Knowledge, attitudes, practices and immediate psychological responses - its associated factors during the initial stage of the COVID-19 pandemic – an epidemiological survey

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Abstract

As a result of the emergence of the Coronavirus Disease 2019 (COVID-19) outbreak caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection in the Chinese city of Wuhan, a situation of socio-economic crisis and profound psychological distress rapidly occurred worldwide. Various psychological problems and important consequences in terms of mental health, including stress, anxiety, depression, frustration, and uncertainty during the COVID-19 outbreak, emerged progressively. The COVID-19 outbreak has a widespread impact on the economy, psyche, and daily living of the public. The pandemic situation of COVID-19 had one of the most challenging impacts on education in our nation's history. The study aimed to gather comprehensive data on how the COVID-19 lockdown and its effects have affected students' overall well-being and mental health. By assessing their knowledge, attitude, and preventive practices towards the virus, as well as evaluating the psychological impact, such as fear, depression, and anxiety, we can gain valuable insights into the challenges faced by students during this unprecedented time.

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Introduction

A novel coronavirus, 2019-nCoV, emerged in Wuhan, China, at the end of 2019.[1-2] The term coronavirus was coined in 1968 due to the presence of crown-like morphology-based electron microscopic studies. It was characterized by the International Committee on the Taxonomy of Viruses as belonging to the family "Coronaviridiae", under the order "Nidovirales", in 1975.[3] The Middle East Respiratory Syndrome Coronavirus (MERS-CoV) outbreak in 2012 and the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) outbreak in 2002 are the two outbreaks of coronaviruses that have affected humans in the past 20 years.[4] This third coronavirus appearance has put public health organizations around the world on high alert.

According to the World Health Organization (WHO), COVID-19 is the fifth pandemic in the last ten decades. SARS-CoV-2 has traveled the world on 213 international flights and 2 foreign conveyances.[5] The rapid spread of the virus has led to widespread travel restrictions and lockdown measures in many countries. On January 24, 2020, at least 830 cases had been diagnosed in 9 countries: China, Thailand, Japan, South Korea, Singapore, Vietnam, Taiwan, Nepal, and the United States.[6] Although the origin and ability to spread among humans are unknown, an increased number of cases have been reported from human-to-human transmission.[7] The global response to COVID-19 has highlighted the need for improved international cooperation and preparedness in dealing with future pandemics.

Many psychological problems and important consequences in terms of mental health, including stress, anxiety, depression, frustration, and uncertainty during the COVID-19 outbreak, emerged progressively.[8,9] Common psychological reactions related to the mass quarantine, which was imposed to attenuate the COVID-19 spread, are generalized fear and pervasive community anxiety, which are typically associated with disease outbreaks and increased with the escalation of new cases together with inadequate, anxiety-provoking information which was provided by media.[10,11] The COVID-19 outbreak has a widespread impact on the economy, psyche, and daily living of the public.[12] The pandemic situation of COVID-19 makes it one of the most challenging outbreaks in education for educators and students in the history of

our nation.[13,14] In accordance with this, the current study was designed to assess mental health, fear, depression, and anxiety by analyzing knowledge, attitude, preventive practices, and psychological effects of the COVID-19 lockdown and its complex effects on student education.

Study design

Using a paper-based, English-language questionnaire document, a survey was carried out with 50 study participants to assess the public's knowledge, attitudes, practices, and immediate psychological effects during the COVID-19 pandemic (*Appendix 1*).

Survey measurements

Parts I and II of the entire study were planned, and the questionnaire document covered all of this information. The first section of the questionnaire comprised personal demographic questions about age, gender, education level, place of residence, occupation, marital status, and household size. Four psychometric scales were used to evaluate the psychological conditions during the COVID-19 pandemic, and all the parameters were mentioned in the questionnaire document. The remaining three sections covered knowledge and its sources, attitudes, and practices.

A five-item questionnaire was used to gauge students' knowledge of COVID-19. Of the questions, three addressed the clinical features of the illness (*i.e.*, primary symptoms, availability and efficacy of treatment, and severity); the other two addressed transmission (*i.e.*, infection through animal contact and transmission through respiratory droplets); and the final item addressed prevention and control (*i.e.*, wearing medical masks for prevention). All respondents had the option to say "Yes," "No," or "Don't know." Each right response on the knowledge test was worth one point, and the total score was determined by adding up the points; higher scores denoted a greater understanding of COVID-19.

Three items covering the following two categories were used to measure precautionary behavior practices: preventive measures, including wearing face masks and washing your hands frequently, and social distancing, involving avoiding crowded areas. Using a 4-point Likert-type scale, students self-reported how frequently they engaged in certain practices during the COVID-19 pandemic (1= never, 2= sometimes, 3= often, and 4= always).

Psychometric scales

The Warwick-Edinburgh Mental Well-Being Scale

The fourteen-item Warwick-Edinburgh Mental Well-being Scale (WEMWBS) assesses both hedonic and eudaimonic elements of mental health, such as psychological functioning (*e.g.*, energy, clarity of thought, competence, and self-acceptance), interpersonal relationships, and positive affect (*e.g.*, feelings of optimism, cheerfulness, and relaxation).[15-17] Every item is rated from "none of the time" (1) to "all of the time" (5) using a 5-point Likert-style scale. A higher score denotes greater positive well-being. The total score is the sum of the scores for each item, resulting in a potential summary score ranging from 14 to 70. According to reports, a score of ≤40 denotes a high likelihood of depression.

Table 1. Sociodemographic profile of the participants (N=50).

Variables	Mean/Frequency (%)
Age	
19-20	1 (2%)
20-21	4 (8%)
21-22	22 (44%)
22-23	18 (36%)
>23	5 (10%)
Gender	
Male	10 (20%)
Female	40 (80%)
Education	Under graduate (B. Pharmacy)
Residential area	In and around Hyderabad
Employment status	
Student	50 (100%)
Employed	2 (4%)
Unemployed	48 (96%)
Marital status	
Single	48 (96%)
Married	2 (4%)
Household size	
2 persons	1 (2%)
3-5 persons	46 (92%)
6 persons or more	3 (6%)

Table 2. Symptoms and physical health status.

Did you test for COVID-19?	N (%)
Positive	14 (28.0)
Negative	36 (72.0)
Were you admitted to the hospital?	
Yes	2 (4.0)
No	48 (96.0)
Symptoms of body discomfort (for more than one symptoms)?	
Persistent fever	15 (30.0)
Chills	9 (18.0)
Headache	20 (40.0)
Myalgia	23 (46.0)
Cough	1 (2.0)
Difficulty breathing	12 (24.0)
Dizziness	4 (8.0)
Sore throat	15 (30.0)
Nausea, vomiting, diarrhea	4 (8.0)
Did you suffer from chronic illness?	
No	47 (94.0)
Yes (please specify: cough, hair loss, malaise…)	40 (80.0)
Have you directly or indirectly contacted patients suffering from COVID-19)?	
Direct	10 (20.0)
Indirect	40 (80.0)

Patient Health Questionnaire 9

The Patient Health Questionnaire 9 (PHQ-9) is a nine-item self-report measure that measures depressive symptoms, which including elevated depressive symptoms (binary) and total depressive symptoms (continuous).[18-21] The nine criteria used in the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV) to diagnose depressive disorders make up the PHQ-9.[22] With a total score ranging from 0-27, each of the nine items can be scored between 0 (not at all) and 3 (almost every day). The total score can be used to determine the severity of symptoms; PHQ-9 scores of 5-9 indicate mild depression, 10-14 indicate moderate depression, 15-19 indicate moderately severe depression, and ≥20 indicate severe depression.

Generalized Anxiety Disorder 7 Scale

This seven-item anxiety scale has enhanced construct, factorial, procedural, and criterion validity. Cut-off points 5, 10, and 15 in Generalized Anxiety Disorder (GAD) 7 are considered mild, moderate, and severe anxiety, respectively.[23,24] Growing scores on the scale are highly correlated with several functional impairment domains. Factor analysis determined that GAD and depression symptoms were distinct constructs, even though they frequently co-occurred.[25]

Statistical analyses

The statistical analyses were conducted using Graph Pad Prism version 5 (Graph Pad Software; Boston, USA). All results of quantitative variables were reported either as Mean (M), Standard Deviation (SD), or frequency (percentage). All results were expressed as Mean±SD.

Results

A total of 50 responses were collected from the Gokaraju Rangaraju College of Pharmacy, Hyderabad, India, undergraduate students in their final year of B. Pharmacy. Of these, 20% were male, and 80% were female, aged between 19 and 23. Additionally, 4% were self-employed and 2% were married. Further sociodemographic information is provided in Table 1. Only 4% of participants

Table 3. Knowledge and beliefs about COVID-19.

Type of virus	N (%)
DNA 3 (6.0)	
RNA 47 (94.0)	
Aware of spread	
No	2 (4.0)
Yes	48 (96.0)
Does COVID-19 transmit through	
Droplets	
Agree	49 (98.0)
Disagree	1 (2.0)
Don't know	-
Via contact	
Agree	48 (96.0)
Disagree	2 (4.0)
Don't know	-
Air-borne	
Agree	48 (96.0)
Disagree	2 (4.0)
Don't know	-
Type of COVID test?	
RTPCR	32 (64.0)
Rapid test	17 (34.0)
Self-test	1 (2.0)

RTPCR, Reverse-Transcriptase Polymerase Chain Reaction.

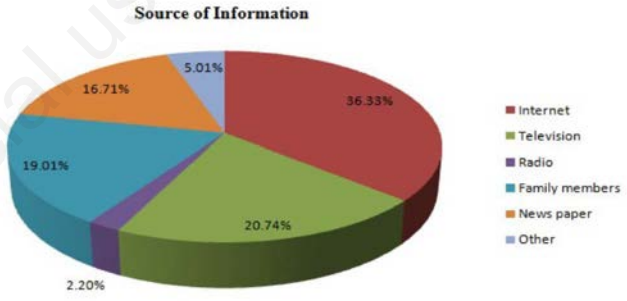

Figure 1. Source of information about COVID-19.

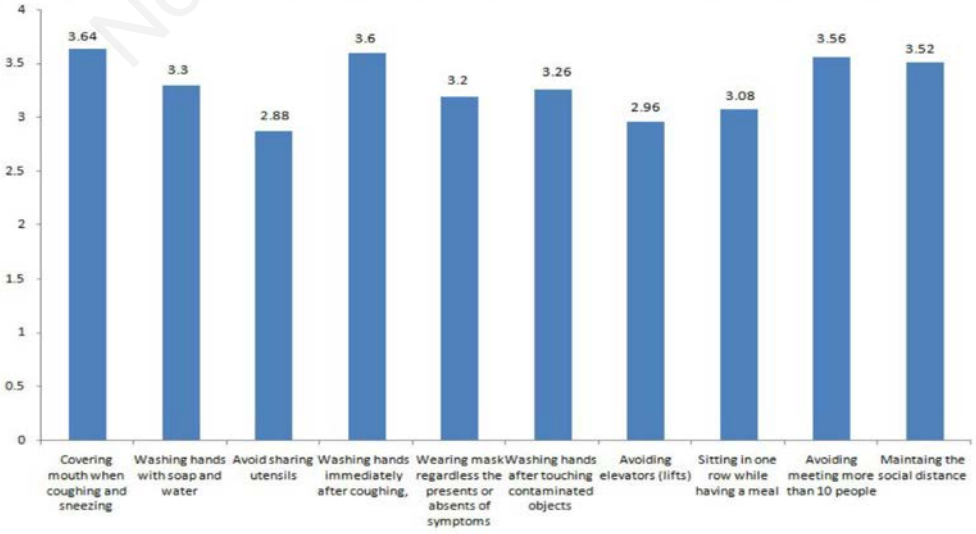

Figure 2. Practice of COVID-19 preventive measures.

were hospitalized despite 28% of them reporting positive COVID-19 test findings during the first and second waves. The majority of people had fever-like symptoms, headaches, myalgia, sore throats, and dyspnea despite having negative test results. The participants' physical health condition and specific symptoms are shown in Table 2. About 90-96% of participants provided accurate answers to the COVID-19 knowledge questionnaire regarding the type of virus, its spread, its transmission pathway, and its testing methods (Table 3). As seen in Figure 1, the majority of participants primarily used social media sites, including Facebook, Twitter, Instagram, and WhatsApp, to get information. Most people focus more on their cleanliness as a COVID-19 preventive step. "Avoid sharing utensils" (2.88), and "avoid elevators" (2.96) had the lowest mean score of preventive practices, while "covering mouth when coughing and sneezing" (3.64), "washing hands immediately after coughing" (3.6), "avoiding meeting more than 10 people" (3.56), and "maintaining the social distance" (3.52) had the highest mean score. Figure 2 shows that the participants' occupation and educational status were found to be strongly correlated with COVID-19 practices. In the present study, the mental well-being scale was expressed in terms of the WEMWS-14 score, which was found to be 43.92 (SD=8.79). The item-wise results are shown in Table 4 and Figure 3. The level of depression and anxiety was expressed in terms of PHQ-9 and GAD-7 scores of 5.52 (SD=2.103) and 2.6 (SD=0.84), respectively. The item-wise data for GAD-7 and PHQ-9 are shown in Table 5 and Table 6, and Figures 4 and 5.

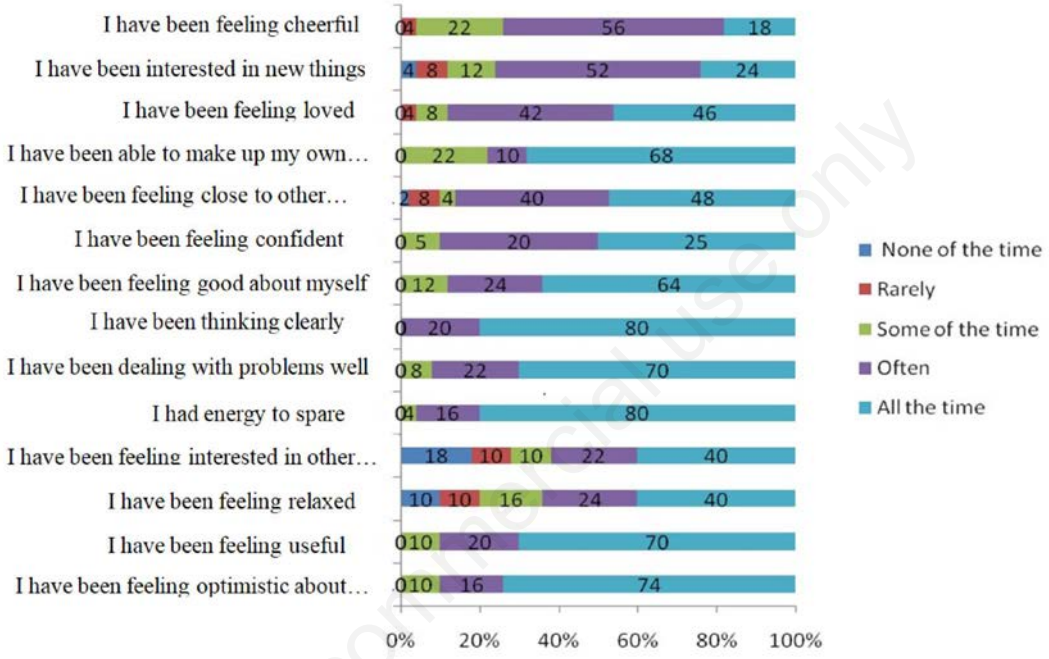

Figure 3. Percentage Likert-type of Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) 14-item scale.

Table 4. Total score of Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) 14-item scale.

Item no	Item characteristics	Standardized factor loadings
Q1	I have been feeling optimistic about the future	3.64
Q2	I have been feeling useful	3.6
Q3	I have been feeling relaxed	2.74
Q4	I have been feeling interested in other people	2.56
Q5	I had energy to spare	3.76
Q6	I have been dealing with problems well	3.62
Q7	I have been thinking clearly	3.8
Q8	I have been feeling good about myself	3.52
Q9	I have been feeling confident	3.4
Q10	I have been feeling close to other people	3.28
Q11	I have been able to make up my own mind about things	3.46
Q12	I have been feeling loved	3.3
Q13	I have been interested in new things	2.84
Q14	I have been feeling cheerful	2.54
	Mean score of WEMWBS	**46.09±22.86**

Discussion

With no alternative ways to escape from the COVID-19 pandemic, almost all the countries have adopted the lockdown strategy as a potentially effective strategy to fight against COVID-19. India was also quite early in its response to impose lockdown, as early as within 2 weeks of the declaration of COVID-19 as a pandemic, *i.e.*, March 25 (WHO declared COVID-19 to be a pandemic on March 11, 2020).[16] Even though this strategy is an important measure to tackle the exponential rise of COVID-19 cases, it has a widespread impact on the economy, psyche, and daily living of the public.[12] The pandemic situation of COVID-19 makes it one of the most challenging outbreaks in education for educators and students in our nation's history.

This study shows that undergraduate pharmacy students are aware of COVID-19 and practice preventive behaviors toward it. According to the study's findings, participants' knowledge of the causative microorganism, the incubation period, and the detecting mode were the questions they answered most accurately. A significant proportion of the participants accurately answered all ques-

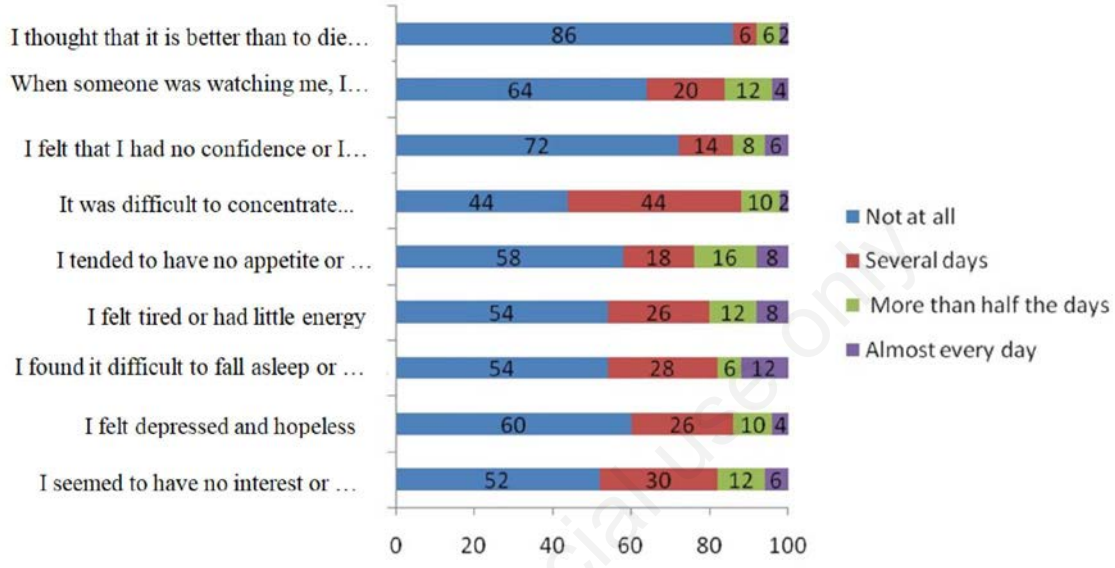

Figure 4. Percentage Likert-type of Patient Health Questionnaire (PHQ) 9-item scale.

Table 5. Total score of Patient Health Questionnaire (PHQ-9) 9-item scale.

Item no	Item characteristics	Standardized factor loadings
Q1	No interest or pleasure in doing work or leisure activities	0.72
Q2	Depressed and hopeless	0.58
Q3	Difficult to fall asleep or keep sleeping or slept too much suddenly	0.76
Q4	Feeling tired or had little energy	0.74
Q5	Tended to have no appetite or overeat	0.74
Q6	Difficult to concentrate on such things as reading newspapers or watching television	0.7
Q7	Feeling no confidence or feeling like a failure, that you have let yourself or your family down	0.48
Q8	Moving or talking slowly so slowly that other people could have noticed	0.56
Q9	Thought that it is better than to die or of hurting yourself in some way	0.24
	Total score of PHQ (Mean±SD)	**5.52±2.103**

Table 6. Total score of Generalized Anxiety Disorder (GAD) 7-item scale.

Item no	Item characteristics	Standardized factor loadings
Q1	Feeling nervous, anxious or on edge	0.2
Q2	Not being able to stop or control worrying	0.4
Q3	Worrying too much about different things	0.34
Q4	Trouble relaxing	0.36
Q5	Being so restless that it is hard to sit still	0.58
Q6	Becoming easily annoyed or irritable	0.3
Q7	Feeling afraid as if something awful might happen	0.42
	Total score of GAD (Mean±SD)	**2.6±0.84**

tions regarding the coronavirus disease and its preventive measures. This could be attributed to their background in pharmacy, which has given them a thorough understanding of disease conditions and preventive measures as part of their academic curriculum. Additionally, they receive up-to-date information about the disease from a variety of sources, including the internet, television, newspapers, and so on.

The fact that most students got their material from social media and could be promptly applied to practice should help explain other findings. This enormous diversity of knowledge can occasionally be biased, leading to pupils being led astray. With the exception of avoiding elevators and sharing utensils, which received lower scores (2.88 and 2.96, respectively), practically all advised preventive actions were practiced to the highest level. The remaining ones discovered a strong correlation between the degree of understanding and the actual application of the advised preventive actions. In the current study, the mean scores for covering one's mouth and donning masks right away after sneezing or coughing were found to be the highest for items 3.64 and 3.6, respectively. This practice is more frequent, and the WHO recommends these essential protective measures. The health facilities need to put in place a safety protocol that encourages and enforces the protective behavioral response.

Many psychological problems and important consequences in terms of mental health, including stress, anxiety, depression, frustration, and uncertainty during the COVID-19 outbreak, emerged progressively. Common psychological reactions related to the mass quarantine which was imposed in order to attenuate the COVID-19 spread are generalized fear and pervasive community anxiety which are typically associated with disease outbreaks, and increased with the escalation of new cases together with inadequate, anxiety-provoking information which was provided by media.[8]

The psychological reactions to the COVID-19 pandemic may vary from panic behavior to collective hysteria. To pervasive feelings of hopelessness and desperation which are associated with negative outcomes including suicidal behavior. Importantly, other health measures may be compromised by abnormally elevated anxiety. The present study focused on the impact of the COVID-19 pandemic on the mental health of the student population by using various psychometric scales like the WEMWBS-14, PHQ-9, and GAD-7 scales.[9]

In the present study, participating students reported mild depression, anxiety, significant distress, and insomnia, and this was correlated with mean scores of PHQ-9 and GAD-7, *i.e.*, 5.52±2.103 and 2.6±0.84, respectively. In general, the majority of the participating students reported a positive impact of the lockdown conditions and education during the pandemic on the relationship dimension in terms of relationships with parents, siblings, and neighbors. The relationships could improve the availability of more free time with parents and relatives, making people realize the value of reconnecting with families. This interpretation was reflected in the good mental well-being (WEMWBS) score, *i.e.*, 46.09±22.86.

Internet and education have integrated to provide students with the necessary skills for future job seeking. Online education is convenient for students, as they can access online materials for 24 hours and recorded classes for a better understanding of the content. More than 90% of the students reported good feedback regarding classes conducted through Google Meet and Newton's software. These online platforms have different tools to facilitate conducting online interactive classes to reduce student loss.

The main strength of this study is that we used a Likert scale to measure the outcome variable, which is much better to measure behavior than the dichotomized response. This was the best possible methodology to reach people and understand the psychological impact using psychometric scales. The limitation of this study was that the measurement tools used relied on participants' self-reported data, which were prone to recall bias, and the data collection method allowed the participants to over-report the precautionary behavioral practice. Furthermore, the population size of this survey was very limited, and the survey is narrow to undergraduates of pharmacy students only. So, there is a need for a web-based (online-based/ social media platforms) survey to further widen the circulation of questionnaires among various degree holders to avoid subject bias.

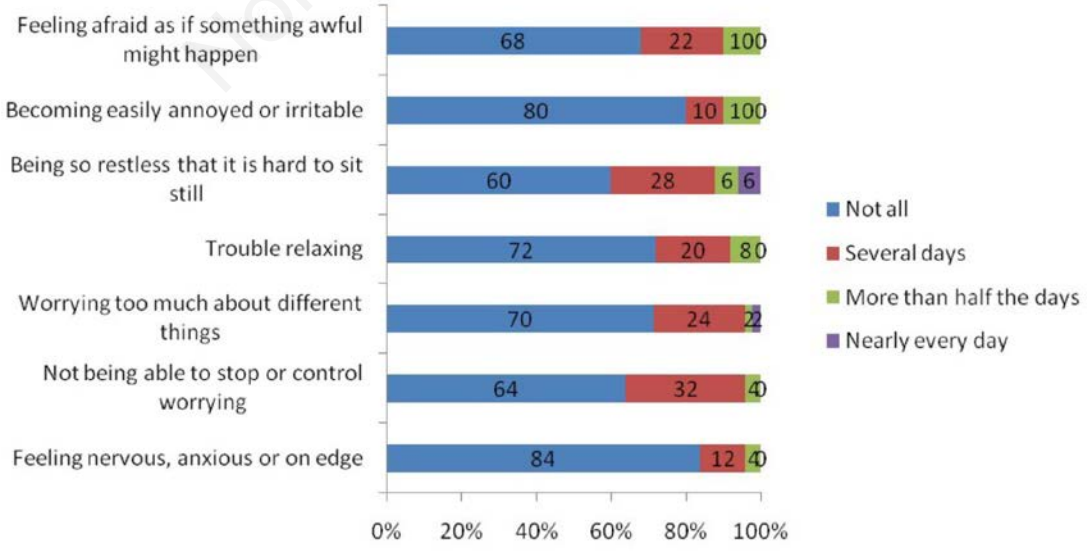

Figure 5. Percentage Likert-type of Generalized Anxiety Disorder (GAD) 7-item scale.

Conclusions

The participants in the current study had a far better understanding of preventive techniques. Even though study participants reported having trouble sleeping, severe distress, anxiety, and mild depression, these issues can be resolved with supportive family members. The majority of participants stated that the lockdown education provided via internet platforms had a favorable impact. Finding the discrepancy between knowledge and behavioral practices is also necessary.

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Online supplementary material:

Appendix 1. The survey form used in this study.