ORIGINAL ARTICLE
COVID-19 & Mental Wellbeing of School Enrolled Teens in Foothills of Himalaya

Deepshikha Chaudhary[1], Jayanti Semwal[2], Neha Sharma[3], Malini Srivastava[4], Priya Ranjan Avinash[5], Abhinav Bahuguna[6]

[1,2,3,6]Department of Community Medicine, Himalayan Institute of Medical Sciences, Swami Rama Nagar, Dehradun;
[4]Department of Clinical Psychology, Himalayan Institute of Medical Sciences, Swami Rama Nagar, Dehradun;
[5]Department of Psychiatry, Himalayan Institute of Medical Sciences, Swami Rama Nagar, Dehradun;

ABSTRACT
Introduction: COVID-19 pandemic resulted in a national lockdown and physical contact was avoided that substantially changed people's lives. The overall impact of lockdown during COVID-19 was negative on the general & mental health of adolescents. During the COVID-19 pandemic, there is a 25% massive increase in the global prevalence of anxiety and depression. **Aims & Objectives:** To assess anxiety & depression and their association with socio-demographic factors during the COVID-19 pandemic among school-going adolescents. **Methodology:** Using two simple random sampling, a cross-sectional study was conducted among 690 school-age adolescents (14 to 19 years) in four Nagar Palikas of the district of Dehradun. The questionnaire includes sociodemographic section, GAD-7, PHQ-2, Modified version of CoPaQ and coping strategies. **Result:** In study it's been found that more than half of the participants were facing symptoms of anxiety and 58.7% of participants had a major depressive disorder likely. 78% participants used phone and internet f/b watching TV (73.8%) and sleeping (68.1%). **Conclusion:** In order to combat adolescents' mental illness, we advise the creation of support groups at the family and school levels as well as prompt intervention through the revision of current strategies or formulation of new legislation

INTRODUCTION
Adolescents are more vulnerable in terms of depression and tend to have more intense & wide-ranging emotions (1). Therefore, emotional illness may have an inverse impact on the life of an adolescent, due to withdrawal from or negligence of family, peers, or their company & may lead to isolation. The prevalence of mental health conditions like anxiety, depression, bereavement, and suicide has increased due to social exclusion, isolation, restricted access to family and friends, financial strain, economic dislocation, and

many other circumstances and the loss of a loved one due to COVID-19 (2). An increase of 25% have reported in prevalence of anxiety and sadness during the COVID-19 pandemic around the world (3). As per available literature the overall impact of COVID-19 was negative on the general and mental health of adolescents (4). Above mentioned literature show worldwide increase in depression, suicide, anxiety, and grief-related symptoms in adolescents during COVID-19. So, research on the psychosocial & mental health needs of vulnerable adolescents during the pandemic is necessary. Therefore, the present study aims to assess the general and mental health status of the adolescent's during COVID-19 and address the same for timely intervention by improvising our strategies or framing new policy in combating mental illness among adolescents.

Aims & Objective: Our prime objective is to Assess anxiety and depression during the COVID-19 pandemic and determining the relationship between teenagers' risk perceptions of COVID-19 infection and their mental health. Finding association between Generalized Anxiety Disorder and Socio-demographic factors was secondary objective.

MATERIAL & METHODS

Study Type & Study design - Cross-sectional study.

Study Setting: four Nagar Palikas (Doiwala, Vikas Nagar, Mussoorie and Herbertpur) of the district of Dehradun

Sampling Technique – Two stage random sampling

Study population - School-going adolescents (14 to 19 years old)

Study duration - 12 months

Sample size calculation - n= Z^2pq/d^2 [where, P is prevalence of depression i.e., 42% (which is the most important risk factor for mental health illness), Z=1.96 (at two-sided interval) q= 1-P = 58%, d is absolute error taken as 4%, n= Z^2pq/d^2=3.8416 x 0.42 x 0.58/ 0.04 x 0.04 = 584. By taking 10% non-responsive rate, the minimum sample size calculated was 642.

Inclusion Criteria - 1. Adolescents of age group 14 to 19 years. 2. Study participants who gave assent and whose school authorities and parents gave consent for the study.

Exclusion Criteria - 1. Form that had > 20% missing data. 2. Adolescents already diagnosed with depression, anxiety, or any other mental illness. 3. Adolescents who were on any medication for mental illness.

Data Collection strategy - a predesigned, pretested semi-structured self-administered questionnaire was used to collect the data. The questionnaire included sections for sociodemographic data, GAD-7, PHQ-2 and modified version of CoPaQ. GAD-7 anxiety scale is a reliable instrument (=0.73) with 89% sensitivity and 82% specificity) (5). Total score for the seven items ranges from 0-21 with four categories of anxiety. PHQ-2 depression scale, which has a 97 percent sensitivity and 67 percent specificity (6). A modified version of CoPaQ (α=0.80) (7) was used to assess the risk perception of study participants. Covid-19 Pandemic Mental Health Questionnaire (CoPaQ) is a newly developed and highly comprehensive self-reported measure of personal and social consequences of the COVID-19-pandemic. As the tool was lengthy, we selected 6 items to assess anxiety, mental health impact, thoughts, and paranoid ideations in relevance of our objectives. Crohn's back alpha was calculated for the same (0.76), which is good and acceptable. The responses were measured using a 5 points Likert rating scale (1=not at all to 5=very much). The mean score of all items was calculated 13.17. Participants scored below the mean (13.17) were categorized as lower risk perception of COVID-19 infection while who scored more than 13.17 were categorized as higher risk perception of COVID-19 infection.

Ethical issues & informed consent - The study was accorded ethical committee approval vide Ethics Committee (Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun) No. SRHU/Reg/in/2021-335(9) dated 09/09/2021. Written informed consent and assent was taken from all the participants and school authorities. The study was carried out in accordance with the principles as enunciated in the declaration of Helsinki.

Data Analysis - The analysis was performed using MS Excel & SPSS Version 20.0 software. Percentage and proportion were calculated for all variables and a graphical representation of the variables was shown to understand the results clearly. The Spearman rank coefficient was used to assess whether there was a significant correlation between two variables or not. A p-value of <0.05 was taken as statistically significant. Chi square test was applied for testing significance of association between the two categorical variables. Statistically significant level was assumed at p<0.05.

RESULTS

Table 1 shows socio-demographic details of study participants. A total of 690 study participants, majority of study participants (47.5%) belonged to the age group of 14-15 years. More than half of participants were males (51%). Majority of participants lived in families of 3-5 members.

Table1: Socio-demographic details of study participants (N=690)

Variables	Study Participants	
Age at the time of interview (in Years)	Number (n)	Percentage (%)
14-15	328	47.5
16-17	264	38.3

Variables	Study Participants	
18-19	98	14.2
Gender		
Male	354	51.3
Female	336	48.7
Religion		
Hindu	599	86.8
Muslim	72	10.4
Sikh	14	2
Christian	4	0.6
Others	1	0.1
Family		
Nuclear	432	62.6
Joint	258	37.4
Total number of family members		
≤5	367	53.1
>5	323	46.8
Father Education		
Illiterate	36	5.2
Upto 5th Class	81	11.7
Upto 10th class	135	19.6
Upto 12th class	67	9.7
Graduation	174	25.2
Post-graduation	103	14.9
Don't Know	94	13.6
Mother Education		
Illiterate	78	11.3
Upto 5th Class	99	14.3
Upto 10th class	92	13.3
Upto 12th class	86	12.5
Graduation	143	20.7
Post-graduation	75	10.9
Don't Know	117	17

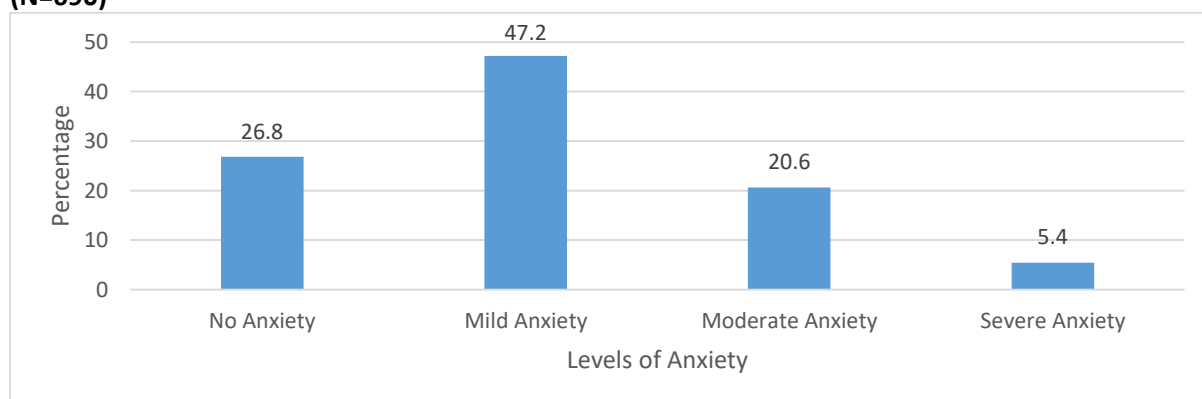**Figure 1: Level of anxiety among Study Participants using Generalized anxiety disorder -7 Tool (N=690)**

Figure 1 reveals that most study participants ((73.2%) faced symptoms of generalized anxiety. Here we can clearly see that most study participants faced mild generalized anxiety disorder (47.2%) followed by moderate level (20.6 %). While only 5.4 percent affected by severe generalized anxiety disorder.

Figure 2: Level of Major Depressive Disorder likely among Study Participants using Patient Health Questionnaire-2 (N=690)
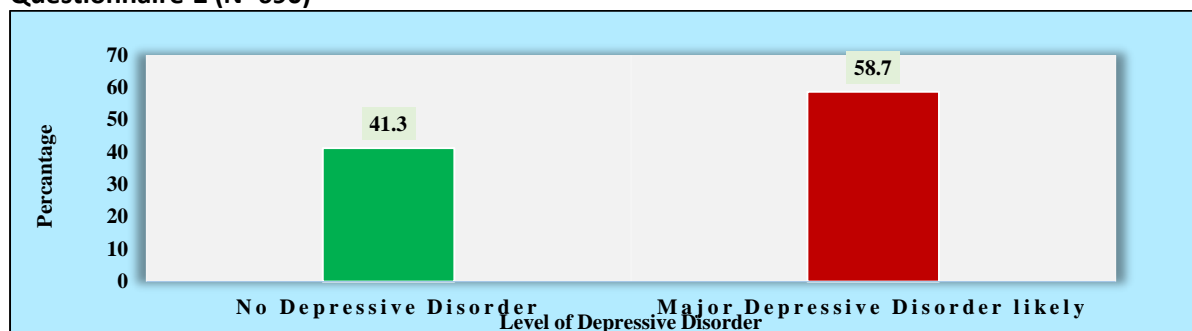

Figure 2 shows that the majority (58.7%) were likely to have a major depressive disorder likely. While 41.3 percent did not face symptoms of depression.

Figure 3: Risk perception of COVID-19 among study participants using modified COVID-19 Pandemic Mental Health Questionnaire (CoPaQ).
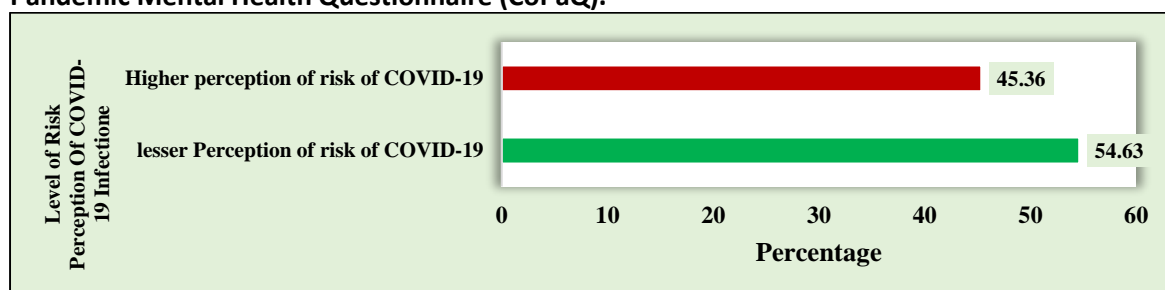

Figure 3 shows that out of a total of 690 study participants majority (54.63%) participants had lower risk perception of COVID-19 infection while 45.36 percent study participants had higher perception of risk.

Figure 4: Correlation between Perception of risk of COVID-19 infection and Mental Health
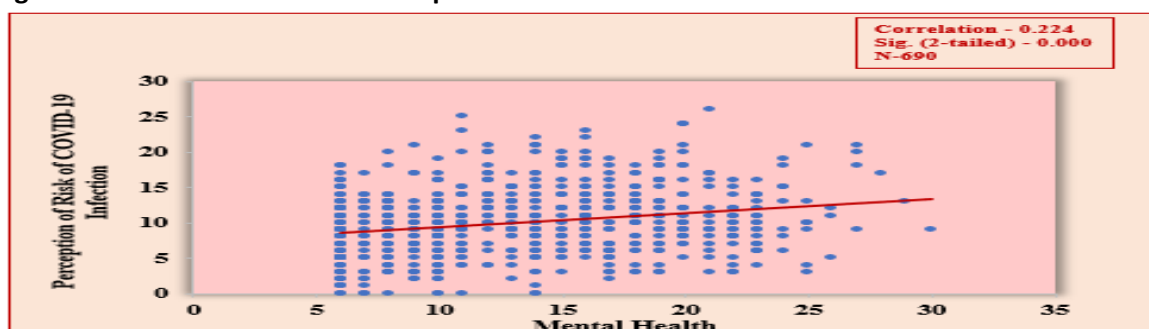

Figure 4 shows that there was a weak positive correlation between the two variables (Risk perception of COVID-19 & Mental Health), r-0.224, p-0.000, and n-313. Scatter plot showing R-0.230 & regression equation y=7.462+ 0.195(x) summarizes the results.

Table 2: Association between Generalized Anxiety Disorder and Socio-demographic factors (N=690)

Variables	Generalized Anxiety Disorder				(χ2/Fisher Exact)/ p-value
	No Anxiety (n=185)	Mild (n=326)	Moderate (n=142)	Severe (n=37)	
Age (in years)					
14-15	113(34.5) [61.1]	146 (44.5) [44.8]	54(16.5) [38.02]	15(4.6) [40.5]	(21.95)/ 0.001
16-17	54(20.5) [29.2]	130(49.2) [39.9]	66(25) [46.5]	14(5.3) [37.8]	
18-19	18(18.4)	50(51)	22(22.4)	8(8.2)	

Variables	Generalized Anxiety Disorder				(χ2/Fisher Exact)/
	No Anxiety (n=185)	Mild (n=326)	Moderate (n=142)	Severe (n=37)	p-value
	[9.7]	[15.3]	[15.5]	[21.6]	
Gender					
Male	91(25.7)	169(47.7)	75(21.2)	19(5.3)	(0.499)/
	[49.2]	[51.8]	[52.82]	[51.4]	0.919
Female	94(28)	157(46.6)	67(20)	18(5.4)	
	[50.8]	[48.2]	[47.18]	[48.65]	
Type of Family					
Nuclear	126(29.2)	203(46.9)	78(18.05)	25(5.8)	(6.37)/
	[68.10]	[62.26]	[54.92]	[67.56]	0.095
Joint	59(22.86)	123(47.67)	64(24.08)	12(4.6)	
	[31.89]	[37.73]	[45.07]	[32.43]	
Stress of Exams during study time					
Ongoing	41(24.84)	72(43.63)	42(25.45)	10(6.06)	(3.61)/
	[22.16]	[22.08]	[29.57]	[27.02]	0.307
Going to be held	144(27.42)	254(48.38)	100(19.04)	27(5.14)	
	[77.83]	[77.91]	[70.42]	[72.97]	
History of Violence at home					
Yes	16(44)	16(35.55)	12(26.66)	1(2.2)	(4.2)/
	[8.64]	[4.90]	[8.45]	[2.70]	0.221
No	169(26.20)	310(48.06)	130(20.15)	36(5.58)	
	[91.35]	[95.09]	[91.54]	[97.29]	
Status of Risk Perception of COVID-19 Infection					
Lower risk perception	117(31.03)	185(49.07)	61(16.18)	14(3.71)	(18.14)/
	[63.24]	[56.74]	[42.95]	[37.83]	0
Higher risk perception	68(21.72)	141(45.04)	81(25.87)	23(7.34)	
	[36.75]	[43.25]	[57.04]	[62.12]	

Table 2 describes Association between Generalized Anxiety Disorder and Socio-demographic factors. It is observed that there is significant association between anxiety disorder and age of study participants. Also observed that study participants lived in nuclear family faced more symptoms of anxiety and who were writing exams during study time.

DISCUSSION

In the present study majority (~74%) of study participants faced symptoms of anxiety. Which suggest overall a higher level of anxiety among school going adolescents. Several other researchers from different parts of world have also reported a similar finding. Sabbagh H.J. et al (8), and Rogowska A.M et al (9) also reported similar findings using the same scale in which 58 to 65 percent study participants had anxiety disorder respectively. Omari A. et al., conducted a study among adolescents and used Depression, Anxiety, Stress Scale (DASS) and reported that 40.5 percent of the study participants had symptoms of anxiety (10). In the current study 58.7 percent of the study participants were screened positive for major depressive disorder. Some other studies suggest that level of anxiety and depression are quite high among adolescents (9,11,12). This shows that the current pandemic has negatively affected the mental well-being of adolescents. Social exclusion and extended school closures because of which their daily routine was disrupted may be the cause of this. Due to social distance, they were unable to express their emotions in person and could not play together. Another possible reason may be that the studies conducted in different countries under different circumstances, different study tools and sample size were used to evaluate depression and anxiety. Overusing the phone and the internet during the COVID-19 pandemic also significantly contributed to the adverse effects of internet addiction and posed a risk for depression.

In general, the study shows higher level of poor mental wellbeing in adolescents living in

nuclear family compared to joint family. Shakil M. et al also found higher level of psychological distress & more anxiety among the study participants living in the nuclear family (13).

We tried to analyse the association of various demographic factors with mental wellbeing. This shows that generalised anxiety disorder significantly associated with age group of study participants. Han O. et al., analysed data from 54,845 participants from 112 countries and reported that risk perception of COVID-19 infection was significantly associated with poor mental health (depression, anxiety, stress etc) (14). The study also revealed significant association between GAD & risk perception of COVID-19 infection. Some other researchers also reported the same (15,16). A study conducted in China among school students also revealed that the higher the risk perception of COVID-19 infection, the worse the mental health and explained that risk perception of pandemic triggered the perception of stress, which affected the mental health of students (15). Which may put them on risk of developing of suicidal tendencies, GAD, depression and other mental and medical illness in future. Which makes depression and anxiety the major health problem among adolescents.

In our study we also tried to analyse corelation between risk perception of COVID-19 infection with mental wellbeing and found a positive relationship between the two variables. Similar findings were reported by Xin. T. T. et al., when he explored the relationship between risk perception of COVID-19 and mental health using Pearson's correlation analysis and found a significant correlation between the two (17).

CONCLUSION

The study showed that more than half of study participants faced symptoms of anxiety and major depressive disorder likely. Due to which they are more likely to struggle in their academic accomplishments and at high risk of developing medical & mental illnesses. In order to decrease overall mental health difficulties attention should be given by policy makers as well the parents & teachers. A protocol should be formulated for identification of adolescents who are at high risk of suspected Mental health problems so that they can be monitored easily and early intervention can be provided. There should be more focus on several factors including awareness, physical activities, psychological counselling, parenting, and Cognitive Behaviour Therapy among school-going adolescents and their parents. Early and timely intervention services should be tailored. Furthermore, parents should be encouraged to create a friendly and positive family environment for their children. Last but not the least the study suggests more essential research in demand on adolescent mental health.

RECOMMENDATION

The study suggests targeted interventions for teenagers with sadness and anxiety, potential for telehealth and mHealth, training for parents and teachers to recognize anxiety and depression symptoms, and exploring social support networks to mitigate the negative impacts of COVID-19 on adolescent mental health.

LIMITATION OF THE STUDY

Though in the present study, the efforts had been made to maintain the quality of the data, but there are few limitations are like: As all assessments were based on self-reports by respondents, their recall might have weakened the reliability of some of the information that was collected. Hence there is a likelihood of recall bias. The study results were based on self-reporting therefore, this cannot be used for definitive diagnosis of psychiatric disorder, thus comprehensive assessment with parent and teacher reported versions and clinical assessment should be done. It was also noticed that some of the respondents were reluctant to share information about violence/scolding at home, hence misinformation bias could not be ruled

RELEVANCE OF THE STUDY

It is vital to conduct this research on how COVID-19 affects the mental health of teenagers in the foothills of the Himalayas. The epidemic has caused mental health problems for adolescents worldwide; this study examines how these problems appear in a

particular setting. The study's emphasis on anxiety, depression, and their relationship can help develop mental health interventions specific to this understudied demographic. By learning more about the mental health of these teenagers, support services in the Foothills and possibly for other similar populations will be improved.

AUTHORS CONTRIBUTION
All authors have contributed equally.

FINANCIAL SUPPORT AND SPONSORSHIP
Nil

CONFLICT OF INTEREST
There are no conflicts of interest.

ACKNOWLEDGEMENT
The authors are thankful to Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, for enabling us to carry out the study.

DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS
The authors haven't used any generative AI/AI assisted technologies in the writing process.

REFERENCES

1. Park Dr K. Mental health. Park's textbook of preventive and social medicine. 25th ed. Pune: M/s Banarsidas Bhanot; 2019:892. https://milonm28.wordpress.com/wp-content/uploads/2017/08/parks-preventive-social-medicine-23rd-ed.pdf
2. Dawel A, Shou Y, Smithson M, Cherbuin N, Banfield M, Calear AL, Farrer LM, Gray D, Gulliver A, Housen T, McCallum SM. The effect of COVID-19 on mental health and wellbeing in a representative sample of Australian adults. Frontiers in psychiatry. 2020;11:579985.
3. WHO News COVID-19 and Mental Health [Internet]. Who.int. [cited 2024 Apr 25] Available from: https://www.who.int/news/item/02-03-2022-covid-19-pandemic-triggers-25-increase-in-prevalence-of-anxiety-and-depression-worldwide
4. Jester N, Kang P. COVID-19 pandemic: Is teenagers' health in crisis? An investigation into the effects of COVID-19 on self-reported mental and physical health of teenagers in secondary education. Public Health in Practice. 2021;2:100099.
5. Spitzer RL, Kroenke K, Williams JB. A brief measure for assessing generalised anxiety disorder: the GAD-7. Arch Intern Med. 2006; 166:1092–7

6. Kroenke K, Spitzer RL, Williams JBW. The Patient Health Questionnaire- 2: validity of a two-item depression screener. Med Care [Internet]. 2003;41(11):1284–92.
7. Rek SV, Bühner M, Reinhard MA, Freeman D, Keeser D, Adorjan K, Falkai P, Padberg F. The COVID-19 pandemic mental health questionnaire (CoPaQ): Psychometric evaluation and compliance with countermeasures in psychiatric inpatients and non-clinical individuals. BMC psychiatry. 2021;21(1):1-5.
8. Sabbagh HJ, Abdelaziz W, Alghamdi W, Quritum M, AlKhateeb NA, Abourdan J, Qureshi N, Qureshi S, Hamoud AH, Mahmoud N, Odeh R. Anxiety among Adolescents and Young Adults during COVID-19 Pandemic: A Multi-Country Survey. International Journal of Environmental Research and Public Health. 2022;19(17):10538
9. Rogowska AM, Kuśnierz C, Bokszczanin A. Examining anxiety, life satisfaction, general health, stress and coping styles during COVID-19 pandemic in Polish sample of university students. Psychology Research and Behavior Management. 2020; 13:797
10. Al Omari O, Al Sabei S, Al Rawajfah O, Abu Sharour L, Aljohani K, Alomari K, Shkman L, Al Dameery K, Saifan A, Al Zubidi B, Anwar S, Alhalaiqa F. Prevalence and Predictors of Depression, Anxiety, and Stress among Youth at the Time of COVID-19: An Online Cross-Sectional Multicountry Study. Depress Res Treat. 2020 Oct 6;2020:8887727.
11. Cohen ZP, Cosgrove KT, DeVille DC, Akeman E, Singh MK, White E, Stewart JL, Aupperle RL, Paulus MP, Kirlic N. The Impact of COVID-19 on Adolescent Mental Health: Preliminary Findings From a Longitudinal Sample of Healthy and At-Risk Adolescents. Front Pediatr. 2021 Jun 8;9:622608.
12. Ali K, Mufti U, Sharma G, Mufti A. A cross-sectional study to assess the quality of life, depression, anxiety, and stress levels after 45 days COVID- 19 lockdown. International Journal of Current Research and Review. 2020:108-14
13. Shakil M., Ashraf F., Tariq S., Asmat A., Muazzam A., Hassan N., The Prevalence and Comorbidity of Death Anxiety and Psychological Distress in Pakistani Population During Covid-19 Pandemic-- Palarch's Journal of Archaeology of Egypt/Egyptology 19(1), 620-632.
14. Han Q, Zheng B, Agostini M, Bélanger JJ, Gützkow B, Kreienkamp J, Reitsema AM, van Breen JA, Collaboration P, Leander NP. Associations of risk perception of COVID-19 with emotion and mental health during the pandemic. J Affect Disord. 2021; 284:247-255.
15. Li L, Cao H, Yang L, Yan C, Wang X, Ma Y. Risk perception and mental health among college students in China during the COVID-19 pandemic: A moderated mediation model. Front Psychiatry. 2022; 13:955093.
16. Dyer, Maddy L, Sallis, Hannah M, Khouja, Jasmine N, Dryhurst, Sarah, Munafò, Marcus R. Associations between COVID-19 risk perceptions and mental health, wellbeing, and risk behaviours. Journal of Risk Research. 2022 Nov 25. 11-12, 1372-1394
17. Xin T.T., Li, Xj., Lei-S et al. The relationship between adolescent risk perception and emotions during the COVID-19: a short-term longitudinal study. Curr Psychol (2022). https://doi.org/10.1007/s12144-022-02860-2