Review Article

Prevalence and gender difference in depression in primary health care in India: A systematic review and meta-analysis

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Abstract

Background: Depression contributes to the major burden of mental illness in India. Assessment of burden is essential to develop interventions to address the problem at the primary care level. **Materials and Methods:** We carried out a systematic review and meta-analysis of studies documenting the prevalence of depression in primary care in India. A wide literature search strategy was developed using keywords and Medical Subject Headings. The literature search was done in MEDLINE (via PubMed), IndMed, and major Indian psychiatric journal websites. The protocol was registered at PROSPERO. Bias assessment was carried out using a Cochrane risk of bias tool. **Results:** A total of 186 studies were identified after an initial search, of which 17 were included in the final analysis using pre-specified inclusion and exclusion criteria. The aggregate point prevalence of depression at the primary care level of the 17 studies using the random-effect model was 23.0% (95% CI: 16.0-30.0%). Significant heterogeneity was reported among the studies attributed majorly to a variety of study tools for assessing depression. Sub-group analysis revealed the higher aggregated prevalence of depression among females as compared to males at the primary care level. **Conclusion:** The study provided updated evidence of higher and gender differential burden of depression at the primary care level in India.

Keywords: Depression, India, primary care

Background

Mental disorders were the second leading cause of disease burden in terms of years lived with disability (YLDs) and the sixth leading cause of disability-adjusted life-years (DALYs) in the world in 2017, posing a serious challenge to health systems, particularly in low-income and middle-income countries.[1] Mental health is being recognized as one of the priority areas in health policies around the world and has also been included in the Sustainable Development Goals.[2-4]

The total number of people living with depression in 2017 in the world was 322 million. Nearly half of these people live in the South-East Asia Region and Western Pacific Region, reflecting the relatively larger populations of those two regions.[5] The total estimated number of people living with depression increased by 18.4% between 2005 and 2015.[6]

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The lifetime prevalence of major depressive disorders is 10-25% for women and 5-12% for men.[7] According to the World Health Organization (WHO), it is also the most important precursor of suicide and will be the second cause of Global Disease Burden by the year 2020, and WHO states that the burden of depression is 50% higher for females than males and Indians are reported to be among the world's most depressed. National Mental Health Survey 2015-16 reveals that nearly 15% Indian adults need active intervention for one or more mental health issues and one in 20 Indians suffers from depression.[8]

Up to 20% of those attending primary health care in developing countries suffer from the often-linked disorders of anxiety and depression, but the symptoms of these conditions are often not recognized.[9] The preponderance of female cases of depressive disorder is consistent finding from India.[10,11] Women have the greatest risk for developing depressive disorders during their child-bearing years. Psychosocial events such as role stress, victimization, sex-specific socialization, internalization, coping style, disadvantaged social status, and perceived stigma of mental illness, more in females,[12] have all been considered to contribute to the increased vulnerability of women to depression. The prevalence of mental morbidity in married women from Mumbai was found out to be 27.2% using a self-reported questionnaire from WHO with higher reporting of somatic symptoms than emotional symptoms.[13]

However, it is crucial to benchmark the prevalence of depression in India and gender differences in depression. We conducted this systematic review and meta-analysis with objective to find the prevalence of depression in primary healthcare attenders in India and to assess gender differential of prevalence of depression at primary healthcare level in India.

Materials and Methods

Protocol and registration

The protocol of this systematic review was registered in PROSPERO (International prospective register of systematic reviews) at www.crd.york.ac.uk under the PROSPERO-ID CRD4201605403.

Search strategy

A wide literature search strategy was developed using keywords and Medical Subject Headings from four categories: population, outcome, intervention type, and study design. The search terms from each category were combined in order to locate all relevant literature using the following databases: MEDLINE (via PubMed), IndMed, and major Indian psychiatric journal websites. The search was last conducted on December 12, 2019. Following keywords were used: a) Depression, b) Prevalence, c) Primary Health Care, d) General Practitioner, and e) India. All grey literature whether published or not published was also searched. Only those articles that were in English were selected.

Search conducted in both manual and electronic searches. Electronic search was conducted in all major electronic databases like PubMed (Medline), IndMed, and major Indian psychiatric journal websites. Search strategy for PubMed search engine is provided in the Box 1.

Data extraction

Initial review was conducted by HRS and RSR. Titles and/or abstracts of studies retrieved using the search strategy, and those from additional sources were screened independently by HRS and RSR to identify studies that potentially meet the inclusion criteria outlined above. The full text of these potentially eligible studies was retrieved and independently assessed for eligibility by HRS and RSR. Any disagreement between them over the eligibility of particular studies was resolved through discussion with RS. SV, RRS, JA, and SHR conducted the analysis. In case of non-availability of full text of article, authors contacted for full text. If gender-wise details were also not available, then authors contacted to provide gender-wise depression data.

Outcome

Primary Outcome: Prevalence of depression at primary healthcare level.

Secondary Outcomes: Gender differences in prevalence of depression.

Bias assessment

SHR and JA independently reviewed the selected articles for bias assessment using the Cochrane risk of bias tool. Disagreements between the review authors over the risk of bias in particular studies were resolved by discussion, with involvement of SHR where necessary. Sensitivity analysis was performed to see effect of studies on gender risk for depression, excluded due to non-availability of gender difference data.

Data analysis

Narrative synthesis of the findings from the included studies and structured around outcome was provided. Results were pooled using a random-effects meta-analysis, with standardized mean differences for continuous outcomes and odds ratios for binary outcomes, and 95% confidence intervals and two-sided *P* values for each outcome were calculated. Heterogeneity between the studies in effect measures was assessed using both the Chi-squared test and the I-squared statistic. I-squared value greater than 50% indicative was taken as measure of substantial heterogeneity. Sensitivity analyses done based on study quality. Stratified meta-analyses were done to explore heterogeneity in effect estimates according to study quality; study populations; the logistics of intervention provision; and intervention content. We assessed evidence of publication bias. Study setting wise and gender-wise subgroup analysis were done.

Results

Study identification

A total of 186 studies were identified after an initial search. After removal of duplicates, we reviewed 184 studies in full. After exclusion of the ineligible studies and addition of articles from the references of included studies, 17 studies were finally included. One study was specific to the elderly, and 14 studies were among adult age groups (years varied among different studies). The flow diagram of the search process is shown in Figure 1. The sample sizes of the reviewed studies ranged from 28 to 1366 (median 218), with a total of 6,522 participants. Characteristics of the included studies. The prevalence of depression and characteristics of the selected studies are presented in Tables 1 and 2. All the included studies reported point prevalence of depression. In terms of the assessment methods, studies used different tools to measure depression: IPSS (1), SDQ-9 (1), MDI (1), HS (1), SRQ (3), CID (1), CIDI (1), CISR (1), MINI (1), Goldberg scale (1), clinical (3), and interview schedule (1). Nine studies were conducted in primary health center (PHC), five studies were done in primary care clinics, two in general practice (GPs), and one in mobile health clinic.

Aggregate prevalence of depression

The aggregate point prevalence of depression of the 17 studies using the random-effect model was 23.0% (95% CI: 16.0-30.0%, Q value = 1462.67, d.f. =20, Tau square = 0.03) [Figure 2]. There was a significant and high level of heterogeneity between the studies (I-square 98.63%, $P < 0.001$).

Box 1: Search strategy

List of Keywords:
- Depression
- Prevalence
- Primary Health Care
- General Practitioner
- India

Pub-Med Search Strategy:
- ((Depression or Depressive disorder or Major depression or Common Mental Disorder [MeSH Terms])) AND (Primary Health Care OR General Practice OR General Physician [MeSH Terms])) AND India

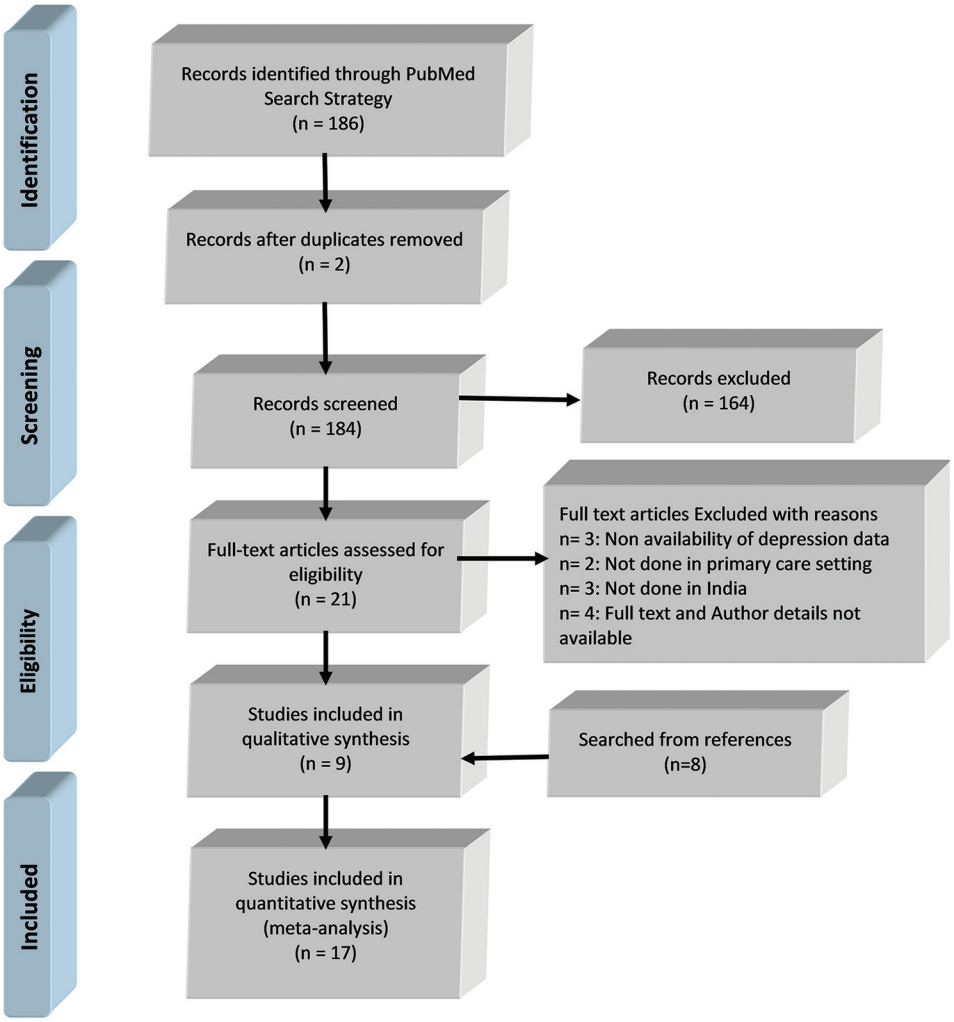

Figure 1: Review and meta-analysis flow diagram

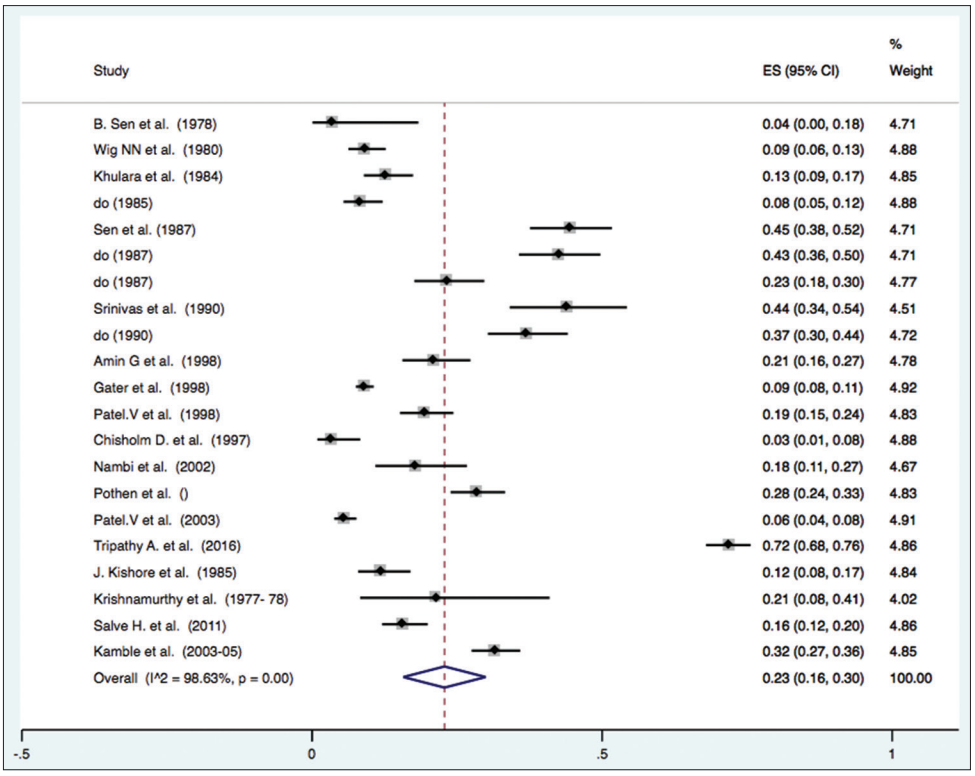

Figure 2: Forrest plot showing prevalence of depression

Publication bias

There was evidence of publication bias (intercept = 8.22, 95% CI: 1.08–15.35, t = 2.41, $P = 0.026$). Figure 3, is showing the funnel plot depicting all studies included in this review, which also shows evidence of publication bias.

Subgroup analysis

Gender distribution for depression: Subgroup analysis was performed by gender. Only studies were included which provided data on gender distribution in the study (eight studies). The prevalence of depression among females ranged from 13% to 72%. Pooled estimate of depression among females was 41% (C.I. 25% to 56%, I square = 98.89%, $P < 0.001$). The prevalence of depression among males ranged from 10% to 67%. Pooled estimate of depression in male gender was 24% (C.I. 10% to 38%, I square = 98.19, $P < 0.001$) [Figures 4 and 5].

Association of gender with depression: O.R. for female gender ranged between 0.79 and 6.28. Female gender was found to be a risk factor for the depression (pooled O.R. 2.27, C.I. 1.59 to 3.25). Heterogeneity among the studies was moderate (I square 75.4%, $P < 0.001$). Figure 6 is showing the Forrest plot for the Odds ratio for depression presence among females in comparison to males.

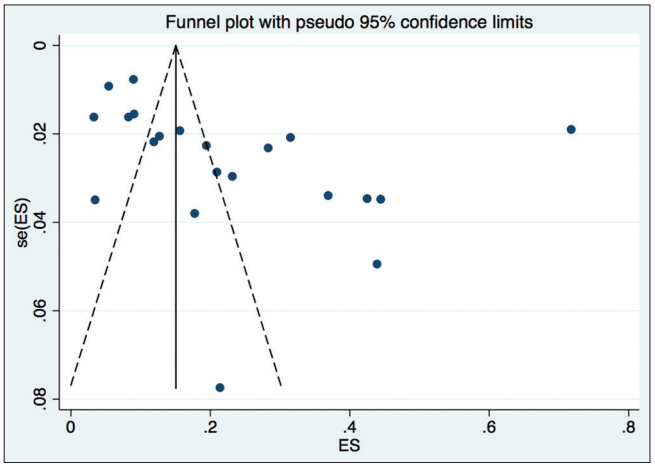

Figure 3: Funnel plot depicting all studies included in the review

Discussion

This meta-analysis provided an up-to-date estimate of the prevalence of depression among adults at the primary care level combining all the evidences available from the published literature in India. We observed that almost one fourth of the patients attending primary care were suffering from depression. Our findings suggest that depression is a common and substantial mental health problem at the primary care level in India. A wide range of populations was examined and contributed to the significant heterogeneity in prevalence across studies. According to the WHO, an important barrier to effective care for depression is covert feature of the disease and inaccurate assessment.[14,15]

World Mental Health (WMH) survey initiative reported comparatively higher prevalence of depression (DSM-IV/CIDI) in low- and middle-income countries than in high-income

Table 1: Summary of studies included

Author	Year	Community	Setting	Age group	Sample size	Sampling procedure	Tool	Prevalence depression %
Sen B *et al.*	1978	GPs	Calcutta		28	Consecutive	IPSS	5
Wig NN *et al.*	1980	PHC	Calcutta		340	Patients attending psychiatric clinic	Clinical	9.1
Kulhara P *et al.*	1984	PHC	Raipur Rani	All age group	259	Patients attending psychiatric clinic	Clinical	12.7
Kulhara P *et al.*	1985	PHC	Raipur Rani	All age group	287	Patients attending psychiatric clinic	Clinical	8.4
Sen B *et al.*	1987	Primary Care clinics	Calcutta	>15 Years	202	All patients >15 years of age	SDQ-9	44.5
	1987	Primary Care clinics	Calcutta	>15 Years	202	All patients >15 years of age	Manifest Depression Items	42.6
	1987	Primary Care clinics	Calcutta	>15 Years	202	All patients >15 years of age	Hamilton Scale	23.3
Srinivasan TN *et al.*	1990	Primary care facility	Madras	Adult	100	Systematic random sampling	11 item check list followed by Clinical examination	44
	1990	Primary care facility	Madras	Adult	200	Systematic random sampling	SRQ	37
Amin G *et al.*	1998	Curative and Preventive General Hospital	Vadodara	>18 Years	200	Systematic random sampling	CID	21
Gater R *et al.*	1998		Bangalore	18-65 Years	1366		CIDI	9
Patel V *et al.*	1998	PHC	Goa	16-65 Years	303		CISR	19.5
Chisholm D *et al.*	1997	PHC	Bangalore	16-60 Years	120		SRQ	3.3
Nambi SK *et al.*	2002		Tamil Nadu	16-65 Years	101	Consecutive	CISR	17.8
Pothen M *et al.*		PHC	Vellore	>15 Years	373	Consecutive	CISR	28.4
Patel V *et al.*	2003	PHC	Goa	Adult	598		CISR	5.5
Tripathy A *et al.*	2016	PHC	Multi-centric		551		PHQ	71.8
Kishore J *et al.*	1985	PHC	Ballabhgarh	18-60 Years	218		SRQ	11.9
Murthy SK *et al.*	1977-78	GPs	Bangalore		28	Convenience	IPSS	21.4
Salve H *et al.*	2011	Mobile Health clinic	Delhi	>18 Years	350	Systematic random sampling	MINI	15.7
Kamble SV *et al.*	2003-05	PHC	Maharashtra	>60 Years	494	Systematic random sampling	Goldberg Scale	31.5

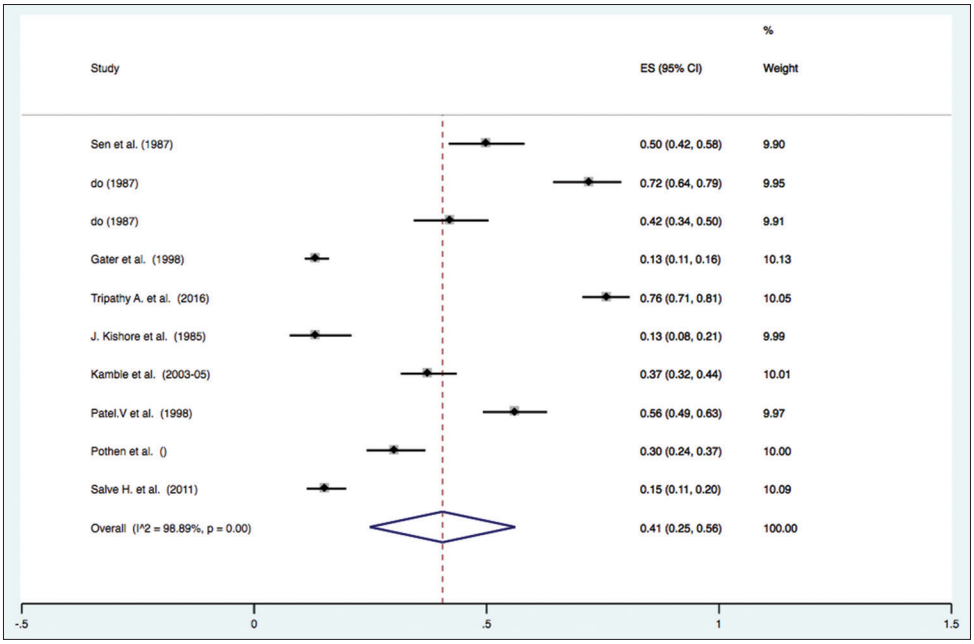

Figure 4: Depression prevalence among females

Table 2: Summary of studies included for gender specific prevalence of depression

Author	Depression prevalence total	Depression prevalence male	Depression prevalence female	OR (Female)	Upper C.I.	Lower C.I.
Sen B *et al.*	44.5	27.08%	50.00%	2.69	5.48	1.32
Sen B *et al.*	42.6	29.17%	72.08%	6.27	12.82	3.07
Sen B *et al.*	23.3	10.42%	42.21%	6.28	16.73	2.36
Gater R *et al.*	9.0	4.83%	13.32%	3.03	4.58	2.00
Tripathy A *et al.*	71.8	67.42%	75.96%	1.53	2.22	1.05
Kishore J *et al.*	11.9	10.48%	13.27%	1.31	2.99	0.57
Kamble SV *et al.*	31.5	24.57%	37.40%	1.83	2.71	1.24
Patel V *et al.*	19.5	24.73%	56.19%	3.90	6.73	2.27
Pothen M *et al.*	28.4	25.00%	30.23%	1.30	2.18	0.77
Salve H *et al.*	15.7	18.52%	15.20%	0.79	1.68	0.37

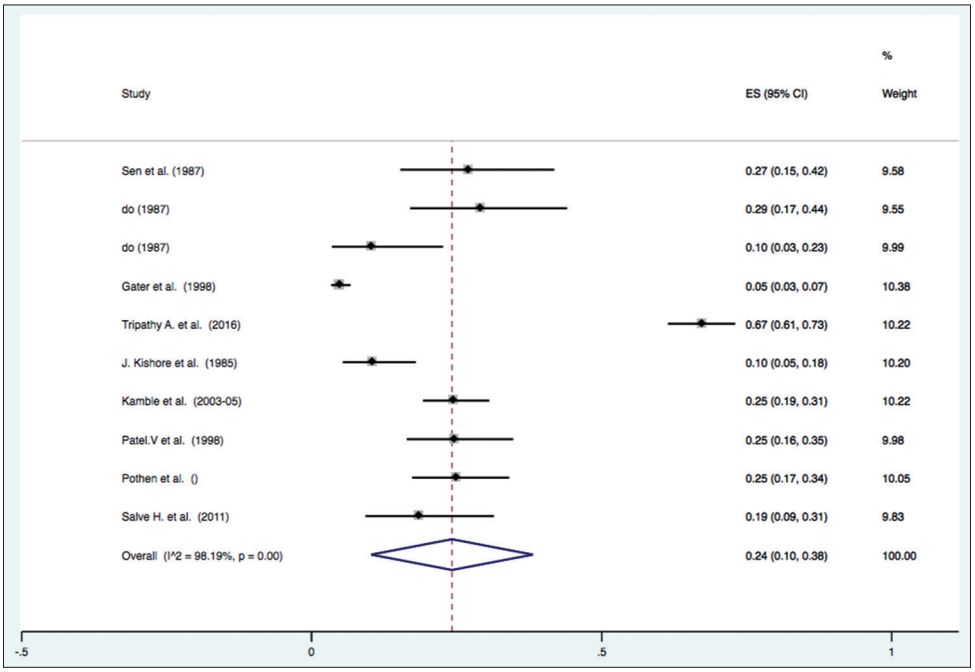

Figure 5: Depression prevalence among males

countries (lifetime prevalence of depression in low- to middle-income countries as 18.4 (Brazil), 14.6 (Ukraine) 13.3 (Colombia), 10.9 (Lebanon), 9.8 (South Africa), 6.5 (China), and 9.0 (India)).[16]

A meta-analysis from Brazil among adults reported the lifetime prevalence of major depressive disorder as 17% (95% CI 14-19; I2 = 91.6%).[17]

Female gender was found to be associated with depression in our analysis. Our findings support earlier findings that the prevalence of depression is higher among women[18,19] and there is still a gender effect on the prevalence of depression.[20,21] The prevalence of depression between women and men was reported to be in the ratio of 2:1.[22] WMH survey initiative also reported higher odds of depression among female gender compared to males, and the difference was more prominent in low- and middle-income countries compared to high-income countries (OR ranged from 1.2 in China, 1.9 in India and Colombia, 2.1 in Lebanon and Mexico, 2.2 in South Africa, 2.5 in Ukraine, and 2.6 in Brazil).[16] Silva MT *et al.* reported higher prevalence of depression among female than males among Brazilian adults.[17]

The strength of this current study includes a comprehensive systematic review and methodological synthesis of data from Indian studies and subgroup analysis. The findings are most applicable to family physicians and public health policy makers in formulating strategies to lessen the burden of depression in the community. Other strengths are the utilization of random-effects models to establish robust aggregate prevalence.

This study has following limitations. First, this meta-analysis has a high level of heterogeneity. Also, there is a presence of publication bias.

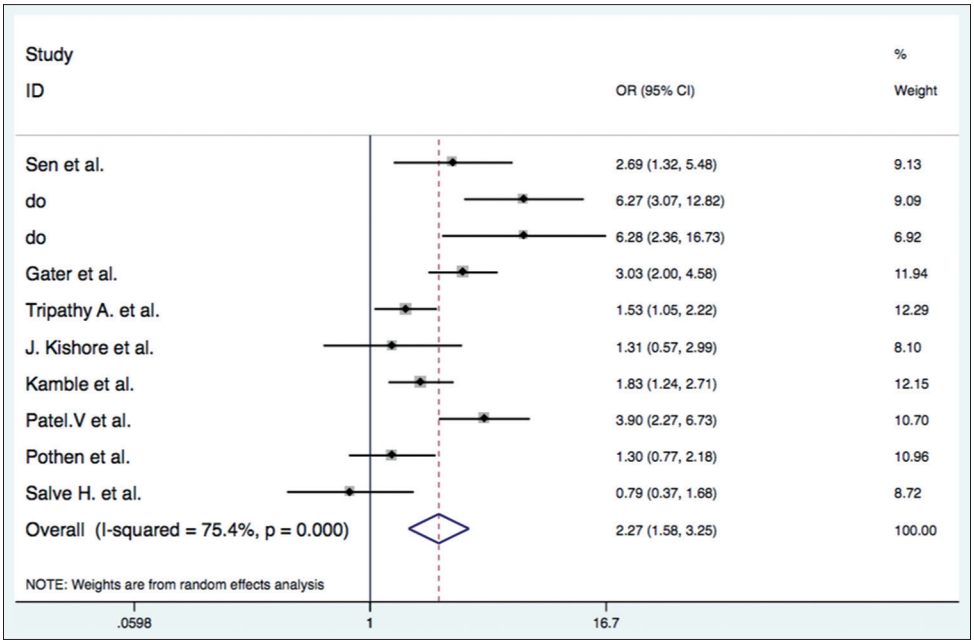

Figure 6: Forrest plot showing the odds ratio for female gender versus male gender (depression)

Conclusion

The study provides evidence for higher and gender differential burden of depression among primary care attenders in India. Integration of mental health services with existing primary care services is the way forward to address the issue. Capacity building of the primary care physician in identification and management of depression is an essential intervention in India.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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