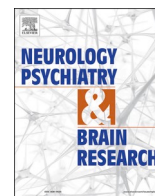




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Mental health research in the lower-middle-income countries of Africa and Asia during the COVID-19 pandemic: A scoping review

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ABSTRACT

Background: Lower middle - income countries of Africa and Asia have accommodated a large portion of the world's population, where mental health research has been under-prioritized. This study aimed to review all published research on mental health issues related to the COVID-19 pandemic in lower middle - income countries of the Afro-Asian region.

Methods: A search was conducted in the PubMed and PubMed Central databases using the terms "mental health," "psychiatric disorders," "COVID-19", "coronavirus," "Asia," "Africa," "Lower Middle-income countries." All articles published in the English language until 3rd July 2020 were included.

Result: A total of 133 papers were found in lower-middle-income countries of Africa (n = 11) and Asia (n = 122), which discussed various aspects of mental health in the context of COVID-19. Most of the studies are cross-sectional studies that addressed mental morbidities, psychological reactions, stress, coping among the general population, and focused groups (healthcare workers, students, elderly, patients). Researchers attempted to develop and validate tools that measure certain psychological constructs (fear, anxiety) concerning COVID-19. Online surveys were the primary modality of researching this COVID-19 pandemic.

Conclusion: COVID-19 related mental health research is scarce in lower-middle-income countries of Africa and Asia. Available researches suggest that mental health challenges during this COVID-19 pandemic are enormous and need attention. There is a need for policy and recommendations to deal with the mental health challenges in lower middle - income countries of Africa and Asia.

1. Introduction

COVID-19 was officially declared a pandemic by the World Health Organization (WHO) on 11th March 2020. Initially transmitted to humans from the bat, human-to-human transmission via airborne droplets is the primary concern now. Asymptomatic and mildly symptomatic cases are amounting to around 80%, can transmit the virus as efficiently as symptomatic cases. The numbers of COVID-19 cases are increasing, and it is clear that every country is vulnerable. Some

countries have crossed the peak of infections, whereas several others have not. By 25th September 2020, the worst affected countries globally (in terms of the total number of confirmed COVID-19 cases) are – The United States of America, India, Brazil, the Russian Federation, Colombia, and Peru (WHO, 2020a). As per WHO data, by 25th September 2020, 1,161,212 confirmed cases and 25,202 deaths had been reported from Africa, and 6,530,873 confirmed cases and 108,181 deaths have been reported in South-East Asia (SEA) (WHO, 2020a). These figures are rapidly changing as the pandemic is progressing. The most

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appropriate strategy for lower-middle-income countries (LMICs) in African and Asia remains containment, i.e., activities that interrupt transmission screening at ports of the countries, containment strategies, fast case detection, isolation and treatment, contact tracing, and management.

Nigeria, in Africa and India, Pakistan, Bangladesh, and Indonesia in Asia are among the world’s most populous countries. These LMICs being over populous, where social distancing is a challenging strategy to implement. Countries like Afghanistan, Iraq, Central African Republic, Chad, Niger, Guinea are some countries with low literacy rates. In some countries, namely South Africa, Afghanistan, Mongolia, the law and order situation is compromised (Crime Index for Country 2020, 2020). Countries like Nigeria, Algeria, and Ethiopia are amongst the most politically unstable (Rubin, 2016). Plenty of social and economic issues exist in these regions over which the present pandemic is an additional burden. Personal protective equipment (PPE), hand sanitizers, hospital beds, ICU beds, ventilators, oxygen- all are of limited supply in these countries (Bong et al., 2020). The LMICs of Africa and Asia struggle with inadequacy and disproportionate distribution of the existing workforce in the mental health sector, improper infrastructure, and low mental health literacy (Papalois & Theodosopoulou, 2018). Additionally, lesser research in mental health and fewer monetary allocations in the national budget are significant setbacks in these countries. The existing health system and inadequate emergency preparedness, homeless population, low living status, high population density, and insufficient education levels are the enduring vulnerability in these countries’ (Kar, Yasir Arafat, Marthoenis, & Kabir, 2020). Hospitals are already overcrowded with pneumonia, tuberculosis, Acquired immunodeficiency syndrome, and malaria patients. Also, patients needing urgent surgeries like the cesarean section cannot be kept waiting.

Moreover, existing stigma, fear, and negative social cognition in these populations further complicate the issue. As per the latest situation report of Vietnam, COVID-19 infection is well controlled in the country, and only sparse cases of COVID-19 are currently being detected (WHO, 2020b). For 99 consecutive days (from 16th April to 25th July 2020), no cases have been detected in Vietnam, while the whole world struggled to contain the spread of COVID-19 (WHO, 2020b). Vietnam government

had successfully implemented the program named “5K”, which emphasized the role of – facemask, hygiene, safe distancing, prohibiting gathering, and health declaration (WHO, 2020b). It is essential to learn from the practices and policies of Vietnam for the effective control of COVID-19. Effective control of COVID-19 will help to minimize the COVID-19 related mental health consequences. This review aimed to see the researches on COVID-19 related mental health issues in LMICs of the Afro-Asian region by reviewing the recently published literature.

2. Methods

Four independent researchers searched the PubMed and PubMed Central (PMC) database using the terms “mental health”, “psychiatric disorders”, “COVID-19”, “coronavirus”, “Asia”, “Africa”, “Lower Middle-income countries”. Also, individual country names (Afro-Asian lower-middle-income countries) were used for the search. We identified forty-seven countries enlisted under LMIC categories in the World Bank (WB) database (World Bank, 2020a). Thirty-six out of these 47 countries are from the Afro-Asian region. We included all articles in the English language published till 3rd July 2020. The search criteria for the allotment of an article to a country has been mentioned in Fig. 1.

Research from the LMIC countries of Africa and Asia was categorized based on the number of mental health themes, the content of the theme, nature of publication, and the number of countries involved. The frequencies of specific data are presented by using the word cloud technique (<https://worditout.com/>). In the word cloud, words with larger fonts indicate that the study parameter with a higher frequency of distribution and smaller fonts indicates the study parameter with a lower frequency distribution frequency. The original research articles’ significant findings are described in tabular form and descriptive form.

3. Result

A total of 133 papers were found in lower-middle-income African and Asian countries, which discussed various mental health aspects in the COVID-19 context. Of those 133 items, 11 were from Africa, and the rest were from Asia. Among the publications from Africa, four are from

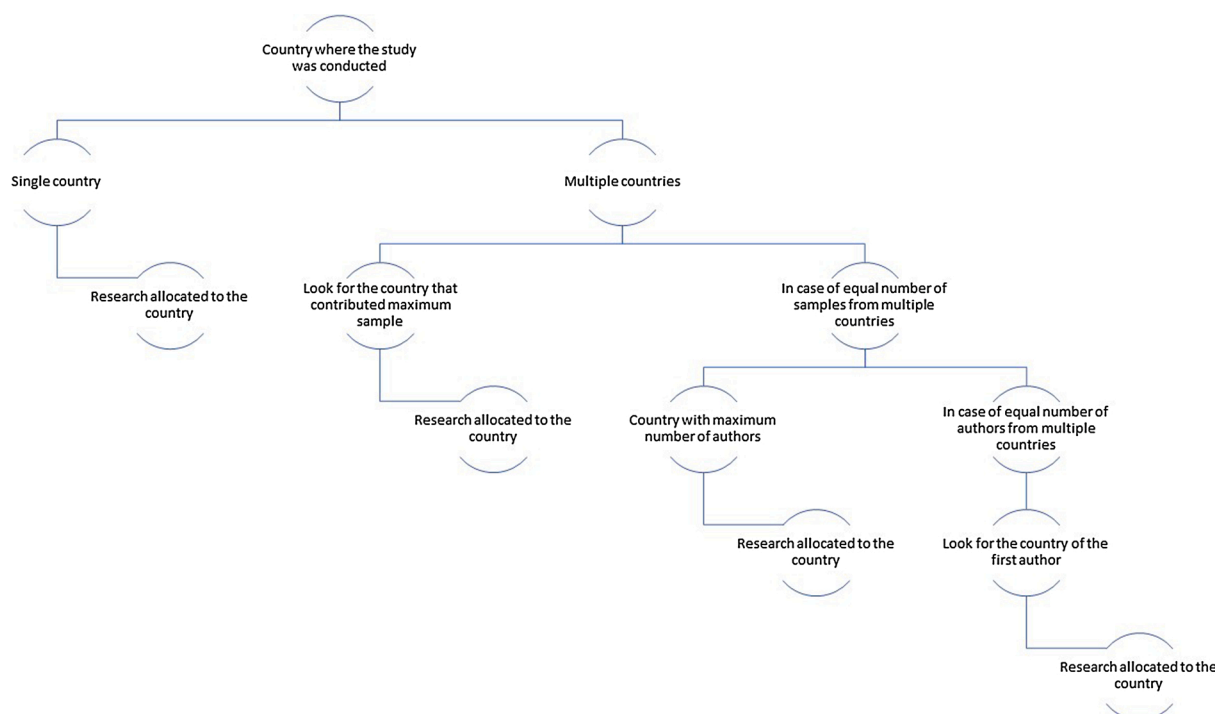


Fig. 1. Allotment steps of articles to the countries.

Egypt; four are from Nigeria, and one from Ghana, Tunisia, and Zimbabwe each. Out of all Asian publications, eighty-seven were from India, 13 from Pakistan, 11 from Bangladesh, four from the Philippines, three each from Indonesia and Vietnam, and one from Myanmar (Fig. 2). Just 27 of the 133 articles were original research papers (Table 1), and the remainder were either reviews/ opinions/ comments/ view-points/ letter to editors ($n = 94$), editorials ($n = 2$), or case studies ($n = 10$). Thirty-four papers collectively addressed several mental health issues, while the remaining 99 papers discussed single mental health issues. Of the 27 original research papers, thirteen studies are done in the general population, six in special population, six in healthcare workers, and two on media report analysis. Among the original researches (>85%) were online surveys ($n = 23$).

Most of these were cross-sectional studies conducted in a community setting in the form of online surveys. Most of them addressed mental morbidity, psychological reactions to COVID-19, stress, coping among the general population groups, and specific groups (e.g., healthcare workers, students, elderly people, patients). In the context of COVID-19, researchers tried to develop and validate tools that measure certain psychological domains (anxiety, fear). Multiple mental health-related issues were studied in 34 (25.56%) articles, whereas the rest 99 (74.44%) articles addressed a single mental health issue (Fig. 3). Most of the publications discussed the mental health issues in the context of COVID-19 in the general population (49.62%), followed by healthcare workers (13.53%) and COVID-19 patients (6.76%) [Fig. 4].

4. Discussion

Although research is essential, it is evident that only a few in LMICs have the time and resources to publish data during the pandemic era, as clinical care is prioritized over research. During this pandemic, journals are getting more number of submissions which are undergoing expedited review. This compromises the quality of peer review, leading to low-quality research data (Balaphas, Gkoufa, Daly, & de Valence, 2020; Di Girolamo & Meursing Reynders, 2020).

As the pandemic progresses, the morbidity and mortality statistics are changing across countries, and thus the research priorities. The future may witness many new findings with the diversification of research. Not having publications does not mean that a country is not providing care or support, and it also does not prove that clinical service is not going on properly in a country. Research and publications are essential, but delivering the healthcare service in the face of crisis is probably more important. As the LMICs of Africa and Asia have been accommodating a considerable proportion of the global population, we aimed to see the research activities on mental health issues during the early phase of the COVID-19 pandemic.

Many studies revealing the mental health aspect during the COVID-19 are yet to come out, especially in LMICs of Africa and Asia.



Fig. 2. Distribution of publications related to mental health during COVID-19 in Afro-Asian LMIC countries.

Psychological responses may be attributed to the impending fear of getting infected with COVID-19, changes in lifestyle due to lockdown, the sudden and unexpected change in income, fear of isolation and even death, anxiety due to the safety measures (Ho, Chee, & Ho, 2020; Kar, Yasir Arafat, Marthoenis et al., 2020; Li et al., 2020). People may develop psychiatric problems like anxiety spectrum disorder, depressive disorders, panic symptoms, feeling of helplessness, disconnectedness, monotony, disappointment, irritability, sleep problems, increased screen watching, suicide, posttraumatic stress disorder (PTSD) (Dixit, Marthoenis, Arafat, Sharma, & Kar, 2020; Ho et al., 2020; Kar, Yasir Arafat, Kabir, Sharma, & Saxena, 2020; Li et al., 2020). After the pandemic, there are chances to increase grief reactions, depression, PTSD, adjustment disorders, addiction problems, sleep disorders, and anxiety disorders. Existing studies addressed panic buying, suicide prevention, sleep disorder, stress, anxiety disorders, fear, stigmatization, mood disorders, depression, financial stress, addiction, geriatric mental health issues, and sexual health. Existing research is also focussed on several psychological interventions, telepsychiatry, psychosocial support, and psychosocial rehabilitation.

4.1. Country specific socio-behavioral issues

Several types of research have been conducted during this pandemic. These researches are based on the opinions and recommendations related to the current pandemic's impact on socio-behavioral challenges. The following are the highlights of researches done in various countries (Table 1). The mental health research related to COVID-19 in different Afro-Asian LMICs (in alphabetical order) has been discussed after the Table 1.

4.1.1. Bangladesh

Given the growing fears concerning the spread of COVID-19 in Bangladesh, a 'Fear of COVID-19 Scale' (FCV-19S) was developed and validated a seven-items uni-dimensional scale designed to serve as a measure for assessing COVID-19 related fears. It has been shown to have good psychometric properties, i.e., Cronbach α co-efficient of 0.871 and significant correlation ($r = 0.406$, $p < 0.001$) with the Bangla Patient Health Questionnaire (PHQ-90). This instrument has contributed significantly in conducting COVID-19 related research and understanding of the pandemic's psychological sequel in Bangladesh (Sakib et al., 2020).

Mamun and Griffiths (2020) reported that the first COVID-19-related suicide case in Bangladesh, where social avoidance and stigma are attributed to suicide (Mamun & Griffiths, 2020). Similar incidents were also reported from rural India (Goyal, Chauhan, Chhikara, Gupta, & Singh, 2020). These rather unfortunate incidents suggest that people who are infected with COVID-19 are experiencing a high level of stigma, especially if they live in rural areas. Therefore, it beholds public health authorities to launch aggressive sensitization and campaigning in rural settings to tackle the issues of stigma against COVID-19 infected (or perceived to be infected) persons. The failure to do this may have dire consequences for the mental health of people in these communities.

Fear of scarcity and losing control over the environment, insecurity, social learning, worsening of anxiety were posited as the core factors responsible for the panic buying phenomenon (Arafat, Alradie-Mohamed, Kar, Sharma, & Kabir, 2020; Arafat, Kar, et al., 2020). However, empirical studies (both quantitative and qualitative) are needed to understand better and avoid the psychological basis of panic buying during future emergencies.

4.1.2. Egypt & Ghana

Egypt is one of the worst affected African countries due to the COVID-19 pandemic, with more than 77 thousand confirmed cases and 3489 deaths (WHO, 2020c). Various mental health issues of the geriatric population, general population, and psychosocial support (El-Zoghby, Soltan, & Salama, 2020; Hayek et al., 2020) were focussed on mental

Table 1
Summary of researches on mental health issues about COVID-19 in LMICs.

Sl. No.	Title of article	Study Population with sample size & nature of the study	Domain(s) studied	Major Findings
1.	Psychometric Validation of the Bangla Fear of COVID-19 Scale: Confirmatory Factor Analysis and Rasch Analysis (Sakib et al., 2020)	General population; n = 8550; Online survey; Cross-sectional study	Scale Validation	<ul style="list-style-type: none"> The Bangla Fear of COVID-19 Scale (FCV-19S) indicated a very high internal reliability–Cronbach α value = 0.871. The FCV-19S was significantly correlated with the nine-item Bangla Patient Health Questionnaire (PHQ-90) ($r = 0.406, p < 0.001$). FCV-19S scores were significantly associated with higher worries concerning lockdown. No gender or age differences in the measurement invariance of the FCV-19S. Moderate awareness levels about the symptoms and preventive measures of COVID-19 Mostly positive attitude towards containment measures such as social distancing, personal hygiene
2.	Study of knowledge, attitude, anxiety & perceived mental healthcare need in the Indian population during COVID-19 pandemic (Roy et al., 2020)	General population ≥ 18 years old; n = 662; Online survey; Cross-sectional study	Knowledge and attitude; anxiety and perceived mental healthcare need	<ul style="list-style-type: none"> High level of sleep disturbances and anxiety related to contracting the disease High perceived importance of mental healthcare during the pandemic
3.	Mental Health Interventions during the COVID-19 Pandemic: A Conceptual Framework by Early Career Psychiatrists (Ransing et al., 2020)	Early career psychiatrists from countries from all WHO regions; n = 16; Online survey; Cross-sectional study	Mental health Intervention model development	<ul style="list-style-type: none"> Development of a conceptual model of the emotional epidemic curve of the pandemic. Development of a 5-component conceptual framework for Mental Health Preparedness and Action Framework (MHPAF)
4.	People with Suspected COVID-19 Symptoms Were More Likely Depressed and Had Lower Health-Related Quality of Life: The Potential Benefit of Health Literacy (H. C. Nguyen, Nguyen, Nguyen et al., 2020)	General population (18-85 years); n = 3947; Online survey; Cross-sectional study	Health literacy, Depression and Health-related Quality of Life	<ul style="list-style-type: none"> Suspected COVID-19 symptoms were associated with higher depression likelihood and lower Health-related Quality of Life (HRQoL). Health literacy had a protective effect on the development of depression and HRQoL during the epidemic.
5.	Binge-watching behavior during COVID 19 pandemic: A cross-sectional, cross-national online survey (Dixit, Marthoenis, Arafat, Sharma, & Kar, 2020)	General population (≥ 18 years) from 4 South-East Asian countries; n = 548; Online survey; Cross-sectional study	Binge-watching, Cyber-psychopathology	<ul style="list-style-type: none"> The lockdown period resulted in an appreciable increase in binge-watching About 1 in 10 participants had increased their binge-watching by 3-5 hours while about 1 in 5 had their binge-watching increase by 5+ hours.
6.	Attitude, practice, behavior, and mental health impact of COVID-19 on doctors (Chatterjee et al., 2020)	Healthcare workers (Doctors); n = 152; Online survey; Cross-sectional study	COVID-19 related knowledge, attitude, and behavior; depression, anxiety, and stress	<ul style="list-style-type: none"> The majority of the participants did not know about COVID-19 until January 2020. Relatively high levels of anxiety (33%), depression (35%), and stress (39.5%) were found. One or more co-morbidities found in 42.8% of participants, thus putting them at even more significant risks of contracting the virus.
7.	Psychological impact of COVID-19 pandemic on general population in West Bengal: A cross-sectional study (Chakraborty & Chatterjee, 2020)	General population; n = 507; Online survey; Cross-sectional study	Knowledge and attitude; psychological well-being	<ul style="list-style-type: none"> Very high rate of COVID-19 related knowledge and mostly positive attitudes towards preventive measures. More worry (about 5 in 7), depressive feelings (about 1 in 5), and sleep disturbances (about 1 in 3) were common.
8.	Does COVID-19 pandemic affect sexual behavior? A cross-sectional, cross-national online survey (Arafat, Alradie-Mohamed, et al., 2020; Arafat, Kar, et al., 2020)	General population; n = 120; Online survey; Cross-sectional study	Sexual behavior	<ul style="list-style-type: none"> 50% population reported positive change in emotional bonding with partner. 45% participants reported that lockdown affected their sexual life.
9.	Adaptation of the Bangla Version of the COVID-19 Anxiety Scale (Ahmed, Faisal, Sharkar, Lee, & Jobe, 2020)	General population; n = 729; Online survey; Cross-sectional study	Psychometric properties; COVID-19 anxiety	<ul style="list-style-type: none"> All items on the Bangla version of the COVID-19 Anxiety Scale (CAS) had a useful item discrimination index and single-factor structure with good factor loadings. The instrument was found to have acceptable internal consistency reliabilities,

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Table 1 (continued)

Sl. No.	Title of article	Study Population with sample size & nature of the study	Domain(s) studied	Major Findings
				test-retest reliability, and composite reliability (≥ 0.7).
10	Impact of the COVID-19 Pandemic on Mental Health and Social Support Among Adult Egyptians (El-Zoghby et al., 2020)	General population; n = 510; Online survey; Cross-sectional study	Psychological impact; social support	<ul style="list-style-type: none"> High correlation among The CAS Bangla version and Depression Anxiety Stress Scale (DASS-21) and a moderate correlation to the depression subscale of the DASS-21 and the COVID-19 Worry Scale. COVID-19 had a severe impact on 4 out of every 10 participants. Increases stress from home was the highest reported (62.7%). More participants (40.6%) reported receiving increased support from family members than friends (24.1%). Covid-19 pandemic has significant psychological impact on adult Egyptians and it has dramatically affected their social support.
11	The Short-Term Impact of COVID-19 Pandemic on Spine Surgeons: A Cross-Sectional Global Study (Khatab et al., 2020)	Healthcare worker (spine surgeons); n = 781; Online survey; Cross-sectional study	Knowledge, attitude, practice, PPEs, psychological distress	<ul style="list-style-type: none"> Older age, being an orthopaedic surgeon and working in the private sector was associated with a more significant impact of covid-19. Availability of N95 masks and face masks was associated with lesser psychological distress. Severe mental distress was found in 1 out of every 20 participants.
12	Mental Health, Physical Activity, and Quality of Life in Parkinson's Disease During COVID-19 Pandemic (Shalash et al., 2020)	Patients with Parkinson's Disease; n = 58; Online Survey; Cross-sectional study	Depression, Anxiety, Stress, Physical activity, Quality of life	<ul style="list-style-type: none"> Patients with Parkinson's Disease (PD) had worse stress, depression, anxiety, physical activity, and QoL than controls during the COVID-19 pandemic. Subjective negative impact of the pandemic on mental health, physical activity, and health care was reported by most of PD patients.
13	Fear of COVID-19 Scale-Associations of Its Scores With Health Literacy and Health-Related Behaviors Among Medical Students (H. T. Nguyen, Do et al., 2020)	Medical students; n = 5423; Online survey; Cross-sectional study	Psychometric properties; Fear of COVID-19; Health Literacy; Health Behaviour	<ul style="list-style-type: none"> The Fear of COVID-19 Scale (FCoV-19S) was found to have good validity and reliability (Cronbach's alpha = 0.90). Smoking and drinking were associated with greater fear of COVID-19. Health literacy was found to be a protective against the fear of COVID-19.
14	Factorial Validity of the Urdu Version of the Obsession With COVID-19 Scale: Preliminary Investigation Using a University Sample in Pakistan (Ashraf, Lee, & Elizabeth Crunk, 2020)	University students and teachers; n = 240; Online survey; Cross-sectional study	Psychometric properties	<ul style="list-style-type: none"> The Urdu version of the Obsession with COVID-19 Scale (OCS) showed weak positive correlations with the total scale and social dysfunction and self-confidence subscales of the General Health Questionnaire (GHQ-12) and no correlation with the depression and anxiety subscale.
15	Depression, Anxiety and Stress Among Indians in Times of COVID-19 Lockdown (Rehman et al., 2020)	General population; n = 403; Online survey; Cross-sectional study	Depression, anxiety, stress	<ul style="list-style-type: none"> Not having sufficient supplies during the lockdown was associated with being more adversely affected by COVID-19. Socioeconomic status was negatively correlated with stress, anxiety, and depression. Higher levels of stress were reported by students and healthcare professionals compared to other professionals. Normal levels of stress, anxiety, and depression were reported by mental health professionals.
16	Factors associated with COVID-19 outbreak-related suicides in India (Shoib, Nagendrappa, Grigo, Rehman, & Ransing, 2020)	Media reports; n = 34; Cross-sectional study	COVID-19-related suicide	<ul style="list-style-type: none"> The majority of victims (52.94%) were young adults (aged 18-35 years) and male (82.95%). Only about 6% of the victims were diagnosed with COVID-19. Fear of COVID-19 infection (47.05%), misinterpretation of fever as COVID-19 (26.47%) and depression and loneliness (20.58%) were the most cited reasons for suicide.
17	Aggregated COVID-19 suicide incidences in India: Fear of COVID-19 infection is the prominent causative factor (Dsouza et al., 2020)	Media reports; n = 69; Cross-sectional study	COVID-19-related suicide	<ul style="list-style-type: none"> The age of victims ranged from 19 to 65 years. The suicide cases were disproportionately males.

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Table 1 (continued)

Sl. No.	Title of article	Study Population with sample size & nature of the study	Domain(s) studied	Major Findings
18	Mental Health Assessment of Frontline COVID -19 Dermatologists: A Pan-Indian Multi-centric Cross-sectional Study (Sil et al., 2020)	Healthcare workers (Dermatologists); n = 41; Online survey; Cross-sectional study	Depression, stress	<ul style="list-style-type: none"> • Fear of COVID-19 infection was the leading reported cause of the suicides. • Other causes reported include financial crisis, loneliness, social boycott and pressure to be quarantined, being COVID-19 positive, COVID-19 work-related stress, unable to come back home after the lockdown was imposed, and unavailability of alcohol. • The overall prevalence of depression and stress was 26.82% and 29.2%, respectively. • Being female, age >30 years, and staying away from family, were significantly associated with moderate-severe depression. • Higher perceived stress scores were associated with being female, working long hours, working in COVID-positive wards, and staying away from family; although not significantly so.
19	Effect of Lockdown Following COVID-19 Pandemic on Alcohol Use and Help-Seeking Behavior: Observations and Insights From a Sample of Alcohol Use Disorder Patients Under Treatment From a Tertiary Care Center (Balhara, Singh et al., 2020)	Patients with alcohol use disorder; n = 73; Cross-sectional study	Help-seeking behavior	<ul style="list-style-type: none"> • Longer duration of abstinence is associated with a decreased need to seek alcohol during the lockdown. • Poor help-seeking behavior of patients with alcohol use disorder during the lockdown.
20	Depression, anxiety, and stress and socio-demographic correlates among the general Indian public during COVID-19 (Verma & Mishra, 2020)	General population; n = 354; Online survey; Cross-sectional study	Depression, anxiety, and stress	<ul style="list-style-type: none"> • Prevalence rates of moderate to too severe depression, anxiety, and stress were 25%, 28%, and 11.6%, respectively. • Employment status and binge drinking were significantly associated with depressive symptoms. • Gender, employment status, and binge drinking were significantly associated with anxiety symptoms. • Binge drinking was significantly associated with stress symptoms.
21	COVID-19 effect on mental health: patients and workforce (Pereira-Sanchez et al., 2020)	Healthcare workers (early career psychiatrists from countries in different WHO regions); n = 16; Online survey; Cross-sectional study	Telepsychiatry; Redeployment of psychiatrists to general medical care during COVID-19; Personal Protective Equipment (PPE)	<ul style="list-style-type: none"> • Telepsychiatry is available in varying degrees in all 16 listed countries, except Nigeria. • Redeployment of psychiatrists: had not yet begun in 8 (50%) of the participating countries; incipient in 2 countries; ongoing in 2 countries; voluntary in 2 countries; variable in 1 country and likely to be imminent in 1 country. • PPE was accessible and training in place in (8) 50% of the countries.
22	Initial psychological impact of COVID-19 and its correlates in Indian Community: An online (FEEL-COVID) survey (Varshney, Parel, Raizada, & Sarin, 2020)	General population(adults); n = 653; Online survey; Cross-sectional study	The psychological impact of COVID-19	<ul style="list-style-type: none"> • Younger age, female gender, and co-morbid physical illness predicted higher psychological impact. • Although physical symptoms and contact history predicted higher psychological impact, the associations were not statistically significant.
23	Compliance and Psychological Impact of Quarantine in Children and Adolescents due to Covid-19 Pandemic (Saurabh & Ranjan, 2020)	Parent-child dyads; n = 252; Cross-sectional study	Compliance with quarantine measures; the psychological impact of COVID-19	<ul style="list-style-type: none"> • Generally, a low level of reported compliance (7.43%) among the participating children and adolescents. • Compliance with community protective measures was better than compliance with household protective measures. • More significant psychological distress was significantly associated with being quarantined. • Worry, helplessness, and fear were the most commonly experienced feelings during the quarantine.
24	Impact of lockdown following COVID-19 on the gaming behavior of college students (Balhara, Kattula et al., 2020)	College students; n = 128; Online survey; Cross-sectional	Gaming behavior; depression; anxiety	<ul style="list-style-type: none"> • About half (50.8%) of the respondents reported increased gaming behavior, while 14.6% reported decreased gaming during the lockdown period. • Hours of gaming per day, an increase in gaming due to examination related stress, and belief that gaming helps managing stress were to be independently associated with gaming behavior during the lockdown period.

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Table 1 (continued)

Sl. No.	Title of article	Study Population with sample size & nature of the study	Domain(s) studied	Major Findings
25	Development and Initial Validation of the COVID-19 Anxiety Scale (Chandu, Pachava, Vadapalli, & Marella, 2020)	General population (≥ 18 years old); n = 307; Online survey; Cross-sectional study	COVID-19-related anxiety; psychometric properties	<ul style="list-style-type: none"> Two components were derived from the COVID-19 Anxiety Scale (CAS), viz, "fear of social interaction;" and "illness anxiety." The final scale had seven items and demonstrated good internal consistency reliability (Cronbach's $\alpha = 0.736$) and construct validity— moderately negative correlation with the self-rated mental health (Pearson's $r = -0.417$) Higher scores were found among individuals with lower educational qualification
26	Comparative analysis of perceived stress in dermatologists and other physicians during home-quarantine and COVID-19 pandemic with the exploration of possible risk factors- A web-based cross-sectional study from Eastern India (Podder, Agarwal, & Datta, 2020)	Healthcare workers (physicians); n = 384; Online survey; Cross-sectional study	Perceived COVID-19-related stress	<ul style="list-style-type: none"> More significant perceived stress was found in non-dermatologists compared to dermatologists, although not statistically significant. Female gender and being unmarried were significantly associated with more stress in both groups. Respondents highlighted the risk of infecting self or colleagues or family members and lack of protective gear at the work-place as leading causes of stress.
27	Measuring hope during the COVID-19 outbreak in the Philippines: development and validation of the state locus-of-Hope scale short form in Filipino (Bernardo & Mendoza, 2020)	General population; n = 3182; Online survey; Cross-sectional study	Hope; anxiety; psychometric properties	<ul style="list-style-type: none"> Confirmatory factor analysis showed a good fit between the four-factor model (as opposed to one-factor and two-factor models), supporting the scale's structural validity. There was also good evidence for the subscales' convergent and discriminant validity. Preliminary evidence for construct criterion validity showed significant associations with well-being and anxiety. The State Locus-of-Hope scale is a viable tool for assessing temporal hope-related thoughts that can inform efforts to understand how individuals engage in goal-related processes and maintain well-being in specific personal and social situations.

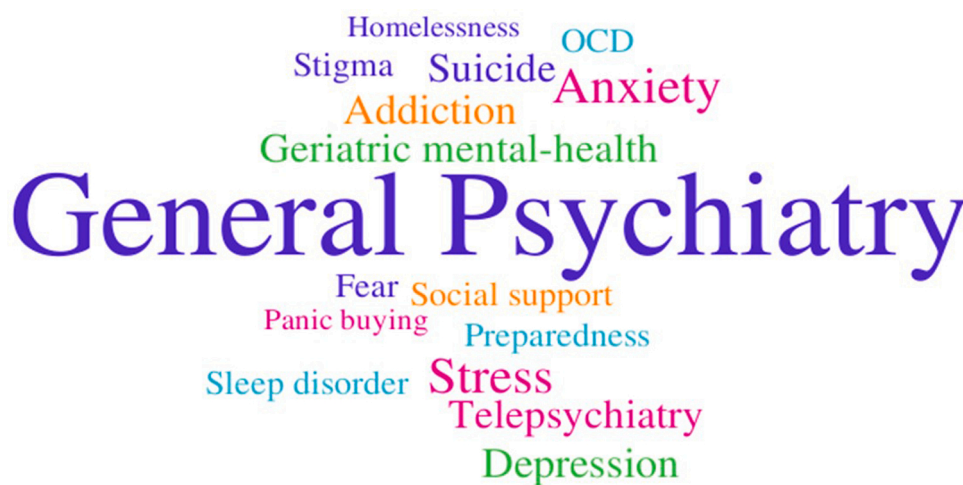


Fig. 3. Publications on mental health themes during COVID-19.

health research related to COVID-19. The mental health support for the vulnerable population during this pandemic falls short to meet the needs. Mental health issues of the focussed population patients with Parkinson's disease, spine surgeons have also been studied (Khattab et al., 2020; Shalash et al., 2020). These groups of population found to have poor mental health than the general population. The mental health issues during this COVID-19 pandemic are poorly studied in Ghana

despite more cases and fatalities due to COVID-19. One opinion statement discusses the mental health challenges, conflicts, and fear related to COVID-19 among Ghana's older adults (Gyasi, 2020). The existing evidence suggests, there is an increased need for attention to the emerging mental health issues in Egypt and Ghana.



Fig. 4. Population characteristics of research publications.

4.1.3. India

In Indian studies, several issues including anxiety disorders, knowledge, attitude, and perceived mental healthcare need (Roy et al., 2020), obsessive-compulsive disorder (OCD), mood disorders, stress, anxiety disorders, psychological preparedness, addiction, hoarding, social isolation, mental health rehabilitation, fear, stigmatization have been addressed (Kar, Yasir Arafat, Marthoenis et al., 2020). Efforts have also been made to address the socio-behavioral effect of lockdown and pandemic on focussed groups, e.g., child and adolescent mental health, geriatric mental health, and students. Studies also report the possible impact of COVID-19 lockdown on the mental health of individuals with pre-existing mental illnesses (Balhara, Singh, & Narang, 2020; Banerjee, 2020; Kumar & Somani, 2020).

During the lockdown period, the Centre for Addiction Medicine, NIMHANS, started the e-Consultation portal with their trained staff and addiction specialists. This program responded to consults in less than 24 hours and provided prompt guidance, contingency plan, and focussed psychoeducation (Ganesh, Sahu, Nair, & Chand, 2020). The Drug E-addiction and Treatment Centre, PGIMER, Chandigarh re-strategized their existing Opioid Substitution Therapy (OST) for patients with opioid dependence, ensuring access to services in these challenging times. The institution formulated interim standard operating procedures (SOPs) to run a hospital-based OST service utilizing take home Buprenorphine- Naloxone (Basu, Ghosh, Subodh, & Mattoo, 2020).

Self-harm and general psychological well-being have also been evaluated (Thakur & Jain, 2020). Fear, anxiety, depressive symptoms, and precipitate suicidal attempts due to COVID-19 related information overload by media have also been highlighted in case studies (Dsouza, Quadros, Hyderabadwala, & Mamun, 2020). The National Centre for Suicide Research and Prevention of mental ill-health (NASP) has been actively attempting to curb the self-harming behavior in the ongoing pandemic by increasing awareness and emphasizing early intervention (Sahoo et al., 2020). Studies have also been carried out concerning Ayurveda and psychoneuroimmunology, social media and rumors, addiction, psychology, stress, binge-watching behavior, gaming addiction, attitude, behavior, anxiety disorders, telepsychiatry, sexual health, general mental health impact, and care of the COVID-19 patients (Balhara, Kattula, Singh, Chukkali, & Bhargava, 2020; Dixit et al., 2020b; Arafat, Kar, et al., 2020; Kar, Yasir Arafat, Kabir et al., 2020; Arafat, Alradie-Mohamed, et al., 2020; Rajkumar, 2020).

The Medical Council of India released the 'Telemedicine Practice Guidelines- enabling Registered Medical Practitioners to provide healthcare using Telemedicine' in March 2020 because of the ongoing pandemic. The Telemedicine center in NIMHANS is now working on the concept of Virtual Physical Examination (VPE) and is planning to evolve specific telepsychiatry guidelines, which can be generalized for the country by involving all stakeholders (Manjunatha, Kumar, & Math, 2020).

To avoid the negative impact of lockdown on mental health, articles highlighting measures to deal with mental health issues have been published (Kar, Yasir Arafat, Kabir et al., 2020). A study conducted via

the social media platform revealed positive feelings of hope, trust, and belief that the situation will become better (Vibha, Prabhu, Kamath, & Pai, 2020). The Government of India has developed a COVID-19 website to provide all necessary information related to the pandemic, including real-time information and myth busters. A central helpline number has been made available for any inquiries related to COVID-19. The Ministry of Health and Family Welfare, Government of India, has released posters, health advisories, videos, and conducted webinars on various mental health issues (MoHFW, 2020).

4.1.4. Indonesia

A study on the Indonesian population revealed that they are liable to experience mental health problems such as depression, anxiety, stress, and frustration due to several factors related to the COVID-19 pandemic (Gunawan, Juthamane, & Aunguroch, 2020). These factors may be associated with the lockdown-related stress, healthcare worker stigma, stigma against individuals and families affected by COVID-19, paranoia, and grief-related issues. The lockdown has subjected people to working in limited spaces, economic difficulties, and constraints on social life, all of which can have deleterious mental health effects in the long run. There have also been incidents of cyberbullying of people affected by COVID-19, especially in individuals who seemed to have had secondary exposure to the virus after having earlier been certified to have recovered from the disease (McIntosh, Hirsch, & Bloom, 2020).

With the advent of the Mobile App Survey (MAS) and tele-consultation initiatives (WhatsApp, Zoom, Meets), online mental health services are gradually gaining ground in Indonesia (Sukmawati, Ardi, Iffdil, & Zikra, 2019). Because of the non-inclusion of mental health services in the emergency helpline, mental health professionals in Indonesia have devised many methods to meet the populace's mental health needs during these critical times.

4.1.5. Myanmar

One study from Myanmar discusses the possible mental health challenges during COVID-19 about the elderly population (Akhter-Khan & Wai, 2020). Though the number of reported cases to date is low (less than 350), with six deaths, considering the rapid spread of this pandemic, it is difficult to say that Myanmar's low figures will persist for long.

4.1.6. Nigeria

Nigeria being a densely populated country, is experiencing challenges related to mental health issues in the context of COVID-19. The limited existing research on mental health-related to COVID-19 discusses the impact of COVID-19 on mental health and the need for psychosocial support (Aluh & Onu, 2020; Chukwuorji & Iorfa, 2020; Kola, 2020; Otu, Charles, & Yaya, 2020).

4.1.7. Pakistan

Economic difficulties (for example – unemployment, poverty) are the primary causes of COVID-19 related suicide in Pakistan during

lockdown (Mamun & Ullah, 2020). Fear of infection is another significant contributor to suicide here. The double-edged role of electronic media, especially in Pakistan, was highlighted by Bilal, Latif, Bashir, Komal, and Tan, (2020)). They observed that the negative handling of the pandemic coverage led to panic and stress-related psychiatric disorders. Given that electronic media is the most common source of information, media formats should boost morale among people by providing help and guidance. More air-time should be dedicated to positive televised campaigns (Bilal et al., 2020), despite keeping people aware of the actual death toll and possible health issues if infected. It has been suggested that applying the evidence-based Health Belief Model (HBM) to the pandemic situation can help in reducing behaviors that implicate fear and anxiety. It also reverts the beliefs formed by pre-conceived notions of the perceived threats (Mukhtar, 2020). The need for the development of a psychological crisis intervention model (PCIM) to deliver early psychological help to mitigate stress and related disorders has also been highlighted (Rana, Mukhtar, & Mukhtar, 2020). The need for timely detection of psychiatric problems and early intervention is essential in dealing with the pandemic's long-term impact. This is especially in countries like Pakistan, where a large portion of the population are daily wage workers who are facing the brunt of this outbreak and thus are susceptible to psychological disorders. Implementing strategies such as online psychological helplines can help provide guidance and in dealing with these problems (Shuja, Aqeel, Jaffar, & Ahmed, 2020).

4.1.8. Philippines

The elderly population and persons with underlying chronic medical conditions such as diabetes, hypertension, and cardiovascular diseases, be more susceptible to COVID-19 and its severe complications (Apple-gate & Ouslander, 2020; Rocklöv & Sjödin, 2020). The elderly population in the Philippines accounts for one-third of the country's total COVID-19 cases. Telehealth is proffered as an effective means to ensure that the elderly have access to mental and physical health services, which may be essential during the pandemic. Robust and synergistic public and private partnership (together with international bodies such as the WHO) would facilitate making this a reality (Buenaventura, Ho, & Lapid, 2020).

In this unprecedented crisis, developing countries such as the Philippines are not sufficiently equipped to manage the challenge. Collaborative efforts of the public and private sectors in conjunction with external aids from developed countries and the WHO may help to manage and to care for these elderly patients adequately.

4.1.9. Tunisia

In a bid to proactively respond to the anticipated mental health offshoots of the COVID-19 pandemic in Tunisia, health professionals in the Strategic Health Operations Centre (SHOC), and the Psychological Support Unit (PSU) collaborated to develop a psychological crisis intervention model. This model incorporated medical students' social workers, psychiatrists, and psychologists. This model seems to possess a number of strengths, like- the inclusion of all age groups, a wide range of services (from psychoeducation to specialized care for suicide and addiction), and offline access to the helpline (Zgueb et al., 2020). Other developing countries may also learn from this initiative and adapt it to suit their individual peculiarities.

4.1.10. Vietnam

A hospital-based study conducted by Nguyen, Do et al. (2020) to investigate the association between suspected COVID-19 symptoms (S-COVID-19-S), depression, and inferior health-related quality of life showed a positive association. In this study, health literacy was found to have a protective effect with respect to depression and health-related quality of life (H. C. Nguyen, Nguyen et al., 2020). This finding affirms the importance of making accurate health information available and accessible to all, both during the pandemic and beyond. Vietnam is

prosperous in containing the spread of pandemic through its exemplary and robust policy and evidence-based management approach (World Bank, 2020b). The effective control of COVID-19 in Vietnam has a positive impact on the economic growth of the country. Maybe a replication of the policy of Vietnam, useful in controlling COVID-19 and associated mental health issues globally (Pham, 2020).

5. Recommendations

During this COVID-19 pandemic, LMICs face the risk of the exacerbated burden of mental health issues due to weak health systems and the lower socioeconomic status of its population. Based on the above review and analysis, this study is recommending the following:

- 1 To ensure access to mental care to all, there is a need for more collaborative research to reform policy formulation & identify the most affordable, accessible & cost-effective mental health interventions.
- 2 The governments should work with local media houses to issue statements against stigmatizing and discriminating COVID-19 patients or people with similar symptoms.
- 3 Telepsychiatry approach in providing mental health services are increasingly being adopted in various countries, including some LMICs. Phone calls, video calls, toll-free numbers, and Unstructured Supplementary Service Data (USSD) codes can be included to reach more people for counseling and mental health advice in remote locations. However, the approach should be well-coordinated to ensure best practices and ethical aspects.
- 4 The LMICs have a limited number of mental health professionals. This critical period requires the building of the capacity of other healthcare professionals (primary care physicians) to identify common mental disorders (anxiety & depression). They should be able to administer psychological first-aid while understanding the need for referral to professionals.
- 5 With the most population in LMICs falling within the lower socioeconomic status, the economic impact of COVID-19 can be enormous. Closing businesses, layoffs, and furlough, rising loans & debts, can all lead to exacerbation of mental issues. Stakeholders planning health interventions should consider the multilayer effect of the pandemic.
- 6 Schools after their resumption should take initiatives to provide positive mental health interventions to children, especially those with developmental disabilities. This will help to address mental health issues like fear, depression, and abuse during the lockdown. Delay in addressing these symptoms may lead to loss of concentration, poor academic performance & even suicide. Teachers may be trained for early identification of common mental health issues and refer them for care.
- 7 In LMICs, not all areas have access to the internet and power supply. Creating innovative and community-specific strategies to reach their vulnerable populace is the need of the hour.
- 8 Social distancing and lockdown have been found to affect people with cognitive impairment, especially the elderly. Routine care should be provided for such individuals. Not seeing a familiar face or drug disruption can cause relapse or aggravated conditions.
- 9 As the LMICs are struggling with a paucity of resources the researchers and policymakers may utilize the information from other LMICs for the development of policy or healthcare delivery. Cross-national collaboration may help in research, publication, and subsequent dissemination of the research findings in these countries.
- 10 It is recommended to interpret the research findings cautiously as the survey methodologies and populations studied in most of the research are not uniform and not the true reflection of ground reality.

6. Limitations

Only PubMed and PMC databases were searched. The search was done in the early phase of the pandemic in Africa and Asia's lower-middle-income countries. Only English language papers were included. The majority of the studies (>85%) were online surveys conducted in populations with access to the internet, which may not reflect the general population; hence, appropriate cautions to be taken while interpreting the study's findings. Most of the researches are from tertiary care centers, which may not reflect the ground reality (i.e., the scenario at the community level). Similarly, the quality of research data published through the expedited review process is also questionable.

7. Conclusion

The mental health impact of COVID-19 is significant. However, mental health researches related to COVID-19 are lacking in LMICs, particularly in Africa. The evidence available shows that mental health issues are immense and require attention during this COVID-19 pandemic. Policies and guidelines are required to tackle the mental health issues in Afro-Asian lower middle-income countries. There is a need for collaboration among researchers to understand the mental health challenges in LMIC countries, which will help develop policy recommendations to meet the challenge posed by COVID-19.

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Ethical statement

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Declaration of Competing Interest

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