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Review

Impact of COVID-19 First Wave on Psychological and Psychosocial Dimensions: A Systematic Review

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Abstract: A systematic review of the literature investigating the effects of the COVID-19 pandemic on psychological and psychosocial factors was completed. Published literature was examined using electronic databases to search psychosocial factors such as beliefs and media persuasion, social support, coping, risk perception, and compliance and social distancing; and psychological factors as anxiety, stress, depression, and other consequences of COVID-19 that impacted mental health among the pandemic. A total of 294 papers referring to the first wave of the COVID-19 pandemic (December 2019–June 2020) were selected for the review. The findings suggested a general deterioration of mental health, delineating a sort of "psychological COVID-19 syndrome", characterized by increased anxiety, stress, and depression, and decreased well-being and sleep quality. The COVID-19 effect on the psychological dimensions of interest was not the same for everyone. Indeed, some socio-demographic variables exacerbated mental health repercussions that occurred due to the pandemic. In particular, healthcare workers and young women (especially those in postpartum condition) with low income and low levels of education have been shown to be the least resilient to the consequences of the pandemic.

Keywords: COVID-19; mental health; pandemic; COVID psychological impact; COVID psychosocial impact

Citation: Filindassi, V.; Pedrini, C.; Sabadini, C.; Duradoni, M.; Guazzini, A. Impact of COVID-19 First Wave on Psychological and Psychosocial Dimensions: A Systematic Review. *COVID* **2022**, *2*, 273–340. https://doi.org/10.3390/covid2030022

Academic Editor: Andrea Fiorillo

Received: 4 January 2022
Accepted: 3 March 2022
Published: 9 March 2022

1. Introduction

As of 21 February 2022, SARS-CoV-2 has infected more than 423 million individuals worldwide and caused more than 5.8 million deaths [1]. During the first months of 2020, the globe was under lockdown: the confinement measures which constituted an emergency protocol imposing restrictions on the free movement of persons [2]. These restrictive measures had various effects on people's daily life, and physical and mental health. This review arose from the need to summarize and schematize the many psychological publications related to the first wave of COVID-19, as they appear to be very large. The authors aim to provide a complete review of the literature on the psychological impact that the first wave (December 2019–June 2020) of COVID-19 had on a global level, to identify which factors related to the pandemic were most impacting people's mental health.

The results of the review regard the first wave of the pandemic (2019–2020). Therefore, this impact is unrepeatable in the future, also regarding resilience and transformative resilience. The findings could indicate a specific structure that could be attributed to a "psychological COVID-19 syndrome", characterized by symptoms relatable to anxiety, depression, stress, less wellbeing and more sleep problems.

We chose to analyze different variables of mental health studied in previous pandemics (Ebola, SARS, MERS, Novel influenza A, Equine influenza, etc.), in addition to psychosocial dimensions which proved to be essential to mitigate the spread of Coronavirus [3–10]. The

authors decided to build on the dimensions considered in previous pandemics to observe whether these variables were also present in the current COVID-19 pandemic. For easy reading of the review, we divided the work into two sections: (1) Psychosocial Variables, and (2) Observables related with Mental Health.

For this systematic review, 294 articles published between December 2019 and June 2020 were analyzed, resulting in a large, heterogeneous literature, with a total sample of 732,852 subjects from more than 30 countries. Although the collected works are often based on non-representative samples, their large number and the possibility of cross-referencing the results common to these studies allows on the one hand to overcome the possible problem of unrepresentativeness, and on the other to grasp the existence of an effect, assuming the heterogeneity of the samples used by these works.

The authors hypothesize that from this systematic review can be derived the psychosocial and psychopathological areas most affected by the COVID-19 pandemic, and likewise, that can be delineated a profile of the most vulnerable individual to these types of issues. So, in this perspective, this review can be useful both for future research and for the current management of the pandemic emergency.

2. Review Methodology

In this section, details about the systematic review approach are provided. We relied on an adapted version of the systematic qualitative review approach by Higgins and colleagues [11]. The authors searched all the papers that included the relationship between COVID-19 and psychological variables of interest.

As a first step, we asked academic information specialists to search for COVID-19 scientific papers that fulfilled our inclusion criteria. These were: written in English language; published between December, 2019 and June, 2020; being an empirical study, project report or review; published in a scholarly peer-reviewed journal and/or conference proceedings; those related to psychological dimensions and mental health (i.e., psychological disorders, risk perception, beliefs, coping, compliance, social support).

The specialists completed their task consulting the databases of PsycInfo, PsycArticles, PubMed, Science Direct, PsyArXiv, NCBI, medRxiv, and Elsevier repository. The authors on their part contributed to the search by consulting Google and Google Scholar to increase the chances of identifying the widest range of sources possible. The consultation took place between April and May 2020. A total of 7381 sources were considered. Subsequently, the authors' results were compared with those of the experts, and duplicates were removed. To select the papers, search terms such as "COVID-19", "Psychology", "Psychological", "Psychological effect", "Mental health" were included in the research. For a more complete list of all the search terms, see Appendix A. Based on the inclusion criteria, only 480 sources were accessed as full-text: 303 papers were eligible since they met the inclusion criteria.

At the title review stage, sources were most commonly rejected because they fulfilled two or more of the following exclusion criteria: were only citations, commentary, or books; were papers published before 2019; those not related to the psychological dimensions and mental health (i.e., psychological disorders, risk perception, beliefs, coping, compliance, social support); articles not in English language. At the abstract and full paper review stages, papers were most commonly rejected for: demonstrating no inclusion of a psychological variable, having incomplete results, using qualitative measures and articles where data analysis was not suitable for the systematic review process (e.g., lack of descriptive statistics, no correlation coefficients provided for the variables of interest).

A flow diagram of the systematic search is shown in Figure 1.

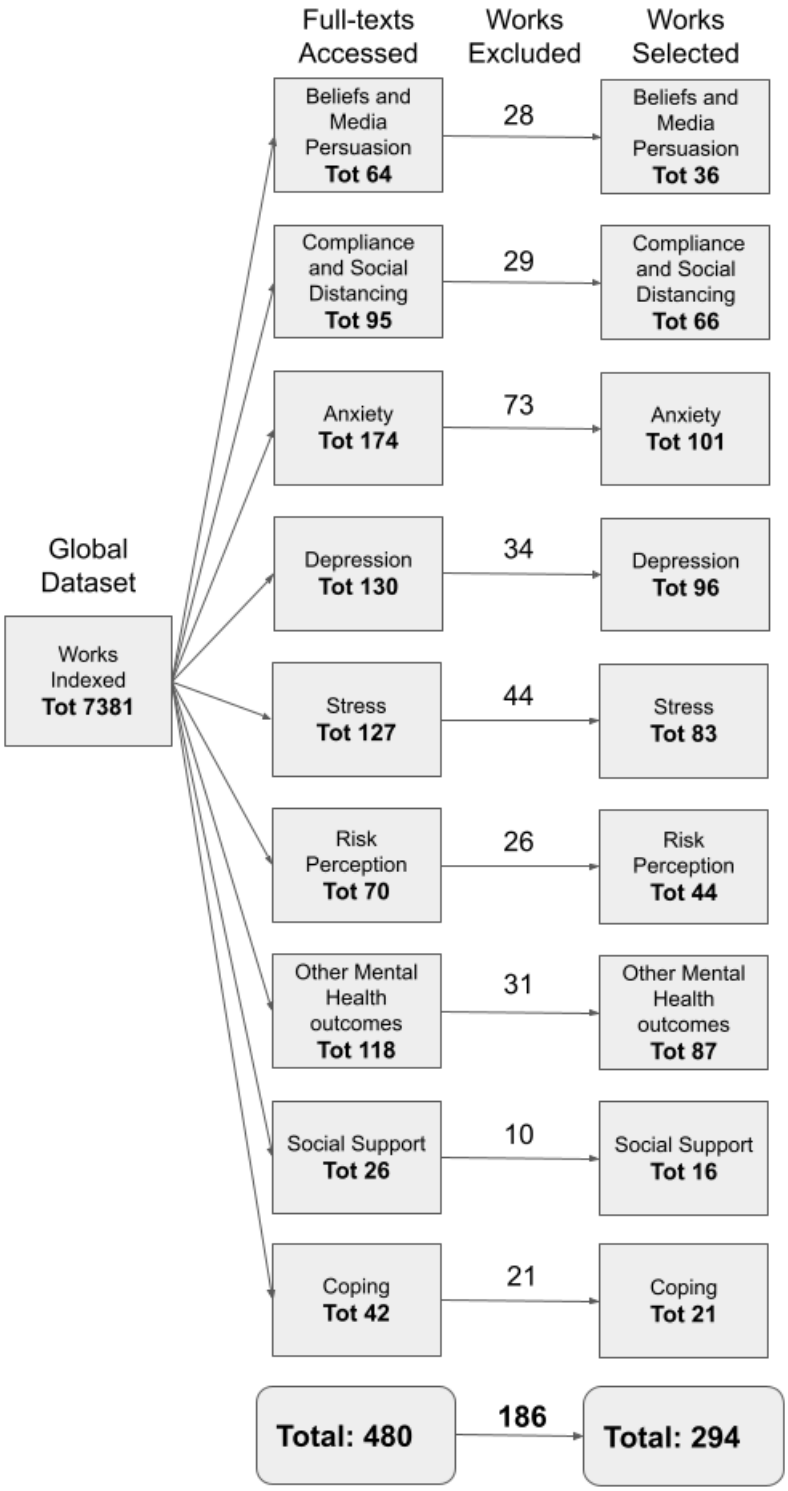

Figure 1. Diagram showing the information flow through the review: the number of works identified, included and excluded.

This review is divided into two main sections: (1) Psychosocial Variables , and (2) Observables related to Mental Health. The first section is in turn divided into different subsections: Beliefs and Media Persuasion, Social Support, Coping, Risk Perception, and Compliance and Social Distancing. The second section is in turn divided into different subsections: Anxiety, Stress, Depression, and Other consequences of COVID-19 on Mental Health. These are the dimensions that emerged most during the analysis of the literature about COVID-19. The subdivision in these paragraphs was formulated to make reading easier. Every subsection is divided into "Introduction ", "Measures", and "Results".

Postponed to the "Discussion" paragraph is the possibility of connecting in a single design all the results emerging from the various sections, towards a definition of a psychological COVID-19 syndrome. For an easier reading, you can consult Table A1 (placed in the Appendix A) that contains the main information of the papers analyzed.

3. Psychosocial Variables: Beliefs and Media Persuasion

3.1. Introduction

Probably the most important factor determining the resilience of a human community exposed to a pandemic is the readiness to change habits in order to face the diffusion of the virus [12–15]. Of course, the role of information spreading about the pandemic was a fundamental factor to promote such a change, even if the impact of the communication style, source of information and other elements should also be taken into consideration in order to maximize the impact of the media on the people's beliefs and behaviours [12–15].

In particular, literature reports studies examining why some people believe in conspiracy theories about COVID-19, and why they choose to not follow the rules/laws given by the government to prevent contagion. Uncertainty and ambiguity regarding the information about COVID-19 could lead to a lack of trust in governmental regulations, bringing people to respond with adaptive or non-adaptive coping strategies [16]. Some studies investigated how people were influenced by the media (both traditional and new media), and how disinformation may be enhanced by the possibility offered by the new media to share an opinion about medical topics without the proper knowledge, widely spreading conspiracy theories [17]. Clearly, the distrust in science and in the medical system could increase the risks [18].

3.2. Measures

Table 1 shows the validated measures used to analyze "Beliefs" and "Media persuasion". About "Media persuasion", all articles [17,19–24] used ad-hoc measures.

Table 1. Validated tools to measure "Beliefs" and "Media persuasion". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Knowledge, Attitude and perception questionnaire [25]	0.70	1
Strengths and difficulties questionnaire (SDQ) [26]	0.77	1
Beliefs in conspiracy theory inventory (BCTI) [27]	0.78	1
Generalised conspiracy beliefs scale (GCBS) [28]	0.90	1
Core Beliefs Inventory (CBI) [29]	0.92	1
Cognitive Reflection Test (CRT) [30]	0.69	2
Vaccination intention [31]	0.79 to 0.94	1
Conspiracy Mentality Questionnaire (CMQ) [32]	0.84	2
Attitude toward vaccination [33]	0.83	1

3.3. Result for Beliefs and Media Persuasion

The results of the articles reviewed on beliefs and media persuasion were distinguished by the authors into three main categories considering three fundamental moderators: attitudes, scholarship and scientific knowledge, finding news on social networks.

Attitudes: From our bibliographic research, we found that even if attitudes towards COVID-19 were optimistic (e.g., the likelihood of being infected was perceived as low), most of the participants took precautionary measures to prevent infection: 96.4% of the participants avoided crowded places and 98% wore masks [34]. In particular, in young adults an optimistic attitude was associated with less psychological distress; also the diffusion of accurate information and a mental health intervention could lead to better attitudes [35]. On the contrary, higher levels of fatalism toward COVID-19 were associated with lower behavioral intentions to support mitigation efforts [36]; also those who believed that the fear of COVID-19 caused unnecessary absences from work and schools, reported higher levels of anxiety [37]. Opposed to these results, Shiina and colleagues [23] found lower anxiety levels. Interestingly, those whose core beliefs (beliefs that guide individuals in their identity) were less violated by the pandemic reported to engage more in social isolation measures [38]. Other results showed that beliefs in myths about illness prevention (e.g., smokers are not susceptible to COVID-19) were associated with behaviors like sanification, clothes disinfection and handwashing [38,39].

Scholarship and scientific knowledge: The most important predictor of COVID-19 knowledge was the level of education [40]. The knowledge resulted in an important predictor for degree of information search behavior, to discern between true and false information, comply with the preventive measures, show less panic reactions, and adopt more behaviors able to reduce infection risk [41]. Moreover, they also assessed the crisis as the worst epidemic crisis, less adopting "unreasonable" behaviors (e.g., hoarding toilet papers or medical equipment, spreading misinformation), being characterized by lower levels of anxiety, and greater risk perception [25,41,42].

Finding news on social networks: Because of the large use of social media as a source of information, these have had a significant impact on the spread of panic and fear about COVID-19. A research showed that participants found information through electronic media and TV (85.5%), social media (81.3%), family members (69.0%) and friends (68.7%). Media communications influenced attitudes founding a positive relationship between exposure to media and prejudice towards four different nationalities (i.e., Chinese, Italian, Hungarian and Mongolian populations), while at the same, time media exposure has been associated with lower anxiety levels [16,17,24,43].

Despite the research, in general, proving that people tend to adopt preventive behaviors to protect others rather than themselves [21], knowledge and beliefs about COVID-19 and preventive behaviors were also affected by age, gender, education, culture and conspiracy theories.

Age: Age affected both knowledge about COVID-19 and preventive behaviors, with the younger people resulting in more acknowledged and adopting preventive behaviours than elders [24].

Gender: Females showed higher levels of worry, anxiety, fear and sadness, about COVID-19 infection regarding family members and friends, than men. Men, on the other hand, were more concerned about the national and international impact of COVID-19 on money and work [44].

Education: Different effects mediated by social condition were found. In particular, lower levels of education were associated with more fear of dying by COVID-19, perception of susceptibility to the infection and worse overall knowledge about the pandemic. Conspiracy theories were widely believed even among highly educated individuals, predicting science mistrust, unwillingness to adhere to public health measures and increased psychological distress [24,25,45–47].

Culture: Culture has proved to be another important variable. Those who claimed to be more religious and more politically rightist were more likely to believe in COVID-19 conspiracies [48]. More specifically, horizontal collectivism (viewing the self as part of a collective that emphasizes equality) was associated with more accurate covid-related beliefs, with respect to vertical individualism (viewing the self as an autonomous individual who accepts inequality) [47,49].

Conspiracy theories: With regard to conspiracy theories, some studies show that subjects who believed that COVID-19 was a hoax complied less with the suggested behaviour to reduce and contain the infection. Moreover, it was seen that these subjects engaged more in self-centred behaviour aimed at personal benefit during the crisis (e.g., hoarding everyday goods, relying on "alternative" sources of information) than in reducing the infection rate (e.g., increased hygiene behavior, keeping physical distance to others) [18]. It has been seen that a high level of collective narcissism (inflated belief in the greatness of one's ingroup) is related to a greater agreement with conspiracy theories [50]. In addition, those who support conspiracy theories may be less likely to get vaccinated if this will be available [51,52]. With regard to the sharing of conspiracy theories related to COVID-19, it was seen that individuals with high levels of Social Dominance Orientation and low levels of Traditionalism were more likely to spread them, but were less likely to share misinformation about the severity and spread of COVID-19 [53]. There are socio-demographic differences: the more religious and/or politically right-wing subjects were inclined to believe in conspiracy theories [48]. In conclusion, the convictions of conspiracy theories related to COVID-19 were strongly correlated with convictions of broader conspiracy theories and a lower level of education, and weakly correlated with more negative attitudes towards the government [46].

Finally, even the communication style affected the attitudes and behaviours of people around the world. Research about media persuasion found that fear messages create a stronger emotional reaction than the prosocial message, but the prosocial message was more effective in increasing the desire for self-isolation if it produces a strong emotional response. Both fear and prosocial messages were equally effective in stimulating a willingness to engage in preventive behaviors [20]. In conclusion, situational awareness (a construct based on SAT—Situational Awareness Theory; a sort of perceived understanding) influenced social distancing. The sources of information, formal and informal, were found to be significantly correlated with situational awareness [22], in particular public health officials or high-power political figures may be more persuasive [19].

Table 2 shows information about the papers analyzed for the study of Beliefs and Media persuasion.

Table 2. Beliefs and Media Persuasion. Summary of sources, with the number of papers analyzed, the total sample size, the provenance of the sample and the mediator variables. *: "MTurk" is used to indicate a sample extended worldwide.

	Beliefs and Media Persuasions
Valid papers	36
Sample size	50,090
Geographical regions	Arabic Emirates, Bangladesh, China, Cyprus, Europe, France, Greece, Japanese, Kurdi, Malaysia, MTurk *, Polonia, Serbia, South America, South Korea, Turkish, UK, USA
Mediator variables	Age, Gender, Education and Culture

4. Psychosocial Variables: Social Support

4.1. Introduction

Current stay-at-home orders, and the COVID-19 pandemic in general, had negative social and economic consequences, for example, many social support networks have been disrupted [54], causing psychological morbidities and fatigue [55,56]. According to Skalski and colleagues [57], "Social support refers to the so-called social network and characterizes the functioning of individuals among other people". In recent studies, social support emerged as able to dampen the pandemic outcomes, due to its negative correlation with anxiety, mental discomfort and psychological pressure [57–59]. Moreover, peer and community support groups appeared as a protective factor for psychological distress [59]. Prosocial communication during COVID-19 (i.e., prosocial language) is also important in

protecting people's well-being, since it appeared to promote "positive" emotions, like hope and joy [20,57], and could maintain health status [57].

4.2. Measures

Table 3 shows the validated measures used to analyze "Social support".

Table 3. Validated tools to measure "Social support". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Perceived Social Support Scale (PSSS) [60]	0.88 to 0.90	9
Social Support Rating Scale (SSRS) [61]	0.81	3
Perceived Social Support Questionnaire (F-SozU K-6) [62]	0.90	1
Social Provisions Scale (SPS) [63]	0.85 to 0.92	1
COVID-19 Prosocial Experiences [64]	0.56 to 0.71	1

Lastly, a few articles used scales created ad hoc for the research [20,58,65,66].

4.3. Results for Social Support

The results of the articles reviewed regarding social support during COVID-19 emergency were analyzed. From these results, people seemed to benefit during the first wave of the pandemic from real-life and online social support [20,24,54–59,64–71]. For example, receiving COVID-19 prosocial acts (e.g., providing support to people concerned about the pandemic, making donations to charities or people in need, grocery shopping for individuals at risk, helping with household chores, and giving gifts) by others reduced anxiety symptoms [64], and increased belongingness and community attachment [64]. Social support also seemed very important for those people involved directly in fighting against the pandemic. For instance, for medical staff, a good level of social support was associated with self-efficacy and sleep quality, and negatively correlated with anxiety, stress and depression [65,70].

Social support appeared able to affect people's compliance, although with some mixed results [56,66]. Indeed, people actively sought support and social connections to cope with COVID-19 changes and maintain higher levels of compliance with quarantine [56]. However, social support did not seem to affect compliance towards other behavioral recommendations like mask-wearing, handwashing and social distancing [66].

Not only was obtaining support from one's social network important for people's well-being, but also engaging in COVID-19 prosocial behaviors (i.e., actively providing support to others) was positively associated with mental health, social responsibility values, and burdensomeness (i.e., unwelcome burdensome difficulty) [64].

In the selected works we found several factors able to affect people's social support during the pandemic that will be described briefly below, while cultural differences in social support levels were not supported [66].

Age: According to Alvis and colleagues [64], adolescents most frequently endorsed giving support to friends, neighbors, or relatives who were worried about COVID-19 [64].

Gender: In accordance with Ma and colleagues [54], males perceived significantly less social support than females [54]. Meanwhile, other studies did not find any significant gender differences [58,59]

Social Condition: According to Tull and colleagues [56], income level was positively related with perceived social support.

Comorbidity: Social support was negatively correlated with anxiety [54,55,57,58,67], coronavirus anxiety [57], depression [24,55,67], distress [71], sleep problems [69], and stress [68].

Table 4 shows information about the papers analyzed for the study of Social support.

Table 4. Social support. Summary of sources, with the number of papers analyzed, the total sample size, the provenance of the sample and the mediator variables. "MTurk" is used to indicate a sample extended worldwide.

	Social Support
Valid papers	16
Sample size	69,769
Geographical regions	China, France, New Zealand, Polonia, UK, USA
Mediator variables	Age, Gender, Social Condition and Comorbidity

5. Psychosocial Variables: Coping

5.1. Introduction

In the scientific literature, one of the most important factors that can buffer the effects of a stressful situation, such as COVID-19, is the coping that people implement to deal with new difficulties [72,73]. Coping refers to the effort to solve personal and interpersonal problems in order to master, reduce or tolerate stress and conflicts [71,74], or in other words, "the thoughts and actions that individuals use to deal with stressful events" [72]. Two general coping strategies are traditionally identified by the literature: (i) problem-focused coping, which concerns solving the problem or taking action to change the situation (active coping, planning, and use of instrumental support), (ii) emotion-focused coping, which aims to reduce the emotional distress (use of emotional support, acceptance, positive reframing, religion, humor, substance use, self-distraction, self-blame, denial, behavior disengagement, and venting) [72,74]. The scientific community also distinguished between coping with a positive or negative outcome [71]. Negative coping strategies are considered primary risk factors, and are associated with depression, anxiety and stress [55,73,75]. Conversely, positive and adaptive coping styles can protect individuals' mental health [75–77], and enhance their capability to deal with challenges [76,78] such as those related to COVID-19 [78,79].

5.2. Measures

Table 5 shows the validated measures used to analyze "Coping".

Table 5. Validated tools to measure "Coping". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Values in Action Inventory of Strengths-120 (VIA-IS-120) [80]	0.58 to 0.90	1
Brief-COPE [81]	0.53 to 0.82	6
Coping Orientation to the Problems Experienced (COPE-NVI-25) [82]	0.62 to 0.92	2
Strengths and difficulties questionnaire (SDQ) [26]	0.64 to 0.70	1
Coping Strategy Questionnaire (CSQ) [83]	0.91 to 0.96	1
Simplified Coping Style Questionnaire (SCSQ) [84]	0.84	4
Brief Self-Control Scale (BSCS) [85]	0.84	1

Several other research used ad hoc questionnaires to analyze coping [86–91].

5.3. Results for Coping

In general, positive coping strategies (e.g., active coping, use of emotional support, humor, mindfulness) appeared related to lower levels of psychological distress in the pandemic scenario [71,72,79] and higher well-being [77,91]. Specifically, high self-control perception, acceptance, behavioral activation, and values-based action strategies resulted in lower levels of fear, restlessness, trouble relaxing, and general vulnerability [76,88]. Moreover, Meaning in Negative Experiences (i.e., the general positive beliefs about negative experiences and the tendency to actively reflect on their meaning or value), was associated with a higher risk perception that may help people in dealing with anti-covid behaviors more successfully [92].

Nonetheless, the outcomes of problem-oriented coping strategies appeared non-definitive. Indeed, problem-oriented coping strategies were found to be associated with higher levels of fear, anger, and psychological distress [72,79]. Negative (emotional-focused) coping was associated with high psychological distress [71], anger [72], and perceived stress [55,74]. Negative coping strategies, like excessive cleaning, reassurance seeking, and excessive checking, were associated with higher levels of irritability and fear [88].

In two recent works [8,93], the most commonly used strategies for coping were: use of emotional support, planning, accepting the situation, learning to start living again, and religious/spiritual strategies. On the contrary, the most rarely used strategies were: substance use, denial of the fact of a difficult situation, behavioral disengagement, and self-blaming for the situation [93]. Those with suspected infection rarely used any coping style to deal with stress, but spent more time searching for information about COVID-19 and received less social support [71].

Coping strategies used during the pandemic were associated with age, gender, socio-demographic, and psychological variables. The results are shown below.

Age: Younger participants reported to use more negative coping strategies like substance use, behavioral disengagement, or "dark" humor [73,75,89].

Gender: Females tended to use more strategies focused on emotions, such as distraction, emotional and religious support and less use of humor [89], but also problem-focused coping strategies [72].

Socio-demographic variables: Students spent more time on social media as a coping strategy [86] and employed more behavioral coping strategies [94]. As for healthcare workers, the most used coping strategies were: religious strategies [8,90], acceptance [8,87], coping planning [8], physical activity [90], talk therapy [90], virtual support groups [90], and positive framing [87].

Comorbidity: Anxiety was negatively associated with total coping strategies [94], especially with problem-focused coping strategies [72].

Table 6 shows information about the papers analyzed for the study of coping.

Table 6. Coping. Summary of sources, with the number of papers analyzed, the total sample size, the provenance of the sample and the mediator variables. "MTurk" is used to indicate a sample extended worldwide.

Coping	
Valid papers	21
Sample size	37,330
Geographical regions	China, Jordan, MTurk, Pakistan, Poland, USA
Mediator variables	Age, Gender, Education and Comorbidity

6. Psychosocial Variables: Risk Perception

6.1. Introduction

Risk perception is defined as one's assessment of hazardous objects or activities [95–97] and it is composed of perceived susceptibility and severity [98,99]. During the COVID-19 research, the first referred to beliefs about the possibility of contracting the disease, while the second referred to beliefs about the severity of the disease [98,99]. It is important to remember that risk perception is based on personal judgements, and not on real features of the risk [25]; for this reason, risk perception increased with dread, lack of control and unknown risk [100]. Results reported that the greater the perceived risk by an individual, the greater the motivation to adopt protective behaviors (e.g., hand washing, avoiding hand shaking, maintaining social distancing) [40,48,95,98,101–107]. As claimed by the Extended Parallel Process Model [108], it is not significant to have a high or low level of risk perception, but it is necessary to have an optimal perception (supported by self-efficacy, susceptibility, severity, and response efficacy), such as to trigger compliance with the rules.

Unfortunately, the perception of personal risk and threat appeared as not sufficient to trigger enough protective behavior during the COVID-19 pandemic: if the only determinant

factor of protective behavior was the perception of the threat, only a few individuals were persuaded and consequently compliant [102]. The risk perception of being infected by COVID-19 was also affected by the type of information that the individual received by the media [25,109,110], by the lack of trust in official guidelines [16], and by the frequent exposure to information [111]. A good communication of information about the pandemic resulted in better preventive behaviors [101], because the severity and the perceived risk of getting infected by COVID-19 appeared as inducing belief in conspiracy theories [39,48]. These irrational beliefs provided a defense against external and unknown events, like the COVID-19 pandemic, and they were associated with negative health behaviors [39]. Indeed, conspiracy theories could persuade people to not follow preventive measures; in this case, a higher risk perception appeared to remove this effect [103].

Finally, socioeconomic and demographic variables (e.g., living alone, living with children), living in high risk areas, and contact with individuals infected by the virus, appeared to modify people's risk perception [112,113]. Risk perception during the COVID-19 first wave was also positively associated with psychosocial distress [111], anxiety [37,40], depression [37] and PTSD [37].

6.2. Measures

Risk perception was investigated mostly with ad hoc measures [16,25,37,39,40,48,76,78,79,92,95,96,98–107,109,110,112–129].

Only two studies [111,130] used already validated measures to assess risk perception (Table 7).

Table 7. Validated tools to measure "Risk perception". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Gainforth's perceived vulnerability scale [131]	0.95	1
General Risk Propensity Scale (GRiPS) [132]	0.92	1

6.3. Results for Risk Perception

Although COVID-19-related risk perception increased from March to April 2020, many people underestimated the risk of the disease [16,39,99,124]. A lower risk perception may lead to a lower level of compliance with health-protective behaviors [37,39,95,102,107,122,124,126], like hand-washing [105,122], social distancing [25,95,105,116,122] and mask-wearing [25,120].

According to Globis and colleagues, and Marotta and colleagues [119,130], during the lockdown period in the USA and Italy, people reported a lower perception of COVID-19 infection risk, probably due to the government's imposition of social distancing [119,130]. A greater knowledge about the prevention and transmissibility of COVID-19 was associated with lower levels of perceived risk [129]. Conservatorism tended to be associated with lower risk perception as well [128]. Risk perception could also be influenced but in a different direction (i.e., positively) by media accuracy [128], exposure to COVID-19 news [111], using social media [109], and collective orientation [118]. Belief in conspiracy theories was also associated with greater risk perception of contamination [48,103].

Concerning emotional states, risk perception influenced negative affect [96] and emotionality personality trait (fearfulness, anxiety, dependence, sentimentality), measured by HEXACO, revealed a significant positive effect on risk perception [117,123].

Contrary to expectations, risk perception of COVID-19 was not influenced by the existence of previous pathologies [79]. Risk perception levels appeared to play a role in the coping strategy that individuals used to deal with the pandemic. Perceived high threat was linked to a higher level of meaning in negative experiences (MINE) [92], while low risk perception was associated with a higher use of COVID-19 humor [115].

Finally, a strong predictor of risk perception was the work: healthcare workers showed higher risk perception than other participants [78,127], especially those who have longer shifts [112].

Risk perception during the pandemic was associated with age, gender, culture, and psychological variables. The results are shown below.

Age: Age was found to be an important predictor of risk perception [40,113]. However, the data showed conflicting results. Some research showed that younger people report higher perceived risk [107,112]. On the contrary, other studies found that the likelihood to feel threatened increased significantly with age, in other words, older adults perceived more risk of COVID-19 than younger people [16,114,117,120].

Gender: Women reported higher levels of risk perception compared to men [104,107, 113,114,117,127]. Moreover, by analyzing the interaction effect between gender and age, Iorfa and colleagues [121] found that older men reported a higher risk perception than younger men [121].

Culture: The levels of risk perception reported in different parts of the world, apart from possible cultural factors, appeared to be affected by the levels of contagion. For instance, people residing in Europe reported lower levels of perceived threat than people residing in North-America [117]. Participants that lived in central and northern Vietnam reported a lower risk perception of COVID-19 than those who lived in southern Vietnam (that is also preferred by Chinese tourists) [109]. This trend is also detectable within the same country if the contagion was not homogeneous. For instance, people living in northern Italy reported more preoccupation about risk of infection than those who live in the center and south Italy [78,127].

Comorbidity: The perceived severity of COVID-19 was positively associated with mental health problems [76,125]. Higher levels of risk perception of COVID-19 were associated with depression [96,129,133], anxiety [37,96,106,110,118], and stress [118,127,133], but also with death anxiety [127] and coronavirus fear [133].

Table 8 shows information about the papers analyzed for the study of risk perception.

Table 8. Risk perception. Summary of sources, with the number of papers analyzed, the total sample size, the provenance of the sample and the mediator variables. "MTurk" is used to indicate a sample extended worldwide.

	Risk Perception
Valid papers	44
Sample size	164,402
Geographical regions	Arabic emirates, Canada, China, Europe, France, Germany, Iran, Italy, Nigeria, Perù, Polonia, Qatar, Serbia, South Africa, South Korea, Turkish, UK, USA, Vietnam
Mediator variables	Age, Gender, Culture and Comorbidity

7. Psychosocial Variables: Compliance and Social Distancing

7.1. Introduction

Governments around the world adopted prevention guidelines (suggested by the World Health Organization, WHO, and the Centers for Disease Control and Prevention, CDC) to contain the spread of COVID-19 [134,135]. The effectiveness of these measures depend mostly on the compliance of the population [135], while the adherence to these relied on how much they were perceived as effective [136,137]. Adopting preventive measures is crucial to control the virus' spread and limiting its consequences [125,136,138,139]. Some of these procedures were enforced by states (e.g., closure of public places), whereas other procedures were only advised but out of the state's control (e.g., social distancing, hand washing) [139]. Many of these rules and recommendations can be considered as fairly drastic for citizens [140]. For this reason, some people ignored these instructions, exacerbating the problem [134]. Despite the importance of these rules, such as social distancing, compliance has been sometimes inadequate [141]. Social distancing was defined by CDC as

"keeping space between yourself and other people outside of your home by staying at least 6 feet from other people, refraining from gathering in groups, and staying out of crowded places and avoiding mass gatherings" and seems to be the best way to limit the COVID-19's spread [141]. Nevertheless, social distancing may lead to self-isolation, which could cause severe psychological consequences [125]: for example, increased loneliness is associated with suicidal ideation and parasuicidal behavior, depression, anxiety, etc [138]. Although there are positive consequences for the public good, it is often a burden for the individual to adopt these preventive measures [136], because it is undeniable that COVID-19 restrictions could lead to drastic changes in daily life, including potential mental health problems [137].

7.2. Measures

In this part of the article, the authors chose to analyze compliance with several health behaviors (i.e., social distancing, hygiene, etc.) recommended by WHO and CDC advice for preventing COVID-19's spread. Most of the articles used ad-hoc measures asking participants to rate their compliance with these behaviors [16,18,38,40,45,48,49,52,66,84,89,90,95,98,101,103,104,115,116,119,125,128,134–137,139–169].

The already validated questionnaires used to measure compliance and social distancing are reported in Table 9.

Table 9. Validated tools to measure "compliance and social distancing". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Preventive COVID-19 Behaviour Scale (PCV-19BS) [170]	0.91	1
Carrier Scenario (CS) [171]	0.71	1
Future Health Behavior (FHB) [171]	0.76	1
Current Health Behavior (CHB) [171]	0.89	1
UCLA Loneliness Scale-8 (ULS-8) [172]	0.96	2
Revised UCLA Loneliness Scale (R-UCLA) [173]	0.96	1
The COVID-19 Safety Behaviour Checklist (CSBC) [174]	0.84	1
Compliance with COVID-19 measures [175]	0.84 to 0.87	1
COM-B self-evaluation questionnaire [176]	0.59 to 0.85	1
YouGov Behavior Change (YGBC) [177]	0.66	1

7.3. Results for Compliance and Social Distancing

The results of the articles reviewed on compliance and social distancing were distinguished by the authors into the two main themes.

Compliance: The first aim of the COVID-19 guidelines was to help slow the spread of the virus, prevent infections, and the consequent depletion of medical structures, supplies, and healthcare personnel [144]. The most implemented protective behaviors were: social distancing, washing hands, avoiding contact, avoiding crowded places, mask and gloves wearing, staying at home as much as possible, avoiding public transportation [16,52,119,136,155,157]. Compliance with these behaviors was positively associated with the fear of COVID-19 [169,170,178], trust in the government [154,164], risk perception [48,104,134,137], trust in science [134,179], feeling of safety [137], perspective taking (i.e., the tendency to look at things from other people's point of view) [90], and disgust towards pathogens [90]. On the contrary, conspiracy theories [18,45,90,103,167], impulsivity [48], self-centered behaviors [18,49,136], outdoor sports [104] and low conscientiousness score [146] were negatively associated with the adherence to the preventive behaviors. Moreover, communication appeared essential to enhance people's compliance. Specifically, by giving detailed information, underlining the impact of non-adhesion to anti-contagion rules, and adhesion benefits, compliance increased [101,144,147,158].

Finally, people who agreed more with anti-covid restrictions [179], were more motivated [150], and had a positive evaluation about how institutions manage the pandemic crisis [165], complied more.

Compliance during the pandemic was associated with age, gender, social condition and psychological variables. The results are shown below.

Age: Age was positively associated with compliance intentions [154]. In general, older individuals appeared as more willing to accept anti-COVID-19 restrictions [140,142]. Nonetheless, results were contradictory: some research [89,101,119,179] showed that older citizens tended to be more (self-declared) compliant; but others demonstrated that young adults complied more with prevention measures (e.g., cell phone disinfection, maintaining a safe distance) [143,160,162,166]. Finally, one research showed that different age ranges followed different protective behaviors. Younger respondents avoided hugging and kissing with family members, friends and acquaintances, respected more movement restrictions and avoided contact with the elderly; differently, the elderly avoided more shaking hands, they maintained the recommended distance more strictly, disinfected their pets' paws more often, and made more dietary plans [40].

Gender: Most of the papers that have investigated this topic agreed that women showed more compliance than men to protective behaviors (e.g., wearing mask, do not touch their face, do not shake hands) [40,66,98,101,119,139,152,154,160,161,179]. Females compliance seemed to be influenced by four internal sources: health history, anxiety, feeling responsible for others, feeling responsible for oneself [161].

Social Condition: the results about social conditions were conflicting. Some papers [40,152,179] found that a higher level of education was associated with more compliance to the prescriptions (e.g., avoid hugging and kissing, use disinfectants, avoid shaking hands). Other papers [101,160] instead found the contrary (high levels of education led to less adherence to the rules).

Comorbidity: according to some papers [148,156], anxiety could be a predictor for the adherence to COVID-19 prescriptions, in fact anxiety seemed to lead individuals to more responsible behavior [148]. Interestingly, adhering to anti-COVID-19 prescriptions seemed to lower Coronavirus anxiety levels [38], and decrease suicidal ideation, negative thoughts and sleep disorders [153]. Moreover, the use of personal measures of prevention (e.g., washing hands, mask wearing) were associated with less severe psychiatric symptoms [168]. Finally, people with chronic health conditions implemented more safety behaviors [180].

Social Distancing: Social distancing was one of the most important and effective measures to fight the COVID-19 pandemic worldwide [159] and was always highly recommended by governments and by WHO. The compliance with social distancing was associated with outcomes like boredom and loneliness, and was achieved by people with a higher self-control [135,159]. Loneliness due to social distancing was particularly high in those who were single, who had a psychiatric diagnosis, and those who ruminated and worried more [125,138]. Furthermore, many people perceived "social isolation fatigue", that was increased by negative surprises (i.e., lockdown measures will be in effect for a longer time than expected) [145]. In fact, according to Briscese et al. [145] and Gollwitzer et al. [151], the intention to social distance weakens with time (due to habituation).

Some of the strongest predictors of social distancing behavior were related to COVID-19 related risk perception, knowledge and beliefs [141]; respondents who were more likely to comply with social distancing included those who believed they could help prevent the spread of COVID-19 [141,151], had higher risk perception [95,116,141,179], perceived their communities were adhering [141,149], knew COVID-19 information [141,151]. Other factors that resulted in a positive association with social distancing compliance were higher financial stability [141,181], negative illness attitude [143], used analytic thinking (deliberative, cognitively-demanding and slow) [167], and had higher FFFS (fight–flight–freeze system) scores (reflecting fear/avoidance behaviors) [143].

According to Charles and colleagues [141], even though 87.5% of the population had high levels of knowledge about social distancing, only 46.2% always practiced it. Those

who perceived social distancing as difficult [141], those who did not like the spokesperson of preventive health behaviors [142], those who were still working [141,151], those who reported more conflicts with their partner [181], and impulsive [179], conservative [128,149] and self-centered people [49] were less likely to comply. In terms of personality, low extroversion [146], high agreeableness [171], and high conscientiousness [95,146,171] predicted the approval of social distancing measures. The motivation to adhere to social distancing rules was affected by empathy [163] and altruism [182]. Finally, humor could be useful to defuse the situation during the lockdown [115].

Social distancing during the pandemic was associated with age, gender, social condition and psychological variables. The results are shown below.

Age: For age, the results showed that younger people were most likely to follow the guidelines, especially social distancing [143].

Gender: According to several pieces of research [89,95,141,161,179], women were more likely to comply with social distancing than men.

Social Distancing: For the social condition, conflicting results have been found. Charles and colleagues [141] found that low-income respondents were more likely to comply with social distancing than those with a higher income [141]. On the contrary, the results of Farias and colleagues [149] showed the lower the income was, the less compliance with social distancing was observed[149].

Comorbidity: According to Hoffart and colleagues [138], social distancing was significantly associated with depression and anxiety [138].

Table 10 shows information about the papers analyzed for the study of compliance and social distancing.

Table 10. Compliance and Social Distancing. Summary of sources, with the number of papers analyzed, the total sample size, the provenance of the sample and the mediator variables. "MTurk" is used to indicate a sample extended worldwide.

Compliance and Social Distancing	
Valid papers	66
Sample size	91,601
Geographical regions	Denmark, France, Germany, Greece, India, Iran, Ireland, Israel, Italy, MTurk, Netherlands, Norway, Poland, Qatar, Serbia, South Korea, Switzerland, UK, USA
Mediator variables	Age, Gender, Education and Comorbidity

8. Mental Health Variables: Anxiety

8.1. Introduction

We chose to analyze anxiety because research on past epidemics, like SARS, MERS, swine flu and Ebola, revealed a wide range of negative psychosocial impacts, of which anxiety was one of the main outcomes [7,37,183–186]. In particular, the quarantine had a huge impact on people: when comparing quarantined versus non-quarantined individuals, the first were more likely to show psychological distress and to have a high prevalence of psychological symptomatology [187]. A recent study about the COVID-19 emergency indicated that "53.8% of respondents rated the psychological impact of the outbreak as moderate or severe; (. . .) 28.8% of respondents reported moderate to severe anxiety symptoms" [186].

Additionally, uncertainty may exacerbate the already existing detrimental effect of the pandemic on anxiety [188]. Anxiety is not just an outcome of the pandemic but could also have repercussions on behaviours implemented during the pandemic.

In the work of [185], it emerged that high and low anxiety individuals [189] behaved differently on some specific COVID-19 related conducts. High anxiety individuals may cause crowding (and thus increase the likelihood of infection), but at the same time they may be reluctant to seek medical assistance for fear of transmission, whereas individuals with low anxiety were found reluctant to comply with preventive measures [185].

8.2. Measures

The already validated questionnaires used to measure anxiety are reported in Table 11.

Table 11. Validated tools to measure "Anxiety". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
GAD-7 [190]	0.92	33
The Fear of Coronavirus-19 Scale (FCV-19S) [191]	0.82	1
Hospital Anxiety and Depression Scale (HADS) [192]	0.68 to 0.90	7
Depression Anxiety Stress 21-item scale (DASS-21) [193]	0.88	16
Hamilton Anxiety and Depression Scale [194]	0.73 to 0.78	1
Beck Anxiety Inventory (BAI) [195]	0.92	7
Short Health Anxiety Inventory (SHAI) [196]	0.95	3
Self-Reporting Questionnaire (SRQ-20) [197]	0.80	1
Corona-19 Fear Inventory (CFI) [198]	0.82	1
12-item General Health Questionnaire (GHQ12) [199]	0.90	2
Patient-Reported Outcomes Measurement Information System (PROMIS) [200]	0.97	1
Coronavirus Anxiety Scale (CAS) [201]	0.86	4
Self-Rating Anxiety Scale (SAS) [202]	0.82	13
GAD-2 (2-item Generalized Anxiety Disorder) [203]	0.77	2
PROMIS anxiety and depression short-form [204]	0.95 to 0.97	1
State-Trait Anxiety Inventory (STAI) [205]	0.65 to 0.75	5
Preventive COVID-19 Behaviour Scale (PCV-19BS) [170]	0.91	1
Psychological Symptom Screening Test (SCL-90-R) [206]	0.98	1
Ecological Momentary Assessments (EMAs) [207]	0.73	1
State-Trait Anxiety Inventory (STAI) [208]	0.85	3
Social Anxiety Scale for Children (SASC) [209]	0.76	1
Patient Health Questionnaire (PHQ-4) [210]	0.75	2

Only four papers decided to use ad hoc measures for anxiety [16,41,161,211].

8.3. Results for Anxiety

Fitzpatrick et al. (2020) [212] and Guo et al. (2020) [213] highlighted high and medium levels of anxiety in the USA and China populations. Pandemic related distress was associated with anxiety: specifically, perceiving symptoms of COVID-19 (fever, cough, etc.), loneliness and stress increased anxiety levels [214,215].

Following protective measures, like mask-wearing and handwashing, were related to lower anxiety levels[23,168,216]. Nonetheless, adopting these protections appeared as not enough for drastically lowering anxiety; instead, adhering to social isolation policies appeared as essentials to reduce anxiety levels [38].

Anxiety was also increased by social contexts. People who knew someone infected by COVID-19 [7,58,110,217–220] reported a higher level of anxiety. Anxiety was also higher in people with a positive COVID-19 diagnosis [201,221–223]. Unexpectedly, longer periods of lockdown did not lead to high anxiety levels [119,224,225].

Individuals with a higher level of COVID-19 knowledge were more likely to report a higher level of anxiety [16,23,41,157], but, despite this, up-to-date and accurate health information, along with being aware of the risks of the pandemic, were protective factors against the pandemic's psychological burden [186,226]. The exposure time to COVID-19 information was associated with greater anxiety levels [211,216,226,227], as well as worries and concerns about COVID-19 [37,118,223,228,229].

Risk perception also played a role in shaping people's anxiety in the pandemic scenario. Indeed, people who perceived a high risk and a realistic high threat reported higher levels of anxiety [6,96,122,133,230].

Anxiety was also studied and investigated in some specific populations, like medical-care workers. Several papers analyzed samples composed healthcare personnel (doctors, nurses,

physical therapists etc.), finding a high prevalence of anxiety symptoms [70,157,220,222,231–235]. Although, according to [8], there was no significant difference in anxiety levels among doctors, nurses and pharmacists. Instead, the essential aspect that appeared to affect healthcare personnel anxiety levels is the time spent in the hospital [72]. In addition, healthcare workers who believed the virus was developed in a lab reported higher levels of anxiety [235].

In conclusion, several studies found that lower anxiety was associated with a higher life satisfaction [236,237], higher crisis management appraise [238], higher perceived level of health [7], a higher number of leisure activities [7], more physical activity and exercise [226,239,240] and resilience [24,133,229]. Instead, higher anxiety was associated with loneliness [24], bad distress tolerance [24], more significant changes in daily life [7], paralyzing worry [229], reduced appetite [229], and engagement in COVID-19 prosocial acts [64].

Anxiety levels during the pandemic were associated with age, gender, social condition, socio-demographic variables, culture and psychological variables. The results are shown below.

Age: 21 papers found a strong relation between anxiety and age [4,118,143,157,187,221,221,222,224,225,239,241–251]. Specifically, 16 reports claimed that younger age seems to be associated with higher anxiety [4,118,187,201,221,224,225,239,241–245,247–249,251–253]. Only three papers argued the opposite [222,246,254]. Instead, specific anxiety for COVID-19 was higher with older age [248].

Gender: There are numerous articles that have found a strong correlation between gender and anxiety [4,157,255–257]. In almost all articles, the female gender was associated with a higher level of anxiety than men [8,16,67,104,161,185,187,221,222,225,233,242–245,250,258–263]. Females reported being more influenced by anxiety and experiencing more negative emotion [161]. Just one article seems to find mixed results, reporting higher GAD-7 scores for males than females [263].

Social Condition: Several studies have shown that a higher level of education is correlated with an increased anxiety about COVID-19 [67,201], particularly individuals with a lower level of education than middle school are more anxious [224]. Other studies show that high levels of anxiety appear to be income-related: lower income leads to higher levels of anxiety [187,233,248,256].

Socio-demographic variables: Research shows that unemployment, self-employment, private sector employment, lack of formal education, family size, and paternity (>2 children) were associated with a higher likelihood of negative mental health [247]. The confidence in the physician's ability to diagnose COVID-19 infection, the decrease in the probability of contracting it and the lower frequency of seeking information about it, because of satisfaction with the information received, have been protective factors against negative mental health, like anxiety [247]. Another protective factor against COVID-19 anxiety is living in urban areas and living with parents [58]. Instead, longer working time and more years of work increased the risk of anxiety [220,261]. Finally, living in heavily crowded areas, where the social distancing requirements are lacking, could lead to higher levels of anxiety [264]. Students, especially abroad ones [54], experienced relatively greater anxiety during the period of the epidemic [7,265], except if they considered themselves healthy [155]. Research has also observed that levels of anxiety among medical students have decreased with the introduction of distance learning [37].

Culture: Only Liu et al. [24] investigated and found significant differences possibly due to culture diversity. In their study, Asian Americans, Hispanic/Latinos reported lower anxiety levels than Whites [24].

Comorbidity: Anxiety measured during COVID-19 epidemic showed different comorbidity effects [55,56,58,67,70,221,229,262,266–268]. People with psychological anxiety disorders appeared more vulnerable to the impact of the COVID-19 epidemic on their mental health in terms of well-being and quality of life [220,221]. Anxiety during the COVID-19 epidemic was associated with negative affect [269], PTSD symptoms [268] and risk of postpartum depression [266,267]. The well known relationship between anxiety and

sleep disorders [188] seemed to be confirmed also about Coronavirus specific anxiety. Indeed, Coronavirus anxiety levels were higher in people with sleep disorders (like insomnia) and poor sleep quality [70,99,188,227,270–272]. Only one article [273] found no significant correlation between anxiety and sleep disorders.

Table 12 shows information about the papers analyzed for the study of anxiety.

Table 12. Anxiety. Summary of sources, with the number of papers analyzed, the total sample size, the provenance of the sample and the mediator variables. "MTurk" is used to indicate a sample extended worldwide.

	Anxiety
Valid papers	102
Sample size	15,174,264
Geographical regions	Arabic emirates, Australia, Austria, Bangladesh, Brasil, Canada, China, Ecuador, Europe, India, Iran, Ireland, Italy, Japanese, Korea, Mexico, Nigeria, Norway, Pakistan, Philippines, Poland, Portugal, Spain, Swiss, Turkish, UK, USA
Mediator variables	Age, Gender, Education and Comorbidity

9. Mental Health Variables: Stress

9.1. Introduction

The COVID-19 outbreak has caused public panic and mental health stress [10]. McEwen and colleagues [274] defined stress as an adaptive psycho-physical reaction in response to a physical, social or psychological stimulus, called a "stressor". Stress-related responses are cognitive, emotional, behavioural and physiological [74,275]. During the first wave, the pandemic had an unprecedented impact on social lives around the world and can be viewed as a global stressor induced, beyond the risk for health, by the social isolation and distancing measures [276–278]. There is a lack of psychological literature related to epidemics (e.g., Ebola, Swine flu) or global pandemics; the last pandemic was the Spanish Flu of 1918, but there is not enough research about this [6]. The few recent studies about epidemics noted that there was increased stress due to the epidemic and quarantine [247]. Quarantine has been associated with high stress levels, depression, anxiety, irritability, insomnia, burnout, and physical symptoms [6,38,75,225,279]. Furthermore, being quarantined is associated with acute stress and trauma-related disorders, like Post Traumatic Stress Disorder (PTSD) [57,75,225,280–283]. In particular, during the first wave of COVID-19, PTSD appeared as characterized by involuntary memories of the trauma such as intrusions or nightmares, persistent avoidance of stimuli associated with the traumatic event, negative alterations in cognitions and mood that are associated with the trauma, as well as alterations in arousal and reactivity that are associated with the trauma [281,283]. Those populations who were more at risk, such as health workers, were more likely to develop this kind of disorder [10,57,225,284].

Moreover, the disruptive changes of the work market also led to higher general levels of stress [285]. For instance, many people had lost their jobs because of the pandemic, others had to work from home while taking care of the family (i.e., remote working) [7], especially teachers who were forced to rely on information and communication technology (ICT) despite their technological literacy and/or fluency [286]. In particular, this pandemic seemed to psychologically affect healthcare providers and other workers, since they were on the front line [284]. Additional factors that seem to exacerbate stress levels in the population during isolation or quarantine [287] were an incorrect perception about the transmission of the virus [288] and conspiratorial beliefs [46].

9.2. Measures

The validated questionnaires used to measure stress are reported in Table 13.

Table 13. Validated tools to measure "Stress". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency. 1: Modified version of PTSD Checklist for DSM-5 [289]; 2: adapted from the 14–item Perceived Stress Scale [290].

Psychological Tool	α	Fr
Impact of Event Scale-Revised (IES-R) [291]	0.94	11
Perceived Stress Scale 10 (PSS-10) [290]	0.86	13
Changes in Outlook Questionnaire (SF-CiOQ) [292]	0.83 to 0.85	1
Global Psychotrauma Screen, post-traumatic stress symptoms subscale (GPS-PTSS) [293]	0.54	1
The Post-Traumatic Stress Disorder related to COVID-191 [289]	0.94	2
DASS-21 (Depression Anxiety Stress 21-item scale) [193]	0.88	22
Acute Stress Disorder Scale (ASDS) [294]	0.86	1
Peritraumatic Distress Index (PDI) [295]	0.92	1
The coronavirus Stress Measure (CSM)2 [290]	0.55	1
The Stanford Acute Stress Reaction (SASR) [296]	0.84	1
National Stressful Events Survey Acute Stress Disorder Short Scale (NSESSS) [297]	0.88	1
The Brief Symptom Inventory (BSI-18) [85]	0.72 to 0.91	1
The Professional Quality of Life Scale (ProQOL) [298]	0.82 to 0.90	1
Measurement of occupational stress and Covid-10 factors [299]	0.82	1
Maslach Burnout Inventory (MBI) [300]	0.84 to 0.87	2
PSS-4, the 4-item Perceived Stress Scale [301]	0.70	1
PTSD Checklist for DSM-5 (PCL-5) [302]	0.94	6
The Chinese Perceived Stress Scale [303]	0.85	1
PTSD Checklist–Civilian Version (PCL-C) [302]	0.94	4
COVID-19 Peritraumatic Distress Index (CPDI) [304]	0.92	1
Impact of Event Scale-6 (IES-6) [305]	0.88	1
The Perceived Stress Questionnaire-8 (PSQ-8) [306]	0.83	1

9.3. Results for Stress

The COVID-19 pandemic and the consequent lockdown period increased the level of stress in the population [5,7,78,259,307], and this was likely to increase as the number of lockdown days increased [287,308]. Higher levels of stress were associated with: loss of job/education [89,309], having to go out to work [187], having an acquaintance infected with COVID-19 [89,187,247], likelihood of contracting the virus [310], more hygiene behaviors [247,256,310], history of stressful situations [187], medical problems [74,187], risk perception and COVID-19 specific fear/worries [10,74,133,247,259,310], perception of changes in life [74], dysfunctional coping strategies (i.e., denial, substance use, behavioral disengagement) [55,74,245], loneliness [10], perceiving physical symptoms as COVID-19 [215], belief in conspiracy theories [46], low distress tolerance [10], low social support [10,55,276], and decreased sleep quality [271]. Protective factors for stress were associated with: resilience [259,311], greater social connectedness [276], seeking information on COVID-19 [74,89,183], up-to-date and accurate health information [186], functional coping styles (i.e., planning, religion) [74,245], internal locus of control [74], perception of being able to avoid the virus [74], satisfaction with life [237], personality traits (high agreeableness, high conscientiousness, high emotional stability and high extroversion) [74], less exposure to COVID-19 [233,273], and agreed/confidence with government measures [186,216,277]. Moreover, individuals who reported high levels of optimism, and reported that the lockdown situation also had positive aspects, had lower stress levels [277,312,313].

Interestingly, using the internet was positively associated with higher levels of stress [183,226,269,309]. For example, some studies showed that the use of social media (during the pandemic) was associated with symptoms of PTSD [183], because on these platforms there was information available that is not necessarily based on well-founded facts [226]. This could lead to confusion and uncertainty among individuals about the preventive measures taken to reduce the spread of the COVID-19 virus. The minimisation and unacceptability of the severity of the COVID-19 pandemic has been associated with

stress [226]. When people reported more stress related to COVID-19, they felt less satisfied, less engaged, and more conflicted in their relationships [181]. For example, one study [7] saw how those who had a relationship without cohabitation perceived more individual and relational stress during lockdown [7].

The category of healthcare workers reported higher levels of stress [127,220,221,254, 260,268,281,288]; and in particular, females reported to be more stressed than males [168,220,314]. According to [87], the main factors associated with stress were: concerns for personal safety, concerns for their families, and concerns for patient mortality; the factors that reduced stress were: correct guidance, and use of protective behaviors for prevention.

Furthermore, other studies showed correlations between stress and low social support [70], lack of psychological therapy [315], poor sleep quality [314], hyperarousal symptoms [314], risk perception [127], worries and knowledge about COVID-19 [127].

Finally, different studies showed that stress was strongly associated with symptoms of burnout (i.e., depersonalization, emotional exhaustion) [233,268,316]. In particular, females [279,284], those who were exposed to COVID-19 patients [285,316], and long-term workers [279,284] reported high levels of burnout.

Stress levels during the pandemic were associated with age, gender, social condition, culture and comorbidity. The results are shown below.

Age: results showed a significant impact of age on stress levels [74]. A lot of papers reported higher stress and PTSD levels among the younger individuals rather than the older one [7,75,118,187,243,247,258,260,277,308,317–320]. These results are not found within the medical staff sample [87].

Gender: numerous articles have reported a significant relation between gender and stress, with females reporting higher levels of stress and PTSD than males [10,74,186,187, 220,221,225,237,242,243,247,252,259,260,277,281,282,309,317,319–322], in particular, women who have been in direct contact with a COVID-19 patient [260], or those who have a recent exposure history in Wuhan [282]. Accordingly to Newby and colleagues [310], not only women, but also those who identify as non-binary or with a different gender were associated with higher self-reported stress. Finally, Cai and colleagues [87] found that factors that could reduce stress (i.e., correct guidance and effective safeguards for prevention from disease transmission) had a larger impact on females than males.

Social Condition: people with lower education experienced higher levels of stress [74,252]. Regarding the difference between occupations, those who had undergone the greatest change in work, like medical staff and teachers, showed themselves as the most stressed [275,286,288]. Indeed, teachers and healthcare workers continued to work in emergency circumstances. Unemployment and discontinued working activity (working more) were also associated with higher stress [7,225,247,309]. Finally, lower incomes [56,233,247], student status [186,265,269,308,323], marital status [247,317], large families [74,317], and more years of working [220] were associated with more stress.

Culture: Geographical differences in the effect of the pandemic were few and fragmentary, but are reported below. Italian, Chinese, Nigerian and Aboriginal populations reported high prevalence of stress symptoms [231,280,310]. Australians were more stressed than the Chinese population, but less than Italians [256]. The Austrian population was less stressed than the Chinese population [226].

Comorbidity: During the COVID-19 pandemic, a significant positive correlation was observed between stress and depression [251,309,312], anxiety [251,312], sleep [283], physical illness [220,262,310,320,324], somatization [312], and history of mental disorders [220,259,310].

Table 14 shows information about the papers analyzed for the study of stress.

Table 14. Stress. Summary of sources, with the number of papers analyzed, the total sample size, the provenance of the sample and the mediator variables. "MTurk" is used to indicate a sample extended worldwide.

	Stress
Valid papers	84
Sample size	198,240
Geographical regions	Australia, Austria, Bangladesh, Brazil, China, France, India, Iran, Italy, Lebanon, Mexico, MTurk, Nepal, Nigeria, Norway, Poland, Portugal, Slovenia, Spain, Switzerland, Turkey, UK, USA
Mediator variables	Age, Gender, Social Condition, Culture and Comorbidity

10. Mental Health Variables: Depression

10.1. Introduction

Depressive disorder affects thoughts, emotions, and physical health to varying degrees [325], and it often manifests as low mood, slow thinking, decreased activity, and impaired cognitive function [253]. The consequences are quite serious, ranging from interruption of interpersonal relationships to lifelong mental illness and suicidal behavior [78,253,312,326]. Previous public health pandemics have been linked to an increase in mental health problems. For example, Ebola, SARS, MERS, novel influenza A, equine influenza outbreak seemed to be associated with higher levels of depression [4,6,157]. In line with previous epidemics, the COVID-19 pandemic showed a similar effect on depression [212,222,223,272,304]. In particular, quarantine and social isolation, but also the strict prevention and control requirements, and the patients' lack of communication with the outside world, were associated with higher rates of psychological depressive symptoms [78,185,187,214,216,223,245,251,321,327].

The pandemic not only elicited symptoms of psychological distress in people with no previous history of depressive symptoms, but also worsened them in people with a history of psychiatric disorders such as depression [78,326]. Another source of depression symptoms was individuated by the literature in the constant exposure to information about COVID-19 [185,216], combined with the uncertainty of the situation [185,251,312]. Just one of 97 papers did not capture effects of the pandemic on depression levels [214].

10.2. Measures

The already validated questionnaires used to measure depression are reported in Table 15. Only two studies used ad hoc questionnaires to analyze depression [328,329].

Table 15. Validated tools to measure "Depression". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Hospital Anxiety and Depression Scale (HADS) [330]	0.67 to 0.90	6
Filgueiras Depression Inventory (FDI) [252]	0.96	1
Edinburgh Postpartum Depression Scale (EPDS) [331]	0.82	3
Hamilton Anxiety and Depression Scale [217]	0.73	2
Beck Depression Inventory (BDI) [332]	0.92	5
Beck Depression Inventory II (BDI-II) [333]	0.82	2
Depression Anxiety Stress 21-item scale (DASS-21) [193]	0.88	20
Self-Rating Depression Scale (SDS) [334]	0.83	8
Patient Health Questionnaire-2 (PHQ-2) [335]	0.77	3

Table 15. *Cont.*

Psychological Tool	α	Fr
Depression Self-rating Scale for Children (DSRSC) [336]	0.77 to 0.84	1
Patient Health Questionnaire (PHQ–9) [337]	0.85	25
Patient Health Questionnaire (PHQ-8) [210]	0.89	1
PROMIS anxiety and depression short-form [204]	0.96 to 0.97	2
Patient Health Questionnaire - 4 (PHQ-4) [338]	0.75	4
Reflection and Rumination Questionnaire (RRQ) [339]	0.85 to 0.90	1
Center for Epidemiologic Studies Depression (CES-D) Scale [340]	0.85 to 0.90	6
COVID-19 Peritraumatic Distress Index (CPDI) [304]	0.92	1
Peritraumatic Distress Index (PDI) [295]	0.83	1
General Health Questionnaire - 12 [341]	0.90	1
The Brief Symptom Inventory (BSI-18) [342]	0.86	3
World Health Organization Self Reporting Questionnaire (SRQ-20) [343]	0.78	1
Brief Psychiatric Rating Scale - 18 (BPRS) [344]	0.75	1

10.3. Results for Depression

The influence of COVID-19 on depression levels is not solely attributable to the factors outlined in the introduction. There were a number of dynamics that still impact depression and were increased during the pandemic [6,212,259,310,328]. Among these factors were those related to aspects strictly connected with COVID-19 [24,111,133,157,214,215,220,225,240,243,269,345–347], risk perception and its reactions [96,111,129,133,143,216,247,256,309], low quality of life [55,157,214,243,259,312], and addictions [220,241].

Pregnancy was another area impacted by COVID-19, especially when it concerned depression, due to its nature as a special, but also critical, moment in womens' lives [267]. In particular, WHO reported that about 10% of pregnant women experience a mental disorder, primarily depression [267], whose likelihood has increased during the COVID-19 pandemic [266,348,349]. Furthermore, for both pregnant women and their husbands, fear of COVID-19 was significantly associated with their depression level [191].

As for the COVID-19 pandemic effects on medical staff, there is some agreement between scholars. Some works highlighted that medical staff particularly suffered from the COVID-19 pandemic in terms of depression symptoms, due also to the increased work-related risks and workload [4,8,220,222,254]. In particular, medical staff members were more likely to have an impairment of their attention, cognitive functioning, and clinical decision-making [220]. Some others found that healthcare workers were at risk to develop depression [10,213,217,219,220,231,232,235,242,254,262,268,270,350]. However, other papers found the contrary [221,260], thus suggesting that the effect of the pandemic on the depression of health workers can be mediated by factors such as: longer average working time, more time in contact with COVID-19 patients, spending more time thinking about COVID-19, and spending more time searching for coronavirus information [217,219,270]. Some protective factors individuated specifically for healthcare workers were: maintaining contacts through social networks [265], individual resilience [281], distress tolerance [281], social support [65], and having a meaning in life [312].

Regarding the general population, literature identified a number of protective factors towards depression. In particular, resilience [24,133,259], sexual satisfaction [236], pandemic-related prosocial experiences [64], hope and zest [183], positive affect [96,243,351], confidence about overcoming COVID-19 pandemic [157,216,352], living farthest from the epidemic [273], high levels of family support [24,307], credibility of updates [216,247,352], home self-quarantine [269,352], having a garden [245], continuing to work [245], physical exercise [239,307], meaning in life [312], trust in medical staff [216,247], taking prevention measures [168], and optimism [307,312] were associated with lower depressive symptoms.

Depression levels during the pandemic were associated with age, gender, social condition, culture and psychological variables. The results are shown below.

Age: Age seemed to be significantly associated with depression [157]. Younger people reported a higher prevalence of depressive symptoms during the COVID-19 pandemic [4,7,184,221,225,235,239,242,243,245,247–249,258,347]. Conversely, older people showed lower depression levels [7].

Gender: The findings showed that women had higher levels of depression than men [4,8,10,67,157,186,187,220–222,225,239,242,243,247,254,255,258–260,262,272,307,321,347], in line with pre-COVID-19 literature [353,354]. A prolonged exposure to domestic hostility due to quarantine worsened the symptoms [259]. Just one research found the contrary [310].

Social Condition: An association between sociodemographic variables and depression was captured: lower levels of education, unemployment, lower income, living in urban areas, living in crowded areas where it is impossible to maintain social distance, not having a child, having an acquaintance infected with COVID-19 have been associated with higher levels of depression [6,8,67,185,187,226,233,245,247,248,253,264,347]. Remote working was associated with lower depressive symptoms [245], while being a student seemed to be significantly associated with higher levels of depression [4,8,186,254,265,310].

Culture: Some differences related to culture were found: during the COVID-19 pandemic, Chinese, Asian Americans, and Israeli Arabs were at low risk of present depressive symptoms, compared to Spanish, White Americans, and Israeli Jewish [7,24,355]. According to Gobbi and colleagues [326], Turkish had the lowest level of depression, compared to Canadians, Pakistanians, and Americans [326].

Comorbidity: Anxiety [38,96,223,345], stress [214,312], sleep difficulties [223,271], history of mental health issues and chronic illness [220,221,255,259,262,268,310,347,356] were consistent predictors of higher depression during COVID-19 pandemic. These results also are in line with pre-COVID-19 literature [353,354].

Table 16 shows information about the papers analyzed for the study of Depression.

Table 16. Depression. Summary of sources, with the number of papers analyzed, the total sample size, the provenance of the sample and the mediator variables. "MTurk" is used to indicate a sample extended worldwide.

Depression	
Valid papers	97
Sample size	243,830
Geographical regions	Australia, Austria, Bangladesh, Brazil, Canada, China, France, India, Iran, Ireland, Italy, Mexico, MTurk, Nigeria, Pakistan, Portugal, Saudi Arabia, South Korea, Spain, Switzerland, Turkey, UK, Urban South Africa, USA
Mediator variables	Age, Gender, Education, Culture and Comorbidity

11. Mental Health Variables: Other Consequences of COVID-19 on Mental Health: Wellbeing, Psychological Distress, Fear of COVID-19 and Sleep

11.1. Introduction

The COVID-19 pandemic, as well as previous epidemics (such as SARS, H1N1, Ebola virus), have caused other psychological consequences with respect to those considered in the previous paragraphs, both on individuals affected by these diseases, as well as on the non-infected ones [3,5,8,9]. In particular, four constructs about Mental Health and Quality of Life domains will be examined below due to their connection with the COVID-19 outbreak.

Wellbeing: Living under the threat of the pandemic and its consequences represented a significant challenge to wellbeing [329,350,357]: indeed, the first wave of the COVID-19 pandemic was linked to worsening in wellbeing and mental health [9,329,358]. The sudden outbreak of COVID-19 and the preventive measures had a strong impact reducing the quality of life of the population [5,93]: forcing a drastic change in habits and routines [359], reducing social contact [329], and restricting freedom of movement as a consequence of social isolation [5]. Both the sudden outbreak of a new and unknown virus and the

measures adopted to decrease its spread have had a strong impact on the mental health and the psychological well-being of the population [5].

Psychological Distress: Variables positively associated with psychological wellbeing were negatively associated with psychological distress [360]. APA defined psychological distress as a set of painful mental and physical symptoms that are associated with normal fluctuations of mood in most people [361]. Furthermore, Arvids Dotter and colleagues [362] defined psychological distress as a state of emotional suffering associated with stressors and demands that are difficult to cope with in daily life. When facing something new or unknown, such as the COVID-19 virus, a lack of effective treatment can lead to psychological distress in health care professionals as well as in patients [362]. The risk of getting infected, the lockdown scenario, and the consequent changes in habits may contribute to feelings of loneliness (connected to social isolation) and psychological distress [5,359,363].

Risk factors associated with greater distress were: not having an adequate supply (of food or goods of first need) [364], quarantine [364,365], low level of health perception [364], risk control [364], risk perception [364], low social support (family) [363], negative coping styles [75], delay in returning to work and school [365], negative thoughts [366], being close to potential risk groups [9], and work environment [3]. In the pandemic, healthcare workers are at high risk of psychological distress [357]: they were worried about overtime work, the stigma of the illness, and the health of their families and themselves [279]. While, protective factors associated with distress were: taking personal prevention/protection and clothing disinfection measures, clear communication of directives, and precautionary measures [364].

Fear of COVID-19: Fear is a negative emotion accompanied by excessive levels of emotive avoidance concerning particular stimuli, and it is an adaptive danger response [133,178,367]. It is associated with clinical phobias [178], social anxiety [178], risk perception [367], health anxiety [367], bad psychological and physical health [133], use of social media [367], high neuroticism and worries [366]. However, fear to some extent can be helpful for people in terms of leading them to comply in protective behaviours against COVID-19 [107,133,178].

In particular, it is also necessary to define the fear of COVID-19, that is based on four basic pillars: fear of the body, significant others, uncertainty, and action/inaction [9,368]. Especially the uncertainty led to changes in habits that are associated with decreased wellbeing and increased psychological distress [9,178].

Sleep: Finally, sleep is an indispensable physiological process in maintaining physical health [369] and sleep quality is a key indicator of health [70]. The stressful situations caused by the COVID-19 pandemic appeared to enhance symptoms such as sleep suppression, increased wakefulness, insomnia, difficulty falling asleep, maintaining sleep, waking up early, daytime sleepiness, nightmares and daytime dysfunction, and other sleep-related disorders [69,70,188,273,283,369]. On the other side, social support appeared to reduce stress and consequently improve sleep quality, and also enhance wellbeing [70].

11.2. Measures

Wellbeing: The validated questionnaires used to measure wellbeing are reported in Table 17.

Table 17. Validated tools to measure "Wellbeing". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Ryff's Psychological Well-Being Scales [370]	0.84	1
Professional Quality of Life Scale (ProQOL) [371]	0.75 to 0.88	1
Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) [372]	0.91	3
Psychological Well-Being Scale [373]	0.86	1
Psychological General Well-Being Index (PGWBI) [374]	0.90 to 0.94	2
WHO Quality of Life-BREF (WHOQOL-BREF) [375]	0.70 to 0.82	1
The Revised Illness Perception Questionnaire (IPQ) [376]	0.61 to 0.90	1

Table 17. *Cont.*

Psychological Tool	α	Fr
Positive and Negative Affect Schedule (PANAS) [377]	0.90 to 0.91	2
The satisfaction with life scale [378]	0.89	3
Danish Mental Health and Well-Being Survey (DMHWBS) [379]	0.94	1
Mental Health Continuum–Short Form (MHC–SF) [380]	0.89	1
The SCL90-R questionnaires [381]	0.70	1
My Life Today [382]	0.82	1
PERMA-Profiler [383]	0.96	1
The Brief Symptom Inventory (BSI-18) [342]	0.86	1

Different research used ad hoc questionnaires to analyze wellbeing [17,38,122,212,233,329].

Distress: The validated questionnaires used to measure distress are reported in Table 18.

Table 18. Validated tools to measure "Distress". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Subjective Units of Distress Scale (SUDS) [384]	no	1
COVID-19 Peritraumatic Distress Index (CPDI) [304]	0.92	3
Kessler 6 questionnaire (K6) [385]	0.89	8
Distress Tolerance Scale [386]	64 to 0.90	1
Kessler 10 questionnaire (K10) [385]	0.88	3
GHQ -12 [387]	0.90	6
Impact of Event Scale [388]	0.94	2
Distress Symptoms (BSI) [342]	0.82	1

Different research used ad hoc questionnaires to analyze distress [8,45,90,166,310,363,366].

Fear of COVID-19: The validated questionnaires used to measure the fear of COVID-19 are reported in Table 19.

Table 19. Validated tools to measure "Fear of COVID-19". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Fear of the Coronavirus Questionnaire (FCQ) [367]	0.77	1
The Fear of COVID-19 Scale (FCV-19S) [170]	0.82	6
COVID-19 Fear Inventory (CFI) [198]	0.82	1
The numeric rating scale (NRS) [389]	no	1

Different research used ad hoc questionnaires to analyze fear [37,107,133,212,277,390].

Sleep: The already validated questionnaires used to measure sleep are reported in Table 20.

Table 20. Validated tools to measure "Sleep". In the table are reported the psychological tools adopted by the studies taken into account, their internal consistency (reliability), and their frequency.

Psychological Tool	α	Fr
Insomnia Severity Index (ISI) [391]	0.91	6
Pittsburgh Sleep Quality Index (PSQI) [392]	0.69	9
Sleep Self Assessment Scale (SRSS)[393]	no	1
PROMIS Sleep-related impairment [394]	0.90	1

Different research used ad hoc questionnaires to analyze sleep quality [69,188,256,269,395].

11.3. Results for Other Consequences of COVID-19 on Mental Health

The influence of COVID-19 on the levels of wellbeing, distress, fear, and sleep appeared as mediated by different factors that are reported below.

Wellbeing: The initial stages of the pandemic had minimal detrimental effects on wellbeing [68]. Several studies found that quarantine [310,359], living in regions with higher COVID-19 prevalence [309], loneliness [214,329,396,397], risk perception [3,122], conspiracy beliefs [45], suspected infection [71], spending time searching for information about COVID-19 [71], searching information on social media [3,359], not practicing prevention measures [3], fear of COVID-19 [9,17,397,398], intolerance of uncertainty [9], rumination [9], exhaustion [397], internet addiction [357], work overload [398], stressful life events [357], negative coping styles [71,86,93], and substance use [93] were associated with lower levels of mental wellbeing. On the contrary, physical exercise [239,399], positive coping strategies (e.g., emotional support, humor, religion) [8,71,77,93], optimistic attitude [35] (Imtiaz et al., 2020a), hope [106,183,329], resilience [106,329], perception of effective protective measures [397], satisfaction at work [397], good social support [71,357,398], and higher self-efficacy [3,398] were associated with an increase of wellbeing levels.

Regarding healthcare workers, it is demonstrated that their workload had a significant negative impact on their psychological wellbeing [279,400].

Distress: Greater mental distress was evident post lockdown [8,214]. The decrease in distress during the initial phase was attributed to preventive measures (including medical support and resources to stop the spread of the virus) [304]. Among the healthcare workers, high levels of distress were found [90,397,401,402], finding also that those who believed the virus was developed intentionally in a lab reported higher levels of distress [401].

Fear: Regarding the fear of COVID-19, it was associated with psychological distress and life satisfaction [170,228,403]: this was a mediating factor between intolerance of uncertainty and wellbeing [9]. According to Mertens and colleagues [367], there are four predictors of the fear of COVID-19: health anxiety, regular media use, social media use, and risks for loved ones [367]. Nevertheless, COVID-19 fear has been shown to predict positive changes in behavior (social distancing, hand hygiene) [107,170,178,390]. Furthermore, people who had higher levels of risk perception experienced more fear, and they were more inclined to develop a mental disorder [133,228]. Finally, between healthcare workers there was also a negative correlation between fear of COVID-19 and wellbeing [279,400,403,404].

Sleep: Reporting sleep-related functional problems was significantly associated with higher distress [397]. During quarantine, sleep timing markedly changed: people went to bed and woke up later, and spent more time in bed, but, paradoxically, also reported a lower sleep quality [271]. The difficulty in falling asleep was the result of an increase of "presleep cognitions", which could probably lead to PTSD [283]. According to Di and colleagues, and Bai and colleagues [395,405], even children reported sleep difficulties during the COVID-19 pandemic [395,405]. In particular, sleep disorders were higher in COVID-19 confirmed cases [223], and those who had adversity experiences/worries [69], no exercise [65], and lower social support [65,69].

According to different studies [65,184,263], healthcare workers had the highest rate of poor sleep compared to other occupations [65,184,263]. They reported more difficulty in falling asleep [314], short sleep duration [314], and more sleep disturbance like insomnia [231,314].

Wellbeing, distress, fear and sleep levels during the pandemic were associated with age, gender, social condition, culture and comorbidity.

Age: Several studies have shown that being younger and having negative self-perceptions about ageing were associated with increased discomfort [5,75,309,319,359,363,364,406,407]. Thus, as a result, older people with positive self-perceptions of ageing seem to be more resistant during the COVID-19 outbreak [8,86,363,397]. In contrast with these findings, only Zhang and colleagues [365] argued that age was positively associated with psychological

distress [365]. Nevertheless, an effect of the quarantine was found even on young people: children and adolescents in quarantine suffered greater psychological distress than children and adolescents not in quarantine [166]. Sleep disorders were more frequent in younger people [256,288,408]. In particular, as far as COVID-19 hospitalized patients are concerned, sleep disorders are greater in people aged 50 and over [223].

Gender: Several studies showed that being female was associated with higher levels of distress, and lower levels of psychological wellbeing [5,86,183,233,239,309,319,363,364,397,406,407,409,410]. Finally, fear of COVID-19 was more severe in females than in males [411]. Most of the papers found the prevalence of sleep disorders as insomnia [225,408] or poor sleep quality was higher among women [256]. Only Zhpu and colleagues [263] found conflicting results: in their paper, the sleep quality of men was worse than that of women [263].

Social Condition: People who were unemployed [309,407,409] or who had just lost their job reported higher psychological distress levels [406]. As for the workers, faculty, post-doctoral researchers and students showed lower levels of wellbeing than staff members [233,345]. Another significant association was found with marital status: those who were married had higher levels of wellbeing than those who were divorced because they had more social contacts and social support [318]. A relationship emerged between job loss, being single, and sleep disorders [69,256]. In particular, unemployed mothers or mothers who continued to work outside were more likely to suffer from sleep disorders than those who continued working at home or stopped working during lockdown [405].

Culture: Only one paper investigated cultural differences. According to Kimhi and colleagues [355], Arab respondents expressed a significantly higher level of COVID-19 distress compared with Jewish ones, who, on the contrary, reported higher levels of wellbeing and resilience [355].

Comorbidity: Having a background illness [239,310,324,398], depression [214,350], anxiety [214,329,350,412], stress [214], burnout [397], sleep problems [397], alcohol abuse [350], and OCD [38] were found to increase psychological distress. For what concerns fear, this was significantly related to depression [133,327], anxiety [133,234,327], specific phobias [327], stress [133,277], health anxiety [228], and general poor mental health [212]. PTSD [283,314], anxiety [70,188,223,256,269,271,272,408], physical dysfunctions [223], stress [70,256,269,271,369], depression [256,269,271], and general mental illness [69] were associated with sleep problems.

Table 21 shows information about the papers analyzed for the study of Wellbeing, Psychological Distress, Fear of COVID-19 and Sleep.

Table 21. Other consequences of COVID-19. Summary of sources, with the number of papers analyzed, the total sample size, the provenance of the sample and the mediator variables. "MTurk" is used to indicate a sample extended worldwide.

	Other Consequences of COVID-19
Valid papers	87
Sample size	303,418
Geographical regions	Australia, Bangladesh, Brazil, Canada, China, Cuba, Cyprus, Denmark, Ecuador, Ethiopia, France, Germany, Greece, Holland, India, Iran, Iraqi Kurdistan, Israel, Italy, Japan, Jordan, Mexico, MTurk, New Zealand, Nigeria, Pakistan, Poland, Spain, Switzerland, Turkey, UK, United Arab Emirates, USA
Mediator variables	Age, Gender, Education, Culture and Comorbidity

12. Discussion

This review aimed to explore the impact of the first wave of COVID-19 on people, analyzing different psychological and psychosocial dimensions. To identify the domains impacted by COVID-19 we relied on previous pandemic literature (e.g., Ebola, SARS, MERS, Novel influenza A, Equine influenza), and chose to reanalyze them in the current one. The analysis of the results revealed that the dimensions most impacted by COVID-19 among

psychosocial variables were: beliefs about COVID-19, coping strategies, risk perception, social support, and compliance and social distancing.

In particular, regarding the three fundamental moderators about beliefs and media persuasion (attitudes, knowledge, and finding news on social networks) the analysis of works showed that, although some attitudes were optimistic (e.g., the probability of being infected was perceived as low), most participants took precautionary measures to prevent infection [34]. On the contrary, higher levels of negative thoughts (e.g., fatalism toward the pandemic) were associated with lower behavioral intentions to comply with protective measures [36]. Furthermore, accurate knowledge about COVID-19 predicted more information-seeking behaviour, the ability to discern between true and false information, compliance with preventive measures, and showed lower panic reactions, a lower level of anxiety, and greater risk perception [25,41,126]. The major sources people used to seek information during the pandemic were TV and social media, but these also led to an increase in disinformation and a spread of fake news and conspiracy theories [16,17,43]. Regarding conspiracy theories about COVID-19, some studies showed that subjects who believed in them complied less with the suggested protective behaviours and were less likely to get vaccinated [18,51,52]. On the contrary, those whose core beliefs (beliefs that guide individuals in their identity) were less influenced by the pandemic reported to engage more in social isolation measures [38].

Beliefs about COVID-19, its transmission, and its protective measures, demonstrated to strongly influence compliance with them. In particular, low compliance was associated with belief in conspiracy theories, impulsivity, and self-centered behaviour [48,49]; instead, higher compliance with protective measures was associated with fear of COVID-19, trust in government and science, and higher risk perception [134,154,169,179].

The risk perception has shown a double effect: on the one hand, a higher risk perception induces higher levels of compliance, for example, in terms of compliance with social distancing [56]. On the other hand, however, it can lead to avoidant behaviors, such as being reluctant to seek medical assistance for fear of transmission, which can damage both the health of the individual and make the management of the pandemic more difficult, probably due to the sense of loss of control that is notoriously associated with high levels of risk perception [100,185].

Quarantine, and the COVID-19 pandemic in general, also had negative social consequences. For example, many social support networks have been interrupted: indeed, social distancing led to boredom, loneliness, social isolation fatigue, anxiety, and depression [54,135,159]. Nevertheless, social support proved to be crucial and had a positive impact on coping with the COVID-19 pandemic [56,59,66]. The results showed that positive coping strategies were correlated with less distress, fear, and general vulnerability, and higher wellbeing. In contrast, negative coping strategies (e.g., substance use, behavioral disengagement) were related to higher stress, distress, fear, and anger [77,79,88].

In addition, psychological dimensions regarding some areas of mental health, specifically anxiety, stress, depression, wellbeing, and sleep, were impacted due to the pandemic.

Restrictive measures had, in general, a protective effect on anxiety, whereas being more in contact with the virus resulted in higher levels of it. In particular, anxiety was negatively related to protective measures from COVID-19 [23,73,168], whereas it related positively to testing positive for COVID-19, being in an environment exposed to COVID-19 [58,110,219], knowing people who were COVID-19 positive [201,221,222], and having more knowledge about COVID-19 [16,23,41].

The COVID-19 pandemic was also associated with higher levels of depression, both in people with a history of psychiatric disorders and in others [78,326]. These results seemed to be due to quarantine and social isolation, but also to the constant exposure to information about COVID-19 [187,223,251].

Stress appeared to be positively related to the COVID-19 pandemic and the subsequent lockdown period [7,78,307]. This effect is buffered by some protective factors, such as lower

exposure to COVID-19 [233,273]and some personality traits, such as emotional stability and conscientiousness [74].

The research has highlighted some risk and protection factors of wellbeing during the pandemic. Quarantine, living in areas with high virus prevalence, overexposure to COVID-19 information, and conspiracy theories seem to decrease wellbeing; while exercise, positive coping strategies, and greater social support seem to promote it [8,399].

The pandemic also impacted the distress experienced by people, particularly of those who were already physically and/or mentally ill. Indeed, poor sleep quality was positively correlated with stressful situations caused by the COVID-19 pandemic [69,273,369].

Overall, the COVID-19 experience may be useful to derive some evidence-based insights to be applied in case of future similar emergencies. Concerning compliance, promoting a correct risk perception in the population by disseminating correct information [17,19,20,39,46,169], and suggesting effective (and positive) coping strategies [71,77,87,91,93,94], would be helpful in increasing the degree of compliance with governmental measures [39,48,76,95,102,104,105,120,123,127,134,137,139,142,148,152,169,178]. Nonetheless, compliance is also affected by the perception of the effectiveness of such restrictions. For this reason, a better media campaign, focused not on fear but on efficiency (and self-efficacy), would be ideal, in the event that an extreme situation, such as the COVID-19 pandemic, should recur [21,24,40,41,46,49,169].

As highlighted by the literature, different management of the emergency would have also led to better psychosocial and psychological outcomes. In this regard, social support appeared to ease emergency management [55,66,67,69–71]. Greater social support was also useful in reducing the levels of anxiety, depression, stress, that ultimately contributed to people's compliance with the rules, fear of contagion, and management of the emergency (both collectively and individually) [55,67,70,71]. Given the widespread increase in psychological/psychiatric symptoms (anxiety, depression, stress, insomnia, and psychological distress) [4,58,64,96,225,233,243,271,319,347], countries all over the world, especially those most affected by the virus, should envisage in such situations a prompter professional support to citizens, so to prevent the emerging or worsening of symptoms.

Finally, one of the factors identified in the scientific literature as key to countering the pandemic was resilience. Resilience resulted in stress [259,311], anxiety [24,57,133], and depression [157] protective factors, and has a positive relationship with wellbeing [329]. Resilience is fundamental in enabling people to change their behaviour in response to stressful events, like the COVID-19 pandemic, which in this specific case may prevent someone from getting sick or dying. For this reason, resilience appears to promote readiness to change, which is one of the factors that enable communities to respond adequately to emergencies such as a pandemic [12–14].

As described above, the pandemic affected several psychological dimensions. However, its effect appeared to be conditioned by a few factors that allowed us to qualitatively describe the psychological and socio-demographic profile of the most resilient people. The factors that more frequently had a significant influence on the previously analyzed variables are: age, gender, culture, social condition, healthcare workers and workload.

As for age, younger people appeared to be less resilient: they were more affected in terms of both psychosocial variables and mental health. Young people showed greater compliance with preventive measures, probably due to their greater risk perception and knowledge of the virus. Despite their major levels of compliance, young people suffered more from the effects of quarantine, implemented negative coping strategies more often, and suffered more from psychological distress and, in general, mental health problems (i.e., anxiety, depression, stress) [24,40,73,74,143,154,157,166,347].

Similarly, women were most affected by the pandemic: they tended to comply more with the rules because they were more worried and perceived greater risks, so they mainly used emotionally focused coping strategies. Again, despite showing higher compliance levels, women were more susceptible to anxiety, depression, stress, sleep disorders, and distress than men [89,114,139,187,223,363,408]. Furthermore, post-partum depression in-

creased during the pandemic [266,348,349]. In light of this, young women appear to be the least resilient, especially under certain conditions such as postpartum.

An effect of culture was particularly evident on beliefs: collectivist societies seemed to have more accurate beliefs about COVID-19 than individualist societies [47,49]. However, the levels of risk perception, as well as people's mental health, apart from possible cultural factors, appeared to be affected by the levels of contagion around the world. So, it was not possible to distinguish between the two causes which one influences more the results [78,127].

Lower levels of education were associated with more fear of dying by COVID-19, perception of susceptibility to the infection and worse overall knowledge about the pandemic [47], more anxiety [247], stress [258] and depression [347].

Lower income and unemployment were associated with higher levels of anxiety [247], stress [56], depression [347], higher levels of distress [406] and more sleep disorders [69,256]. The results about compliance and social distancing were conflicting regarding income [40,101,141,149].

Finally, healthcare workers experienced an increase in workload that led to several consequences, including higher risk perception [127], higher levels of anxiety [184], stress [288], depression [222], less wellbeing [232], worse sleep quality [184], and higher risk of psychological distress [357]. Healthcare workers implemented coping strategies like religious strategies, acceptance, planning, physical activity, virtual support groups, talk therapy, and positive framing [8,87,90]. Of these factors, some (e.g., age, gender) are known to be relevant to mental health even before the pandemic; nevertheless, the papers we analyzed did not distinguish the effects of these variables before and after the pandemic.

In conclusion, the aim of the paper was to research how the COVID-19 pandemic impacted the psychological health of the global population during the first wave. In particular, we investigated which psychosocial and psychological variables were most affected, delineating a first and preliminary picture of symptoms related to COVID-19 that could be called "psychological COVID-19 syndrome". This syndrome appeared to be characterized by an increase in stress, depression, anxiety, sleep disturbance, and distress related symptoms. Healthcare workers were the most affected by the consequences of the COVID-19 pandemic, as they found themselves on the front lines facing the virus and experienced a sudden increase in workload. In addition to healthcare workers, the results showed that people who proved less resilient were young women, with low income and low education, particularly if they were in post-partum condition. In light of this, it would be hopeful to implement prevention and aid projects for these individuals, particularly affected by the pandemic.

The number of studies about the psychological effects of the COVID-19 pandemic is increasing. However, the literature available until June 2020 was still in the early stages of maturity. Therefore, thanks to the articles published since June 2020, the "psychological COVID-19 syndrome", hypothesized in this review through the first wave studies, could be modified or expanded. Future research should investigate the second and third waves of the pandemic so that comparisons can be made with the present research.

Author Contributions: Conceptualization, A.G. and M.D.; methodology, A.G. and M.D.; investigation, V.F., C.P. and C.S.; data curation, V.F., C.P. and C.S.; writing—original draft preparation, V.F., C.P. and C.S. and M.D.; writing—review and editing, V.F., C.P., C.S., M.D. and A.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Search Strategy: PsycInfo, PsycArticles, PubMed, Science Direct, PsyArXiv, NCBI, medRxiv, and Elsevier repository.

Searched Terms:

COVID-19 AND Psychological (Search results: 1010)
COVID-19 AND Psychology (Search results: 2160)
COVID-19 AND Risk perception (Search results: 116)
COVID-19 AND Coping strategy (Search results: 17)
COVID-19 AND Coping strategies (Search results: 91)
COVID-19 AND Personality (Search results: 314)
COVID-19 AND Personality Traits (Search results: 177)
COVID-19 AND Risk Perception (Search results: 116)
COVID-19 AND Fear (Search results: 300)
COVID-19 AND Anxiety (Search results: 626)
COVID-19 AND Psychology learning (Search results: 87)
COVID-19 AND Psychology resilience (Search results: 129)
COVID-19 AND Psychology self-efficacy (Search results: 15)
COVID-19 AND Psychology motivation (Search results: 39)
COVID-19 AND Psychology self-esteem (Search results: 15)
COVID-19 AND Psychology communication (Search results: 124)
COVID-19 AND Psychology control (Search results: 264)
COVID-19 AND Psychology optimism (Search results: 21)
COVID-19 AND Psychology workplace (Search results: 31)
COVID-19 AND Psychology Psychological (Search results: 365)
COVID-19 AND Psychology employee (Search results: 337)
COVID-19 AND Psychology sleep (Search results: 106)
COVID-19 AND Psychology depression (Search results: 84)
COVID-19 AND Psychology mental health (Search results: 798)
COVID-19 AND Psychology panic (Search results: 98)
COVID-19 AND Social distancing
COVID-19 AND Messages
COVID-19 AND Media

Table A1. Main characteristics of the studies reviewed: reference, country, sample size, impacted dimension, and main findings (n = 294). Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[136]	Germany	419	Compliance	People use protective measures primarily to protect themselves and only secondarily to protect others. Social distancing and washing hands are the most implemented.
[135]	USA	895	Compliance	Those with higher levels of boredom perceived social distancing as more difficult and adhered less.
[158]	Ireland	500	Compliance	Evidence to support communications that inform people about recommended behaviors.
[19]	USA	1022	Beliefs/	Up-to-date and accurate specific health information Media Persuasion and special precautionary measures have been associated with a lower psychological impact.
[178]	MTurk	324	Compliance	"COVID-19 fear" is a predictor of a positive change in behavior (social distancing, better hand hygiene).
[67]	China	144	Anxiety, Depression,	Presence of depressive and anxiety symptoms Social Support in patients with COVID-19. Lower perceived social support appears to be related to an increase of the symptoms.
[137]	Brazil, Colombia,	2285	Compliance	Preventive measures are perceived as Germany, Israel, more effective when control levels are Norway, USA higher and the perceived risk is lower.
[21]	MTurk	2176	Beliefs/	self-interested framing isn't more Media Persuasion effective than prosocial framing.
[105]	USA	1591	Risk	Subjects demonstrated a growing awareness Perception of the risk and reported engaging in protective behaviors with increasing frequency.
[76]	China	4607	Risk	People with low self-control are more Perception vulnerable and more in need of psychological help to maintain mental health.
[34]	China	6910	Beliefs/	Although attitudes towards COVID-19 were optimistic, Media Persuasion most residents took precautions to prevent infection.
[134]	MTurk	525	Compliance	Those who perceive COVID-19 as a serious threat and those who have greater faith in science are more likely to act in accordance with guidelines.
[145]	Italy	894	Compliance	Respondents were more likely to reduce their self-isolation if the quarantine extension turned out to be longer than they expected.
[282]	China	2091	Stress	The prevalence of post-traumatic stress symptoms in China one month after the outbreak was 4.6%.
[43]	Poland, UK	652	Beliefs/	The prejudice towards foreign nationalities was Media Persuasion sensitive to the epidemiological situation.
[155]	China	4607	Compliance	Emotional and behavioral reactions were slightly influenced by the outbreak of COVID-19.
[163]	Germany,	2192	Compliance	Inducing empathy for those most vulnerable to the virus UK, USA promotes motivation to adhere to social distancing.

Table A1. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[304]	China	52,730	Other Consequences	Over time, levels of distress have significantly decreased. It can be partly attributed to the effective prevention and control measures taken by the Chinese government.
[42]	USA	1709	Beliefs/	Those who are least likely to rely on their Media Persuasion intuitions and who have lower basic scientific knowledge were the worst at discerning fake news.
[367]	Holland	439	Other Consequences	Four predictors of "COVID-19 fear" were found: intolerance to uncertainty, health anxiety, increased media exposure, and risks to loved ones.
[130]	Italy	1573	Risk perception	In line with international literature, for the Italian population, too, experimental data confirmed a decrease in risk propensity of around 17.4% during the lockdown.

Table A2. Main characteristics of the studies reviewed, pt.2. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[254]	China	600	Anxiety,	There were anxiety in 6.33% and Depression depression in 17.17% of the sample.
[231]	Nigeria	884	Anxiety, Stress,	Results revealed significant difference in Depression, the prevalence of depressive symptoms,insomnia symptoms, Other consequences post-traumatic stress symptoms and clinical anxiety symptoms with a higher prevalence reported by the healthcare personnel.
[65]	China	7071	Anxiety, Depression,	Doctors and nurses had more psychological Other Consequences, symptoms while defending against Social Support the outbreak than before.
[10]	China	1315	Anxiety, Depression,	A total of 1315 frontline HCWs were included, of which 49.1% Stress reported a moderate to severe stress 10.7% reported moderate anxiety to severe and 12.4% reported a major depression.
[92]	China	30,077	Beliefs/Media	The COVID-19 outbreak improves Chinese people's Persuasion, Coping, ability to see the meaning of negative experiences. Risk Perception
[310]	Australia	5071	Stress, Depression,	More than three quarters of participants reported that Other consequences their mental health had been worse since the outbreak. A small proportion reported improvements in their mental health since the outbreak
[167]	UK	520	Compliance	There are significant associations between analytical thinking and compliance. Those who use slow cognitive styles are more likely to maintain social distance and reject COVID-19 conspiracy theories.
[144]	USA	501	Compliance	Greater conscientiousness was directly associated with adherence to guidelines, indirectly associated with greater self-efficacy.
[217]	China	150	Anxiety, Depression	The participants had severe anxiety and depression.

Table A2. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[267]	Turkey	260	Anxiety, Depression	the COVID-19 exerted statistically significant effects on psychology, social isolation, and BDI and BAI scores.
[224]	China	992	Anxiety	A clinical significance of anxiety symptoms was observed in 9.58% of the respondents.
[140]	Denmark	799	Compliance	People's age (positively), levels of emotionality (positively), and the dark personality D factor (negatively) explain who is most willing to accept restrictions.
[142]	Switzerland	705	Compliance	The governmental rules were more effective and stronger among the older respondents, while having a lower risk perception.
[406]	Australia	551	Other consequences	31% reported severe psychological distress, 35% in those with job loss and 28% in those still employed but working less. Those who had significantly greater odds of high psychological distress were younger, female, had lost their job and had lower social interactions.
[162]	USA	789	Compliance	Most teens reported not engaging in pure social distancing (70%), but were monitoring the news (75%) and performing disinfectant behavior(88%)
[56]	USA	500	Depression, Anxiety,	Findings highlight the importance of social connection to Other consequences mitigate negative psychological consequences.
[219]	China	882	Anxiety, Depression	The overall prevalence of GAD and depressive symptoms were 33.73%, and 29.35%, respectively.
[153]	USA	//	Compliance	Quarantine rules resulted in a significant flattening of the curve for Google searches for suicidal ideation, anxiety, negative thoughts and sleep disturbances.
[247]	India	873	Anxiety, Depression,	The prevalence of depression, anxiety and stress Stress were 18.56%, 25.66%, and 21.99%.
[258]	Brazil	1460	Anxiety, Depression,	Levels of stress, depression and anxiety were all Stress predicted by gender, food quality, psychotherapy frequency, exercise frequency, work outside, education level and age.
[18]	MTurk	220	Beliefs/	Participants who believed that COVID-19 was a hoax or a Media Persuasion bio-weapon indicated less compliance with restrictive behaviors and greater commitment to self-centered preparedness behavior.

Table A3. Main characteristics of the studies reviewed, pt.3. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[369]	China	26	Stress,	ISI was positively correlated with total sleep time, Other Consequences and negatively correlated with deep sleep; patient SRQ scores were positively correlated with TST, sleep efficiency and REM. SRQ-20 and sex were risk factors for insomnia.
[171]	USA	503	Compliance	Agreeableness and conscientiousness predicted endorsement of social distancing, hygiene, and the appeal of health messages in general. Dark traits (psychopathy, meanness, and disinhibition) predicted low endorsement of health behaviors.
[169]	MTurk	1665	Compliance, Beliefs/	Some indication was found that concern about COVID-19 Media Persuasion and beliefs about others' behavior may predict behavior change.
[73]	China	1600	Coping	The general population with a history of visits to Wuhan, those with a history of epidemics, ant those who perceived more severe impacts of the COVID-19 epidemic on their lives, emotional control, and epidemic-related dreams had a higher level of psychological distress than those with none or little of these experiences. During the C-19 outbreak, the degree of concern about media reports influenced the general population's level of psychological distress and coping style. Media reports could influence the perception of the disease and the preventive measures implemented.
[139]	Norway	8676	Risk Perception	Increased media exposure, perception of measures as effective, and of the epidemic as a serious endeavor lead to positive predictions for health protection behavior.
[25]	Perù	225	Risk Perception	Knowledge is highly correlated with education, occupation, and age.
[221]	Spain	3550	Anxiety,	A substantial portion of the sample analyzed Depression, exhibited symptoms of depression, anxiety, Stress stress, and PTSD as measured on validated scales. In addition, respondents showed high levels of concern for their own health and that of relatives such as their parents, as well as for the social and economic situation resulting from the COVID-19 crisis.
[20]	USA	955	Beliefs/	The effectiveness of the fear intervention was less Media Persuasion dependent on the strength of the emotional response than the prosocial intervention. In contrast, the prosocial message was more effective in increasing the willingness to self-isolate if it produced a strong, positive, emotional response. Both fearful and prosocial messages were equally effective in stimulating engagement in protective behavior.
[91]	China	97	Coping	Mindfulness reduced daily anxiety. The sleep duration of participants in this condition was less affected by increased infections in the community than participants in the control condition.
[22]	MTurk	210	Beliefs/	Social distancing is significantly influenced by situational awareness. Media Persuasion Information sources, formal and informal were found to be significantly related to perceived understanding.
[248]	England	2025	Anxiety,	Higher levels of anxiety, depression, and trauma symptoms Depression, were reported, but not dramatically so. Anxiety Stress and depression symptoms were predicted by low income, loss of income, and preexisting health conditions. C-19-specific anxiety was greater in older participants.
[109]	Vietnam	391	Risk Perception	11% of respondents did not actively search for information on C-19, while over 80% admitted to searching at least 2 times per day.

Table A4. Main characteristics of the studies reviewed, pt.4. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[350]	China	1074	Anxiety,	A higher rate of anxiety, depression, hazardous Depression, and harmful alcohol use, and lower mental well-being Other Consequences in the Chinese population following the C-19 pandemic. The findings also revealed that young people are in a more vulnerable position in terms of mental health conditions and alcohol use. Young people are at higher risk for stress (despite lower mortality) as they take information from social media.
[58]	China	7143	Anxiety	0.9% of respondents had severe anxiety, 2.7% moderate anxiety, and 21.3% mild anxiety. Living in urban areas, family income stability, and living with parents were protective factors against anxiety. Having relatives or acquaintances infected with COVID-19 was a risk factor for increased anxiety. Economic effects and effects on daily life, as well as delays in academic activities, were positively associated with anxiety symptoms, whereas social support was negatively correlated with anxiety level.
[109]	Vietnam	391	Risk Perception	11% of respondents did not actively search for information on COVID-19, while over 80% admitted to searching at least 2 times per day.
[359]	Spain	584	Other consequences	Participants reported an important increase in negative affect and an important decrease in positive affect during the lockdown period, compared to before the lockdown.
[24]	China	10,905	Beliefs/Media Persuasion	In general, 74.1% of participants acknowledged the effectiveness of overall control measures and it was negatively correlated with regional number of existing cases.
[246]	China	194	Anxiety,	The overall prevalence of depressive symptoms, Depression, generalized anxiety and somatic symptoms were Stress 37.6%, 32.5% and 50%, respectively.
[147]	China	1920	Compliance	All studies together confirms that intentions to wear a face covering are higher in the priming reason condition compared to the priming emotion condition.
[280]	Italy	2286	Stress	Significant correlations were found among COVID-19-PTSD scores, general distress and sleep disturbance.
[44]	USA	1034	Other Consequences	Self-reported emotions showed that women were more worried, anxious, scared, and sad than men, and these results were supported by language differences. In addition, models showed that men wrote more frequently about concerns related to their health than women.
[164]	China	1011	Anxiety	The prevalence of moderate to severe anxiety was 4–5 times its normal level in urban China. The majority engaged in all six behaviors. Confusion about the reliability of information significantly fueled public anxiety levels.
[120]	Vietnam	345	Risk Perception	Those who use medical masks have a higher perception of risk than other people. This implies that people chose to wear a medical mask before the pandemic broke out perceive a higher risk than their counterpart. People tend to perceive greater risk as they age.
[47]	China	1075	Beliefs/	The majority of respondents appear to take the risk of C-19 Media Persuasion (on themselves, their community, and their livelihood) very seriously and are aware of ways to reduce risk. Education was an important demographic determinant, and the impact of age is likely associated with both education and life experience.

Table A4. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[220]	China	5062	Anxiety,	Women and those with more than 10 years of employment, Depression, concomitant chronic illnesses, history of mental disorders, Stress and confirmed or suspected family members or relatives are prone to stress, depression, and anxiety among nurses during the COVID-19 pandemic.
[148]	MTurk	1439	Compliance	Greater concern and weaker endorsement of unfounded C-19 beliefs leads to more responsible behavior.

Table A5. Main characteristics of the studies reviewed, pt.5. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[156]	China,	4505	Compliance	Overall levels of anxiety and adoption of positive behaviors Italy were strongly influenced by the sufficiency of information in all three countries, demonstrating that population-level risk perception, self-efficacy, and response to an outbreak can be intensified or attenuated by the quantity and quality of information provided.
[126]	Canada,	1975	Risk Perception	Cognitive sophistication-that is, the quality of one's reasoning UK, USA was associated with lower misperceptions in all three countries. In fact, in both the United States and the United Kingdom, cognitive sophistication was a stronger predictor of resistance to misperceptions than political ideology.
[127]	Italy	353	Risk Perception	Medical personnel in Northern Italy were more stressed and anxious than those in Central and Southern Italy. HCWs reported higher risk perception, level of concern and knowledge regarding C-19 infection than the general population.
[227]	USA	303	Anxiety,	69.0% of the sample reported moderate to severe levels of anxiety. Other Consequences Changing behavioral factors were better predictors of anxiety than psychological, situational, or informational factors, but all were significant.
[186]	China	1210	Anxiety,	53.8% of respondents rated the psychological impact Depression, of the outbreak as moderate to severe; Stress 16.5% reported moderate to severe depressive symptoms; 28.8% reported moderate to severe anxiety symptoms; and 8.1% reported moderate to severe stress levels.
[413]	China	205	Depression	A higher prevalence of depression was found primarily in patients who had C-19 infection.
[213]	China	11,118	Anxiety,	Approximately 4.98% of respondents reported medium Depression and high levels of anxiety, while 13.47% of respondents reported medium and high levels of depression. The level of perceived disaster-related risk was influenced by a person's level of awareness and knowledge about the pandemic.
[363]	Spain	1310	Other Consequences	Being female, younger, having negative self-perceptions about ageing, more exposure to C-19 news, more contact with relatives other than those residing in the home, less positive emotions, less perceived self-efficacy, lower sleep quality, less positive emotions, and higher loneliness were associated with greater distress.
[159]	MTurk	//	Compliance	Confinement measures are associated with aversive experiences including boredom, so adherence is likely to require self-control.

Table A5. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[404]	China	2299	Other Consequences	Compared with nonclinical staff, frontline medical personnel with close contact with infected patients showed higher scores on the Fear, HAMA, and HAMD scales, and were 1.4 times more likely to experience fear and 2 times more likely to experience anxiety and depression.
[216]	China	1738	Anxiety,	Statistically significant longitudinal reduction Depression, in mean IES-R scores after 4 weeks. Moderate Stress to severe stress, anxiety, and depression were observed during the initial assessment. Hand hygiene, mask use, and trust in physicians reduced psychological impact.
[410]	Denmark	2458	Other Consequences	The psychological well-being of the general Danish population is negatively affected by the COVID-19 pandemic. Females were more affected than males by the C-19 pandemic, in agreement with findings in other countries, reporting lower levels of well-being than their male counterparts.
[201]	USA	775	Anxiety	High CAS scores were associated with C-19 diagnosis.

Table A6. Main characteristics of the studies reviewed, pt.6. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[281]	China	285	Stress	The study showed a higher prevalence of symptoms in females. Finally, the study demonstrated the relationship between self-reported sleep conditions and the prevalence of PTSD, showing that participants with worse sleep quality had a higher prevalence of PTSD.
[5]	Italy	1639	Stress	Of 1639 respondents equally distributed in the Italian territory, Other Consequences 5.1% reported PTSD symptomatology, and 48.2% evidenced lower psychological well-being linked to COVID-19 diffusion.
[272]	China	307	Anxiety,	The prevalence of anxiety, depression symptoms Depression, were 18.6% and 13.4%, respectively. Other Consequences PSQI scores were significant positively associate with SAS scores and SDS scores ($p < 0.05$).
[327]	Italy	250	Anxiety,	Analysis of the data showed satisfactory psychometric characteristics Depression, and confirmed the scale's unidimensional properties. Other Consequences Construct validity for the FCV-19S was supported by significant and positive correlations with the HADS and SMSP-A.
[240]	MTurk	219	Anxiety,	During the initial C-19 impacted academic term (Winter 2020), Depression, individuals were more sedentary and reported increased anxiety and depression symptoms, relative to the previous academic terms and subsequent academic breaks.
[347]	Mexico	6023	Depression,	Regarding indicators of psychological distress Stress mean values for severities of depression and anxiety reached the respective cutoff scores for mild degrees, and the mean score of the IES-6 was borderline.
[412]	Turkey	126	Other Consequences	The impact of the health anxiety on wellbeing levels among mothers with autistic children is stronger than it is among mothers with normotypic children.

Table A6. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[251]	China	515	Anxiety,	The results showed that prevalence of anxiety, Depression, depression and PTSD was 14.4, 29.7, and 5.6%, respectively. Stress There was a significantly positive correlation between anxiety and depression/ PTSD.
[59]	//	//	Anxiety, Stress,	A systematic review that investigate the impact of the Depression pandemic on mental health and the related implications.
[241]	Mexico	561	Anxiety,	In the initial phase of the pandemic the prevalence for anxiety Depression and depression was 50% and 27.6%, but during the lockdown was incremented by 51% and 86% respectively.
[59]	//	//	Anxiety, Stress,	A systematic review that investigate the impact of the Depression pandemic on mental health and the related implications.
[8]	Pakistan	1134	Anxiety,	The frequency of anxiety and depression was 34% and 45%. Depression, The main sources of distress were related to adverse effects of Other Consequences, ongoing pandemic on daily life. The main coping strategies Coping adopted were religious/spiritual coping and acceptance.
[226]	Austria	4126	Anxiety,	43.3% of the sample rated the psychological impact Depression as moderate or severe. 26.5% reported depression, Stress 20.3% anxiety and 21.2% stress.
[182]	USA	1159	Compliance	Highlighted the critical role of working memory in social distancing compliance during the early stage of the pandemic.
[111]	UK	501	Depression,	News exposure was positively associated with depression; Risk Perception perceived vulnerability to C-19 mediated the relationship.
[55]	China	41	Anxiety, Stress,	Anxiety, depression and stress symptoms Depression, Coping, were associated with negative Social Support coping strategies and low social support
[244]	Iran	1038	Anxiety	The majority of healthcare workers(60.4%) had minimal to mild anxiety.The other 39.6% had moderate to severe anxiety.
[265]	Switzerland	212	Anxiety,	Students who participated in the Sept.2019 and Depression Apr.2020 surveys reported an average increase in Stress depressive symptoms, anxiety, stress, and loneliness.
[23]	Japan	4000	Anxiety,	12% participants were unconcerned about the transmission, Beliefs/ 11% showed no worry about developing a serious Media Persuasion condition, 8% were not anxious about spreading infection.

Table A7. Main characteristics of the studies reviewed, pt.7. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[129]	Africa	957	Depression,	Higher perceived risk of COVID-19 infection Anxiety is associated with greater depressive symptoms among adults with histories of childhood trauma during the first 6 weeks of quarantine.
[407]	UK	15,835	Depression, Anxiety	Mean population GHQ-12 score increased from Stress, 11.5 (2018/19) to 12.6 (April 2020), Other consequences one month into lockdown.

Table A7. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[260]	Iran	535	Depression,	There was a significant relation between Stress, gender and variables of depression, anxiety, and stress. Anxiety There was also an inverse relationship between stress and variables of educational level and age.
[51]	France	805	Beliefs/	Conspiracy beliefs positively predicted a pro-chloroquine Media Persuasion attitude. The same relations were found with vaccine attitudes, intention to be vaccinated, and pro-chloroquine attitudes.
[284]	Iran	615	Other consequences	326 persons (53%) experienced high levels of burnout.
[38]	USA	408	Anxiety	Adhering to social isolation policies predicted lower levels of C-19 Anxiety. This effect was largely mediated by conservation of core beliefs and ability to make meaning of the pandemic.
[223]	China	66	Anxiety, Depression	The incidences of anxiety, depression, and sleep disorders Depression in the suspected case group were 18.2%, 18.2%, and 39.4%. The anxiety, depression and sleep disorder scores were significantly positively correlated ($p < 0.05$).
[183]	Italy	944	Anxiety,	46% of participants presented moderate to extremely severe Depression, symptoms of depression, 40% presented moderate to extremely Stress, severe symptoms of stress, and 30% presented Other Consequences moderate to extremely severe symptoms of anxiety. People well-endowed with transcendence strengths (e.g., hope, zest, gratitude) scored higher for general mental health, lower for psychological distress (fewer symptoms of depression, anxiety and stress), and higher for self-efficacy in coping with the lockdown situation.
[3]	MTurk	929	Other Consequences	Of all respondents, 421(45.1%) had low psychological distress, 274(29.4%) had moderate psychological distress, 164 (17.6%) had high psychological distress, and 72 (7.3%) had very high psychological distress.
[397]	Arabic	1006	Other Consequences	Exhaustion, anxiety, depression, and sleep disturbances were reported (in past seven days) by approximately 34%, 34%, 19%, and 29% of subjects (respectively).
[401]	Ecuador	252	Anxiety,	Of the sample, 24.2% believed the virus was developed Other consequences intentionally in a lab; 20.6% believed the virus came about naturally; 13.9% believed it was made accidentally in a lab; and the remaining 41.3% were unsure where it originated. Almost one third (32.5%) of the healthcare workers surpassed the cutoff of distress disorder, and 28.2% of the healthcare workers had anxiety disorder.
[141]	USA	2500	Compliance	Even though 87.5% of the population had high levels of knowledge about social distancing, only 62.5% intended to always practice it, and only 46.2% always practiced it.
[285]	MTurk	2707	Other Consequences	Across all countries, reported burnout was associated with work impacting household activities, feeling pushed, exposure to COVID-19 patients, and making life prioritizing decisions.
[39]	China	150	Risk Perception,	The prevalence of the perceptions of high risk of contracting Beliefs/ COVID-19 and disease severity was 18.6% and 25.5%, respectively. Media Persuasion
[110]	China	4991	Risk Perception,	Over half of the respondents rated their risks of acquiring Anxiety COVID-19 as low. 14% of them reported mild to moderate anxiety level, 5.1% moderate to severe, only 1.5% reported severe anxiety.

Table A8. Main characteristics of the studies reviewed, pt.8. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[222]	Iran	2045	Anxiety,	65.6% of the participants have moderate and severe anxiety Depression symptoms, 42.3% had moderate and severe depression symptoms.
[114]	USA	146	Risk Perception	Younger adults perceived a lower risk of C-19 than did elders, and men perceived lower risks than did women.
[357]	China	1442	Other Consequences	26.63% of the participants demonstrated significant distress, and internet addiction was associated with it.
[52]	Serbia	407	Beliefs/	76.7% of the participants reported adhering to at least 3 health Media Persuasion, behaviors; participants moderately endorsed conspiracy theories, Compliance and only modestly overestimated their knowledge about C-19.
[279]	Italy	273	Other Consequences,	Women reported higher scores of fatigue and burnout than men. Stress COVID-19 fear levels and fatigue in HCWs decreased over the temporal trend, while satisfaction slightly increased.
[405]	Italy	245	Other Consequences	Mothers reported a worse sleep quality during lockdown, a decrease in time pressure and an increase in time expansion.
[316]	Italy	1153	Stress	More than 1 out of 3 HCWs showed Emotional Exhaustion, and 1 out of 4 reported Depersonalization.
[278]	China	157	Stress	41.4% Non-COVID-19 patients worried about their disease conditions during the epidemic. The most common psychological problems was little interest or pleasure in doing things.
[268]	Norway	1778	Anxiety,	The levels of PTSD, anxiety, depression and health anxiety Stress, among health personnel and public service providers were Depression high: 27.7% had clinical or subclinical symptoms of PTSD.
[398]	Israel	338	Other Consequences	Risk of elevated psychological distress was found in 11.5% of the sample, particularly among those who had background illness, fear of contracting COVID-19, and higher subjective overload.
[102]	MTurk	26,508	Risk Perception	Perceived threat is positively correlated with protective behavior, so does Efficacy and Institutional trust.
[328]	MTurk	324	Depression	Amongst all the psychological effect, panic was the most agreed with, instead suicidal effect was the least agreed.
[98]	Germany	661	Compliance,	Participants reported that they adopted protective measures often. Risk Perception Shutdown and governmental restrictions were widely accepted.
[119]	USA	1145	Compliance,	Participants perceived their own likelihood of getting C-19 Risk Perception to be significantly lower than others; this relative private Anxiety optimism was strongly related to sense of agency and happiness.
[168]	China	673	Compliance,	Members of workforce reported a low prevalence of anxiety Anxiety, Stress, (3.8%), depression (3.7%), and stress (1.5%). Compliance with Depression safety measures was associated with less severe symptoms.
[234]	United Arab	1485	Anxiety,	Almost half of students reported anxiety levels from mild Emirates Other Consequences to severe, with females reporting higher anxiety scores, and medical students reporting lower anxiety than dental students.
[75]	China	584	Coping,	40.4% of young sample were prone to psychological Stress, problems, as they reported PTSD symptoms and Other Consequences negative coping strategies.

Table A8. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[270]	Italy	131	Anxiety,	Those with moderate/severe depressive symptoms Depression reported more helplessness, spent more than 3 h searching for C-19 information, perceived less adequate PPE and visited more infected patients.
[273]	China	5461	Anxiety, Stress,	People who were farthest from the epidemic Depression, of COVID-19 had generally lower scores for each Other Consequences variable (anxiety, depression, stress and sleep).
[86]	Jordan	381	Coping,	There was a significant inverse relationship between Other Consequences severe psychological distress and motivation for distance. The most common coping strategy among students was spending more time on social media.
[261]	USA	898	Anxiety	Loneliness, C-19 specific worries, and distress tolerance were significantly associated with anxiety.

Table A9. Main characteristics of the studies reviewed, pt.9. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[259]	India	159	Anxiety,	An increase in anxiety and stress scores Depression, during the two months of follow-up was found, Stress and also an increase in depressive symptoms.
[90]	USA	657	Compliance,	Positive screens for psychological symptoms were common; Other consequences 57% for acute stress, 48% for depressive, and 33% for anxiety symptoms. For each, a higher percent of nurses/advanced practice providers screened positive vs. attending physicians, though housestaff's rates for acute stress and depression did not differ from either.
[45]	Cyprus, Greece	100	Beliefs/	The findings showed conspiracy theories are widely Media Persuasion, believed even among highly educated individuals. Compliance, Conspiracy theory beliefs predicted science mistrust Other Consequences and unwillingness to adhere to public health measures. Psychological distress increased conspiracy beliefs.
[276]	Austria	902	Stress	Greater social connectedness during the lockdown was associated with lower levels of perceived stress, as well as general and COVID-19 specific worries. A negative relationship between fatigue and social connectedness was found (mediated by feelings of stress, general worries, and C-19 specific worries).
[49]	MTurk	704	Beliefs/	Social distancing intentions were positively Media Persuasion, predicted by horizontal collectivism, but only Compliance indirectly through lower feelings of powerlessness. Vertical individualism negatively predicted intentions to engage in social distancing, directly and indirectly through belief in C-19 conspiracy theories.
[46]	MTurk	660	Beliefs/	Participants perceived themselves and their loved ones Media Persuasion, as moderately/high at risk of contracting a serious illness. Stress C-19 conspiracy beliefs were strongly related to other measures of conspiracy belief; respondent's level of stress was unrelated to any of the conspiracy belief scales.
[113]	Iran	3727	Risk Perception	56.4% of participants were engaging in danger control processes and 43.6% in fear control processes.

Table A9. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[262]	Turkey	771	Anxiety,	86% patients with RD were unwilling to go to the Depression, hospital, while 22% discontinued their medications. Stress The frequency of anxiety (20%), depression (43%) and stress (28%) among patients with RD were found to be comparable to that among the teachers/academic staff, whereas significantly less than that among HCWs.
[70]	China	180	Anxiety, Stress,	Levels of social support for medical staff were Social Support, significantly associated with self-efficacy and sleep quality Other Consequences and negatively associated with the degree of anxiety and stress. Anxiety was significantly associated with stress, which negatively impacted self-efficacy and sleep quality. Anxiety, stress, and self-efficacy were mediating variables associated with social support and sleep quality.
[99]	South Korea	973	Beliefs/	Respondents' perceived risk of COVID-19 infection. Media Persuasion, The average perceived severity score was higher than Compliance, perceived susceptibility. Precautionary behaviors were Risk Perception associated with perceived risk and efficacy.
[315]	Spain	3109	Stress	Of the 1671 physicians who completed the survey, the highest psychosocial impact was perceived in Respiratory medicine and Geriatrics. Higher distress levels were found in the areas with the highest incidence of COVID-19.
[187]	Italy	2766	Anxiety,	There is an associations between sociodemographic variables, Depression, depression, anxiety, and stress levels during the C-19 outbreak. Stress Higher levels of negative affect and detachment were associated with higher levels of depression and anxiety.

Table A10. Main characteristics of the studies reviewed, pt.10. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[326]	MTurk	2734	Depression	Canada: 80.89% proportion of patients reporting worsening of their psychiatric condition; Pakistan: 72.41%; USA: 67.5%. Turkey had the lowest percentage: 28.57%. All scores were significantly ($p < 0.05$) higher in patients reporting worsening of psychiatric conditions.
[264]	Saudi Arabia	2081	Anxiety,	The prevalence of depression and anxiety among the Depression participants was 9.4% and 7.3%, respectively.
[288]	China	939	Stress,	Difference between occupations: teachers reported that Other Consequences their mental state improved for the specific question regarding fidgeting and not knowing what to do; after 2 weeks, medical staff and business managers reported increased anxiety, officials showed more anxiety and fear regarding the epidemic when compared with people with other occupations.
[309]	France	1771	Depression, Stress,	In total, 38.06% of the respondents had psychological distress. Other Consequences Sex, unemployment and depression were associated with it.
[9]	Turkey	1772	Other Consequences	Mental wellbeing was negatively associated with intolerance of uncertainty, rumination, and fear of C-19.
[103]	France	991	Compliance,	Conspiracy was positively correlated with the adoption Risk Perception of non-normative prevention behaviours, in contrast, no association was observed with the adoption of normative prevention behaviours. Furthermore, conspiracy was associated with a greater perception of risk of contamination of the French population, personal contamination, and risk of death.

Table A10. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[349]	Italy	192	Depression	The COVID-19 study group had significantly higher mean EPDS scores compared with the control group. Analysis of three EPDS subscales revealed significantly higher scores among the COVID-19 group compared with the control group for anhedonia and depression.
[229]	Poland	356	Anxiety	Persistent thinking about C-19 was associated with increased coronavirus anxiety and negative trauma effects. Anxiety served as a partial mediator in the link between persistent thinking about C-19 and negative trauma effects.
[121]	Nigeria	1500	Risk Perception	Higher risk perception was related to greater precautionary behaviour.
[215]	Bangladesh	505	Anxiety,	28.5% of the respondents had stress, 33.3% anxiety, Depression, 46.92% depression from mild to extremely severe, Stress according to DASS 21 and 69.31% had event-specific distress from mild to severe in terms of severity according to IES. Perceiving physical symptoms as COVID-19 was significantly associated with DASS stress, anxiety and depression subscales.
[100]	Germany	1055	Risk Perception	Individuals showed biases in their risk perception concerning overconfidence and the underestimation of exponential growth of infection cases in the early phase of the pandemic. Risk perceptions increased with perceived dread and tended to increase with perceived control over infection, the evaluation of scientific and own knowledge about the pandemic.
[314]	China	371	Stress,	1 month after the outbreak, the prevalence of PTSSs was Other Consequences 3.8% in HCWs. HCWs with higher exposure level also rated more hyperarousal symptoms. In summary, targeted interventions on sleep contribute to the mental recovery during the outbreak of COVID-19.

Table A11. Main characteristics of the studies reviewed, pt.11. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[125]	Poland	621	Compliance,	Loneliness was correlated with MHS and with affective response Risk Perception to COVID-19's threat to health. However, increased worry about the social isolation and heightened risk perception for financial problems was observed in lonelier individuals.
[157]	China	608	Compliance, Anxiety,	More respondents had state anxiety than trait anxiety. Depression was found among 27.1% of respondents. About 10.1% of respondents suffered from phobia. The three most commonly used prevention measures were making fewer trips outside and avoiding contact, wearing a mask, and hand hygiene.
[242]	India	291	Anxiety,	Of total sample analyzed, the overall prevalence of Depression, acute stress reaction, GAD and depressive symptoms Stress were 1.37%, 11.34%, 42.61% respectively.
[277]	Switzerland	1565	Stress,	The shows that worries about the individual, social, and Other Consequences economic consequences of the crisis, strongly boost stress. The infection rate in the zone of residence also contributes to stress. Positive thinking and perceived support mitigate worries and stress.

Table A11. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[257]	China	3611	Anxiety	The mean SAS score was significantly higher than that of the national norm, and there were still 557 students identified as anxious of different levels with the max score of 100, whom were from different provinces and at different grades with different majors.
[365]	China	3248	Other Consequences	3248 individuals were enrolled, and the score of psychological distress scale was 15 × 93 ± 6 × 99, the score of psychological help seeking was 82 × 34 ± 13 × 04.
[66]	France	4003	Social Support,	The effects of sociocultural variables on compliance are Compliance not mediated by psychosocial variables, but by cognitive ones.
[322]	China	3088	Stress	Using psychological stress as the dependent variable, authors found several predictors, including being female.
[312]	Turkey	451	Depression,	Having high level of stress or being pessimistic was Stress associated with more maladaptive psychological constructs.
[166]	India	121	Compliance,	Most of the children and adolescents were non-compliant, Other consequences quarantined ones experienced greater psychological distress.
[243]	UK	3097	Anxiety,	Mean scores for depression, stress and anxiety, and significantly Depression, exceeded population norms. Being younger and female, Stress was associated with all outcomes.
[320]	India	1106	Stress	One third of respondents had IES-R > 24.
[346]	China	500	Depression	The prevalence rate of mild depression was 29%, 12.8% for moderate, 6.2% for moderately severe, and 0.8% for severe.
[50]	UK,	950	Beliefs/	Participants high in national narcissism agreed USA Media Persuasion more strongly with COVID-19 conspiracy theories.
[311]	China	600	Stress	There was a significant negative correlation between perceived stress and resilience.
[228]	Pakistan	347	Anxiety,	Fear of C-19 was related to disgust sensitivity, Other Consequences anxiety sensitivity-related physical concerns, body vigilance, contamination cognitions and general distress.
[235]	South Korea	65	Anxiety,	32.3% of physical therapists had GAD-7 $\geq$ 5, indicating Depression presence of anxiety; 18.5% had PHQ-9 $\geq$ 10, indicating presence of depression.
[318]	Spain	878	Stress,	No significant group differences emerged in older adults' Other Consequences appraisals or COVID stress-related variables. Older adults experienced more gratitude and resilience.
[123]	USA	100	Risk Perception	Participants rated both the USA and European governments as somewhat unprepared for future outbreaks, they were less concerned with personally being infected but they perceived the disease as quite severe, they were very likely to get vaccinated.
[154]	USA	302	Compliance	Perceived norms were lower than individuals' own beliefs.

Table A12. Main characteristics of the studies reviewed, pt.12. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[181]	MTurk	3593	Compliance,	People with more social isolation or stress reported Stress more problems in relationships with their partner.
[253]	China	1620	Depression	279 students had social anxiety, and 102 students had depression. The following variables were found to be significant risk factors for social anxiety during home quarantine: deterioration of the parent-child relationship, increased conflicts with parents, irregular work and rest, and worrying more about being infected.
[57]	Poland	515	Stress,	Ego-resiliency and social support had a Social Support significant impact on the level of C-19 anxiety.
[53]	MTurk	404	Beliefs/	The sample was mildly inclined towards conspiracy ideation and Media Persuasion indicated a slight inclination towards rejecting science.
[366]	Germany	1609	Other Consequences	Neuroticism was associated with negative affect in daily life, paying more attention to information, and worrying more about one's own health.
[409]	Italy	1569	Other Consequences	Lower media exposure, higher worry, lower coping efficacy, lower trust in institutions, and negative attitudes toward quarantine measures predicted more mental health symptoms.
[402]	China	98	Other Consequences	Mental distress among participants was not very serious in general. C-19 survivors presented a highest score.
[64]	USA	437	Anxiety,	Greater negative C-19 experiences were associated with Depression, higher depressive symptoms, higher anxiety, Social Support and lower belongingness.
[151]	USA	3101	Compliance	Greater self-reported social distancing was linked to reporting that one can control C-19 via one's own behavior and greater self-reported hygiene practices.
[211]	China	631	Anxiety	Anxiety was correlated with the frequency of receiving negative news, current health situation and time spent on receiving information related to C-19.
[116]	MTurk	1657	Risk Perception,	As the pandemic evolved, people's perceived infection Compliance increased and they tended to respect social distance more.
[115]	Italy	1751	Risk Perception,	For psychological distance factors, a positive effect of risk Compliance perception emerged and was modulated by the type of humor.
[143]	UK	202	Anxiety,	Depression and anxiety were highly correlated with Depression, fight–flight–freeze system, and behavioural inhibition and system. Compliance.
[48]	Turkey	1088	Risk Perception,	Those who are less tolerant of uncertain situations were more Compliance, Beliefs/ likely to believe in conspiracy theories; these were positively Media Persuasion correlated with perceived risk, but negatively with compliance.
[236]	Italy	67	Anxiety,	No worsening of anxiety and depression Depression levels was found in MS patients.
[88]	MTurk	487	Coping	The increase of the adaptive coping strategies was associated with lower levels of fear, restlessness, and trouble relaxing.
[8]	Pakistan	398	Anxiety, Coping,	Most frequently coping strategies adopted by HCWs were Depression, religious coping, acceptance and coping planning. The Other Consequences prevalence of anxiety and depression were 21.4% and 21.9%.

Table A12. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[212]	USA	10,368	Anxiety,	Fear appears to be concentrated in regions with the highest Depression, reported COVID-19 cases. Greater fear correlates Other Consequences with anxiety and depression.
[188]	Turkey	451	Anxiety,	Individuals who were experiencing sleep problems during the Other Consequences COVİD-19 pandemic had higher levels of anxiety.
[348]	China	845	Depression	The prevalence of postpartum depression among women was 30%. Significant factors as concerns about contracting COVID-19 and certain precautionary measures were relevant.
[104]	Italy	932	Anxiety,	The mean compliance scores follow a hyperbolic-like curve, Risk Perception, decreasing over time for the lowest level of risk. Higher Compliance levels of anxiety and perceived risk were reported by women.

Table A13. Main characteristics of the studies reviewed, pt.13. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[287]	Lebanon	950	Stress	Quarantine started to cause PTSD symptoms during the second week, worsening in the fourth.
[364]	Spain	4180	Other Consequences	Results showed a high level of psychological distress, with a higher percentage in women and people of middle age.
[358]	Australia	673	Other Consequences	Results showed more presence of mental health outcomes for participants measured during C-19, compared to before C-19.
[286]	Slovenia	964	Stress	Educators' stress was negatively related to their ICT self-efficacy, attitudes about online education, and perceived support.
[4]	UK	12,090	Anxiety,	People showed statistically significant increases in mental Depression health problems (anxious and depressive symptoms).
[149]	Brazil	2056	Compliance	There was a significant difference among political partisan groups when it comes to attitudes toward social distancing.
[106]	Turkey	220	Other Consequences	Dispositional hope was negatively and moderately correlated with psychological health of adults. Psychological health was negatively associated with resilience and subjective well-being, and resilience had positive correlation with subjective wellbeing and preventive behaviours.
[36]	MTurk	851	Beliefs/	Higher levels of fatalism were associated with Media Persuasion lower behavioral intentions to support mitigation efforts; the optimistic message increased support for mitigation efforts relative to no message.
[112]	Italy	580	Risk Perception	The risk infection perception is higher in those regions where the number of confirmed cases is higher. C-19 outbreak emergency negatively affected psychological state and symptoms (separation distress, psychological symptoms), as well as the ability to cope with challenging times.
[74]	Italy	2053	Coping, Stress	The results suggest a characterization of people who are more vulnerable to experiencing high levels of stress during the COVID-19 pandemic.
[107]	Turkey	4536	Risk Perception,	Vulnerability, perceived risk, and fear can increase Other Consequences engagement in preventive behaviours during the pandemic.

Table A13. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[269]	Bangladesh	555	Anxiety, Stress,	Prevalence estimates of depression, anxiety and stress were Depression, 76.1%, 71.5% and 70.1% for at least mild symptoms, Other Consequences 62.9%, 63.6% and 58.6% for at least moderate symptoms.
[355]	Israel	761	Depression,	The Israeli Arabs reported a higher level of distress Other Consequences and a lower level of resilience and well-being.
[238]	China	846	Compliance,	Results demonstrated reciprocal negative associations Anxiety between anxiety and crisis management appraise.
[396]	China	803	Other Consequences	Exploratory analyses suggested that relatively extroverted individuals exhibited larger declines in social connection.
[232]	Pakistan	389	Anxiety,	A 43% prevalence of anxiety/depression among Depression frontline physicians of Pakistan was reported. Almost all the doctors had moderate/high knowledge score.
[323]	China	415	Stress	Overall, analysis of data on perceived stress and professional identity pandemic suggests that stress levels are inversely proportional to knowledge in effective ways of handling the pandemic.
[266]	China	1160	Anxiety,	Compared with general adults in some regions of China, Depression the scores of SAS and SDS were both significantly higher in pregnant women during the outbreak of COVID-19.
[345]	Pakistan	500	Depression,	Results specified a normal (65.9%), mild (9.10%), Other Consequences moderate (9.12%), and severe (15.90%) depression prevalence, and findings stipulated that anxiety disorder prevalence was higher than the depression disorder.
[128]	USA	1153	Risk Perception,	Differences in reported social distancing were mediated Compliance by divergent perceptions of health risk, explained by differences in self-reported knowledge of C-19 and perceived media accuracy in covering the pandemic.
[68]	New Zealand	1103	Social Support,	Broadly speaking, levels of trust, and Other Consequences attitudes toward the nation and government changed following lockdown.

Table A14. Main characteristics of the studies reviewed, pt.14. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[329]	MTurk	29,744	Depression,	The results show that participants' emotional Other Consequences experiences were characterized by love and hope, as well as feelings of anxiety and sadness.
[101]	China	1022	Depression,	Findings show that government emergency public information, Other Consequences detailed pandemic information, and positive risk communication had greater impact on protective behaviors.
[275]	China	4268	Stress	Results revealed that in all provinces of China, medical staffs scored significantly higher on all items of psychological stress than college students.

Table A14. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[160]	Switzerland	737	Compliance	Non-compliance, especially with hygiene-related measures, was more prevalent in males and in individuals with higher education, higher SES, and a non-migrant background.
[117]	MTurk	996	Risk Perception	Who felt more threatened by C-19 stockpiled more toilet paper. A predisposition towards Emotionality predicted the perceived threat and affected stockpiling behavior.
[146]	Brazil	715	Compliance	Results show a trend towards lower extroversion scores in the social distance group, and lower conscientiousness scores for the groups that considered that the containment measures were not essential.
[122]	MTurk	1142	Risk Perception, Anxiety,	Studies reveal that both realistic and symbolic threats Other Consequences predict higher distress and lower well-being.
[41]	USA	1182	Beliefs/	3 distinct clusters of psychological responses: Media Persuasion, informed, panic, and ignorant. Clusters Anxiety differed regarding their knowledge about the virus, C-19-related anxiety (i.e., worry and emotionality), and evaluation of the C-19 crisis's severity.
[230]	USA	474	Anxiety	Those in threat condition reported a higher likelihood that the prevalence of C-19 would increase in the future and also reported greater harm to the US from C-19.
[351]	China	5115	Depression	Participants who reported greater flow also reported more positive emotion, less severe depressive symptoms, less loneliness, and more healthy behaviors. Interactions with quarantine length were more consistent.
[96]	China	1346	Anxiety,	Significant correlations were found between anxiety Risk Perception, and perceived risk, positive affect and negative affect; Depression depression correlated with perceived risk, positive affect, negative affect and anxiety symptoms.
[399]	Brazil	592	Other Consequences	Wellbeing related to physical activity during quarantine was linked to an established routine of physical activity before the social isolation period.
[79]	China	117	Compliance	Psychological distress during the pandemic Risk Perception was associated with greater C-19-related catastrophizing, increased general health anxiety, greater support-seeking coping, but less use of problem-focused coping.
[185]	Turkey	318	Anxiety,	Female gender, living in urban areas and previous psychiatric Depression illness were found as risk factors for anxiety and depression.
[271]	Italy	1310	Anxiety,	During lockdown, sleep timing changed (people going to Depression, bed and waking up later), but also reporting a lower Stress, sleep quality, especially for those with a higher Other Consequences level of depression, anxiety and stress symptomatology.
[78]	Italy	1163	Coping, Stress,	The perceived impact on health was significantly higher Depression, in HCWs and in people living in northern Italy. A significant Risk Perception indirect effect of problem-oriented coping was found.
[184]	China	7236	Anxiety,	The prevalence of anxiety symptoms, depressive symptoms, Depression, and poor sleep quality were 35.1%, 20.1%, Other Consequences and 18.2%, respectively.

Table A15. Main characteristics of the studies reviewed, pt.15. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[69]	UK	45,109	Social Support,	Individuals with diagnosed mental illness, lower social Other Consequences support, and more worries had worse sleep quality.
[408]	China	484	Other Consequences	Females, young people, and those with higher fatigue and anxiety severity were more likely to experience insomnia.
[54]	China	182	Anxiety,	Chinese overseas students experienced a Social Support higher level of anxiety than the Chinese population.
[356]	USA	374	Depression	Factors associated with depression included: degree of C-19 interference with the treatment of cancer, and concern that patients will not receive the level of care needed.
[321]	India	100	Stress,	Female college students are severely affected by PTSD, Depression and present a correlation between depression and avoidance.
[390]	Japan	1148	Other Consequences	The number of workplace measures correlated positively with respondents' fear and worry, negatively with distress.
[89]	USA	1015	Coping,	The most common stressor is reading about the severity of Stress, C-19, uncertainty about length of quarantine and social Compliance distancing requirements. Most common coping strategies: distraction, active coping, and seeking emotional social support.
[95]	Qatar	405	Compliance,	87.3% of participants reported that they stay at home, Risk Perception 60.3% said that they maintain an adequate distance, and 73.5% believed that COVID-19 is a dangerous disease.
[16]	USA	464	Anxiety, Compliance,	Most of the people received information through TV, social Risk Perception, media, family and friends. Only 35.1% stated that they were Beliefs/ likely to contract C-19; nearly 38% did not consider Media Persuasion C-19 serious for themselves; 47.8% had high levels of anxiety.
[245]	Portugal	1280	Anxiety,	Severe depression and anxiety symptoms existed in 7.6% Depression and 9.1% of the sample.
[77]	USA	269	Coping,	Active coping, denial, use of emotional support, humor, Other Consequences religion, and self-blame were associated with wellbeing.
[94]	China	2640	Coping	Behavioral coping showed the highest level, and emotional coping the lowest.
[93]	Poland	353	Coping,	Most used strategies for coping with the stress generated Other Consequences by C-19 are: emotional support, planning, acceptance.
[71]	China	1588	Coping,	Suspected cases of C-19 had high psychological distress, Other Consequences, spent more time searching for information, they rarely Social Support used any coping style to deal with the stressor, and had less social support.
[138]	Norway	10,084	Compliance	Social distance may lead to self-isolation, that could cause severe consequences (feeling loneliness).
[133]	Turkey	204	Anxiety, Stress,	Perceived risk was significantly and positively correlated Depression, with coronavirus fear, depression, stress, and anxiety, Other Consequences and negatively associated with resilience.
[87]	China	534	Coping,	Coping strategies, strict protective measures, knowledge of Stress prevention and transmission, social isolation, and positive self-attitude resulted in less stress.
[313]	Turkey	475	Stress	C-19 stress had negative correlations with meaning in life and optimism, as well as positive associations with pessimism and depressive symptoms.

Table A15. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[308]	Ethiopia	374	Stress	3/4 of the sample rated their stress as moderate to high.
[256]	Australia	1491	Stress, Depression,	Negative changes in physical activity, sleep, smoking Anxiety, and alcohol intake were associated with higher Other consequences depression, anxiety and stress symptoms.
[263]	China	210	Stress, Depression,	The average score of the GAD-7 of all subjects was Anxiety at the level of moderate anxiety, while the average score of the PHQ-9 of them was at the level of mild depression.
[255]	Canada, USA	616	Anxiety, Depression	For depression, there were significant main effects of gender and health status.For anxiety, there were significant main effects of gender and health status.
[357]	China	232	Stress	22.4% HD patients and 13.4% PD patients had moderate or severe PTSS, which need psychological support. Both groups considered psychological support necessary.

Table A16. Main characteristics of the studies reviewed, pt.16. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[35]	Bangladesh	700	Beliefs/	Psychologically distressed participants showed more Media Persuasion negative attitudes toward winning over C-19 Other Consequences than participants with good mental health.
[72]	China	802	Coping	It was found that nurses' anxiety, fear, sadness, and anger was significantly higher than the emotional level of nursing college students.
[161]	USA	1070	Compliance,	Women adhere more to preventive behaviors than men. Anxiety During pandemics, policymakers may benefit from disseminating preventive health messages purposely tuned to motivate adherence by men.
[218]	Philippines	538	Anxiety	Respondents are suffering from moderate illness anxiety: symptoms of hypochondriasis, attitude on acquiring COVID-19, avoidance, and reassurance seeking behavior.
[254]	China	702	Depression,	Risk of severe depression in rst-line Stress staff was 6.63 fold; the risk of severe panic disorder was 2.62 fold higher than non-rst line group.
[152]	Bangladesh	350	Compliance	Better self-control ability, higher education and good mental health emerged as factors that significantly shaped the precautionary behaviors of young adults in this study.
[317]	MTurk	54,245	Stress	Higher levels of stress are associated with younger age, being women, being single, staying with more children, and living in collectivist cultures.
[124]	USA	2135	Risk Perception	US adult residents severely underestimated their absolute and relative fatality risk.
[150]	UK	2025	Compliance	All three COM-B components significantly predicted good hygienic practices, with motivation having the greatest influence on behaviour.

Table A16. *Cont.*

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[40]	Serbia	975	Compliance, Beliefs/	Significant association was found between Media Persuasion, educational level, gender, age and different variables Risk Perception of preparedness and various information variables.
[66]	France	2000	Compliance	Results show a high rate of compliance with the behavioral recommendations.
[6]	USA, Canada,	2065	Anxiety, Stress,	Cross-sectional findings indicated elevated anxiety Europe Depression and depressive symptoms associated with COVID-19 concern more strongly than epidemiological objective risk.
[352]	China	1951	Depression	Credibility of real-time updates and confidence in the epidemic control are associated with a decline in depression but an increase in happiness.
[25]	South America	600	Beliefs/	Our study identified that, although people reported Media Persuasion adequate knowledge by identifying expected symptoms and coronavirus transmission process.
[180]	Croatia	1854	Compliance	Parents, mothers especially, represent the most concerned group, regardless of age. People with chronic health conditions also expressed greater concern and safety behaviour than healthy participants.
[249]	Turkey	103	Anxiety,	Anxiety, hostility, and phobic anxiety were higher Depression in participants over the age of 29 years.
[37]	United Arab	2200	Beliefs/Media Persuasion,	Females, those who felt public fear as justifiable, Emirates Risk Perception, worried about C-19, intended to take the vaccine, Other Consequences, and smokers were all associated with anxiety. Anxiety
[403]	Mexico	2860	Other Consequences	There was a significantly higher level of fear in nursing and administrative personnel.
[239]	China	474	Anxiety, Depression,	Age had a curvilinear relationship with Other Consequences nonsomatic pain, depression, and anxiety.

Table A17. Main characteristics of the studies reviewed, pt.17. Main characteristics of the studies reviewed.

Ref	Country	Sample Size	Impacted Dimension	Main Findings
[411]	Cuba	772	Other Consequences	In the sample, on average, female participants experienced significantly greater fear of COVID-19 than men.
[214]	USA, UK,	218	Anxiety, Depression,	Contrary to expectations, depression, rumination, Canada Other Consequences and distress intolerance were at equivalent levels during the pandemic as they were at baseline.
[395]	China	30,861	Other Consequences	The results showed that there were significant differences in children's behavior scores in variables such as age, whether or not an only child and place of residence.
[170]	Iran	290	Compliance, Anxiety,	Fear of COVID-19 among pregnant women was significantly Depression, and positively associated with their psychological problems, Other Consequences with their husbands' psychological problems, with their and their husband's preventive COVID-19 behaviour.
[400]	Pakistan	250	Other Consequences	The psychological impact of quarantine ward on healthcare professionals has identified through six dimensions of PGWB, i.e., psychology effect; depression; negative well-being; lack of self-control; general health; vitality.
[233]	USA	5550	Anxiety, Stress,	Among all workers, anxiety, depression, Depression, and high work exhaustion were independently Other Consequences associated with community or clinical exposure to COVID-19.
[319]	India	586	Stress,	During the lockdown due to COVID-19, 1-in-2 Indian endodontists Other Consequences had distress, as measured by CPDI and 4-in-5 of them had perceived stress, as indicated by PSS.
[225]	Italy	18,147	Anxiety, Stress,	Quarantine was associated with PTSS, anxiety and ADS. Depression, Any recent COVID-related stressful life event Other Consequences was associated with all the selected outcomes.
[7]	Spain	3055	Anxiety, Stress,	Spanish consider the current COVID-19 health crisis Depression as fairly severe, and the majority felt that the COVID-19 crisis had greatly impacted on their daily life, including changes in their daily routines and cancellation of important activities.
[17]	Kurdistan	516	Beliefs/	Participants reported that social media has a significant impact Media Persuasion, on spreading fear and panic related to the COVID-19 outbreak Other Consequences in Iraqi Kurdistan, with a potential negative influence on people's mental health and psychological well-being.
[237]	Poland	317	Stress, Anxiety,	Analyses indicated that stronger basic hope and Beliefs/ higher levels of meaning in life and life satisfaction Media Persuasion correlate with lower state anxiety and stress.
[307]	MTurk	12,817	Depression,	Female gender, pre-existing psychiatric condition, Stress and prior exposure to trauma were identified as risk factors, whereas optimism, ability to share concerns with family and friends, positive prediction about COVID-19, and daily exercise predicted fewer psychological symptoms.
[283]	China	2027	Stress	The results showed rapid growth in the first 4 days, Other Consequences and then decreased in the last days, both in PTSD and in sleep-related problems.

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