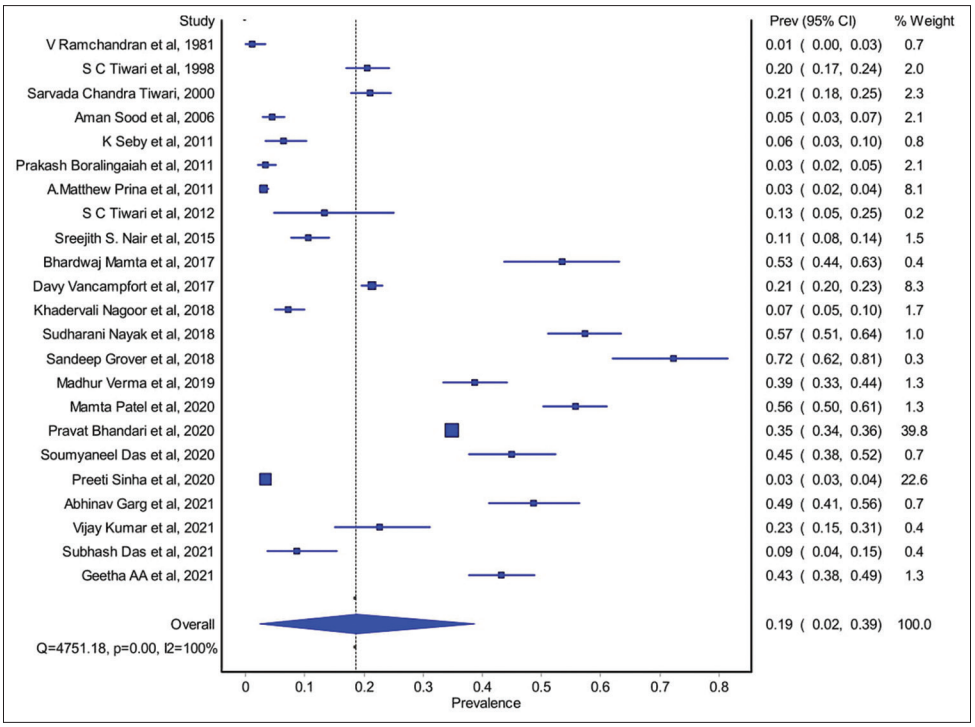

Figure 2: Estimated prevalence of anxiety among older adults in India pooling included studies

In India, a lot of work has been done on mental health in the past few years but at a slow pace.[38] As per the Global Burden of Disease report, mental disorders account for 13% of total disability-adjusted life years lost for years lived with disability (YLD) with depression being the leading cause.[39] Data from other researchers also show a high prevalence of anxiety in the older adult population.[4,40]

Because of the high prevalence of anxiety and depression in older persons, as well as the severity of the consequences of these comorbidities, effective therapies that show effects on both anxiety and depression are essential. A systematic review shows that coexisting anxiety and mood disorders in older adults can probably be treated simultaneously with psychological therapies.[41] More research is needed to better understand how to treat anxiety disorders in older persons with coexisting mood disorders in a variety of settings and groups.

One possible source of heterogeneity could be the various anxiety screening tools available. According to the National Mental Health Survey of India, 2015–2016, the most extensively used and verified general psychopathology instruments in psychiatry are the general health questionnaire and Symptom Check List-90 Revised version.[42]

According to research, the absence of domestic support and care from children/family members, female gender, loss of physical independence, fear of death, education and depression are linked to anxiety.[4,24,43] A study also discovered that social factors influence depression and anxiety in various ways, low contact frequency and being childless was linked to anxiety.[44]

One of the first things we observe about other individuals is their age. Ageism is a relatively new term that draws comparisons to racism and sexism. It is defined as 'treating a person less favourably than others because of his or her chronological age'. This is ageism: the stereotypes (how we think), prejudice (how we feel) and discrimination (how we act) towards others or ourselves based on age. The term exclusively refers to unfair or unjustified adverse discrimination based on age. Ageism can be reduced or eliminated through the use of three strategies: intergenerational interventions, educational initiatives, and policies and laws.[45,46]

The COVID-19 pandemic has heightened anxiety, with uncertainty about the impacts and risk factors affecting many communities. Physical distancing guidelines to prevent Severe acute respiratory syndrome coronavirus-2-2019 (SARS-CoV-2-2019) viral transmission raised the risk of social isolation and loneliness, which are linked to undesirable consequences such as anxiety, depression, cognitive impairment and mortality.[47-49] The dread of catching the virus could be another source of anxiety for this group, contributing to the overall anxiety. According to a comprehensive review, the prevalence of anxiety was higher in 2020 than in previous years (2019).[50] If this is not addressed, a slew of problems will occur, as a good mental condition is critical to society's success.

According to the research, physical activity appears to protect against anxiety symptoms and disorders.[4,51] Physical activity and exercise, especially for older adults, are among the simplest and least expensive ways of anxiety management. Experts should be recommended that frequent sports should be used in conjunction

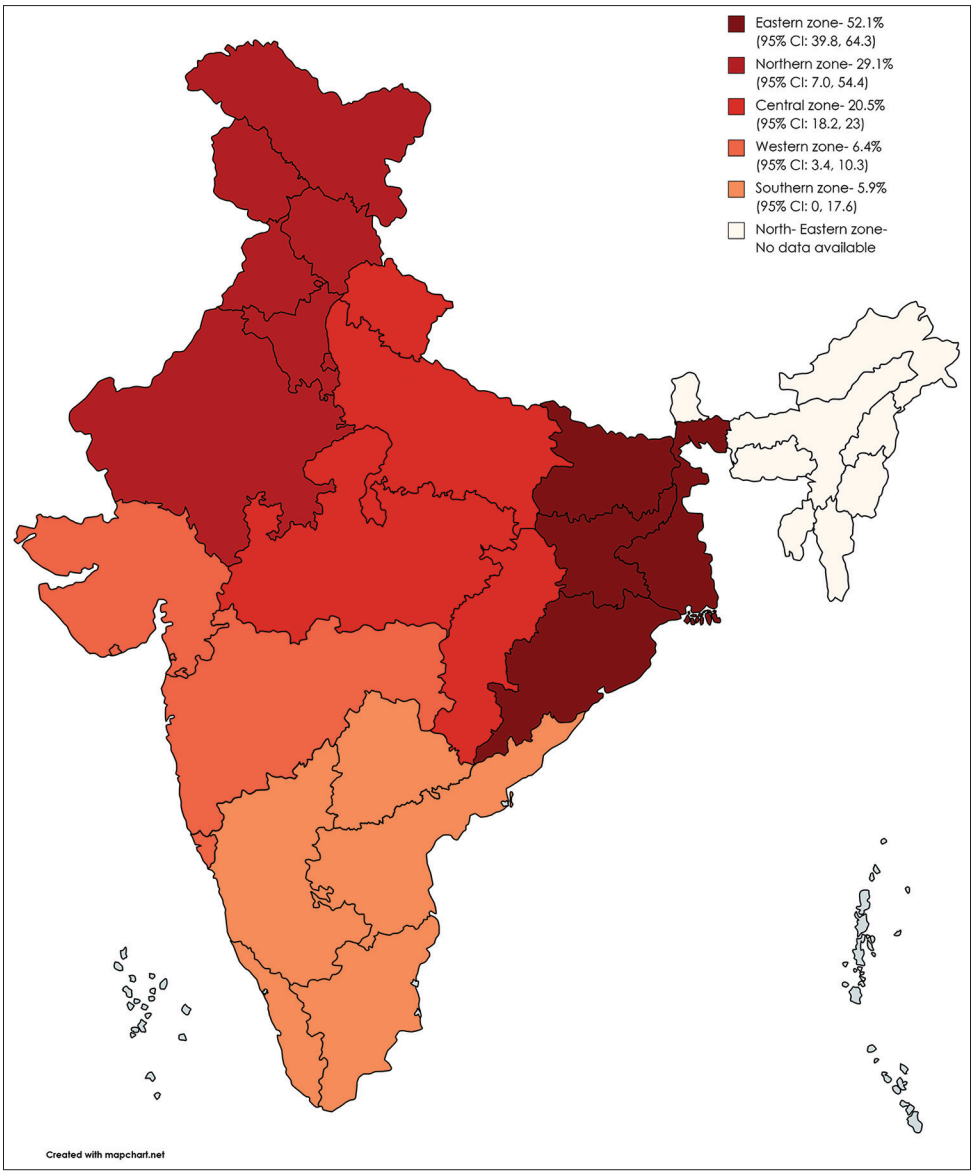

Figure 3: Estimated prevalence of anxiety among older adults in states of India

with medications to benefit the geriatric population. There is also a need for more research on the relationships between different modalities and domains of physical activity and anxiety.

In recent years, social robots have advanced rapidly and are already being used in different countries. The use of social robots has been identified to satisfy the mental health requirements of older individuals through interaction or information exchange. Robots have advantages such as reducing loneliness and facilitating a conversation. According to research, social robots have the potential to reduce agitation and anxiety in older persons while also improving their quality of life.[52,53] More and more new technologies are upcoming and policymakers need to focus on them.

Death anxiety is one of the most common mental problems among older adults. Death anxiety encompasses an understanding of the significance of death as well as the various forms of beliefs, attitudes, ideas and thoughts regarding death and what happens after death. It can be reduced significantly with behavioural therapy.[54]

Our estimate needs to be understood in light of the drawbacks of the study. The studies we included have a high degree of heterogeneity (I^2 = 99.5%). The highest risk of bias was seen in addressing and categorizing non-responders. Screening methods can be useful in public health surveillance, but they may not be a suitable substitute for a comprehensive clinical interview in terms of validating the diagnosis of anxiety. The best outcomes are likely to come through screening along with confirmation by a psychiatrist, therapy and follow-up.

Conclusion

It was found in this systematic review and meta-analysis that

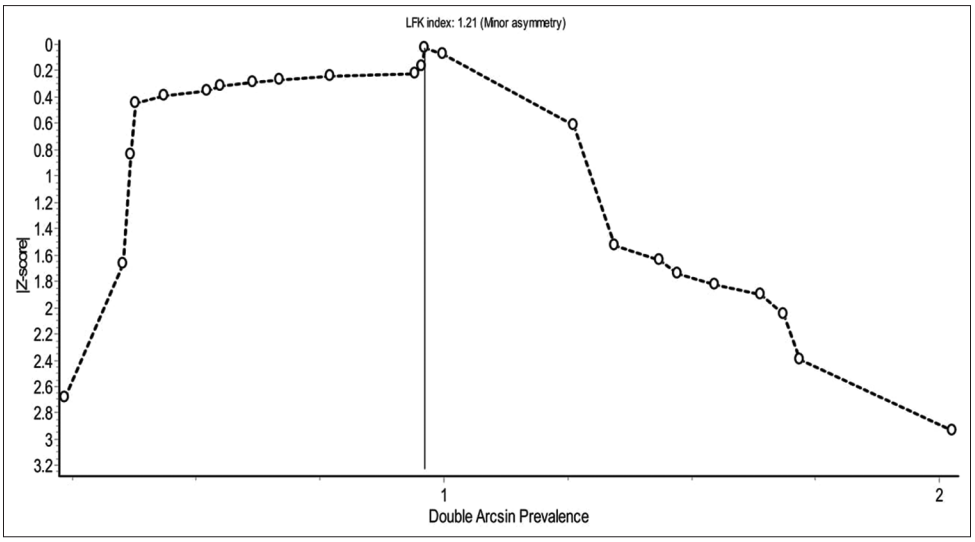

Figure 4: DOI plot

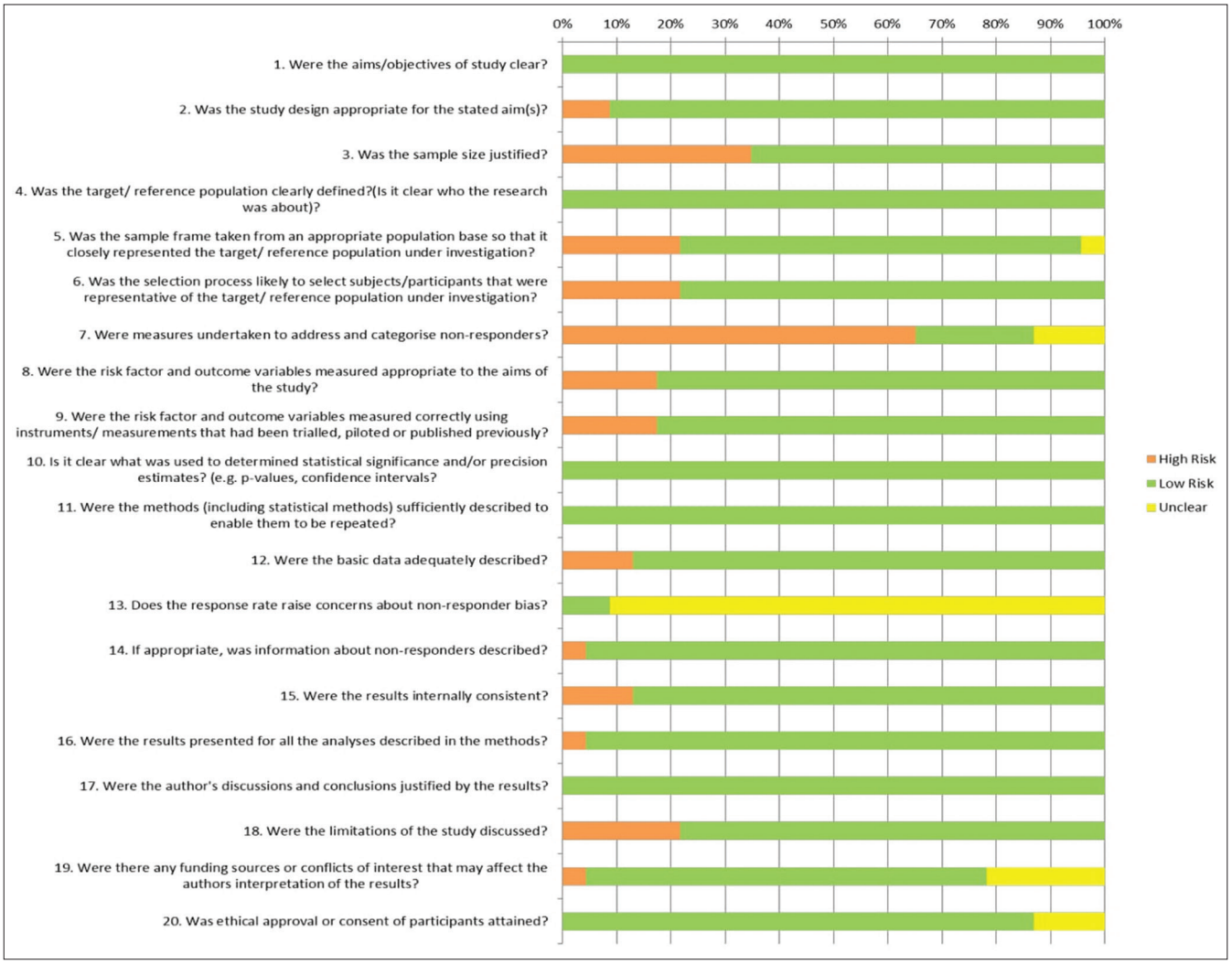

Figure 5: Assessing the risk of bias through the AXIS tool

around one in five older adults in India suffer from anxiety, while figures varied greatly across the country. This review helped in the estimation of the burden of anxiety and it will further help the government in prioritization of resources. As

the world's population ages, the number of people suffering from mental health diseases is expected to rise dramatically. Although depression is the most common mental health disorder, it is high time to start working towards the prevention and control of anxiety-related disorders as well.

Abbreviations

GAD: generalized anxiety disorder; OCD: obsessive–compulsive disorder; PTSD: post-traumatic stress disorder; PRISMA: preferred reporting items for systematic reviews and meta-analysis; MeSH: medical subject headings; AXIS: appraisal tool for cross-sectional studies; PROSPERO: international prospective register of systematic reviews; HAM-A: Hamilton anxiety rating scale; GA: generalized anxiety scale; BKPAI: building a knowledge base on population ageing in India; GHQ-12: general health questionnaire 12; GHQ-28: general health questionnaire 28; GMS: geriatric mental state examination; AGECAT: automated geriatric examination for computer-assisted taxonomy; SAGE: study on global ageing and adult health; COVID: corona virus disease; MINI: Mini-International NeuroPsychiatric Interview; ICD-9: International Classification of Diseases, ninth revision; SPAS: survey psychiatric assessment schedule; GAI: Geriatric Anxiety Inventory Hindi version; HADS: Hospital Anxiety and Depression Scale; DALY: disability-adjusted life years; YLD: years lived with disability; SCL-90-R: Symptom Check List 90 Revised version.

Ethics approval and consent to participate

Not applicable (PROSPERO registration done).

Consent for publication

All the authors provide consent for publication.

Availability of data and materials

All the data sheets are available with the authors and can be shared on request of the readers.

Authors' contributions

- Conception or design of the work, writing, original draft preparation, finding resources—Dr Mamta Patel, Dr Akhil Dhanesh Goel, Dr Neha Mantri.
- Acquisition, analysis or interpretation of data for the work—Dr Nitin Joshi, Dr Manoj Gupta.
- Drafting the work or revising it critically for important intellectual content—Dr Yogesh Jain, Dr Vibha Joshi, Dr Vikas Yadav.
- Final approval of the version to be published—Dr Srikanth Srinivasan, Dr Kuldeep Singh, Dr Pankaj Bhardwaj.
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved—Dr Pankaj Bhardwaj, Dr Akhil Dhanesh Goel.
- All authors have read and approved the manuscript.

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Conflicts of interest

There are no conflicts of interest.

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