

COVID-19 and Psychological Distress among the General Population of India: Meta-Analysis of Observational Studies

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Abstract

Background: There is scanty evidence regarding the magnitude of COVID-19-related psychological distress (PD) among the general population of India. **Objectives:** This study aimed to estimate the pooled prevalence of PD among the general public of India during the COVID-19 pandemic. **Material and Methods:** We conducted a meta-analysis of 21 online surveys conducted across the Indian subcontinent and published between 2020 and 2021. **Results:** Overall estimates of PD among the general public during the COVID-19 pandemic by the random-effects model is 33.3% (95% confidence interval: 23.8%-42.8%; $n = 21$ studies). The level of heterogeneity was high among the included studies ($I^2 = 99.67\%$). In subgroup analysis, it was found that the survey tool and the methodological quality had a significant effect on the overall prevalence estimates. Approximately 33% of the general public reported to have PD during the COVID-19 pandemic in India, although the overall prevalence varied based on survey tools and quality of studies. **Conclusion:** As the pandemic crisis seems to be ebbing across the world, the current findings are a wake-up call to devise pragmatic strategies to curtail the burden of similar pandemics and to successfully meet the challenges ahead.

Keywords: COVID-19, India, psychological distress, the general public

INTRODUCTION

Psychological distress (PD) is an indicator for assessing the mental health of the population in epidemiological studies and as a health and psychological outcome.^[1] The PD is a state of emotional turmoil and has diversified meaning as per the context. It is widely agreed that, it is a state of emotional insufficiency or emotional distress.^[2] COVID-19 pandemic has severe physical, emotional, and psychological consequences which were novel to the society. With the global pandemic, these “silent” and insidious issues can go unnoticed.^[3] The common response to COVID-19 is confinement to physical spaces, lack of mobility, loss of income, isolation from the family and friends, powerlessness, helplessness, and affecting the overall well-being of the individual and community during the lockdown. Uncertainty and insecurity of the future might have resulted in more symptoms of PD.^[4]

As the pandemic seems to be ebbing with the impending uncertainty and the emergence of a new strain of the virus,

there is a potential for yet another wave, which demands preparedness at the individual, family, and community levels.^[5] A large and sufficient number of national and international studies serve a better understanding of PD during the pandemic. This pandemic period has taught the requirement of empirical data to devise the preventive mental health strategies to diminish perceived distress and augment subjective psychological well-being to manage the crisis.^[6] Every individual has varying degrees of PD due to COVID 19 and the effect of the virus and related pandemics poses much uncertainties among general public.^[7] This warrants immediate attention of the researchers and policy makers to identify the

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pandemic's aggregate burden, which is untapped. Hence, the present study is aimed to identify the empirical literature on the pooled prevalence of psychological distress among the general public of India during the COVID 19 pandemic.

METHODS

Article search strategy

We searched, PubMed, Wiley online library, Science Direct, APA Psych Info, Proquest, and Google Scholar with the following keywords: “general public,” “COVID-19,” “psychological distress,” and “India” following the Preferred Reporting Items for Systematic Review and Meta-analysis^[8] guidelines to retrieve potential studies for the review. The search was performed for articles published between 2020 and 2021 [Figure 1]. Finally, 22 studies were found suitable for systematic review in which one study did not specify the cut-off score of the outcome measure, and the same was excluded in the meta-analysis ($n = 21$). The detailed search strategy is described in Supplementary Material 1.

Eligibility criteria

Our inclusion criteria were studies conducted in India; studies reporting PD, the population included the general population. PD was operationally defined as the measurement of stress during COVID-19 based on validated standardized screening tools. Our exclusion criteria were studies conducted outside India, specific populations such as health-care personnel, police personnel, reviews, case reports, and qualitative studies. Further, studies with inadequate data and outcome measures other than PD such as anxiety and depression, and psychiatric illness were also excluded.

Data extraction and quality assessment

The data extraction was carried out based on the following study characteristics: author (period of study), study setting/study design, gender, sample size/sampling method, age in

years, survey tool, and the prevalence of stress. The “JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data”^[9] was used for the risk of bias assessment of the included studies. The total quality score was ranging from 1 to 9 in which the risk of bias was categorized as follows: high (0–3), moderate (4–6), and low (7–9) risk of bias.

Statistical analysis

Open meta-analyst software was used to perform this meta-analysis. Assuming the significant inconsistency among the studies, a random-effects meta-analysis model was used and I^2 statistics were calculated to measure heterogeneity among studies. The funnel plot and Egger’s regression tests were used to assess potential publication.

RESULTS

Studies included in our meta-analysis are shown in Table 1.^[10-31] All 22 included studies were conducted using online cross-sectional surveys using the snowball sampling technique by distributing the Google form through Facebook, WhatsApp, or Twitter. In 16 of 22 studies, the online survey was conducted across India, while in others, it was conducted in selected states/states. The sample size of included studies varied from 159 to 2317. The number of male subjects in the included studies varied from 95 to 1160 and the female subjects varied from 56 to 1541. The age of the participants varied from 15 to 70 years. In eight studies, the stress was assessed using the Depression, Anxiety, and Stress Scale-21 (DASS-21); Impact of Event Scale-revised was used in four studies and Perceived Stress Scale was used in three studies. Other scales used to assess the PD included General Health Questionnaire (12 and 28) in two studies, The 5-item World Health Organization Well-Being Index In in one study, Kessler PD Scale in one study, and K10 in one study. Most of the included studies were found to have a moderate risk of bias ($n = 15$) and the median score was 5 (mean-5.23; standard deviation -1.2). Four studies were found to have a low risk of bias (7/9). The risk of bias assessment of the studies is summarized in Table 2.

Prevalence of psychological distress

The overall estimates of PD among the general public during the COVID-19 pandemic by the random-effects model are 33.3% [95% confidence interval (CI): 23.8%–42.8%; $n = 21$ studies, Figure 2]. There was a significant heterogeneity on the outcome measure ($I^2 = 99.67\%$, $Q = 6073.155$, $P < 0.001$, Tau Squared = 0.049). Nonsignificant eggers test value ($P = 0.34$) and a reasonable symmetry of the funnel plot did not reveal any source of publication bias [Figure 3]. In sensitivity analyses, no significant effect of any particular study was found on the overall pooled estimates in which the values ranged between 30.7% (21.6%–39.8%) and 34.5% (24.6%–44.4%).

Subgroup analyses

Subgroup analysis was performed based on the screening

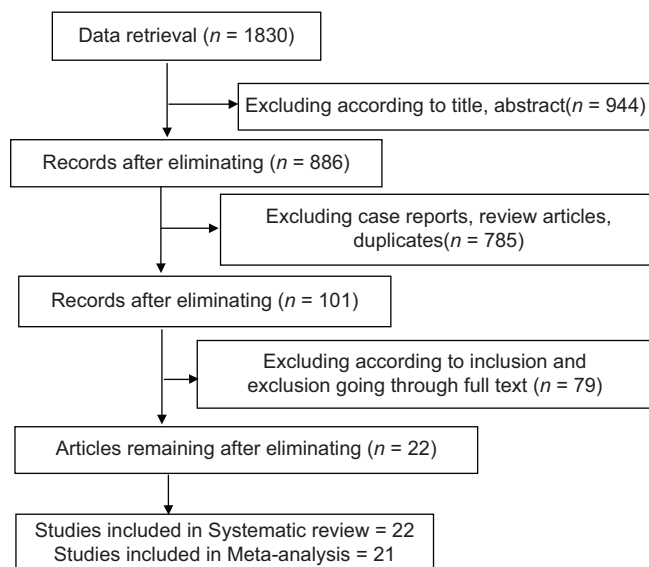


Figure 1: Process of search and selection of studies

Table 1: Characteristics of the studies of the psychological distress related to the COVID-19 pandemic among the general population of India

Author/period of study	Study setting and design	Male/female	Sample size/sampling method	Age in years (mean±SD)/range	Survey tools	Stress % (n/N)
Anand <i>et al.</i> ^[10] Journal submission on March 06, 2021	Across India/ Online survey	486/574	1060/snow ball	21-65	K6	53.86% (571/1060)
Bhowmick <i>et al.</i> ^[11] April 18-May 3, 2020	West Bengal/ Online survey	182/171/2 others	355/snow ball	18-80	WHO-5	37.74% (134/355)
Venugopal <i>et al.</i> ^[12] April 26-May 1, 2020	Across India/ Online survey	225/228	453/snow ball	24.18±14.00	GHQ 28	42.16% (191/453)
Pandey <i>et al.</i> ^[13] March 24-April 11, 2020	Across India/ Online survey	582/805	1387/snow ball	25.0±10.2	DASS 21	2.4% (33/1387)
Gopal <i>et al.</i> ^[14] March 29- May 24, 2020	Across India/ Online survey	103/56	159/snow ball	27.44±9.17	Single item Stress scale	30.8% (49/159)
Verma and Mishra <i>et al.</i> ^[15] April 4-14, 2020	Across India/ Online survey	183/173	345/snow ball	18-41	DASS 21	11.6% (40/345)
Kaurani <i>et al.</i> ^[16] April 19-May 5, 2020	Across India/ Online survey	310/317	627/snow ball	20-70	PSS	52.31% (328/627)
Kaur <i>et al.</i> ^[17] May 24-June 5, 2021	Across India/ Online survey	525/584	1109/snow ball	32.98±14.72	DASS-21 PSQI	9.28% (103/1109)
Singh and Khokhar <i>et al.</i> ^[18] Last week of April 2020	West Bengal/ Online survey	95/139	234/snow ball	28.59±10.47	IES-R	28.2% (66/234)
Nair and Rajmohan ^[19] April 30-May 12, 2020	Across India/ Online survey	114/149	263/snow ball	29±9.8	Structured validated questionnaire	39.5% (103/263)
Ramasubramanian <i>et al.</i> ^[20] April 13-25, 2020	Tamil Nadu/ Online survey	830/1541	2317/snow ball	25-55	CPDI	23.34% (541/2317)
Sathe <i>et al.</i> ^[21] April 29-May 3, 2020	Across India/ Online survey	283/247	530/snow ball	32.45±12.22	K10	23.58% (125/530)
Wakode <i>et al.</i> ^[22] May 18-25, 2020	Across India/ Online survey	149/108	257/snow ball	25	PSS 10	84% (217/257)
Nathiya <i>et al.</i> ^[23] May 23-29, 2020	Across India/ Online survey	278/201	479/snow ball	15-30	DASS-21	37.36% (179/479)
Sebastian <i>et al.</i> ^[24] Not available	29 States of India/ Online survey	NM	1257/snow ball	29.3±9.7	IES-6	53.3% (670/1257)
Hazarika <i>et al.</i> ^[25] April 6-22, 2020	Across India/ Online survey	167/255	422/snow ball	30.5±10.9	DASS 21	35.5% (149/422)
Grover <i>et al.</i> ^[26] April 6-24, 2020	Across India/ Online survey	NM	894/snow-ball	41.2±13.6	PSS	74.49% (666/894)
Varshney <i>et al.</i> ^[27] March 26-29, 2020	Across India/ Online survey	491/154/8 other	453/snow ball	41.82±13.85	IES-R	47.9% (217/453)
Nagarajan <i>et al.</i> ^[28] May 8-June 16, 2020	Across India/ Online survey	150/250	400/snow ball	15-84	GHQ 12	8.8% (35/400)
Tomar and Suman ^[29] April 28-May 8, 2020	Across India/ Online survey	1160/1085	2245/snow ball	32.4±11.4	DASS 21 ISI	21.60% (485/2245)
Wani <i>et al.</i> ^[30] May 2020	Kashmir/Online study	138/149	287/snow ball	27.35±78.12	DASS 21	10.45% (30/287)
Reddy <i>et al.</i> ^[31] April 1-May 12, 2020	11 States of India/ Online survey	477/416	891/ respondent-driven	16-60	DASS 21	10% (93/891)

SD: Standard deviation, NM: Not mentioned, K6: The Kessler Psychological Distress Scale (6 item; Cut off -3), K10: The Kessler Psychological Distress Scale (10 item; Cut off - 25) WHO-5: The 5-item World Health Organization Well-Being Index (Cut off -12), Depression, Anxiety, and Stress Scale-21 (Cut off: - Depression ≥13, Anxiety ≥09, Stress ≥19), PSS: Perceived Stress Scale (Cut off ≥14), IES-R: Impact of event scale-revised (Cut off ≥24), GHQ-12: General Health Questionnaire (cutoff - 2/3; Cut off - 20.55), ISI: Insomnia Severity Index (Cut off ≥15), GHQ-28: General Health Questionnaire (Cutoff ≥23), CPDI: Peri-traumatic distress index (Cutoff ≥28), DASS 21: Depression, Anxiety, and Stress Scale-21

instrument tool and risk of bias assessment [Table 3]. The pooled prevalence of PD was significantly lower based on DASS-21 measurements as compared to those with studies other than DASS-21 scales (15.0%; 95% CI: 09.8%–20.1% vs.

43.0%; 95% CI: 31.2%–57.6%). In terms of methodological quality, studies with moderate risk of bias showed higher prevalence (32.3%; score-3–6) as compared to those with low risk of bias (19.1%; score >7/9).

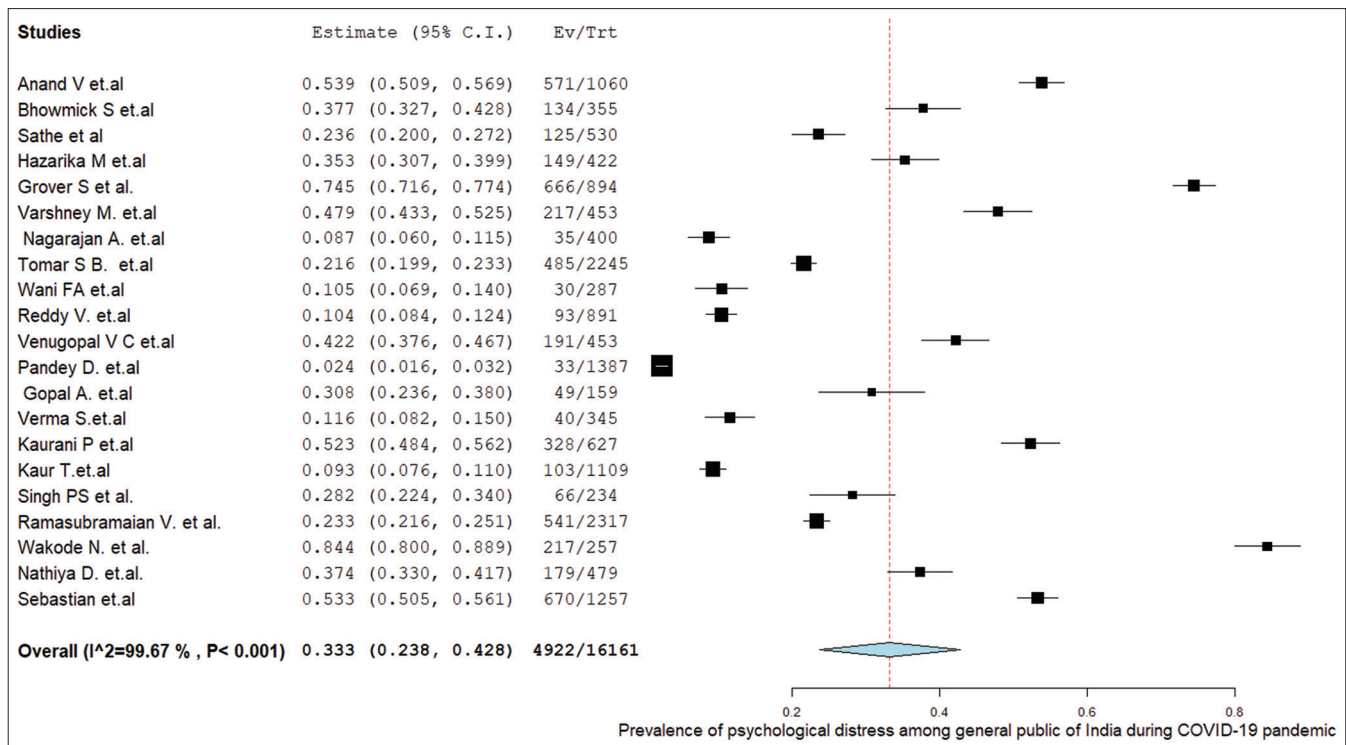


Figure 2: Prevalence of psychological distress among general population of India during COVID-19 pandemic

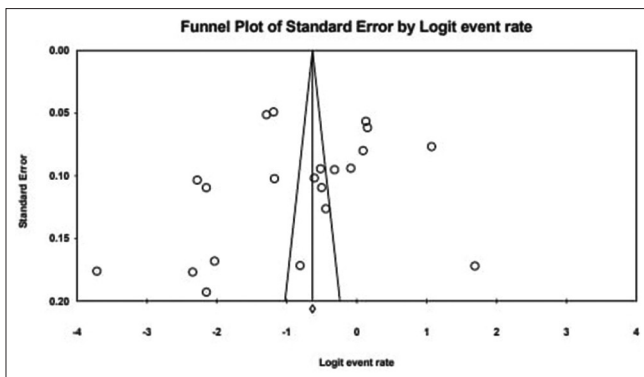


Figure 3: Funnel plot of psychological distress among general public

DISCUSSION

The present meta-analysis is a pioneer study that elucidates the aggregate estimates of COVID-19-related PD based on the observational studies conducted among the general population of India. Our findings suggest that approximately 33% of the general public reported having PD during the COVID-19 pandemic in India.

There are certain caveats to generalize our findings. The results are purely based on online surveys conducted across the various parts of the country. To address the imposed restrictions of COVID-19, the majority of studies distributed questionnaires to an unknown broader audience posing some serious methodological limitations in the form of sampling bias and respondent bias.^[32] There was a significant inconsistency among the included studies as the level of heterogeneity

was high ($I^2 = 99.67\%$). This was evident in the subgroup analysis in which the survey tool and the methodological quality significantly affected the pooled prevalence. The recent meta-analyses reported relatively similar rates of PD (26%–37.3%) in the general population during the COVID-19 pandemic globally.^[33,34]

The psychological impact of the pandemic is largely influenced by certain factors such as onset and burden according to nations, availability of pandemic preparedness. This might be the reason for the wide variation in the average prevalence of COVID-19-related PD in the existing literature.^[35,36] It is worth noting that our pooled prevalence is based on the representative number of studies ($n = 21$) as compared to the similar meta-analyses where the findings are reported based on a meager number of studies ($n = 6$). We have not included studies without a standard survey tool or cutoff scores reflecting the scientific worth of the magnitude of the outcome measure from an Indian general public perspective. Moreover, there was no significant effect of any particular study on the overall pooled estimates in our sensitivity analyses in which the values ranged from 30.7% to 34.5%. However, considering the methodological limitations, the current findings should be interpreted accordingly.

The pandemic crisis seems to be ebbing and almost all parts of the world are returning from their new normal to a normal rhythm. This wake-up call makes the governments around the world devise national strategies to curtail its spread and must re-engineer the way they operate to successfully meet the challenges ahead. There is a need for regular interaction and emotional support from friends, family, partners, caregivers,

Table 2: Quality Assessment Criteria - Joanna Briggs Institute critical appraisal tool for prevalence studies

Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Score	Remarks
Anand V <i>et.al</i>	1	1	0	1	1	1	1	1	0	7	Low risk of bias
Bhowmick S <i>et.al</i>	0	0	0	1	1	1	0	1	0	4	Moderate risk of bias
Venugopal V C <i>et.al</i>	1	0	0	0	1	1	0	1	0	4	Moderate risk of bias
Pandey D. <i>et.al</i>	1	1	0	0	1	1	0	1	0	5	Moderate risk of bias
Gopal A. <i>et.al</i>	0	0	1	1	0	1	1	1	0	5	Moderate risk of bias
Verma S. <i>et.al</i>	1	1	0	1	1	1	0	1	0	6	Moderate risk of bias
Kaurani P <i>et.al</i>	1	0	0	0	1	1	0	1	0	4	Moderate risk of bias
Kaur T. <i>et.al</i>	1	1	0	1	1	1	0	1	1	7	Low risk of bias
Singh PS <i>et.al</i>	1	0	0	0	0	1	0	1	0	3	High risk of bias
Nair <i>et al</i>	1	1	0	0	1	1	1	0	1	6	Moderate risk of bias
Ramasubramaian V. <i>et al</i>	1	1	0	1	1	1	0	1	0	6	Moderate risk of bias
Sathe, <i>et al</i>	1	1	0	0	1	1	0	1	1	6	Moderate risk of bias
Wakode N. <i>et al</i>	0	0	0	1	1	1	0	1	0	4	Moderate risk of bias
Nathiya D. <i>et.al</i>	1	1	0	1	1	1	1	1	0	7	Low risk of bias
Sebastian <i>et.al</i>	1	1	0	0	1	1	1	0	1	6	Moderate risk of bias
Hazarika M <i>et.al</i>	1	1	0	1	1	1	1	1	0	7	Low risk of bias
Grover S <i>et al</i>	1	1	0	0	1	1	1	0	1	6	Moderate risk of bias
Varshney M. <i>et.al</i>	1	1	0	1	1	1	0	1	0	6	Moderate risk of bias
Nagarajan A. <i>et.al</i>	1	0	1	0	1	1	0	1	1	6	Moderate risk of bias
Tomar S B. <i>et.al</i>	1	1	0	0	1	1	0	1	1	6	Moderate risk of bias
Wani FA <i>et.al</i>	0	0	0	0	1	1	0	1	0	3	High risk of bias
Reddy V. <i>et.al</i>	1	1	0	1	1	1	0	1	0	6	Moderate risk of bias

Q1 - Sample frame to address the target population; Q2 - Sampled in an appropriate way; Q3 - Sample size adequacy; Q4 - Study subjects and the setting described in detail; Q5 - Data analysis conducted with sufficient coverage of the identified sample; Q6 - Valid methods used for the identification of the condition; Q7 - Was the condition measured in a standard, reliable way for all participants; Q8 - Appropriate statistical analysis; Q9 - Was the response rate adequate, and if not, was it managed appropriately? (1 - Yes; 0 - No)

Table 3: The prevalence of psychological distress using random effect model by subgroup analyses

Subgroup	Category	Number of studies	Events/N	Pooled prevalence (95% CI)	Heterogeneity		χ^2 (P value)
					I ²	t	
Screening instrument	DASS-21	8	761/7165	15.0% (09.8% - 20.1%)	98.56	0.005	1182. 2
	Others	13	3877/9025	43.0% (31.2% - 57.6%)	99.48	0.054	<.0001
Risk of bias (score 0-9)	Low risk (7-9)	04	1002/3070	19.1% (14.4%-23.8%)	98.65	0.014	
	Moderate Risk (4-6)	15	3824/12570	32.3% (21.4%-43.1%)	99.69	0.045	29.65
	High risk (0-3)	02	96/521	19.2% (18.0%-36.6%)	96.22	0.015	<.0001

DASS 21: Depression, Anxiety, and Stress Scale-21, CI: Confidence interval

community, and social media to minimize psychological stress.^[37] Further it is the requirement for a preventive mental strategy on maximizing positive mental health, diminishing perceived distress, and augmenting subjective psychological well-being to manage the crisis. It is the optimal time to design the targeted approach through the online resilience initiatives to reduce PD on a large scale with low cost in time of crisis.^[38]

Strength and limitations

The major uniqueness of this study is its novelty of a meta-analysis based on a representative number of studies reflecting the magnitude of the COVID-19 related PD from an Indian general public perspective. Most of the included studies were found to have a moderate risk of bias and

the separate analysis-based screening tools further add the scientific worth of the evidence. Despite the strengths, there are certain limitations to our findings. The outcome measures are based on web-based surveys in which the sample might be contaminated by respondent bias. The level of heterogeneity of the included was high and pooled estimates varied as per survey tools quality of studies.

CONCLUSION

Approximately 33% of the general public reported having PD during the COVID-19 pandemic in India, although overall prevalence varied based on survey tools and quality of studies. As the pandemic crisis seems to be ebbing across the world,

the current findings are a wake-up call to devise pragmatic strategies to curtail the burden of similar pandemics and to successfully meet the challenges ahead.

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Conflicts of interest

There are no conflicts of interest.

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SUPPLEMENTARY MATERIAL 1

PubMed (Search hits-46)

Filters: Journal Article, English, from 2020/1/1-2021/10/31

((("human s"[All Fields] OR "humans"[MeSH Terms] OR "humans"[All Fields] OR "human"[All Fields]) AND ("covid 19"[All Fields] OR "covid 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms] OR "covid 19 serotherapy"[All Fields] OR "covid 19 serotherapy"[Supplementary Concept] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid testing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid 19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "sars cov 2"[All Fields] OR "sars cov 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR (("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "cov"[All Fields]) AND 2019/11/01:3000/12/31[Date - Publication])) AND ("india"[MeSH Terms] OR "India"[All Fields] OR "india s"[All Fields] OR "indias"[All Fields]) AND ("psychological distress"[MeSH Terms] OR ("psychological"[All Fields] AND "distress"[All Fields]) OR "psychological distress"[All Fields])) AND ((journalarticle[Filter]) AND (2020/1/1:2021/10/31[pdat]) AND (english[Filter]))

2. Wiley Online Library (Search hits = 141)

Topic: Covid 19 psychological distress Indian population" anywhere and "Psychological distress OR stress OR anxiety OR depression OR insomnia OR PTSD" anywhere and "India" anywhere

Refined by: Journal Article, from 2020/1/1-2021/10/31

3. Science Direct (Search hits = 175)

Topic: Humans, COVID-19, India, Psychological Distress

Refined by: Journal Article, from 2020/1/1-2021/10/31

4. APA Psych Info (Search hits = 10)

Any Field: humans OR Any Field: general population AND Any Field: psychological distress AND Any Field: covid-19 AND Any Field: India AND Year: 2020 To 2021

5. Proquest (search hits = 849)

Humans, COVID-19, India, Psychological Distress

Refined by: Journal Article, from 2020/1/1-2021/10/31

5. Google Scholar (Search hits- 609) Publication date from 2020/01/01 to 2021/10/31 Relevant Journals & Search:- Asian Journal of Psychiatry (9), Indian Journal of Psychiatry (272), Indian Journal of Social Psychiatry (165), Indian Journal of Psychological Medicine (15), Journal of Mental Health and Human Behavior (16), Annals of Indian Psychiatry (61), Journal of Family Medicine and Primary Care (7), International Journal of Community Medicine and Public Health (64)

Search terms used: Humans, COVID-19, India, Psychological Distress