

Review Paper

Iranian Adolescent Girls' Related-anxiety Factors During and Post-COVID-19: A Systematic Review Study




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ABSTRACT

Background and Objectives: During the COVID-19 pandemic, school closures, and home quarantine measures resulted in a myriad of mental health challenges for teenagers, notably heightened levels of stress and anxiety, with far-reaching implications. Against this backdrop, the current study identifies the factors associated with anxiety and fear among adolescent girls during both the COVID-19 pandemic and the subsequent post-pandemic period.

Methods: This study conducted a comprehensive review using related keywords, such as anxiety, fear, phobia, adolescent, teenager, teen, coronavirus, corona, and COVID-19. Specifically, articles with Iranian affiliations were investigated in PubMed, Science Direct, Google Scholar, and SID databases from July 19 to August 26, 2023.

Results: A comprehensive analysis of 16 studies revealed significant associations between various factors and the level of COVID-19 anxiety among teenagers. Specifically, factors such as effective communication skills, robust social support networks, mindfulness practices, resilience, and optimistic attitudes mitigated COVID-19 anxiety levels. Conversely, factors such as insomnia, excessive exposure to news updates, and prolonged periods of quarantine were associated with heightened COVID-19 anxiety levels among teenagers.

Conclusions: Adolescents have exhibited psychological vulnerability amidst the COVID-19 pandemic, particularly manifesting symptoms of anxiety and fear. The reviewed studies primarily focused on elucidating the associations between various factors and anxiety levels. Hence, future research endeavors are encouraged to delve into investigating efficacious methodologies fortifying these associations and bolstering beneficial factors. This approach is vital for averting the deleterious consequences of anxiety in the post-COVID-19 era.

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Introduction

The World Health Organization (WHO) officially declared the coronavirus disease 2019 (COVID-19) a global pandemic on March 11, 2020 [1]. This declaration precipitated a myriad of psychological, physical, and social challenges worldwide [2]. As a pivotal measure to mitigate the rampant spread of the disease, governments worldwide resorted to widespread school closures [3]. Surveys conducted during the COVID-19 pandemic underscored the profound impact of school closures and home quarantine on the physical and mental well-being of adolescents [4]. During periods of school closure, adolescents exhibited reduced physical activity levels, disrupted sleep patterns, and inadequate dietary habits [4]. The pandemic and associated school closures imposed a range of adverse outcomes, including diminished physical activity, feelings of confinement, fear of contagion, social isolation from peers, academic challenges, and increased familial tension [5]. Consequently, adolescents experienced heightened levels of anxiety stemming from COVID-19, leading to various maladaptive behaviors, such as obsessive-compulsive disorder, anorexia nervosa, and depression [6, 7].

A study conducted by Liang et al. (2020) comprising 548 adolescent students during quarantine revealed that 40% of them exhibited mental health issues, including post-traumatic stress disorder, depression, and psychological distress [8]. Consequently, the COVID-19 outbreak poses significant psychological stressors, potentially detrimental to students' learning and mental well-being [9].

Furthermore, reviews of studies conducted globally have highlighted the adverse psychological impact of COVID-19 beyond its mortality, with anxiety being a predominant issue [10]. Anxiety is characterized by heightened worry and agitation concerning potential future adversities [11]. Specifically, coronavirus anxiety arises from the uncertainties surrounding the COVID-19 infection, fostering cognitive ambiguity [12]. Zhang et al.'s investigation into anxiety prevalence among students during the COVID-19 outbreak reported a prevalence rate of 31.4% [13], underscoring the vulnerability of adolescents during this period of heightened stress and anxiety [14].

The elevated stress and anxiety experienced during quarantine and social isolation, compounded by the absence of peer interaction, contribute significantly to adolescents' psychological distress [15, 16]. Notably, re-

search by Cerván-Lavigne et al. demonstrated that girls experienced higher levels of anxiety compared to boys amidst the COVID-19 pandemic [17]. The abrupt transition to virtual learning and the unprecedented experience of a pandemic outbreak further exacerbated fear and stress among adolescents [18, 19].

Fear, defined as the response to an imminent threat or dangerous circumstances, is a prevalent emotion during the COVID-19 pandemic [20]. Studies indicate that fear of illness and death, coupled with disruptions to daily routines, can detrimentally affect adolescents' psychological well-being, contributing to increased anxiety and depression [21]. In a pandemic, such as the coronavirus, fear of illness and fear of death combined with the disruption of daily activities causes people to struggle with disease anxiety [22]. Pandemic viral infections can cause significant mental distress at the population level [23].

Given the pivotal role of adolescent girls in shaping future societal dynamics and the critical developmental stage of adolescence, particularly amidst the COVID-19 pandemic, identifying factors contributing to anxiety and fear in adolescent girls during both the pandemic and post-pandemic periods is imperative. The insights gleaned from this study hold promise for formulating preventive measures and interventions to mitigate mental health challenges and disorders among adolescent girls.

Methods

This is a systematic review study to explore factors associated with anxiety and fear among adolescent girls during the COVID-19 and post-COVID-19 periods in Iran. The research population comprises all scientific articles indexed in reputable databases that address this topic. The search encompassed international databases, such as PubMed, Science Direct, and Google Scholar, as well as Persian language databases, including the Scientific Information Database (SID). No time constraints were applied to ensure comprehensive coverage of relevant literature. To find related articles in English language databases, we used the following keywords: "Anxiety," "fear," "phobia," "adolescent," "teenager," "teener," "coronavirus," "corona," and "COVID-19." The keywords were used in combination via AND/OR mediators. The search strategy in the PubMed database was based on the following combination:

(Anxiety OR fear OR phobia) AND (adolescent OR teenager OR teener) AND (coronavirus OR corona OR COVID-19).

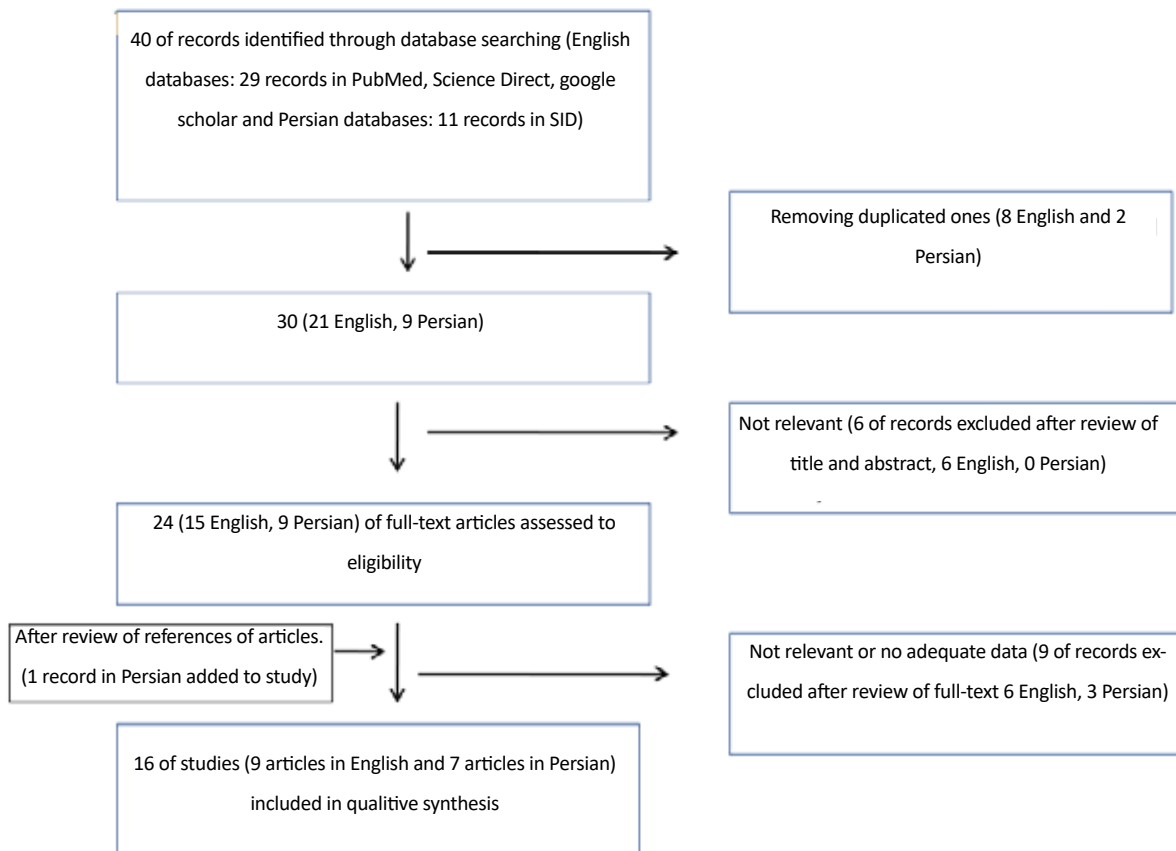


Figure 1. Process entering the studies into the current research

The keywords used to search in Persian databases included the combination of the words “anxiety,” “fear,” “youth,” “coronavirus,” and “COVID-19,” in multiples. Paper sources were not used because the articles published in the mentioned databases are more valid than theses that have not been written and access to internet resources is more possible than books and theses.

After searching, 19328 studies were obtained. Endnote information resource management software was used to organize the studies. At first, 18883 unrelated studies were removed by reviewing the titles of the articles. Subsequently, using the aforementioned software, and by reviewing the titles of the articles, 454 related studies were found, which were examined by the researchers by reviewing the abstracts of 40 articles. The process of entering studies into research is shown in [Figure 1](#). The inclusion criteria were published articles in Persian or English, conducting research in Iran, females as the target population of the article, having access to the full text of the articles, original research papers (including descriptive articles), and mentioning factors affecting

anxiety. Meanwhile, review articles and letters to the editor were not selected due to a lack of primary data.

By carefully studying the title and abstract of the articles that met the inclusion criteria by the researcher, a large number of the articles were eliminated due to their weak connection with the purpose of the study. If it was not possible to decide on the article after reading the title and abstract, the authors referred to the full text. Then, to ensure the recovery of all the documents, the list of sources of articles was also searched and a qualified study was added to the analysis. Several articles were excluded due to the disproportionate age range of samples and some due to a lack of investigation of anxiety factors or relation with the COVID-19 period.

After examining the purpose of the studies and inclusion criteria, 16 studies were evaluated in terms of quality by two researchers separately. The quality of these articles was evaluated using the strengthening the reporting of observational studies in epidemiology (STROBE) scale. This scale evaluates the articles in terms of the selection process, including representativeness

of samples, sample size, location and time of the study, sampling process, description of study design, inclusion, and exclusion criteria, definition of study variables, and description of tools, and examines the results (statistical analysis, demographic characteristics, and study results). Based on the STROBE scale, the articles are scored from 0 (the weakest) to 18 (the strongest). To preserve the data, the studies that had a score lower than the average score (<9) were considered low quality.

Results

In this study, a total of 16 eligible papers were systematically reviewed. The articles underwent rigorous evaluation using the STROBE checklist, as depicted in Table 1. The findings extracted from the reviewed articles about anxiety and fear among adolescent girls during both the

COVID-19 and post-COVID-19 periods are synthesized and presented in Table 2.

Discussion

The current research discerned the factors associated with anxiety and fear among adolescent girls during the COVID-19 pandemic and its aftermath. The study findings revealed a notable prevalence of anxiety among teenagers amid the COVID-19 outbreak. Factors contributing to this phenomenon include the developmental stage of adolescence, paternal occupation, limited knowledge about the disease, apprehension stemming from its unknown nature, diminished parental support, prolonged periods of quarantine, restricted autonomy of teenagers, and reduced social interactions with peers.

Table 1. Specifications and abstracts of the reviewed articles

Author (y)	Study Results	Demographic Characteristics	Statistical Analysis	Check Tool	Study Variables	Sample Size	Location/Time	Participants	Study Design
Fazeli et al. 2020 [24]	2	2	2	2	2	1	2	2	1
Sheikhi et al. 2022 [25]	2	1	2	2	1	2	2	2	2
Ghorbani et al. 2021 [26]	2	2	2	2	2	1	2	1	2
Khosrojerdi et al. 2022 [27]	2	0	2	2	2	1	2	2	2
Yazdani et al. 2022 [28]	2	2	2	2	2	2	2	2	2
Bahrami-Samani et al. 2022 [29]	2	2	2	2	2	2	2	2	2
Aref-Kashefi et al. 2022 [30]	2	0	2	2	1	1	2	1	2
Tofangchiha et al. 2022 [31]	2	2	2	1	2	1	2	1	2
Bigham Lal Abadi et al. 2022 [32]	1	0	2	2	2	1	2	2	2
Seyyedkalan et al. 2022 [33]	1	0	1	2	1	1	2	2	2
Torbatinezgad et al. 2023 [34]	1	0	2	2	1	1	2	2	1
Kazemi et al. 2020 [35]	2	0	2	2	1	1	2	2	2
Hekmatiyani Fard et al. 2022 [36]	2	1	2	2	1	1	1	2	1
Shomaliahmadabadi et al. 2021 [37]	1	0	2	2	2	1	2	2	2
Asanjarani et al. 2022 [38]	2	0	2	2	1	1	2	2	2
Eyni et al. 2021 [39]	0	0	2	2	1	1	2	2	2

Table 2. Review of the selected articles

Row	Author (y)	Title	Study Method	Age Range (y)	Study Tools	Findings
1	Fazeli et al. 2020 [24]	Depression, anxiety, and stress mediate the relationship between internet gaming disorder, insomnia, and quality of life during the COVID-19 outbreak	Cross-sectional	13-18	Depression, anxiety, and stress scale 21 (DASS-21)	Psychological distress (depression, anxiety and stress) is a strong mediator in the relationship between immunoglobulin D, insomnia, and quality of life.
2	Sheikhi et al. 2022 [25]	Prediction of psychological distress based on coronavirus anxiety and self-care among Iranian adolescents during the coronavirus epidemic	Descriptive-correlational	10-19	Coronavirus anxiety scale (CDAS)	Anxiety and self-care of coronavirus had a significant effect on psychological distress in Iranian adolescents during the COVID-19 epidemic. Coronavirus anxiety and self-care can predict approximately 17% of the variance in psychological distress.
3	Ghorbani et al. 2021 [26]	The relationship between physical activity and mental health in Iranian adolescents during the COVID-19 pandemic: An accelerometer-based study	Cross-sectional	15-17	Depression, Anxiety, Stress Scale 21 (DASS-21)	Moderate to vigorous motor activity was negatively associated with mental health issues, such as depression, anxiety, and stress. The majority of adolescents reported symptoms of mild to moderate mental health disorders.
4	Khosrowjerdi et al. 2022 [27]	Adolescents' COVID-19 anxiety: The relationship between personality strengths and family social support	Descriptive-correlational	Mean age=15.66	Coronavirus anxiety scale (CDAS)	Strengths of personality and family social support play an effective role in reducing the anxiety of COVID-19.
5	Yazdani et al. 2022 [28]	Stress symptoms in children and adolescents during the COVID-19 outbreak in Shiraz city, Iran: A cross-sectional study	Descriptive-analytical-sectional	4-18	Children's online self-reported stress symptoms questionnaire	25% of participants reported moderate to severe stress. The most common symptoms of stress in children and adolescents were worry, anger, and weakness. In addition, older children, first-child ones, and children living with both parents were more likely to be stressed.
6	Bahrami-Samani et al. 2022 [29]	Anxiety, depression, and predictive factors among Iranian students aged 8 to 18 in the first peak of COVID-19 outbreak	Descriptive-analytical-cross-section	8-18	Children's anxiety and depression inventory	Age, father's job, following COVID-19-related news, and infection-related nervousness were predictors of anxiety (11%). There was a significant relationship between the effect of quarantine on family communication and anxiety and depression. Quarantine makes parents and children spend a lot of time together and provides a great opportunity for better communication and parental support, which may be a reason to experience less anxiety and depression in students. This study shows an inverse relationship between safety precautions taken by individuals and anxiety or depression.

Row	Author (y)	Title	Study Method	Age Range (y)	Study Tools	Findings
7	Aref-Kashefi et al. 2022 [30]	The mediating role of self-esteem on the relationship between communication skills and anxiety in adolescents during the coronavirus pandemic	Descriptive-correlational	15-18	COVID-19 anxiety scale	Communication skills have a direct effect on anxiety and self-esteem caused by COVID-19, while self-esteem does not affect anxiety caused by COVID-19. Furthermore, self-esteem-mediated communication skills did not affect anxiety caused by COVID-19.
8	Tofangchiha et al. 2022 [31]	Relationship between fear of COVID-19, dental anxiety, and mental discomfort in Iranian adolescents	Cross-sectional	Mean age=15.28	COVID-19 fear scale-19 depression, anxiety, stress scale-21	High levels of fear of COVID-19 were associated with higher levels of dental anxiety and poorer oral health. In addition, fear of COVID-19 was positively associated with anxiety, depression, and stress. And dental anxiety plays a mediating role in the relationship between fear of COVID-19 and oral health.
9	Bigham Lal Abadi et al. 2022 [32]	The mediating role of mindfulness in the relationship between loneliness and anxiety of COVID-19 in adolescents during the COVID-19 epidemic	Descriptive - analytical	13-18	Coronavirus anxiety questionnaire	Mindful thinking can mediate COVID-19 anxiety and feelings of loneliness. Mindfulness in better coping in crises protects people from negative effects and can help in better mental health.
10	Seyyed Klan et al. 2022 [33]	The relationship between coronavirus anxiety and social support and its effects on academic motivation (case study: Sanandaj state sample)	Descriptive-correlational	--	Coronavirus anxiety scale	There is an inverse and significant relationship between COVID-19 anxiety and students' social support and academic motivation.
11	Torbatinezgard et al. 2023 [34]	The Relationship Between COVID-19 anxiety and academic isolation and cognitive skills of first high school students in Sarakhs City, Iran	Descriptive-correlational	--	Coronavirus anxiety inventory	There was a positive and significant relationship between COVID-19 anxiety and academic isolation and there was a negative and significant relationship between COVID-19 anxiety and cognitive skills.
12	Kazemi et al. 2020 [35]	The relationship between self-differentiation and COVID-19 anxiety in adolescents mediated by parent-child conflict	Descriptive-correlational	Average age=17.13 years	Coronavirus anxiety scale	Mother-child and father-child conflict resolution styles mediate the relationship between self-differentiation and COVID-19 anxiety in adolescents.
13	Hekmatiyan Fard et al. 2022 [36]	Investigating COVID-19 anxiety in adolescents of families affected by COVID-19: The moderating role of social support and resilience about psychological well-being	Descriptive-correlational	13-15	Coronavirus anxiety questionnaire	There is a negative relationship between the COVID-19 anxiety questionnaire and psychological well-being and resilience. There is a positive relationship between COVID-19 anxiety and social support.
14	Shomaliahmad-abadi et al. 2021 [37]	The role of COVID-19 anxiety, worry, and negative metacognitive beliefs in predicting learning anxiety in students in COVID-19 pandemic	Descriptive-correlational	Mean age=16.27	Coronavirus anxiety questionnaire	There is a significant positive relationship between worry, negative metacognitive beliefs, and COVID-19 anxiety with students' learning anxiety. Meanwhile, 28% of the variance in learning anxiety is predicted by COVID-19 anxiety, negative metacognitive beliefs and worry.

Row	Author (y)	Title	Study Method	Age Range (y)	Study Tools	Findings
15	Asanjarani et al. 2022 [38]	COVID-19 stress and internalizing problems in adolescents: The effect of optimism and pessimism	Cross-sectional	11-18	Coronavirus stress questionnaire	Optimism and pessimism mediate the impact of coronavirus stress on internalizing symptoms. COVID-19 stress significantly predicts internal problems through optimism and pessimism.
16	Eyni et al. 2021 [39]	Students' mental health during the coronavirus epidemic: The predictive role of coronary anxiety, cognitive distortion, and psychological hardiness	Descriptive-correlational	15-18	Coronavirus anxiety questionnaire	There was a significant negative relationship between students' mental health with COVID-19 anxiety and cognitive distortion and a significant positive relationship with psychological hardiness.

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The limited scientific knowledge surrounding the coronavirus has a significant impact on adolescent girls [40], who are more susceptible, which exacerbates their anxiety. The prevailing uncertainty and cognitive ambiguity associated with this virus contribute to widespread anxiety among teenagers. Fear of the unknown has historically been a catalyst for anxiety across human societies. Presently, the escalation of mental distress attributed to the proliferation of infectious diseases within society notably amplifies fear and anxiety levels. COVID-19 anxiety manifests as a physiological and psychological response when individuals perceive an imbalance between their capabilities and the demands imposed by the pandemic. This imbalance during the era of COVID-19 anxiety detrimentally affects adolescents' learning outcomes [34]. According to Belen et al. individuals' fears and anxieties surrounding their or their loved ones' susceptibility to the coronavirus prompt behaviors, such as social distancing, home confinement, feelings of isolation, and apprehension about the future, all of which can intensify psychological distress among teenagers [41].

In this context, Benke et al. conducted a study in Germany involving 4335 participants, among whom 75.8% were female and 24.2% were male, with an average age of 12.45 years. The results indicated a direct and indirect correlation between feelings of loneliness during the COVID-19 pandemic and anxiety. Given that social interactions, particularly those with peers, significantly influence mental well-being, younger individuals were more susceptible to mental health issues and were at a heightened risk of experiencing depression and anxiety due to quarantine measures [42].

Furthermore, in European nations, numerous young individuals reside independently, thereby exacerbating the disruption to their social interactions resulting from

staying at home. Research by Seyyedkalan indicated an inverse correlation between anxiety stemming from the coronavirus pandemic and students' academic motivation; specifically, lower levels of coronavirus-induced anxiety were associated with higher levels of academic motivation among students, and conversely. In a broader perspective, among the variables scrutinized, such as social symptoms, external and intrinsic motivation, and psychological symptoms, psychological symptoms exerted the most significant influence on coronavirus-related anxiety, while external motivation played the predominant role in shaping students' academic motivation [33].

The findings of this study align with the results of Tan, who investigated the impact of COVID-induced anxiety and online education on diminishing students' academic motivation [43], as well as Breneiser et al., whose research [44] similarly indicates a decline in students' motivation in online learning compared to traditional face-to-face instruction. The transition to virtual classrooms and remote learning has imposed significant challenges on educators, students, and their families [45, 46]. Moreover, research by Hiremath et al. and Omidvar et al. [47, 48] highlights that students are experiencing heightened levels of stress and anxiety, with COVID-related anxiety notably dampening their academic motivation.

One factor contributing to increased anxiety among teenagers is the lack of social support. Research suggests that lower levels of support from parents, teachers, and school administrators correlate with heightened anxiety related to the coronavirus [33]. For instance, Eyni et al.'s study underscores the relationship between perceived social support, a sense of coherence, and COVID-19-related anxiety among nurses, indicating that these factors

can predict individuals' responses to anxiety. Specifically, individuals develop a sense of coherence when they perceive that life events are manageable and resolvable, and recognize the availability of resources such as support from family, friends, and colleagues to cope with challenges. This sense of coherence empowers individuals to better navigate negative psychological states like anxiety amidst the backdrop of the coronavirus pandemic [39]. These findings align with prior research by Tan (2020) [43] and Özmete and Pak (2020) [49].

Another influential factor contributing to anxiety related to the coronavirus is individuals' level of mindfulness. Mindfulness entails directing focused and purposeful attention to the present moment, coupled with acceptance of thoughts and feelings without judgment [50]. Bigham Lal Abadi et al.'s findings suggest that individuals with higher levels of mindfulness, when exposed to COVID-19-related information, are better equipped to avoid dwelling on negative events compared to those with lower mindfulness levels. Consequently, these individuals may experience reduced rumination about the pandemic and lower levels of anxiety. Thus, adolescents who practice mindfulness and remain attuned to the present moment are less susceptible to the adverse psychological effects of the COVID-19 pandemic, including symptoms of anxiety and feelings of loneliness [32].

In their investigation, An et al. examined mindfulness, neuroticism, and depression among Chinese adolescents following a tornado incident. The study included 455 adolescents with an average age of 14 years, of whom 208(47.0%) were male. All participants had encountered the tornado, with nine being trapped and six sustaining injuries during its occurrence. Additionally, 78 of the participants' relatives or friends were trapped, and 80 of the participants sustained injuries as a result of their relatives or friends. A total of 27 relatives or friends of the participants lost their lives in the event. The findings suggest that individuals with elevated levels of mindfulness exhibit greater adaptability as they maintain awareness of both positive and negative occurrences in their surroundings, allowing them to respond more effectively to unfolding events in the present moment. Conversely, individuals may react involuntarily and impulsively to events rather than engage in deliberate, thoughtful responses [51].

In both investigations, the focal demographic consisted of teenagers, although the temporal context differed, with the An et al. study coinciding with a tornado incident [51]. Guo et al. conducted a study to explore the influence of social support on depression, anxiety,

and stress amidst the Chinese COVID-19 pandemic. Their findings revealed a negative correlation between low social support and mental health symptoms. Specifically, women received greater social support compared to men, leading to elevated levels of depression, anxiety, and stress symptoms among men [52]. Conversely, the Hafstad study, which examined symptoms of anxiety and depression among 3572 adolescents aged 13 to 16 in Norway, identified heightened levels of stress and anxiety among adolescent girls, with cultural disparities contributing to these outcomes. Additionally, the Hafstad study highlighted health disparities among adolescents in vulnerable groups during an epidemic, along with other factors influencing levels of COVID-19 anxiety, such as pre-existing mental health issues and residing in single-parent, low-income households [53].

Kazemi et al.'s findings suggest that adolescents who possess a greater degree of differentiation and an independent identity from their family are better equipped to assess situations, such as the COVID-19 epidemic, rationally and devise fundamental coping strategies [35]. Conversely, adolescents are highly attuned to psychological and social shifts due to their extensive interactions within their peer groups and the broader social sphere compared to their family members, as well as younger individuals like infants and children, thus forming intricate relationships with their peers [54]. Consequently, measures such as prolonged quarantine have engendered traumatic psychological repercussions, including confusion, anger, despair, financial distress, panic, anxiety, depression, and fear, affecting all demographic groups, particularly adolescents. Thus, post-COVID-19 efforts should prioritize fortifying familial bonds and mitigating psychological impacts by leveraging familial resources [35]. Additionally, Aref-Kashefi et al.'s findings indicate that enhancing communication skills is effective in alleviating coronavirus-related anxiety in teenagers, whereas improving self-esteem does not significantly impact such anxiety levels [30]. Given that most teenagers lack prior experience with contagious and severe illnesses during the COVID-19 era, they grapple with numerous psychological and physical challenges. Reviewed research underscores that anxiety and fear among teenagers correlate with diminished academic and social performance. Among the constraints of the present review, limited access to full-text articles hindered their inclusion in the review process. It is recommended to conduct descriptive studies on teenagers' fears and anxieties in the post-COVID-19 era within the country to identify vulnerable individuals and implement necessary psychological interventions with careful planning.

Conclusion

During adolescence, a pivotal stage in human development, teenagers exhibit heightened psychological vulnerability, particularly toward symptoms of anxiety and fear amid the COVID-19 pandemic. Various factors, such as effective communication skills, robust social support networks, mindfulness practices, resilience, and optimistic outlooks contribute to reducing COVID-19-related anxiety levels among teenagers. Conversely, factors including insomnia, excessive news consumption, and prolonged quarantine exacerbate anxiety levels in this demographic. Thus, it is recommended that mental health professionals develop comprehensive educational programs for families and schools, recognizing the significance of addressing this issue for the enhancement of adolescent social well-being and health in the post-COVID-19 era.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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Authors contributions

Conceptualization and writing the original draft: Fatemeh Nematian; Analysis: Fatemeh Edalattalab; Review, editing and final approval: All authors.

Conflicts of interest

The authors declared no conflict of interests.

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