A non-systematic, descriptive literature review of observational research on anxiety during the first COVID-19 pandemic phase

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Abstract

Fear of contagion, together with the consequences of mitigation strategies, are often cited as causes of high levels of anxiety in the general population in the context of the COVID-19 pandemic. However, it is unclear whether published reports make it possible to distinguish between normal and pathological anxiety. We conducted a non-systematic, descriptive literature review on observational studies reporting the prevalence or frequency of anxiety symptoms in non-clinical settings published between July and December 2020. Seventy-six studies were included. Two were conducted through telephone contact while the remainder were conducted on the internet. Factors associated with greater presence/severity of anxiety symptoms were sociodemographic variables (e.g., age, gender, employment, place of residence, living conditions, marital status, and educational level). Thirty publications (39.4%) reported data on a comparison group, including samples of general populations from different geographic regions or in different periods. Only 16 studies (21%) included some estimation of the functional impairment of detected anxiety symptoms. Only seven of the studies that estimated functional impairment had comparison groups. None of the studies included in this review contain sufficient contextual or descriptive information to determine whether the reported high levels of anxiety are normal reactions of subjects in high-stress situations or actual psychiatric disorders.

Main messages

- During the first phase of the COVID-19 pandemic, increased anxiety rates were reported, but it is unclear whether published reports distinguish between normal and pathological anxiety.
- We analyzed 76 studies reporting the prevalence or frequency of anxiety symptoms in non-clinical settings.
- None of the studies contains sufficient contextual or descriptive information to determine whether the high anxiety levels are normal reactions of subjects in high-stress situations or psychiatric disorders per se.

Introduction

There has been extensive and continuous research worldwide on the psychological repercussions of the COVID-19 pandemic. Fear of contagion and exposure to unbalanced information, together with the consequences of the mitigation strategies implemented by governments, are often cited as causes of high anxiety levels in the general population [1–3]. Reported risk factors for the development of anxiety mentioned in these published investigations include the initial outbreak, female sex, younger age, marriage, social isolation, unemployment and student status, financial hardship, low educational level, insufficient knowledge of COVID-19, epidemiological or clinical risk of disease, and some lifestyle and personality variables [4]. According to data from a systematic review with meta-analysis of 62 studies published between November 2019 and May 2020, including 162 639 participants from 17 countries, the pooled prevalence of anxiety was 33%, being higher among patients with pre-existing conditions and COVID-19 infection, and similar among healthcare workers and the general population [4]. Another study with the same design [5], which included 17 studies (n = 63 439) published until May 2020 and without a lower time limit, estimated the prevalence of anxiety at 32%. Finally, a third systematic review with meta-analysis from 43 publications between December 2019 and August 2020 [6] estimated the prevalence of anxiety at 25%, which would be more than three times higher than expected for the general population.

Despite these findings, it is to be expected that individuals exposed to unusual and threatening circumstances will react with intense but transient fear and anxiety, without further consequences. In the words of Horwitz [7]: "are these outcomes, mental disorders… or distress that non-disordered people naturally develop under stressful circumstances?" The problem then is determining whether we are dealing with the same internal psychological dysfunctions listed by the DSM [8] or with expected and even adaptive reactions. According to the DSM-5-TR [8], a mental disorder reflects a dysfunction in the psychological, biological, or developmental processes underlying cognitive functioning. Otherwise, regardless of the original cause, some mechanism of the individual is unable to function properly. In contrast, distress is initiated and maintained directly by primary stressors and would disappear when the stressor ceases to exist or when people adapt to their circumstances. Distress is a normal human emotion and not a disorder when it arises and persists in proportion to external stressors.

Of course, there is nothing wrong with reporting elevated levels of normal anxiety in the general population. However, the distinction between transient states of elevated anxiety, triggered by extreme events, and disorders caused by exposure to stressful situations sustained over more extended periods of time has implications at multiple levels. For example, a significant demand for care has been predicted, and public authorities are expected to prepare healthcare systems by increasing or redirecting resources. Also, new technologies, such as mental health apps, have been proposed as tools that may be needed to reach the general population [1]. However, while there is no doubt that some mental disorders may have their origin in environmental factors, this does not mean that all psychic reactions resulting from periods of stress should be treated as mental disorders. Moreover, research, treatment, and public policy may benefit from distinguishing distress initiated and maintained by social conditions from mental disorders dysfunctions of internal psychological mechanisms [6].

Th DSM-5-TR [8] distinguishes between prominent and excessive anxiety disorders based on the types of objects or situations that induce symptoms. Adjustment disorders with anxiety or mixed anxiety and depressed mood are characterized by onset within three months in response to an identifiable stressor. They must be clinically significant, evidenced by excessive distress and/or significant functional impairment. These criteria are essential to avoid over-including cases generated by a diagnostic system based on symptom detection. However, the use of symptom rating scales does not, by itself, allow these aspects to be evaluated. In this regard, Wakefield [9] warned about the methodological shortcomings of research using these instruments, in particular abbreviated self-applied questionnaires, initially designed as screening instruments, which do not assess the clinical impact of complaints and do not allude to the context in which they originated.

Probably not all studies analyzing mental symptoms during the COVID-19 pandemic reported mental disorders as such, but rather symptoms that are normally observable in contexts of environmental stress. Therefore, in this article we describe the observational studies that evaluated anxiety in the general

population during the first phase of the COVID-19 pandemic, with the main objective of assessing whether they took into account the appraisal of functional impairment, a fundamental criterion to consider if a set of symptoms constitutes a clinical entity. In addition, we describe the methodological design, the methods used to assess anxiety, the related risk factors, and the main results. Finally, some clinical and research implications are discussed.

METHODS

We conducted a non-systematic, descriptive literature review. We performed a search in Medline/PubMed (January 2022), using "anxiety," "anxiety disorder," "COVID-19," and "general population" as search terms. Primary and observational studies reporting the prevalence or frequency of anxiety and/or anxiety disorders, published between July and December 2020 were included. Studies that measured anxiety in clinical samples of people with a mental disorder and those published exclusively in Asian languages were excluded. A descriptive analysis of each study was performed, stating the methodological design, sample size, geographic region, presence of a comparison group (the study made comparisons between different samples or in the same model at different times), specific and general instruments used, method of data collection, assessment of functional impact, analysis of factors associated with anxiety, and main results. The proportion of studies by geographic region of the specific anxiety instruments used and the measurement of functional impairment are described.

RESULTS

We included 76 studies: 92.1% (n = 70) were cross-sectional studies [10–79], and 7.8% (n = 6) were prospective cohort studies [80–85]. Most were developed in Asia (48.6%; n = 37)[10–12,15–21,23–25,27,32,33,35,37,39,40,43,45,49,51,52,59,61,63,64,66–68,72–74,77,85] and Europe (35.5%; n = 27) [13,14,22,26,28–30,34,41,42,46,47,53–55,57,62,65,69–71,75,76,79–81,83], followed by Latin America (6.5%; n = 5) [31,50,58,60,82], Africa (3.9%; n = 3) [36,44,84], Oceania (1.3%; n = 1) [38], and North America (1.3%; n = 1) [78], while two studies included samples from two or more continents [48,56]. None of the studies included in this review were conducted with face-to-face interviews. Two of them were conducted through telephone contact with the subjects [49,55]. The rest of the research was conducted on the internet. Sample sizes of the selected studies in this review varied widely, from several hundred to one hundred thousand; the samples generally included people from the same country. Table 1 summarizes the main characteristics of the included studies. The full version of Table 1 can be found elsewhere [86].

We identified eight specific scales for the measurement of anxiety symptoms. In contrast, the others collected general information about the subject's mental state (e.g., depression, stress, trauma-related factors, resilience, spiritual experiences, coping styles, psychological flexibility, and personality traits), quality of life, knowledge about COVID-19, and insomnia, among others. The most frequently specific scales were the Generalized Anxiety Disorder Scale (53.9%; n = 41), the Depression, Anxiety, and Stress Scale (19.7%; n = 15), and the State-Trait Anxiety Inventory (5.2%; n = 4). Overall, 89.4% (n = 68) applied specific scales, and 81.5% (n = 62) also applied other psychometric instruments.

All the studies included appraised factors associated with greater presence/severity of anxiety symptoms, most frequently sociodemographic factors (e.g., age, gender, employment, place of residence, living conditions, marital status, and educational level). Others, much less frequent, included measures of access to information about COVID-19, previous psychiatric disorders, physical comorbidities, and psychological attitudes.

Thirty publications (39.4%) reported data on a comparison group, including comparisons between general population samples from different geographical regions [43,46,48,50,54,56,59,61–63,72], at different times [16,20,49,52,80–85], or concerning healthcare worker status [11,12,14,32,35,36,66,73,79]. Six noteworthy studies consisted on longitudinal follow-up of anxiety symptoms at various periods of time during the pandemic [80–85].

Only 16 studies (21%) included some estimate of the functional consequence of the detected anxiety symptoms. These studies were developed in Europe (n = 10) [14,28,53–55,69–71,75,80], Asia (n = 4) [15,45,72,85], and Africa (n = 2) [36,84]. Some aspects assessed by individual studies were insomnia, sleep quality, somatic symptoms, quality of life, physical activity and physical activity avoidance, cardiovascular risk, and limitations in daily life and activities of daily living (i.e., sexuality, nutrition, and sense of freedom). Only seven studies estimating functional impairment included comparison groups [14,36,54,72,80,84,85].

DISCUSSION

The most commonly used instrument was the Generalized Anxiety Disorder Scale, a brief self-report scale developed to identify probable cases of generalized anxiety disorder. The validation study showed good reliability and criterion, construct, factorial and procedural validity. Increasing scores on the scale were strongly associated with multiple domains of functional impairment [87]. The second most commonly used scale was the Depression, Anxiety and Stress Scale [88], which aims to cover the full range of core symptoms of anxiety and depression, with a high psychometric level and maximum discrimination between the two scales. No cut-off points were provided. The third scale in terms of frequency was the State-Trait Anxiety Inventory [89], which consists of two 20-item self-report scales to measure transient and permanent anxiety; a

Table 1. Description of the included studies.

Study	Country and design	Anxiety instrument	Functional impairment	Main results
Wakode et al. [10]	India; cross-sectional (n = 257); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	88% had moderate to severe levels of anxiety
Reddy et al. [11]	India; cross-sectional (n = 247); online, self-report; compared to healthcare professionals	Depression, Anxiety, and Stress Scale	No	Anxiety scores were low (92.7%)
Velikonja et al. [22]	Slovenia; cross-sectional (n = 7731); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	The sample presented a mild level of anxiety
Meesala et al. [33]	India; cross-sectional (n = 1346); online, self-report; no comparison group	COVID-19 Anxiety Scale	No	The mean Covid Anxiety Scale score was 18.9 ± 6.4 (The item with highest mean scores was: "How worried are you about people coughing or sneezing for fear that you might get COVID-19?")
Matsungo et al. [44]	Zimbabwe; cross-sectional (n = 507); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	The prevalence of generalized anxiety disorder was 40.4%
Bérard et al. [55]	France; cross-sectional (n = 536); telephone interview; no comparison group	Generalized Anxiety Disorder Scale	Cardiovascular risk, physical activity	32% of participants reported symptoms of anxiety
Muhammad Alfareed Zafar et al. [66]	Pakistan; cross-sectional (n = 1014); online, self-report; compared to healthcare professionals and medical students	Self-Rating Anxiety Scale	No	The prevalence rate of anxiety symptoms was 4.6%; The general public had more anxiety than healthcare professionals
Ansari Ramandi et al. [77]	Iran; cross-sectional (n = 788); online, self-report; no comparison group	Hospital Anxiety and Depression Scale	No	Anxiety mean score was 7.01 ± 3.68 (119 participants had abnormal anxiety scores)
Kantor et al. [78]	US; cross-sectional (n = 1005); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	264 subjects (26.8%) met criteria for anxiety disorder based on a GAD-7 cut-off of 10; a cut-off of 7 resulted in 416 subjects (41.4%), who met the clinical criteria for anxiety.
Demartini et al. [[79]	Italy; cross-sectional (n = 432); online, self-report; compared to healthcare workers	Depression, Anxiety, and Stress Scale	No	25.5% presented pathological levels of anxiety
He et al. [12]	China; cross-sectional (n = 2689); online, self-report; compared to healthcare workers	Generalized Anxiety Disorder Scale	No	The proportion of individuals with mild or serious anxiety was higher in the general population when compared to quarantined population and healthcare workers
Hoffart et al. [13]	Norway; cross-sectional (n = 10 061); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	25.6% met the cut-off for generalized anxiety disorder

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Table 1. Cont.

Study	Country and design	Anxiety instrument	Functional impairment	Main results
Rossi et al. [14]	Italy; cross-sectional (n = 24 050); online, self-report; compared to healthcare workers	Generalized Anxiety Disorder Scale	Insomnia	Anxiety symptoms had a prevalence of 21.25% for the general population group, 18.05% for second-line healthcare workers, and 20.55% for first-line healthcare workers
Vu et al. [15]	Vietnam; cross-sectional (n = 406); online, self-report; no comparison group	No	Quality of life	Most people reported having anxiety/depression problems, which were 40.1%, 38.6% and 30.0% among people in the groups that did not need isolation, self-isolation and government quarantine facilities, respectively.
Zhang et al. [16]	China; cross-sectional (n = 179); online, self-report; compared to previous research (pre-COVID) in urban and rural areas	Self-Rating Anxiety Scale	No	Mean anxiety scores was 40.93 ± 9.36 (below the significant cutoff value)
Xiao et al. [17]	China; cross-sectional (n = 1038); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	63% of the sample had at least mild anxiety, with 118 (11.4%) having moderate anxiety and 75 (7.2%) severe anxiety
Alamri et al. [18]	Saudi Arabia; cross-sectional (n = 1597); online, self-report; no comparison group	Depression, Anxiety, and Stress Scale	No	10% reported moderate to severe anxiety symptoms
Zhong et al. [19]	China; cross-sectional (n = 2185); online, self-report; no comparison group	Depression, Anxiety, and Stress Scale	No	Ten percent of the participants reported having experienced moderate to severe anxiety, and 9.8% reported mild symptoms of anxiety.
Ran et al. [20]	China; cross-sectional (n = 1775); online, self-report; compared to previous research (pre-COVID)	Self-Rating Anxiety Scale	No	Compared to Ya'an (8.0%), participants in Jingzhou in 2020 had a significantly higher rate of anxiety (Self-rating Anxiety Scale scores ≥ 50, 24.1%)
Peters et al. [80]	Germany; cohort (n = 113 928); online, self-report; compared changes in mental health scores between the NAKO baseline examination and the time of the COVID-NAKO questionnaire	Generalized Anxiety Disorder Scale	Self-reported health status	The increase in mean severity of both depressive symptoms and anxiety symptoms raised the proportion of those who were above the cut-off points on these two scales (≥10 points): from 4.3% to 5.7% (anxiety)
Ngoc Cong Duong et al [21]	Vietnam; cross-sectional (n = 1385); online, self-report; no comparison group	Depression, Anxiety, and Stress Scale	No	14.1% presented significant levels of anxiety

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Study	Country and design	Anxiety instrument	Functional impairment	Main results
Mirhosseini et al. [23]	Iran; cross-sectional (n = 3565); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	The average anxiety scores of the participants were 6.06
Jiang et al. [24]	China; cross-sectional (n = 60 199); online, self-report; no comparison group	State-Trait Anxiety Inventory	No	33.21% were mildly anxious, 41.27% were moderately anxious, and 22.99% were severely anxious
Rias et al. [25]	Indonesia; cross-sectional (n = 1082); online, self-report; no comparison group	Depression, Anxiety, and Stress Scale	No	Individuals who had low levels of spirituality had increased anxiety compared to those with higher levels of spirituality
Lenzo et al. [26]	Italy; cross-sectional (n = 6314); online, self-report;with no comparison group	Depression, Anxiety, and Stress Scale	No	The prevalence of moderate to extremely severe symptoms among participants was 24.4% for anxiety
Thomas et al. [27]	United Arab Emirates; cross-sectional (n = 1039); online, self-report, no comparison group	Generalized Anxiety Disorder Scale	No	55.7% had scores above the cut-off of GAD-7
Ferrucci et al. [28]	Italy; cross-sectional (n = 10 025); online, self-report; no comparison group	No	Daily life activities (sexuality, nutrition, sleep, sense of freedom)	Data from north Italy exhibited higher prevalence of high psychological impact (anxiety 28%, fear 18%, anger 21%,sadness 27%, concern 42%) compared to center-south regions (anxiety21%, fear 14%, anger 22%, sadness 23%, concern 34%)
Jacques-Aviñó et al. [29]	Spain; cross-sectional (n = 7053); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	A total of 31.2% of women and 17.7% of men reported anxiety
Elezi et al. [30]	Albania; cross-sectional (n = 1678); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	Anxiety symptoms were more likely to occur in those who spent a longer time focusing on the outbreak of COVID-19
Torales et al. [31]	Paraguay; cross-sectional (n = 2206); online, self-report; no comparison group	No	No	41.97% of the sample reported anxiety
Lu et al. [32]	China; cross-sectional (n = 1417); online, self-report; compared to healthcare workers	Generalized Anxiety Disorder Scale	No	The median score of GAD-7 was 4 ("normal level")
Schnell et al. [34]	Germany-Austria; cross-sectional (n = 1538); online, self-report; no comparison group	No	No	41% of the sample had moderate symptoms of depression/anxiety
Hou et al. [35]	China; cross-sectional (n = 3088); online, self-report; compared to healthcare workers	Generalized Anxiety Disorder Scale	No	The prevalence of anxiety was 13.25%

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Study	Country and design	Anxiety instrument	Functional impairment	Main results
Agberotimi et al. [36]	Nigeria; cross-sectional (n = 884); online, self-report; compared to healthcare workers	Generalized Anxiety Disorder Scale	Insomnia	The prevalence of anxiety symptoms was significantly higher among healthcare personnel than the general population (58.4% vs. 49.6%)
Ren et al. [37]	China; cross-sectional (n = 6130); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	The prevalence of anxiety was 7.1%
Fisher et al. [38]	Australia; cross-sectional (n = 13 829); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	The estimated prevalence of clinically significant symptoms of anxiety was 21.0%
Massad et al. [39]	Jordan; cross-sectional (n = 5274); online, self-report; no comparison group	The Beck Anxiety Inventory	No	The prevalence of mild, moderate, and severe anxiety was 21.5%, 10.9%, and 6%, respectively
Pandey et al. [40]	India; cross-sectional (n = 1395); online, self-report; no comparison group	Depression, Anxiety, Stress Scale	No	Anxiety was reported by 22.4%
O'Connor et al. [81]	UK; cohort (n = 3077); online, self-report; repeated measures	Generalized Anxiety Disorder Scale	No	Symptoms of anxiety did not change significantly
Stylianou et al. [41]	Cyprus; cross-sectional (n = 216); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	The overall prevalence of generalized anxiety disorder was 8.33%
Canet-Juric et al. [82]	Argentina; cohort (n = 6057); online, self-report; repeated measures	State-Trait Anxiety Inventory	No	Anxiety levels showed a slight decrease in the full sample
Shevlin et al. [42]	UK; cross-sectional (n = 2025); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	The prevalence of anxiety was 21.6%
Qian et al. [43]	China; cross-sectional (n = 1011); online, self-report; compared to general population samples (Wuhan and Shanghai)	Generalized Anxiety Disorder Scale	No	The prevalence of moderate or severe anxiety was significantly higher in Wuhan (32.8%) than Shanghai (20.5%)
Huang et al. [45]	China; cross-sectional (n = 1172); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	Insomnia, physical symptoms	The percentage of anxiety was 33.02%
Fiorillo et al. [46]	Italy; cross-sectional (n = 20 720); online, self-report; compared general population samples from different geographical regions	Depression, Anxiety, and Stress Scale	No	17.6% reported severe or extremely severe anxiety symptoms
Parlapani et al. [47]	Greece; cross-sectional (n = 3029); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	A significant proportion reported moderate-to-severe anxiety symptoms (77.4%)
Passos et al. [48]	Portugal-Brazil; cross-sectional (n = 550); online, self-report; compared general population samples from different geographical regions	Generalized Anxiety Disorder Scale	No	The prevalence of anxiety was 71.3% (mild anxiety was present in 43.1%)

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Table 1. Cont.

Study	Country and design	Anxiety instrument	Functional impairment	Main results
Zhao et al. [49]	China; cross-sectional (n = 1501); online/telephone interview, self-report/interview; compared general population samples at different times	Generalized Anxiety Disorder Scale	No	The prevalence of anxiety was similar between 2016 and 2017 but greatly increased during the COVID-19 outbreak
Campos et al. [50]	Brazil; cross-sectional (n = 12 196); online, self-report; compared general population samples from different geographical regions	Depression, Anxiety, and Stress Scale	No	The prevalence of mild, moderate and severe, or extremely severe anxiety was 8.5%, 19.2%, and 16.5%, respectively
Hossain et al. [51]	India; cross-sectional (n = 880); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	The prevalence of anxiety was 49.1%
van der Velden [83]	Netherlands; cohort (n = 3983); online, self-report; repeated measures	No	No	The prevalence of anxiety and depression symptoms did not increase compared to the pre-outbreak prevalence
Azizi et al. [84]	Morocco; cohort (n = 537); online, self-report; repeated measures	No	Quality of life	No significant differences in total anxiety and depression symptom scores
Duan et al. [52]	China; cross-sectional (n = 1390); online, self-report; compared general population samples at different times	No	No	There were no significant differences in compulsion-anxiety between the outbreak and the remission of pandemic, but fear significantly decreased
Casagrande et al. [53]	Italy; cross-sectional (n = 2291); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	Sleep quality	32.1% reported high anxiety
Rossi et al. [54]	Italy; cross-sectional (n = 18 147); online, self-report; compared general population samples from different geographical regions	Generalized Anxiety Disorder Scale	Insomnia	20.8% reported severe anxiety symptoms
Sameer et al. [56]	India-Pakistan- Saudi Arabia-UK-US-Canada-United Arab Emirates-Estonia, Netherlands-Germany-Bangladesh-Chile-Korea-Japan-Malaysia-Switzerland; cross-sectional (n = 418); online, self-report; compared general population samples from different geographical regions	Depression, Anxiety, and Stress Scale	No	For anxiety, among male participants, 11.5% had moderate, 10.7% severe, and 36.9% extremely severe anxiety; while among female participants, 4.6% had moderate, 8.0% severe, and 54% extremely severe anxiety
Pakenham et al. [57]	Italy; cross-sectional (n = 1035); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	12.3% and 3% of the sample reported moderate and severe anxiety levels, respectively.
Galindo-Vásquez et al. [58]	Mexico; cross-sectional (n = 1508); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	20.8% had symptoms of severe anxiety

Table 1. Cont.

Study	Country and design	Anxiety instrument	Functional impairment	Main results
Han et al. [59]	China; cross-sectional (n = 9764); online, self-report; compared general population samples from different geographical regions	State-Trait Anxiety Inventory	No	People in Hubei province were the most anxious (37.2% with high anxiety), followed by those living in Beijing (30.5% with high anxiety) and Shanghai (30.2% with high anxiety)
Fernández et al. [60]	Argentina; cross-sectional (n = 4408); online, self-report; no comparison group	Brief Symptom Inventory-53	No	Participants reported elevated symptoms of anxiety (31.8%) and phobic-anxiety (41.3%)
Al-Qahtani [61]	Saudi Arabia; cross-sectional (n = 1508); online, self-report; compared saudi and non-saudi participants	Depression, Anxiety, and Stress Scale	No	Anxiety levels differed significantly between saudi and non-saudi samples
Nekliudov et al. [62]	Russia; cross-sectional (n = 23 756); online, self-report; compared general population samples from different geographical regions	State-Trait Anxiety Inventory	No	State Anxiety Scale scores were higher than Trait Anxiety Scale scores across all regions of Russia
Ran et al. [63]	China; cross-sectional (n = 1840); online, self-report; compared general population samples from different geographical regions	Generalized Anxiety Disorder Scale	No	The prevalence of moderate and severe anxiety was 6% and 2.8%, respectively
Guo et al. [64]	China; cross-sectional (n = 2331); online, self-report; no comparison group	Hospital Anxiety and Depression Scale	No	32.7% experienced elevated anxiety or depression symptoms
Hyland et al. [65]	Ireland; cross-sectional (n = 1041); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	20% of the sample screened positive for generalized anxiety disorder
Islam et al. [67]	India; cross-sectional (n = 1311); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	37.3% reported generalized anxiety
Alkhamees et al. [68]	Saudi Arabia; cross-sectional (n = 1160); online, self-report; no comparison group	Depression, Anxiety, and Stress Scale	No	24% reported moderate to severe anxiety symptoms,
Solomou et al. [69]	Cyprus; cross-sectional (n = 1642); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	Quality of life, including finances, personal health, and satisfaction with life	14% scored moderate anxiety and 9.1% severe anxiety
Petzold et al. [70]	Germany; cross-sectional (n = 6509); online, self-report; no comparison group	No	Limitations in daily life	More than 50% reported having anxiety and psychological distress related to the COVID-19 pandemic.
Gualano et al. [71]	Italy; cross-sectional (n = 1515); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	Avoidance of physical activity, insomnia	Anxiety symptoms prevalence 23.2%
Shi et al. [72]	China; cross-sectional (n = 56 679); online, self-report; compared general population samples from different geographical regions	Generalized Anxiety Disorder Scale	Insomnia	31.6% reported significant anxiety levels
Naser et al. [73]	Jordan; cross-sectional (n = 4126); online, self-report; compared to healthcare professionals	Generalized Anxiety Disorder Scale	No	The prevalence of anxiety was 13.1%

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Table 1. Cont.

Study	Country and design	Anxiety instrument	Functional impairment	Main results
Verma et al. [74]	India; cross-sectional (n = 354); online, self-report; no comparison group	Depression, Anxiety, and Stress Scale	No	28% suffered from moderate to extremely severe anxiety.
Shevlin et al. [75]	UK; cross-sectional (n = 2025); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	Somatic symptoms	There may be increased levels of generalized anxiety in the general population, but there may also be anxiety specifically associated to COVID-19
González-Sanguino [76]	Spain; cross-sectional (n = 3480); online, self-report; no comparison group	Generalized Anxiety Disorder Scale	No	21.6% were likely to be diagnosed with anxiety.
Wang et al. [85]	China; cohort (n = 1738); online, self-report; repeated measures	Depression, Anxiety, and Stress Scale	Physical symptoms	During the initial evaluation, moderate-to-severe anxiety was noted in 28.8% with no longitudinal changes

GAD-7: Generalized Anxiety Disorder Scale.
Prepared by the authors based on the results of the study.

higher score indicates a higher level of anxiety with no cutoff point. Despite being designed as a screening method for generalized anxiety disorder, there are significant differences between the Generalized Anxiety Disorder Scale [87] and the DSM-5-TR [8]. In contrast to the DSM-5-TR criteria: "more days with symptoms than without symptoms for at least six months", the Generalized Anxiety Disorder Scale only requires the presence of symptoms for at least two weeks. Furthermore, generalized anxiety disorder is characterized by excessive anxiety and multiple concerns. This raises questions about using this instrument to measure anxiety symptoms in the general population in the pandemic context.

Regarding adjustment disorder with anxious symptoms, although the length of time between the onset of symptoms and the onset of stress makes it likely to meet the definition, the instruments used in the research do not contain items that would allow verification of compliance with two essential criteria. Distress must be disproportionate to expected reactions to the stressor, and symptoms must cause impairment of functioning.

Assuming that the use of the above symptom inventories does not by itself diagnose specific disorders. In that case, it is possible that the studies are detecting a mixture of normal and abnormal cases of anxiety whose correct identification depends on the context in which they occur [7]. In any case, it is important to consider that the presence of anxiety, by itself, is not considered a disorder in current psychiatric nosology, unless it is an adaptive disorder, since it requires a specific pattern of situations and stimuli that generate that anxious response, or that the anxiety symptoms have a specific presentation.

An important feature to differentiate a pathological anxiety state from a normal reaction is the impact on the psychosocial functioning of the affected subject. This criterion is present in all DSM-5-TR diagnoses. However, only 16 studies in this review included some form of estimation of this aspect, almost always indirectly. However, although anxiety disorders show different profiles of functional impairment in different domains, the overall results may indicate that the correlation between symptoms and functioning is somewhat weak [90]. In this sense, it is interesting to consider Wakefield's psychopathological analysis proposal, i.e. "harmful dysfunction." [9] It states that psychological conditions are disorders only if they receive a negative assessment according to sociocultural standards ("harmful") and if they represent the failure of some internal biological mechanism that prevents it from fulfilling the function for which this mechanism was biologically (evolutionarily) designed ("dysfunction"). According to this notion, most of the studies included in this review do not confirm the sociocultural and factual dimensions of anxiety proposed by Wakefield, which constitute it as a disorder. Therefore, there is a lack of evidence to assert that pathological anxiety rates increased during the first phase of the pandemic.

Almost all of the studies were conducted using surveys available on the internet and self-administered by the participating subjects. The self-report method is a resource that has made it possible to expand community screening for disorders, mainly because of its low cost and the fact that it does not require trained interviewers. A key feature of this method is that all subjects answer the same questions, but at the same time, there is no opportunity to clarify the reported symptoms or their context.

A significant number of investigations include pre-pandemic anxiety prevalence figures from official studies. This is significant, as it allows comparison with expected results for the study population during normal periods. However, this comparison should be taken with caution due to methodological

differences with studies using sampling techniques that ensure representativeness and adequate sample size. In contrast, most reviewed publications were based on the snowball recruitment of subjects via social networks (e.g., Facebook, WeChat, and Qzone).

The inclusion of factors associated with anxiety enriches the description of the findings by describing patterns of vulnerability to a stressor, allowing comparisons between subjects and with other situations. In general, the available data tend to show that those most exposed to the adverse effects of the pandemic are those most at risk of developing anxiety symptoms. This again raises the question of whether what is being detected is only the presence of an expected emotional reaction in a more exposed population or whether it corresponds to a pathological process in more vulnerable subjects due to the failure of adaptive mechanisms.

Properly distinguishing between normal and pathological conditions is one of the primary functions of medicine and has profound cultural, social, political, and economic implications. However, the widespread use of instruments designed to detect mental symptoms in the general non-consulting population seems to generate a dilemma between increasing the sensitivity or validity of the measurements. None of the studies included in this review contain sufficient contextual or descriptive information to determine whether the high levels of anxiety reported are normal reactions of subjects in high-stress situations or psychiatric disorders per se. The difficulty in distinguishing between the two situations is one of the factors associated with the medicalization of life problems, a phenomenon often associated with the increasing use of medication and which generates a public perception of unmet demand for health care. Articles such as those reviewed in this paper could easily be improved by adding some estimate of symptoms' functional impact or duration. These are parameters usually included in classification systems to avoid overdiagnosis and ensure the measurements' scientific usefulness and their appropriate use in the generation of public health policies.

Notes

Contributor roles

AC: conceptualization, methodology, formal analysis, investigation, resources, writing (original draft preparation, review, and editing), visualization, supervision, project administration. MA: conceptualization, methodology, formal analysis, investigation, resources, writing (original draft preparation, review, and editing), visualization.

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The authors declare no competing interests.

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Ethics

This study did not require evaluation by an institutional review board as it is a review article using secondary data.

Data sharing statement

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Revisión de la literatura no sistemática descriptiva de estudios observacionales sobre ansiedad durante la primera fase de la pandemia de COVID-19

Resumen

El temor al contagio, junto con las consecuencias de las estrategias de mitigación, suelen citarse como causas de los altos niveles de ansiedad en la población general en el contexto de la pandemia de COVID-19. Sin embargo, no es claro si los informes publicados permiten una distinción entre la ansiedad normal y la patológica. Se realizó una revisión de la literatura no sistemática y descriptiva de los estudios observacionales que analizaron la prevalencia o la frecuencia de los síntomas ansiosos en contextos no clínicos publicados entre julio y diciembre de 2020. Se incluyeron setenta y seis estudios. Dos se realizaron mediante contacto telefónico con los participantes y el resto a través de internet. Los factores asociados a una mayor presencia/gravedad de los síntomas ansiosos fueron las variables sociodemográficas (e.g., edad, género, ocupación, lugar de residencia, condiciones de vida, estado civil y nivel educativo). Treinta publicaciones (39,4%) informaron datos sobre grupos de comparación, incluidas muestras de la población general de diferentes regiones geográficas o en diferentes períodos. Solo 16 estudios (21%) incluyeron alguna estimación de la alteración funcional asociada a los síntomas ansiosos. Solo siete de los estudios que estimaron la alteración funcional incluyeron grupos de comparación. Ninguno de los estudios incluidos en esta revisión contiene suficiente información contextual o descriptiva para determinar si los altos niveles de ansiedad son reacciones normales de personas en situaciones de alto estrés o trastornos psiquiátricos per se.