Factors associated with anxiety and depressive symptoms among Indonesian adolescents during the COVID-19 pandemic: a cross-sectional study

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Abstract

Despite the conclusion of the pandemic, addressing mental health concerns during disasters remains crucial. Examining the impact of mental health issues in such contexts yields valuable insights for preventing future crises. This study aimed to examine the factors linked to anxiety and depression symptoms among Indonesian adolescents during the COVID-19 pandemic. This was a cross-sectional study. The study utilized an online survey collected from 738 participants from 34 provinces in Indonesia. The participants were asked to provide information on their demographics, social media exposure, self-rated health, GAD-7 scores, and the WHO-5 well-being index. The associations between participant characteristics and depression and anxiety were investigated using independent t-tests, ANOVA tests, and ordinal logistic regression. The majority of the participants were late adolescents, aged 18-21 years old (95%), and female (79.1%). Factors such as gender, self-rated health, and social media exposure were significantly associated with depression and anxiety among adolescents during the COVID-19 pandemic. Male adolescents had a higher risk of depression (OR=0.657, 95% CI=0.476-0.908), while infrequent social media exposure was linked to lower anxiety levels (OR=0.401, 95% CI=0.190-0.847). The study revealed that younger age, female sex, suspected COVID-19 infection, and excessive social media exposure were associated with higher levels of depression and anxiety. To manage depression and anxiety during and after pandemics, it is crucial to provide valid and reliable information and healthcare services, foster social connections, and create supportive environments in households and workplaces.

Introduction

On March 11, 2020, the World Health Organization (WHO) formally classified COVID-19 as a pandemic, leading to the global implementation of various social interventions, such as stay-at-home orders, quarantines, and social distancing guideline.[1,2] The COVID-19 virus, first detected in Wuhan, China, on December 31, 20191, has become a global health challenge, persisting in causing both health emergencies and mental health crises around the world. The pandemic had a greater impact on the most vulnerable groups, including youth, the elderly, low-income individuals, and people with comorbidities. Perhimpunan Dokter Spesialis Kedokteran Jiwa Indonesia (PDSKJI) found that the age groups experiencing the most psychological problems during the pandemic in Indonesia

included individuals aged 17–29 years and those over 60 years.[3–5] These measures have had a profound impact on the daily lives and routines of people of all ages, including adolescents, who are especially vulnerable during public health emergencies.[6] Adolescents are susceptible to mental health conditions, including internalizing disorders such as depression and anxiety, which can have enduring impacts on their physical and mental health and overall quality of life.[7] The COVID-19 pandemic has led to significant changes in circumstances that are known to influence mental health, such as daily routines, household finances, and social interactions. Regulatory laws and sudden changes have turned people's lives upside down, leaving them in shock.[8] These changes have presented increased difficulties for teenagers in establishing positive social connections beyond their immediate family.[9–11] During the initial stage of the pandemic in Indonesia, a research study found that adolescents faced a higher likelihood of experiencing mental health issues.[12–14] Furthermore, similar results from studies conducted in China have documented elevated levels of symptoms associated with anxiety and depression relative to rates reported prior to the pandemic,[15–17] while a longitudinal study of Australian adolescents found an increase in depression and anxiety symptoms during the pandemic[18]. On the other hand, a study conducted in Britain observed a rise in depressive symptoms among adolescents but did not report any significant changes in anxiety symptoms during the pandemic.[19]

Nevertheless, some other studies have found no significant changes in internalizing symptoms or even a reduction in the risk of anxiety among early adolescents during the pandemic.[20]

There is a possibility that individual-level factors, such as age and race/ethnicity, may contribute to the alterations in adolescent mental health from pre-pandemic to during the pandemic. It is, therefore, crucial to examine these factors as moderators to determine who is at the highest risk and in need of support.[21] Although initial cross-sectional studies suggested that older adolescents had higher levels of anxiety and depression symptoms compared to younger adolescents at the outset of the pandemic, it does not necessarily imply that older adolescents experienced greater changes in mental health symptoms during the pandemic than their younger counterparts.[15,16] It is possible that older adolescents had distinct experiences during the pandemic compared to younger adolescents, given that they tend to spend more time with their peers, which may have been complicated by pandemic-related restrictions. Furthermore, they may have had greater needs for autonomy and independence, which could have been affected by pandemic-related disruptions.[22,23]

Depression and anxiety symptoms are prevalent during public health crises and periods of social isolation, as evidenced by both the SARS and COVID-19 pandemics. Research has demonstrated that a substantial number of people experience such symptoms, including COVID-19 patients, frontline healthcare workers, and the general population. For adolescents, depressive and anxiety symptoms are linked to greater frailty and reduced well-being, potentially increasing their vulnerability to COVID-19. However, there is a lack of consensus regarding the prevalence of these symptoms among adolescents during the pandemic, with estimates varying widely.[24–26] Although the pandemic has come to an end, the significance of addressing mental health concerns during times of disaster remains crucial. Examining and understanding the impact of mental health issues in such contexts can provide valuable insights that contribute to the prevention of future crises. Therefore, the aim of this study was to examine factors related to anxiety and depression symptoms among Indonesian adolescents during the COVID-19 pandemic.

Research question

What factors are related to anxiety and depression symptoms among Indonesian adolescents during the COVID-19 pandemic, and how do these factors contribute to our understanding of addressing mental health concerns during times of disaster and preventing future crises?

Materials and Methods

Study design

The current study utilized a cross-sectional online survey design and recruited participants through snowball sampling, which involved distributing an online questionnaire to students who then shared it with their peers. This approach allowed for the collection of a varied and diverse sample for analysis.

Samples

The study population consisted of Indonesian adolescents aged between 11 and 21 years, who were willing to participate. Individuals with a history of mental health problems or diagnoses were excluded from the sample. The exclusion criteria allowed researchers to better isolate the potential impact of the COVID-19 pandemic on mental health symptoms, focusing their investigation on individuals without prior conditions. The optimal sample size was determined using G*Power 3.1, based on a correlation (p H1) of 0.15, an α error of 0.01, and a power of 0.95, minimizing the risk of errors22. As a result, the minimum sample size required was 693, but ultimately, 738 individuals completed the survey and provided comprehensive responses to all questions.

Instruments

Sociodemographic

Previous research has suggested that demographic factors, including gender, age, education, marital status, occupation, area of residence (urban or rural), and self-rated health status, can impact mental health outcomes. However, the relationship between these factors and mental health outcomes can differ depending on the individual's place of residence.[27] To account for the potential impact of demographic factors on mental health outcomes, this study collected information on various sociodemographic variables, including age, gender, and education level. Additionally, the study assessed the participants' exposure to COVID-19-related information on social media (less, sometimes, frequently), self-rated health status (healthy or good, unwell or sick, or not good), and history of exposure to COVID-19 patients (categorized as "ever" and "never"). It is worth noting that all sociodemographic questionnaires were provided in the Indonesian language.

Anxiety

The Generalized Anxiety Disorder Scale (GAD-7) was used to assess the anxiety level of the adolescents.[28,29] The researchers obtained permission to use the GAD-7 instrument for non-commercial data collection purposes in this study. The Indonesian version of GAD-7 was translated previously.[30] The GAD-7 is a tool that individuals can use themselves to assess the severity of their generalized anxiety symptoms. It consists of seven questions that assess different aspects of anxiety, including excessive worry, restlessness, irritability, and physical symptoms like sleep disturbances and fatigue. Respondents rated each item on a scale of 0 to 3, with higher scores indicating more severe symptoms. The

GAD-7 has established cut-off scores for mild, moderate, and severe anxiety symptoms. Studies have shown that it is a reliable and valid measure, with high sensitivity and specificity at a cut-off score of 10. The scale's internal consistency is also high, indicating that it consistently measures anxiety symptoms.

Depression

The assessment of depression in this study was conducted using the WHO-5 Well-Being Index, which comprises five items featuring positive language that indicates the presence or absence of well-being rather than depression symptoms.[24] The WHO-5 Well-Being Index is a self-administered questionnaire that measures well-being in individuals. The Indonesian version of the index was developed with the help of the Language Center of Universitas Andalas and was reviewed by an expert panel prior to the study. To test the validity and reliability of the index, it was administered to a group of 30 individuals who had the same criteria as the study participants. The index demonstrated good internal consistency, with a Cronbach's alpha coefficient of 0.864. Participants were asked to report positive feelings they experienced in the past two weeks using a 6-point scale. The severity of depression is indicated by the score generated, with higher scores indicating higher depression. The total score ranges from 0 to 25. The scale was modified to categorize the responses as never, rarely, sometimes, often, and always. Since no established cut-off score exists, the possible range of scores was divided into percentiles to provide categories of severe, moderate, mild, and minimal or no depression. A score of ≤11 indicates severe depression, 12-13 indicates moderate depression, 14-15 indicates mild depression, and ≥16 indicates minimal or no depression.

Data collection

The research study was conducted over a period of three months, from February to April 2020. To collect research data, the present study employed snowballing technique with online questionnaires distributed through popular social media platforms, such as WhatsApp, Facebook, and Instagram. This approach was chosen since it provides access to hard-to-reach populations, leverages existing social networks, is convenient and cost-effective for online surveys, and can explore hidden or understudied groups. In this context, it allows the research to tap into a diverse sample of Indonesian adolescents who may have experienced mental health issues during the COVID-19 pandemic, making it a practical and efficient choice for the study.

The survey was initially disseminated through student groups, and participants were encouraged to share it with their social media networks. The study followed ethical guidelines by obtaining informed consent from participants before they filled out the online questionnaire on the Google form. Those aged between 11 and 21 years were eligible if they obtained parental consent and agreed to the terms on the consent page. The study's objectives, procedures, and administrative aspects were clearly explained to all participants. A total of 738 participants from 34 Indonesian provinces willingly participated and provided information on their demographics, social media exposure, self-rated health, GAD-7 scores, and the WHO-5 well-being index. Participants had the right to withdraw from the study at any time without providing a reason.

Data analysis

The data collected in this study underwent statistical analysis using IBM SPSS Statistics software version 22.0 (IBM Corp., Armonk, N.Y., USA). The normality assumption of continuous variables was confirmed through the Kolmogorov-Smirnov test, indicating that the data followed a normal distribution. To summarize the data, descriptive statistics, including frequencies, percentages, means, medians, minimum and maximum values (min-max), and standard deviations (SD), were employed. Furthermore, the relationship between participants' characteristics and depression and anxiety was examined using independent t-tests and ANOVA tests. Subsequently, a stepwise ordinal logistic regression analysis was conducted to identify the variables that influenced depression and anxiety. The Brant test was used to assess the proportionality assumption, and the model's performance was evaluated using the Hosmer test for goodness of fit. The statistical significance level was set at $p<0.05$.

Ethical consideration

Informed consent was obtained from all adult human participants and their parents or legal guardians. Additionally, informed assent was obtained from the adolescents, ensuring their understanding and agreement to participate. The Research Ethics Committee of the Faculty of Medicine, Universitas Andalas (Approval number: 280/KEP/FK/2020), has approved this research.

Results

Characteristics of the participants

The study involved 738 participants. The majority of the participants were late adolescents aged 18-21 years old (n=701, 95%). Additionally, most of the participants were female (n=584, 79.1%) and had a high school background (n=720, 97.6%). The researchers also collected data on the participants' exposure to COVID-19. The majority of the participants reported having a good self-rated health status (n=707, 95.8%), frequently being exposed to COVID-19-related information on social media (n=407, 55.1%), and having been exposed to COVID-19 patients (n=730, 98.9%). This information is presented in Table 1.

Anxiety description among adolescents during COVID-19 outbreak

Table 2 presents the GAD-7 item descriptors. There were 7 questions included in the study to measure the anxiety level of the participants. Item 1 had a mean score of 0.97 (SD=0.52) and indicated that the majority of adolescents felt nervous, anxious, or on edge on several days (77.9%). Item 2 obtained a mean score of 0.80 (SD=0.60) and showed that the majority of adolescents were not able to stop or control worrying for several days (63.7%). Item 3 had a mean score of 0.89 (SD=0.58) and indicated that the majority of adolescents worried too much about different things for several days (67.9%). Item 4 had a mean score of 0.73 (SD=0.65) and indicated that the majority of adolescents experienced difficulty in relaxing for several days (54.9%). Item 5 had a mean score of 0.54 (SD=0.64) and showed that the majority of adolescents did not experience being so restless that it was hard to sit still (52.6%). Item 6 had a mean score of 0.97 (SD=0.70) and indicated that the majority of adolescents became easily annoyed or irritable for several days (60.6%). Lastly, Item 7 had a mean score of 0.99 (SD=0.64) and showed that the majority of adolescents felt afraid, as if something awful might happen for several days (68.4%).

Depression description among adolescents during COVID-19 outbreak

Furthermore, there were 5 questions included in the study to measure depression. Item 1 had a mean score of 2.74 (SD=0.80) and indicated that the majority of adolescents felt cheerful and in good spirits most of the time (45.3%). Item 2 obtained a mean score of 2.72 (SD=0.84) and showed that the majority of adolescents felt cheerful and in good spirits most of the time (45.7%). Item 3 had a mean score of 2.60 (SD=0.83) and indicated that the majority of adolescents sometimes felt active and vigorous (39.6%). Item 4 had a mean score of 2.69 (SD=0.92) and showed that the majority of adolescents woke up feeling fresh and rested most of the time (41.5%). Lastly, item 5 had a mean score of 2.43 (SD=0.92), indicating that the majority of adolescents reported that their daily life had been filled with things that interested them at times (40.2%) (Table 3).

Anxiety and depression among adolescents during COVID-19 outbreak

Table 4 presents the descriptive statistics for anxiety scores, including the mean and standard deviation. Based on the results, the mean depression score in adolescents was 13.18 (SD 3.45), and the mean anxiety score was 5.88 (SD 3.01). The majority of the respondents (73.6%) reported experiencing depression during the COVID-19 outbreak. Among those respondents, 24.8% reported symptoms of mild depression, 19.4% reported moderate depression, and 29.4% reported severe depression. Additionally, most respondents experienced mild levels of anxiety (47.4%), while 314 (42.5%) respondents did not experience significant anxiety.

Related factors of depression and anxiety among adolescents during COVID-19 outbreak

Table 5 presents findings that demonstrate a statistically significant link ($p<0.05$) between anxiety and variables such as age, gender, and exposure to social media. However, no discernible connection was observed between anxiety and other factors like self-rated health, exposure to COVID-19 patients, and education ($p>0.05$). Moreover, Table 5 reveals a statistically significant correlation ($p<0.05$) between depression and both gender and social media exposure. Nevertheless, no noticeable relationship

Table 1. Description of participant characteristics (n=738).

Characteristics	f (%)
Age, in years	
11-14 (early adolescent)	3(0.4)
15-17 (middle adolescent)	34(4.6)
18-21 (late adolescent)	701(95.0)
Gender	
Male	154(20.9)
Female	584(79.1)
Self-rated health	
Good	707(95.8)
Not good	31(4.2)
Exposure to COVID-19 patients	
Never	8(1.1)
Ever	730(98.9)
Social media exposure	
Never	2(0.3)
Rarely	32(4.3)
Sometimes	146(19.8)
Often	407(55.1)
Always	151(20.5)
Education	
High school	720(97.6)
College	18(2.4)

Table 2. Description of anxiety among adolescents during COVID-19 outbreak.

Over the last two weeks, how often have you been bothered by the following problems?	Mean ± SD f (%)	No at all f (%)	Several days f (%)	More than half the days f (%)	Nearly every day f (%)
Feeling nervous, anxious, or on edge	0.97±0.52	100 (13.6)	575 (77.9)	49 (6.6)	14 (1.9)
Not being able to stop or control worrying	0.80±0.60	214 (29.0)	470 (63.7)	43 (5.8)	11 (1.5)
Worrying too much about different things	0.89±0.58	163 (22.1)	501 (67.9)	65 (8.8)	9 (1.2)
Trouble relaxing	0.73±0.65	273 (37.0)	405 (54.9)	48 (6.5)	12 (1.6)
Being so restless that it is hard to sit still	0.54±0.64	388 (52.6)	308 (41.7)	32 (4.3)	10 (1.4)
Becoming easily annoyed or irritable	0.97±0.70	171 (23.2)	447 (60.6)	94 (12.7)	26 (3.5)
Feeling afraid, as if something awful might happen	0.99±0.64	134 (18.2)	505 (68.4)	75 (10.2)	24 (3.3)

Table 3. Description of depression among adolescents during COVID-19 outbreak.

Over the last two weeks, how often have you been bothered by the following problems?	Mean ± SD f (%)	At no time f (%)	Rarely f (%)	Sometimes f (%)	Most of the time f (%)	All of the time f (%)
I have felt cheerful and in good spirits	2.74±0.80	2 (0.3)	35 (4.7)	241 (32.7)	334 (45.3)	126 (17.1)
I have felt calm and relaxed	2.72±0.84	5 (0.7)	47 (6.4)	223 (30.2)	337 (45.7)	126 (17.1)
I have felt active and vigorous	2.60±0.83	3 (0.4)	52 (7.0)	292 (39.6)	281 (38.1)	110 (14.9)
I woke up feeling fresh and rested	2.69±0.92	5 (0.7)	76 (10.3)	208 (28.2)	306 (41.5)	143 (19.4)
My daily life has been filled with things that interest me	2.43±0.92	10 (1.4)	96 (13.0)	297 (40.2)	238 (32.2)	97 (13.3)

was found between depression and other variables such as age, self-rated health, exposure to COVID-19 patients, and education (p>0.05). Additionally, Table 6 highlights variations in participant characteristics across different categories of depression, while Table 7 demonstrates differences in participant characteristics across categories of anxiety.

According to the results of the multivariable analysis, several factors were found to be significantly associated with depression among adolescents during the COVID-19 pandemic. Specifically, variables such as gender, self-rated health, and social media exposure showed a significant relationship. The analysis revealed that the risk of higher depression was 0.657 times (OR=0.657, 95% CI=0.476-0.908) higher among male adolescents compared to their female counterparts. Conversely, adolescents with good self-rated health were 0.439 times (OR=0.439, 95% CI=0.220-0.876) less

Table 4. Anxiety and depression level among adolescents during COVID-19 outbreak.

Variables	f (%)	Mean (SD)
Depression		13.18 (3.45)
No depression	195 (26.4)	
Mild	183 (24.8)	
Moderate	143 (19.4)	
Severe	217 (29.4)	
Anxiety		5.88 (3.01)
No anxiety	314 (42.5)	
Mild	350 (47.4)	
Moderate	66 (8.9)	
Severe	8 (1.1)	

Table 5. Personal characteristics and relationships with the anxiety and depression.

Characteristics	Anxiety Mean±SD	t	F	p	Depression Mean±SD	t	F	p
Age, in years			3.791	0.023*			0.896	0.409
11-14 (early adolescent)	3.67±2.08				15.67±3.78			
15-17 (middle adolescent)	7.12±3.86				13.44±3.16			
18-21 (late adolescent)	5.83±2.95				13.15±3.46			
Gender		-2.315		0.021*		2.232		0.026*
Male	5.38±3.36				13.73±3.58			
Female	6.01±2.90				13.03±3.40			
Self-rated health		-1.746		0.081		1.780		0.075
Good	5.84±2.98				13.22±3.45			
Not good	6.81±3.49				12.10±3.29			
Exposure to COVID-19 patients		-0.596		0.551		-1.071		0.284
Never	5.25±3.69				11.88±4.01			
Ever	5.89±3.00				13.19±3.44			
Social media exposure			3.048	0.017*			4.248	0.002*
Never	4.00±5.65				15.00±7.07			
Rarely	4.41±2.89				14.78±3.20			
Sometimes	6.22±3.01				12.42±3.38			
Often	5.78±2.90				13.15±3.32			
Always	6.17±3.01				13.60±3.72			
Education		0.386		0.700		-0.333		0.739
High school	13.17±3.47				13.17±3.47			
College	13.44±2.85				13.44±2.85			

t, t-test; F, one-way ANOVA, *Statistically significance (p<0.05).

Table 6. Results of ordinal logistic regression on the association between variables of interest and depression of respondents during COVID-19.

Variables	Categories	Depression OR	95% CI for OR Lower	Upper	p
Age	Continuous	1.005	0.898	1.126	0.923
Gender (reference: female)	Male	0.657	0.476	0.908	0.010*
Education (reference: college)	High school	1.287	0.573	2.892	0.554
Exposure to COVID-19 Patients (reference: never)	Ever	3.223	0.696	14.920	0.134
Self-rated health (reference: not good)	Good	0.439	0.220	0.876	0.019*
Social media exposure (reference: always)	Never	0.479	0.026	8.869	0.621
	Rarely	0.711	0.357	1.419	0.334
	Sometimes	1.895	1.249	2.876	0.003*
	Often	1.442	1.030	2.019	0.033*

Parallel line test (p=0.105). Goodness of fit test of overall model: Deviance (Chi-Square=247.828, df=234, p=0.255). ***p<0.001; **0.001<p<0.01; *0.01<p<0.05.

likely to experience depression compared to those with a poorer health status. Furthermore, adolescents who were sometimes and often exposed to social media content related to COVID-19 had 1.895 times (OR=1.895, 95% CI=1.249-2.876) and 1.442 times (OR=1.442, 95% CI=1.030-2.019) a higher likelihood of experiencing depression, respectively, compared to those who had exposure every day.

Another finding indicated that several factors were significantly associated with anxiety among adolescents during the COVID-19 pandemic, including gender and social media exposure. The analysis demonstrated that the risk of higher anxiety was 0.657 times (OR=0.657, 95% CI=0.476-0.908) higher among male adolescents compared to females. Additionally, adolescents who had infrequent exposure to social media content related to COVID-19 were 0.401 times (OR=0.401, 95% CI=0.190-0.847) less likely to experience anxiety compared to those who had daily exposure.

Discussion

The sample group mostly consisted of females aged between 18 and 21 years old, which is consistent with previous studies conducted in Indonesia. These studies also found that individuals who experienced psychosocial effects of the pandemic were mostly female,[12,31,32] despite the fact that the latest national census shows an equal distribution between both sexes.[33] This study did not adhere to specific data collection standards, although the results are consistent with previous research,[34,35] Furthermore, the accessibility of the internet may have exposed the respondents to a vast amount of COVID-19 information from online sources such as social media and online news portals, which may have contributed to the observed levels of mental health problems. In some studies in China, frequent and prolonged social media exposure during the COVID-19 pandemic was found to be strongly associated with anxiety and depression.[36]

The research findings indicate that middle adolescents were more likely to experience significant anxiety during the COVID-19 pandemic. This is consistent with previous studies on the topic, which also found that younger populations, especially adolescents, were more prone to depression and anxiety.[32,37] The increased depression and anxiety among adolescents are related to disruptions in their daily routines, such as transitioning to an online learning or work environment, as well as concerns about their future plans and financial stability. Additionally, the frequent use of social media by adolescents may lead to information overload and misinformation, further exacerbating depression and anxiety.[27]

This study found that a small percentage of the participants, specifically 4.3%, experienced significant anxiety during the COVID-19 pandemic. In contrast, the majority of the respondents, 73.6%, reported experiencing depression during the outbreak. These results differ from previous studies conducted before the pandemic, including national data from Indonesia Basic Health Research in 2018, which reported that 9.8% had mental and emotional problems.[38] Conversely, our proportion was higher than the global prevalence of anxiety reported by WHO, which was 3.6%.[39] In comparison to other pandemics in different countries, the prevalence of anxiety in our study was relatively lower. A study[40] revealed that the prevalence of anxiety during an infectious disease outbreak was 14.8%. In addition, the prevalence of anxiety among people in isolation during an infectious disease outbreak in Korea was approximately 7.6%. Furthermore, our findings show that the prevalence of anxiety was relatively lower than in other countries such as China and Turkey, which reported anxiety prevalence rates of 35.1% and 45.1%, respectively.[41–43] The observed disparity in anxiety prevalence may be explained by differences in the timing of the study and the national situation of the COVID-19 pandemic.

This study investigated various factors that may contribute to anxiety and depression in adolescents. Multivariable analysis showed that predictors contributing to depression in adolescents were gender, self-rated health, and social media exposure. Furthermore, predictors contributing to anxiety in adolescents were gender and social media exposure. The results of this study indicate that female participants had a higher level of depression and anxiety compared to males. This finding is consistent with the results of a previous study,[32] which also found that young females experienced higher levels of depression and anxiety than males. It is well-known that females have a higher susceptibility to depression and anxiety compared to males due to various factors, including biological factors such as sex chromosomes and hormonal exposure, as well as social factors.[44–47]

This study's results also extend the findings of an earlier study, which observed a link between lower self-rated health levels and the development of depression and anxiety in a population-based group.[48] Additionally, another study revealed that self-rated health

Table 7. Results of ordinal logistic regression on the association between variables of interest and anxiety of respondents during COVID-19.

Variables	Categories	Anxiety			
		OR	95% CI for OR		p
			Lower	Upper	
Age	Continuous	0.892	0.786	1.013	0.077
Gender (reference: female)	Male	0.691	0.487	0.980	0.038*
Education (reference: college)	High school	1.021	0.408	2.553	0.964
Exposure to COVID-19 patients (reference: never)	Ever	0.930	0.221	3.913	0.921
Self-rated health (reference: not good)	Good	0.536	0.270	1.063	0.074
Social media exposure (reference: always)	Never	0.446	0.027	7.379	0.573
	Rarely	0.401	0.190	0.847	0.017*
	Sometimes	0.826	0.530	1.288	0.400
	Often	0.721	0.502	1.034	0.076

Parallel line test (p=0.003). Goodness of fit test of overall model: Deviance (Chi-Square=197.344, df=234, p=0.961). *Statistically significance (p<0.05).

could effectively identify individuals at a higher risk of depression and anxiety.[49,50] As stated by the WHO, three factors are associated with increased depression and anxiety during the COVID-19 outbreak. Some of the mental disorders experienced by adolescents include feelings of loneliness, anxiety, stress, psychiatric disorders, and emotional disturbances.[51] These factors include fear of infection, misinterpretation of bodily sensations, and exposure to news and misinformation from untrustworthy sources. Continuous coverage of COVID-19 news is available through various media platforms such as newspapers, television, radio, and social media. Additionally, individuals have a tendency to seek out information about the ongoing crisis to stay informed, particularly during times of emergency. Most of the respondents stated that they often had exposure to COVID-19-related information on social media.[52–55]

As COVID-19 nears its end, the research findings maintain their relevance. They emphasize the continued need for mental health support, even as the pandemic wanes, and highlight the importance of preparedness for future health crises. Gender-specific approaches in public health and mental health policies are underscored. These implications extend beyond the pandemic, emphasizing ongoing mental health care, readiness for emergencies, and tailored support for various populations in public health contexts.

The results of this study also have broad implications for the formulation of public policies to address not only the current but also future pandemics. The heightened prevalence of depression observed during the pandemic underscores the importance of ongoing and effective measures to support vulnerable groups, with a particular focus on adolescents, females, and those with excessive social media exposure.

These findings highlight the need to ensure that individuals have reliable access to information and healthcare services to prevent mental health problems both during and after pandemics. Policymakers should take these insights into account and implement policies that facilitate such access to a wider population, thereby enhancing the generalizability and applicability of these findings to various public health contexts.

Conclusions

In conclusion, this study emphasizes the continued importance of addressing mental health issues post-pandemic. Insights gained here can inform strategies to prevent future crises and enhance mental well-being. Factors such as age, gender, suspected COVID-19 infection, and social media exposure are linked to higher rates of depression and anxiety. Policymakers should prioritize accurate information, healthcare access, and supportive environments. More research is needed to explore anxiety in digitally underserved populations and across diverse age groups. Monitoring the long-term impacts of the COVID-19 pandemic on mental health remains crucial.

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