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Review Article

Prevalence of Mental Disorders in India and Other South Asian Countries

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Abstract

The present study focused on a systematic review and meta-analysis of literature related to the prevalence of psychiatric disorders in India and other South Asian countries. This study was carried out to fill up the scanty research conducted in the quantitative review of the prevalence of common mental disorders in South Asian countries. For this purpose, PubMed, PsycINFO, EBSCOhost and Google Scholar databases were searched to find out studies that examined the prevalence of psychiatric morbidity in South Asia. Subsequently, additional articles were searched based on the references mentioned in the identified published studies. Retrieved articles were systematically selected using specific inclusion and exclusion criteria. The present meta-analysis included 34 epidemiological studies consisting of 158555 persons, out of which a total number of 8389 persons were reported to have mental disorders across seven countries of South Asia. This alarming number of mentally disordered people amounts to 122 per 1000 population, i.e. (95% CI: 8-252, $Z = 1.82$, $p < 0.06$). Epidemiological studies also reported that prevalence of mental disorders varied from 6.06 to 533.73/1000 population in South Asia. From the present review, it may be concluded that psychiatric disorders are affecting people across all the regions of South Asia and appears to be a serious public health issue in South Asia.

Key words: Meta-analysis, prevalence, psychiatric morbidity

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

The South Asian regions comprising of India, Bangladesh, Bhutan, Maldives, Nepal, Pakistan, Sri Lanka and Afghanistan, comprise 23% of the world's population^{1,2}. One fifth of psychiatrically ill patients in the world are said to reside in the South Asian region, estimated to be 150-200 million^{1,2}. Most of the people in these countries share a common cultural and political heritage. Most of the countries in South Asia region are considered to be developing nations and have limited resources. Generally, mental health is not considered to be a major concern in many of these countries. Moreover, many South Asian countries face the problem of inadequate resources to treat mental health problems³. The government expenditure on mental health in the majority of the South Asian countries is less than 1% of their total national health budget¹. South Asia has been lacking behind in the field of mental health research primarily due to lack of adequate economic support, physical infrastructure, poor alliance among various health agencies in the region, besides political apathy towards this problem in these countries¹.

A few meta-analytical studies⁴⁻⁸ has been reported in India and its subcontinent related to the prevalence of mental and behavioural disorders. Firstly, in a meta-analytical study, Reddy and Chandrashekar⁴ reported that the total prevalence of mental disorders in India is 58 per 1000 person [confidence interval (CI) 55.7–60.7]; 48.9 per 1000 in the rural and 80.6 per 1000 in the urban population. Based on the 15 Indian epidemiological studies on psychiatric morbidity, Ganguli⁵ estimated that prevalences of all mental disorders are at 70.5 (rural), 73 (urban) and 73 (mixed rural and urban) per 1000 population (range: 18–207). Inclusion and exclusion criteria of both studies mentioned above are different; hence, the number and type of included studies are not the same. Similarly, Gururaj *et al.*⁶ estimated the prevalence of major mental and behavioural disorders at any given point of time as 65/1000 population, based on the average value of two above-mentioned pooled studies (57/1000 and 73/1000, respectively). In a systematic review study, Math *et al.*⁷ and Math and Srinivasaraju⁸ have also reported that the prevalence of psychiatric disorders in India ranges from 9.5-370 per 1000 populations.

In a recent systematic review, Hossain *et al.*⁹ reported the prevalence of adults' and children' psychiatric morbidity in Bangladesh. It is reported that a total of 08 studies on adults' psychiatric morbidity and 05 studies on children's psychiatric morbidity have been published in Bangladesh till October 2013. It is reported that the prevalence of mental disorders in Bangladesh varied from 6.5-31.0% and 13.4-22.9% among adults and children, respectively⁹.

In Sri Lanka, Afghanistan and Bhutan, the epidemiological and health system data related to mental disorders are scarce and not easily accessible. Therefore, only a few published articles provide a rough estimate of the prevalence of psychiatric morbidity in these countries.

There is a lack of meta-analytic study regarding prevalence of mental and behavioral disorders in South Asian countries. Therefore, this meta-analysis was carried out to understand the prevailing trends of mental disorders in India and other Indian subcontinent countries. The prime objective of the present study was to provide useful insights that may assist health professionals and policy makers in defining the need and planning service delivery models. The present researchers did not find a single study that reported a quantitative review and analysis of the epidemiological studies in South Asian countries.

MATERIALS AND METHODS

Identification of studies: To identify relevant studies, the authors ran searches on PubMed, PsychINFO, Ebscohost and Google Scholar up to May 2015. The following key words "psychiatry" "prevalence", "community" and "epidemiology" combined with "country name" were used. Key words were combined by using Boolean operators to narrow down the search results. Articles were retrieved for further assessment when the title or abstract suggested that reference would give sufficient information about the prevalence of mental disorders in South Asian countries. Subsequently, manual searches were done to identify additional articles based on the bibliographies mentioned in the identified published studies⁴⁻⁹. References and cross-references of the articles were reviewed manually to find any relevant study missed by the electronic and/or manual search. Additionally, two Indian journals namely, Indian Journal of Psychiatry and NIMHANS Journal that could be accessed online were also searched manually. Cross-references of the earlier published meta-analytical/review studies i.e., Reddy and Chandrashekar⁴, Gururaj *et al.*⁶, Math *et al.*⁷ and Math and Srinivasaraju⁸ and Hossain *et al.*⁹ were also reviewed thoroughly.

Inclusion criteria: Manuscripts were included if they met the following criteria:

- Prevalence study carried out in general population either in rural, urban, or mixed background
- Inclusion of all mental disorders or at least major mental disorders

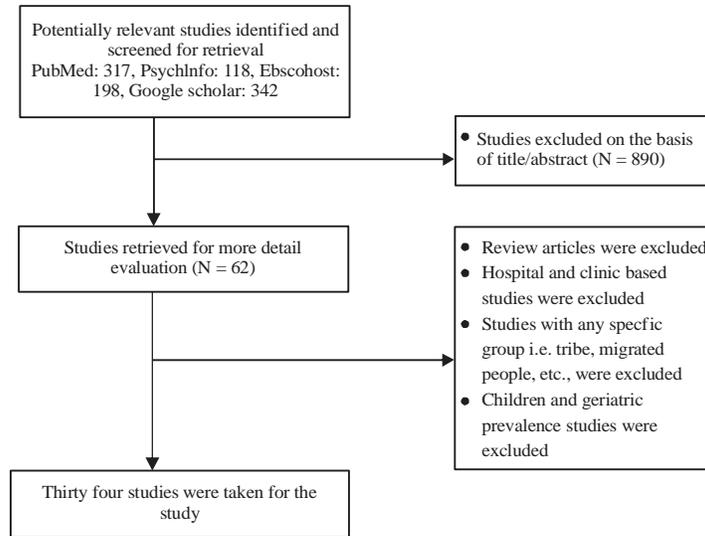


Fig. 1: Flow chart of searches for studies reporting prevalence of mental disorders in South Asia

- Covering general population including both or either gender
- Data should be presented in numbers or frequencies
- Article is in English

Review search strategies: The references search process has been done as recommended by the Quality of Reporting Meta-Analysis (QUOROM)¹⁰ as shown in Fig. 1. The initial search yielded 317 reference titles in PubMed, 118 in PsychINFO, 198 in Ebscohost and 342 in Google Scholar. On the basis of title, abstract and full text, 62 titles were identified as useful references to understand the prevalence of mental disorders in South Asian countries. Out of 62 references, 28 were review studies and therefore left out from the current analysis. Similarly, studies having hospital based or dealing with any specific group i.e. tribe, migrated people, etc., were excluded. Studies dealing with the prevalence of mental disorders among children and geriatric population were also excluded. Finally, 34 studies were included in the present meta-analysis.

Data extraction and selection procedure: Initially selected references were coded in the domains of the year of publication, the total number of person surveyed and the number of persons screened of having the mental illness. Data presented in percentage was converted into numbers. Research articles written in other than the English language were excluded from the present meta-analysis.

Statistical analysis: For conducting the meta-analysis, computer software Comprehensive Meta-Analysis (CMA),

2.0 version was used. In a systematic software review for meta-analysis, Bax *et al.*¹¹ found that CMA 2.0 is identical and it has only minor numerical inconsistencies. The CMA 2.0 scored highest on usability and also had the complete set of analytical features¹¹. Statistical test was carried out at the 5% level of significance. Random effects model was used in the present meta-analysis as all the included references were conducted by different researchers in different places, using different tools and so forth¹².

Computational processes of the present meta-analysis:

Firstly, event rate was calculated i.e.:

$$\text{Rate} = \frac{\text{No. of cases detected (Event)}}{\text{No. of population surveyed}} \quad (1)$$

Then event rate was converted in to rate standard error:

$$(\text{Rate SE}) = \frac{\sqrt{\text{Event}}}{\text{Population}} \quad (2)$$

Next process was to compute the variances of each study i.e.:

$$\text{Within study variance} = (\text{RateSE})^2 \quad (3)$$

The weight of each study was computed using the value of each study variances^{12,13}, i.e.:

$$\text{Weight} = \frac{1}{\text{Variance}} \quad (4)$$

Subsequently, between-study variance was calculated, where the:

$$\text{Between study variance } (T^2) = \frac{Q - df}{c} \quad (5)$$

where, cochrans (Q) is:

$$\sum \text{weight} \times \text{Rate}^2 - \frac{\sum (\text{weight} \times \text{Rate})^2}{\sum \text{Weight}} \quad (6)$$

and correction (C) is^{12,13}:

$$\sum \text{weight} - \left(\frac{\sum (\text{Weight})^2}{\sum \text{Weight}} \right) \quad (7)$$

Total variance was calculated by summing up the value of within study variances and between study variance. Percentage of variation across studies is:

$$I^2 = \frac{Q - df}{Q} \quad (8)$$

Z value = Weighted mean/between the study standard error. Weight mean is:

$$\frac{\sum (\text{Weight} \times \text{rate})}{\sum \text{Weight}} \quad (9)$$

the between the study variance is:

$$\frac{1}{\sum / \text{weight}^2} \quad (10)$$

and between the study error^{12,13} is $\sqrt{\text{Between the study variance}}$.

RESULTS

The prevalence of various mental disorders in South Asian countries, computed from the epidemiological studies are shown in Table 1 and 2. The present meta-analysis is based on 34 epidemiological studies¹⁴⁻⁴⁷ consisting of 158555 persons, out of which a total number of 8389 persons were reported to have mental disorders. This amount of mental disorders is approximately 122 per 1000 persons (95% CI: 8-252) in South Asian countries (Fig. 2). Altogether 20 Indian studies¹⁴⁻³³ included in the present meta-analysis indicated an estimated prevalence of psychiatric morbidity in India as 56 per 1000 (95% CI: 37-74) representing the sample of 84265 (Fig. 2). Other 14 studies³⁴⁻⁴⁷ dealt with the prevalence of mental disorders in subcontinent countries like Pakistan, Nepal, Bangladesh, Bhutan, Sri Lanka and Afghanistan (Table 2). The present meta-analysis indicates that the estimated prevalence rate of psychiatric morbidity in Indian subcontinent countries is 189 per 1000 (95% CI: 165-212) representing the sample of 74290 (Fig. 2). There are a very few published studies³⁴⁻³⁶ on the prevalence of psychiatric disorders in Pakistan. Three studies carried³⁴⁻³⁶ out in Pakistan indicate that the overall prevalence of psychiatric disorders in Pakistan is 179 per 1000 (95% CI: 163-198). Further, it is evident from the review that

Table 1: Studies reported prevalence of psychiatric morbidity in the general population of India

Investigators	Year	Center	Location	Sampling	Tools	Population	#Prevalence	#No. of cases
Surya ¹⁴	1964	Pondichery	Urban	H-H	Mental health screening questionnaire	2731	9.5	26
Sethi <i>et al.</i> ¹⁵	1967	Lucknow	Urban	H-H	QAPF	1733	72.7	126
Dube ¹⁶	1970	Agra	Mixed	H-H	Diagnosis confirmed by a psychiatrist(s) (DCP)	29468	18	531
Elnagar <i>et al.</i> ¹⁷	1971	Hoogly	Rural	H-H	Case history method and DCP	1393	27	38
Sethi <i>et al.</i> ¹⁸	1972	Lucknow	Rural	H-H	Case history questionnaire and case history	2691	39.4	106
Verghese <i>et al.</i> ¹⁹	1973	Vellore	Urban	SRS	Mental health item sheet and DCP	1887	66.5	126
Sethi <i>et al.</i> ²⁰	1974	Lucknow	Rural	TSPS	Psychiatric screening questionnaire and DCP	4481	67	300
Thacore <i>et al.</i> ²¹	1975	Lucknow	Urban	H-H	Psychiatric health questionnaire, DCP	2696	81.6	220
Nandi <i>et al.</i> ²²	1975	West Bengal	Rural	H-H	Household schedule, QS, case record schedule	1060	102.8	109
Nandi <i>et al.</i> ²³	1977	West Bengal	Rural	H-H	HS, SESS,DIS and case record schedule	2918	58.25	170
Nandi <i>et al.</i> ²⁴	1979	West Bengal	Rural	H-H	HS, SESS,CDS and case record schedule	3718	102	380
Shah <i>et al.</i> ²⁵	1980	Ahmedabad	Urban	H-H	Mental health screening questionnaire and DCP	2712	47.2	128
Mehtha <i>et al.</i> ²⁶	1985	Vellore	Rural	S-S	Indian psychiatric survey schedule and DCP	5941	14.5	86
Sachdeva <i>et al.</i> ²⁷	1986	Faridkot	Rural	H-H	Household schedule (HS), SESS and DCP	1989	22.12	44
Reddy <i>et al.</i> ²⁸	1991	Andhra Pradesh	Rural	H-H	Indian psychiatric survey schedule (IPSS)	1964	58	114
Premarajan <i>et al.</i> ²⁹	1993	Pondichery	Rural	RS	Indian psychiatric survey schedule and DCP	1066	99.4	106
Shaji <i>et al.</i> ³⁰	1995	Erankulam	Rural	H-H	IPSS, SESS, case record schedule and DCP	5284	14.57	82
Nandi <i>et al.</i> ³¹	2000	West Bengal	Rural	H-H	HS, SESS, CDS, case record schedule	3488	105.8	367
Sharma and Singh ³²	2001	Goa	Mixed	SRS	Rapid psychiatric examination schedule, DCP	4022	60.2	242
Deswal and Pawar ³³	2012	Pune	Urban	H-H	World mental health survey initiative, SCAN	3023	50.28	152
Total						84265		3453

H-H: House to house survey, S-S: Systematic sampling, SRS: Stratified random sampling, TSPS: Three stage probability sampling, RS: Random sampling, QAPF: Questionnaire for the assessment of psychiatric state of the family, IPSS: Indian psychiatric survey schedule, SFQ: Social functioning questionnaire, HS: Household schedule, QS: Questionnaire schedule, CDS: Case detection schedule, SESS: Socioeconomic status schedule, SCAN: Clinical assessment in neuropsychiatry, #Approximated

Table 2: Studies reported prevalence of psychiatric morbidity in the general population of ^PPakistan, ^BBangladesh, ^NNepal, ^{BH}Bhutan, ^SSri Lanka and ^AAfghanistan

Investigators	Year	Centers	Location	Sampling	Tools	Population	[#] Prevalence	[#] No. of cases
Mumford ^{P34}	1996	Chitral, Hindukush	R	H-H, 2SS	BSI, ICD-10	515	82.00	42
Mumford <i>et al.</i> ^{P35}	1997	Rural Punjab	R	H-H 2SS	BSI, ICD-10, SRQ	664	222.89	148
Mumford <i>et al.</i> ^{P36}	2000	Rawalpindi	U	H-H 2SS	BSI, ICD-10	760	184.21	140
Chowdhury <i>et al.</i> ^{B37}	1981	Dasherbandi	R	H-H	NA	1181	65.19	77
Islam <i>et al.</i> ^{B38}	2003	Dhaka	U	CBS, SRSS	SRQ	1145	280.00	321
Karim <i>et al.</i> ^{B39}	2006	Dhaka	M	CRS, SRS	SRQ, SCID	327	122.32	40
Hosain <i>et al.</i> ^{B40}	2007	Bangladesh	R	H-H, 2SS	GHQ-60, CE	766	165.00	127
NIMHH and WHO ^{B41}	2007	Bangladesh	M	CBS	SRQ, SCID as per DSM-IV	13080	161.00	2106
Tausig <i>et al.</i> ^{N42}	2000	Jiri, Dolakha district	R	H-H, RSS	The DSM-III-R criteria checklist	653	206.00	135
Upadhyaya and Pol ^{N43}	2003	Syangja, Parbat district	R	H-H, RSS	SRQ	773	354.46	274
Khattri <i>et al.</i> ^{N44}	2013	Baglung district	R	H-H, RSS	GHQ-12 Nepalese version	261	375.47	98
Wijesinghe <i>et al.</i> ^{S45}	1978	Sri Lanka	SU	CBS	SI	7653	45.50	348
Wangmo and Wangmo ^{BH46}	2009	Three districts of Bhutan	M	CBS	NA	45000	6.06	273
Trani and Bakhshi ^{A47}	2013	121 districts	M	H-H, 3SRC	MDDI, interview	1512	533.73	807
Total						74290		4936

U: Urban, R: Rural, M: Mixed, SU: Semi urban, 2SS: 2 Stage screening, 3SRSS: 3 stage stratified random sub-sample; CBS: Community based survey; SRSS: Stratified random sub-sampling, CRS: Cross sectional survey, SRS: Simple random sampling, BSI: Bradford somatic inventory, ICD: International classification of diseases, SRQ: Self reporting questionnaire, SCID: Structured clinical interview for diagnosis: Non patient version, GHQ-60: General health questionnaire 60, CE: Clinical examination, RSS: Randomly selected sample, SI: Standardized interview by social workers and psychiatrists, 3SRC: Three stage random clustering, MDDI: 22 items of the mental distress disorders instrument, [#]Approximated

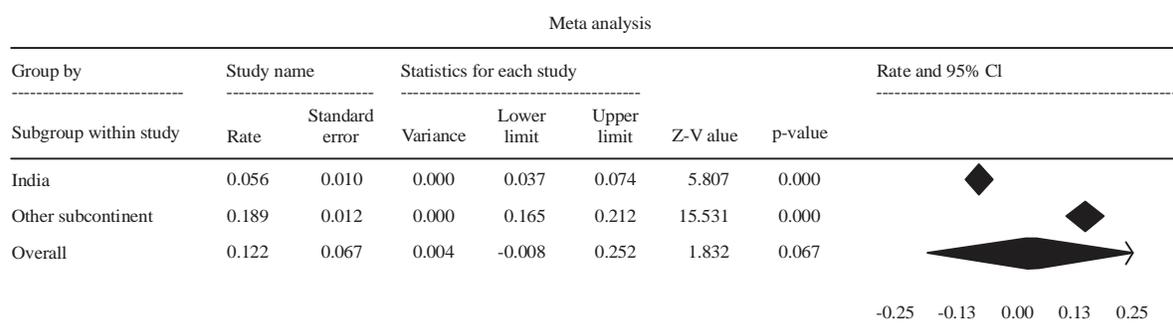


Fig. 2: Forest plot of mental disorders in India and other South Asian countries

Bangladeshi studies³⁷⁻⁴¹ reported a wide variation in the prevalence of mental disorders range from 65-280 per 1000. However, the overall prevalence in Bangladesh is approximately 166 per 1000 population (95% CI: 160-172). Epidemiological review of prevalence studies of psychiatric disorders in Nepal indicate⁴²⁻⁴⁴ that only three studies have been conducted in general population, where prevalence of mental illness falls in the range of 207-375 persons per 1000. The present meta-analysis estimated that the prevalence of psychiatric disorders in Nepal is nearly 307 per 1000 persons in a sample consisting of 1687 (95% CI: 285-330). There was only one epidemiological study⁴⁵ that was exclusively conducted to assess the prevalence rate of psychiatric morbidity in the semi-urban population of Sri Lanka. Here, only one Sri Lankan, methodologically pioneering study⁴⁵, reported a prevalence rate of 45.5 per 1000 in a sample of 7653 (95% CI: 41-50). Similar to Sri Lanka, there is only one published article⁴⁶ regarding the prevalence of psychiatric

morbidity in Bhutan which reports the prevalence as approximately 6 per 1000 person in a sample of 45000 (95% CI: 5-7). There is only one study⁴⁷ that examined the prevalence of mental distress disorders in Afghanistan. Cross-sectional surveyed data indicated that the estimated prevalence of mental distress disorder in Afghanistan is 534 per 1000 in a sample of 1512 (95% CI: 509-559).

DISCUSSION

The present review has sought to identify almost all literatures on the prevalence of psychiatric disorders in the South Asian countries published over a period of 53 years. It is evident from the review that data on prevalence of mental disorders in South Asian countries are quite scanty, except in India. Of the 34 studies that met the inclusion criteria of the present meta-analytical study, majority of them were carried out in India.

The total prevalence of mental disorders in South Asian countries is 122 per 1000 which is within the range of reported Indian and Bangladeshi meta-analytical studies^{5,7,9}. Epidemiological studies¹⁴⁻⁴⁷ also reported that the prevalence of psychiatric disorders varies from 6.06 to 533.73/1000 population in South Asia. These varying prevalence of mental disorders are not only specific to Indian studies¹⁴⁻³³ but also witnessed in other South Asian studies³⁴⁻⁴⁷. Though the study detected a wide range in prevalence estimates, these figures, on the other hand, strongly suggest that mental disorders constitute a major public health problem in South Asia.

Prevalence of psychiatric morbidity in South Asian countries is lower than the global prevalence of common mental disorders as reported by Steel *et al.*⁴⁸ have approximated that the lifetime prevalence of common mental disorders was at 29.2% (292 per 1000 person) from 85 undertaken surveys across 39 countries. Similarly, countries of North and South East Asia in particular have lower prevalence estimates than other regions of the world⁴⁸. Low prevalence rate may be attributed to under-reporting of symptoms due to stigma associated with mental illnesses⁸. Consequently, the included participants may have tendency to under-report the psychopathology.

Trani and Bakhshi⁴⁷ reported that Afghanistan has the highest prevalence rate of psychiatric morbidity of 534 per 1000 persons in South Asia. Trani and Bakhshi⁴⁷ further hypothesized that intensive and ongoing exposure to war and conflict impairs the mental health status of Afghanies. Everyday survival entails repetitive stressors that many Afghanies are not well equipped to deal with. They are already fragile due to other factors of vulnerability that may or may not directly or indirectly be linked to war such as, violence, poverty, under or unemployment, lack of education, widowhood and other issues.

Nepal has the second highest prevalence rate (307 per 1000) of psychiatric morbidity in comparison to other South Asian countries. All three Nepalese studies⁴²⁻⁴⁴ included in the present meta-analysis are carried out in the geographically challenged remote hilly area of Nepal i.e., Kusmi of Baglung district, Jiri of Dolakha district, Kusma of Parbat district and Walling of Syangja district; higher prevalence rate may be the result of that. Limited psychometric properties of screening and diagnostic tools used for assessing mental illnesses may be another possibility of high prevalence in Nepalese studies. For example, Khattri *et al.*⁴⁴ used GHQ-12 only for the screening and diagnostic purpose and Upadhyaya and Pol⁴³ used 22 items self-rating questionnaire for the screening and diagnostic purpose. The GHQ-12 has limited sensitivity and specificity is

Table 3: Summary statistics

Parameters	Subcontinent		
	India	countries	South Asia
Q	1360.50	4221.00	6126.66
df	19.00	13.00	33.00
I ²	98.603	99.962	99.461
p-value	0.000	0.000	0.000

Q: Test of heterogeneity, df: Degree of freedom, I²: Percentage of variation

85.58 and 74.79%, respectively with positive predictive value of only 86.66% and negative predictive value 85% in the Nepalese population⁴⁹. Upadhyaya and Pol⁴³ did not measure psychometric properties of Nepali version of Wright's Self Rating Questionnaire before using it. Therefore, the prevalence figures mentioned here must be interpreted with caution, since there are several possible sources of bias in the use of the self-report questionnaire.

Bhutan has the least prevalence rate (6.06 per 1000 person) of psychiatric morbidity in comparison to all other South Asian countries. It is a universally known fact that happiness always leads to complete wellbeing and mental health of individuals. Based on a global survey, Bhutan is rated the happiest country in Asia and the eighth happiest country in the world. Bhutan is, in fact, the only country where happiness is measured in the form of an index, 'Gross National Happiness'⁵⁰.

Cochran Q is a test of heterogeneity, which was applied to test the null hypothesis that 'all studies share a common effect size'. The computed Q values are greater than df (Q>df) and associated p values are significant (p<0.001). Thus, it can be concluded that there is heterogeneity present across the studies (Table 3). I² indicates the percentage of variation across studies that are due to heterogeneity and not due to chance^{13,51}. All the I² values are greater than 99%, which indicated that there is the high amount of heterogeneity across the studies (Table 3).

The comparison of prevalence studies¹⁴⁻⁴⁷ of psychiatric disorders in South Asia is challenging due to the heterogeneous nature of samples surveyed, the wide range of screening and diagnostic tools used in studies, as well as methodological variations of each study comprising sampling methods, differences in age distributions and so forth. Math *et al.*⁷ and Hossain *et al.*⁹ have encountered similar challenges in their meta-analytical studies. The present meta-analytical study has some limitations: Firstly, the review search process of the present study is only limited to the English indexed journals; second, the sample of included studies may not be truly representative of the general population of their respective countries and lastly, we are unable to collect unpublished articles which are not available online. Further, the publication bias of the present review

could have been reduced by including at least six more studies as we calculated through Duval and Tweedie's Trim and Fill analysis. These factors should be taken into consideration in future meta-analytical review in order to have a broader perspective of the generalization of the findings.

CONCLUSION

The present meta-analysis has approximated that the prevalence rate of mental disorder is 122 per 1000 person from 34 epidemiological surveys undertaken across 07 countries of South Asia. The findings confirm that mental disorders are highly prevalent and increasingly affecting people across all regions of South Asia, irrespective of the substantial degrees of inter-survey heterogeneity in the meta-analysis. There is wide range of variation in prevalence of mental disorders in different South Asian countries. It is speculated that different South Asian countries vary in terms of psycho-social, cultural and political aspects that may be considered as leading factor of variations in the prevalence. That needs to be further examined.

SIGNIFICANCE STATEMENTS

The present meta-analytical investigation is the quantitative estimation of the prevalence of mental disorders in five countries of South Asia, based on the studies published during 1964–2015. The result reveals that the estimated prevalence of the mental disorders in South Asian countries is 122 per 1000 person. Furthermore, this study discovered that there are regional variations endure across the nations of South Asia regarding the prevalence of mental disorders. These findings may have significance for the mental health professionals as well as health policy makers of entire South Asian nations.

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