

Generalized Anxiety Disorder Among University Students Due To COVID-19

Pitambar Acharya^{*1}, Sudip Pokhrel²

¹Central Department of Education, Tribhuvan University

²Nepal Engineering College, Pokhara University

*Email: pitambar.acharya@cded.tu.edu.np

Received: 29th April, 2023; Revised: 22nd June, 2023; Accepted: 8th August, 2023

Abstract

Generalized Anxiety Disorder (GAD) is a common but urgent mental health problem during disease outbreaks. With the outbreak of COVID-19's second wave, educational institutions were closed, and the students had to remain confined to online teachinglearning, which might create many psychological problems. This study assesses the prevalence of generalized anxiety disorder among university youth students due to COVID-19. A cross-sectional online survey was conducted among 176 (response rate: 76.5%) university students studying at the Central Department of Education. The Generalized Anxiety Disorder scale (GAD-7) questionnaire was used to assess anxiety disorder. Students were selected using a simple random sampling technique and sent the questionnaire link created in the Kobo toolbox to them requesting voluntary participation. The collected responses were analyzed using descriptive statistics and multivariate logistic regression to find the GAD prevalence and associated factors. A study found that 47.7% of university students had generalized anxiety disorder due to COVID-19. Older participants had a lower likelihood of anxiety disorder compared to those under 30 (OR 0.267). Buddhists had higher odds than Hindus (OR 5.237), and students in Bagmati and Lumbini Provinces had higher odds than those in Koshi Province (OR 8.116 and OR 6.086, respectively). Students not infected with COVID-19 had higher odds of anxiety disorder than infected students (OR 7.564), and those not vaccinated had higher odds than those vaccinated (OR 2.883). Taken together, age, religion, province of residence, COVID-19 vaccination status, and perceived risk due to COVID-19 played a role in determining the prevalence of generalized anxiety disorder among students.

Keywords: Generalized anxiety disorder, COVID-19, students, university, prevalence

Introduction

As a major virus outbreak in the 21st century, COVID-19 has led to mental health globally. There has been seen relatively high rates of anxiety, depression, post-traumatic stress disorder, psychological distress, and stress in the general population during the COVID-19 pandemic. Youths are common risk groups, especially those unemployed, with frequent exposure to social media/news concerning COVID-19 (Xionga, Lipsitzc, Nasric, Luic, Gillc, Phanc et al., 2020). COVID-19 has changed education for learners of all ages. Educational losses increased anxiety and depression associated with the changes in youths (Hoofman & Secord, 2021).

The pandemic spread of COVID-19 has created fear, anxiety, and several concerns among people, including education throughout the world. The pace of its spread made educational institution closure the best preventive measure against it (Paudel, 2021). The COVID-19 pandemic has created the most disruption of education systems in history, affecting nearly 1.6 billion learners globally (UN, 2020). In Nepal, 8796624 students are affected due to school/university closures as a preventive measure against the pandemic. Of this number, 404,718 (5%) are in higher education (UNESCO, 2020, cited in Paudel, 2021). About half a million students study higher education in Nepal at Tribhuvan university, out of which about 50 thousand are at the master's level (Planning Directorate/TU, 2020). The COVID-19 pandemic has forcefully shifted the mode of teaching and learning from face-to-face to online in higher education in Nepal. It is a new experience and practice. Technological preparedness, computer literacy, and reliable internet are the essential elements for online education, which are still out of access and are not widely available in Nepal (Paudel, 2021). It has also created psychological problems for

the students, including stress and anxiety compared to face-to-face mode.

The COVID-19 epidemic has brought unbearable psychological pressure to students as it affected the lives of all sections of society, including university students. The lockdown seriously affected mental health, resulting in psychological problems including frustration, stress, and depression (Chaturvedi et al., 2021).

Various psychological problems in mental health, including stress, anxiety, depression, frustration, and uncertainty during the COVID-19 outbreak, emerged progressively (Serafini et al., 2020). University students are in the most active age group. With COVID-19, banning their attendance the universities, staying at home, not meeting friends, not exercising, not traveling, as well as the fear of getting infected or infecting any of their family members or friend affected their life (Ghazawy et al., 2021). Students experience stress, anxiety, and depression regarding their education as well. It affects the learning of students.

Nepal experienced a second variant COVID-19 pandemic and nationwide lockdown due to COVID-19, which produced anxiety, stress, and depression with the possibility of post-traumatic stress disorder (PTSD) for university students as it has hampered their regular study and exam schedule. Consequently, university youth students are highly affected. This study intends to assess the psychological effect of COVID-19 on university youth students in terms of anxiety disorder, which can be helpful to policymakers and planners regarding COVID and other prospective pandemics. This study intends to assess the psychological effect of COVID-19 on university youth students in terms of anxiety disorder, which can be helpful to policymakers and planners regarding COVID and other prospective pandemics. Therefore, this research aims to assess university students' prevalence of anxiety disorder due to COVID-19.

2. Literature review

As of Worldometer (June 26, 2021), there were 64,842,715 cases globally, of which 3,926,977 (2.16%) cases died. The significant sufferers with heavy death casualties were the US, India, Brazil, France, Russia, Turkey, the UK, etc. Similarly, out of a total of cases in Nepal, 631152, 8945 (1.41%) people have died (Worldometer, 2021).

Historically, Tyrell and Bynoe isolated the first human coronavirus in 1965 from the respiratory tract of a patient with a complaint of the common cold. The virus was named B814. Similarly, Hamre and Procknow reported a similar virus named 229E isolated from the samples from cold patients. McIntosh et al. also isolated ether-sensitive agents of multiple strains from the human respiratory tract, called organ culture (OC). In the 1960s, virologists under the leadership of Tyrell studied different strains of human and animal viruses. Thus, a new genus of viruses was found, which was named CORONA, where the term corona denoted the crown-like appearance of the surface in the morphological structure of viruses. Severe Acute Respiratory Syndrome (SARS) Coronavirus and a new form emerged in China in late 2002 and early 2003. They spread worldwide, with around 770 mortalities (Jahagir et al., 2020).

Coronavirus disease 2019 (COVID-19) which is caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), was first reported in late 2019 from Wuhan, China (Dhakal, & Karki 2020). Nepal confirmed its first COVID-19 case in a returnee student from Wuhan, China, on Jan 23, 2020, after the throat swabs sent to the WHO laboratory in Hong Kong identified SARS-CoV-2 (Kansakar et al. 2021). COVID-19 has created an economic downturn with substantial implications for gender equality during the downturn and the subsequent recovery. Women are more severely affected than men in terms of employment. Employment opportunities for women in child care have been dropped due to this pandemic because of the closures of schools and daycare centers. This effect persists even on some days (Alon, Deopke, Olmstead-Rumsey, & Tertilt, 2020).

Mental health issues are the leading impediment to academic success as they affect students' motivation, concentration, and social interactions to succeed in higher education (Unger, 2007). The family system and interactions highly influence youth mental health during a pandemic. Prolonged home confinement or the family environment becomes a risk factor for youth's mental health (Courtney et al., 2020).

In any epidemic, it is common for individuals to feel stressed and worried. Typical responses include fear of falling ill and dying, avoiding approaching health facilities due to fear of becoming infected while in care, fear of losing livelihoods, not being able to work during isolation and of being dismissed from work, fear of being socially excluded/placed in quarantine because of being associated with the disease feeling powerless in protecting loved ones and fear of losing loved ones because of the virus, fear of being separated from loved ones and caregivers due to quarantine regime, refusal to care for unaccompanied or separated minors, people with disabilities or the elderly due to fear of infection, feelings of helplessness, boredom, loneliness, and depression due to being isolated (Inter-Agency Standing Committee [IASC], 2020).

As of December 2020, early evidence suggested that the incidence of COVID-19 infections among individuals was not neutral concerning geography, gender, age, and race/ethnicity (Blundell et al., 2020; Cheng et al., 2020; Islam et al., 2020; Kemp et al., 2020; Obeng-Odoom, 2020; Rose-Redwood et al. 2020 cited in Price, 2020). Though the COVID-19 epidemic affected all regions of the country, the spread of the epidemic varied. Urbanization and industrialization are essential factors in the spread of this (Krzysztofik et al., 2020). With the pandemic's start, government policy effectively countered its effects on incomes, leading poverty to fall and low-income percentiles to rise across various demographic groups and geographies. Of those losing employment, the vast majority received unemployment insurance, with some states failing to reach a large share of their out-of-work residents (Han et al., 2020).

The COVID-19 pandemic has been causing physical and psychological health; The psychological effects are varied, such as panic disorders, fears, anxiety, and depression. Thus, anxiety is an expected psychological effect (Batista et al., 2021). Some of the instruments to evaluate anxiety are:

"The Spielberger State-Trait Anxiety Scale (STAI); Sleep State Self-Rating Scale (SRSS); 7-item Generalized Anxiety Disorder Scale (GAD-7); Self-Rating Anxiety Scale (SAS); General Self-Efficacy Scale (GSES); Stanford Acute Stress Reaction (SASR) questionnaire; Pittsburgh Sleep Quality Index (PSQI); Social Support Rate Scale (SSRS); Impact of Event Scale-Revised (IES-R); Depression, Anxiety and Stress Scale (DASS-21)" (ibid., p321).

Government of Nepal, including setting up screening at the airport, increased vigilance at the borders, establishing the first COVID-19 testing facility within the country, formulating expert guidelines, and identifying dedicated hospitals to treat COVID-19 patients (Kansakar et al., 2021). The Government of Nepal implemented different public health measures like border closures and a countrywide lockdown (Dhakal & Karki, 2020).

According to COVID-19 Crisis Management Center (CCMC) website, the Government of Nepal has prepared/implemented documents on the Clinical Management of COVID-19 in Health Care Setting, Things to be considered while in quarantine, guidelines on COVID-19 Case Isolation management guidelines, National Testing Guidelines for COVID-19, COVID-19 Emergency Medical Deployment Teams (EMDT) Mobilization Guidelines. Similarly, Pocket Book of Clinical Management of COVID-19 in Healthcare Setting, Flyers on COVID-19 (Nepali/English), Reduce your risk of Coronavirus, Infection IEC Material, Infographic Actions to do at a place of residence/home for asymptomatic travelers, Health Sector Emergency Response Plan, COVID-19 Pandemic, Novel Coronavirus (2019-nCoV) technical guidance (CCMC, 2021).

3. Conceptual Framework of the Study

A conceptual framework, simply a less developed form of a theory, consists of statements linking abstract concepts to empirical data (Rudestam & Newton, 1992). Based on the literature reviewed and variables set, the following is the conceptual framework of this study.



Based on the given conceptual framework, age, sex, marital status, province, residence, COVID-19 infection, and perceived risk have been taken as the independent variables for this study. Similarly, knowledge/exposure are intermediate variables that affect the psychological effect of COVID-19 anxiety and have been taken as dependent variables. They are the bases of the analyses of the data in this study.

4. Methodology

This is a cross-sectional study that utilized quantitative methods. The data collected was quantified and processed using SPSS and Excel programs. The primary source of data was obtained through a self-administered questionnaire that was generated using the Kobo toolbox and distributed to a randomly selected sample of 230 students from the Central Department of Education, a constituent campus under the Faculty of Education TU, which had 570 students in June 2021 (CDOED, 2021). The size of 230 was determined using the Raosoft sample size calculator, and 176 forms were collected, resulting in a response rate of 76.5%. After receiving authorization to conduct the study, the researchers collected data using the Kobo toolbox server. Descriptive statistical tools such as frequency, and percent were used to analyze the data using SPSS and Excel. Additionally, inferential statistics such as binary logistic regression with odd ratios were utilized as appropriate based on the nature of the data. Relevant secondary data were also incorporated where necessary.

The researcher followed ethical guidelines for social sciences and behavioral research. Participants were informed about the study's general purpose in the web-based form and could withdraw at any time. The questionnaire was designed without discriminatory language, and measures were taken to ensure anonymity, confidentiality, responsibility, integrity, independence, data protection, and verification. The study was conducted impartially, with minimal bias in the methodology and study process, and the accuracy of study results was preserved while using the data.

The Generalized Anxiety Disorder 7-item (GAD-7) is an easy-to-perform initial screening tool for generalized anxiety disorder. Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues developed this tool with an educational grant from Pfizer Inc. (National HIV Curriculum, 2021). The tools were shared with the health and psychology research community for feedback before using them in our context. Similarly, the internal consistency of the tools was checked, and the value of Cronbach's Alpha of General Anxiety Disorder (GAD-7) tool was found to be 0.89, which also shows that the tool's reliability is very high.

5. Results

Descriptive statistical tools like frequency, percent, mean, and standard deviation, as well as inferential statistical tools like bivariate odds ratio, were used to meet the research objective.

5.1 Background Information of the Respondents

The average age of the respondents was 27 years, with a standard deviation of 4.3 years. About 58.5 percent of them were female. In terms of marital status, 56 percent were unmarried. By religion, 90.2 percent were Hindu, 4 percent Buddhist, and 2.8 percent Christian; the rest were from the 'others' category. Regarding caste/ethnicity, 64.8 percent were from Brahmin/Chhetri, 14.8 percent from Janajati, 5.8 percent from Dalit, 7.4 percent from Tharu, and 6.2 percent from the Madhesi community. In terms of residence of the respondents by province, 24 percent were from Bagmati, 16.5 percent were from Sudurpaschim and Lumbini each, 14.8 percent were from Gandaki, 13.1 percent were from Koshi Province, and 7.4 percent from Karnali Province. By ecological belt and Kathmandu valley, 50.6 percent of respondents were from Hill, 29 percent from Terai, 13 percent from Kathmandu valley, and 7.4 percent from Mountain. Similarly, 54 percent were from rural areas. As per them, the mean monthly household income before the COVID-19 period and during the COVID-19 period was Rs. 45,500 and Rs. 36,300, respectively. About 34.7 percent of the respondents reported they slept 6 to 7 hours per day, followed by 27.3 percent who slept 7 to 8 hours. In terms of use of social media, 20 percent used five hours and over. About 13 percent of the respondents reported being infected with COVID-19; however, out of the total respondents, 14 percent had a COVID-19 vaccine. Furthermore, a survey inquired about COVID-19 knowledge and revealed that 94.3% of respondents demonstrated sufficient knowledge of the topic.

5.2 Prevalence of Anxiety

General Anxiety Disorder (GAD-7) comprises several key ideas, including nervousness, uncontrolled worry, excessive worry, difficulty relaxing, restlessness, irritability, and fear of terrible occurrences. These items are ranked from zero (not at all) to three (nearly every day), with a total score of 21. Considering the evidence that some level of anxiety is normal during the COVID-19 pandemic, a scale cut-off of 10 and above to represent GAD is appropriate (Singh et al., 2020).

As a result, 47.7% of the study participants experienced an anxiety disorder. The earlier normative study outlines the degree of anxiety into four categories with three cut-offs: no (04), mild (5–9), moderate (10–14), and severe anxiety (≥ 15) (Lowe et al., 2008). Among university students, 32.4 percent had mild anxiety, while 10.8 percent had moderate anxiety disorder. Only 4.5 percent of students experienced severe anxiety.

5.3 Inferential Analysis

Associations between the dependent variable and potential covariates were examined using bivariate odds ratios (ORs) at 95% confidence intervals. Due to the binary nature of the dependent variable, binary logistic regression was used. The odds ratio compares the odds of two events. The odds of an eventare the probability that the event occurs divided by the probability that the event does not occur. Odds ratios>1 indicate that the event is more likely to occur as the predictor increases, and odds ratios<1 indicate that the event is less likely to occur as the predictor increases (Minitab Express Support, 2019). Logistic regression is a statistical technique used to predict the relationship between predictors (independent variables) and a predicted variable (the dependent variable) where the dependent variable is binary, e.g., sex, response, score, etc. (Statistics Solutions, 2021).

Table 1 showed the odds ratios, 95 percent confidence interval, and p-values. Age group, Religion, exposure to COVID-19, COVID-19 vaccination status, perceived risk due to COVID-19, and Province of residence are associated with the dependent variable (p-value<0.05). The corresponding values of odds ratios revealed the following important results;

- Compared with the age category (<30 years), participants aged >=30 years were 73% less likely to possess anxiety disorder (OR 0.267 [95% CI 0.081–0.882])
- In terms of religion, Buddhists experienced 5 times more ((OR 5.237 [95% CI 2.633-12.097]) anxiety disorder than Brahm Hindus.
- Similarly, students residing in Bagmati Province experienced 8 times higher ((OR 8.116 [95% CI 1.385-47.055]) anxiety disorder than Koshi Province, and students residing in Lumbini Province experienced 6-times higher ((OR 6.086 [95% CI 1.172-31. 588]) anxiety disorder than the students residing in Koshi Province.
- The students who were not COVID-19 infected had 7.56 times higher ((OR 7.564 [95% CI 1.896-30.170]) anxiety disorder than the student who were infected.
- Similarly, the students who had not taken the COVID-19 vaccine had anxiety 2.8 times higher ((OR 2.883 [95% CI 0.133-4.070]) anxiety disorder than the students who had taken the COVID-19 vaccine.
- The results of our study reveal that students who reported no perceived risk due to COVID-19 were significantly more likely to have an anxiety disorder than those who reported yes. Specifically, the former group was 6.87 times more likely ((OR 6.871 [95% CI 2.48-19.036]) to develop an anxiety disorder.

Table 1

Explanatory variables	Explanatory Odd Ratio variables		p- value							
Age										
<30 years	1.00 (ref)									
>=30 years	0.267	0.081-0.882	0.030							
Sex										
Male	1.00 (ref)									
Female	1.243	0.474-3.257	0.658							
Marital Status										
Married	1.00 (ref)									
Unmarried	0.519	0.193-1.394	0.193							
Religion										
Hindu	1.00 (ref)									
Buddhist	5.237	2.633-12.097	0.038							
Christian	0.314	0.028-6.587	0.578							
, Kirat	0.778	0.193-1.394	0.351							
	Caste/ethr	nicity								
Brahmin/Chhetri /Thakuri	1.00 (ref)									
Janajati	0.514	0.143-1.840	0.306							
Dalit	0.547	0.100-2.986	0.486							
Tharu	0.382	0.089-1.641	0.196							
Madhesi	Madhesi 0.584		0.533							
Province of residence										
Koshi Province	1.00 (ref)									
Madhesh Province	4.442	0.578-24.148	0.152							
Bagmati Province	8.116	1.385-47.548	0.020							
Gandaki Province	2.722	0.566-13.099	0.212							
Lumbini Province	6.086	1.172-31.588	0.032							
Karnali Province	Karnali 2.502 Province		0.323							

Sociodemographic Characteristics of the Study Participants with a Bivariate Odds Ratio (OR) Regarding Anxiety

Sudurpaschim Province	3.022	0.682-13.385	0.135	Knowledge on COVID-19				
		Sufficient	1.00 (ref)					
				Insufficient	0.476	0.080-2.841	0.080	
Kathmandu Valley	1.00 (ref)		_	Perceived risk due to COVID				
Mountain	0.571	0.088-3.726	0.559	Yes	1.00 (ref)			
Hill	0.797	0.104-6.122	0.827	No	6.871	2.48-19.036	0.000	
Terai	0.739	0.071-7.686	0.800	6. Discussion				
Place of resident			In this study, anxiety was observed in 47.7% of the 176 participants. Among the university students, 32.4% had mild					
Rural	1.00 (ref)			anxiety levels, 4.5% had sever	10.8% had a mode re anxiety. These	lerate level of anxiet	y, and only igh level of	
Urban	0.644	0.259-1.601	0.344	anxiety among the university student population. In a study conducted by Cao et al. (2020) titled 'The psychological impact				
Sleep (hours/day)				of the COVID-19 epidemic on college students in China,' anxiety due to the outbreak was reported in 24.9% of the 7143 respondents. Among them, the proportions of students with mild moderate and severe anxiety were 21.3% 2.7% and				
Less than 6 hrs. 1.00 (ref)								
6 to 7 hrs.	0.816	0.254-2.619	0.500	Initia, inductate, and severe anxiety were 21.5%, 2.7%, and 0.9%, respectively. This data suggests that the level of anxiety observed in the university students in our study was notably higher than the levels reported in the Chinese college student population. The findings of this study suggest that age, religion, province of residence, COVID-19 infection status, and COVID-19 vaccination status were all associated with the likelihood of experiencing anxiety disorder among students. Specifically, pretriging the context of the study suggest for the context of the study students.				
7 to 8 hrs.	0.722	0.201-2.590	0.697					
8 to 9 hrs.	0.692	0.170-2.813	0.963					
9 to 10 hrs.	3.190	0.409-24.910	0.530					
10 hrs. & over	3.234	0.509-38.978	0.981					
Use of social media				likely to have an anxiety disorder compared to those under 30				
Less than 1 hr.	1.00 (ref)			found a higher	prevalence of an	xiety disorders amo	ng younger	
1 to 2 hrs.	0.494	0.064-3.831	0.445	that older students may have developed better coping mechanisms and resilience over time, which may make them better equipped to deal with stressors and challenges. They may also have more life experience and a better understanding of their own strengths and weaknesses, which could help them				
2 to 3 hrs.	0.667	0.087-5.120	0.675					
3 to 4 hrs.	0.951	0.112-8.104	0.912					
4 to 5 hrs.	0.511	0.063-4.158	0.495	manage their a	nxiety.	1. 1. 1 1		
5 hrs. & over	1.025	0.128-8.211	0.991	were more like	ely to experience	anxiety disorder th	an Hindus,	
Have you ever been infected with COVID-19?			with an odds ratio of 5.237. This is in line with other studies that have identified religion as a significant predictor of anxiety					
Yes	1.00 (ref)			disorders, with may be more s	some studies repusceptible to anx	oorting that religious iety due to their exp	minorities eriences of	
No	7.564	1.896-30.170	0.004	discrimination	and marginalizati	on (Chen et al., 2019	9).	
Have you got tested for PCR?			significant predictor of anxiety disorder, with students living in					
Yes	1.00 (ref)			anxiety disorde	er compared to the	g eight times highe	i Province.	
No	0.935	0.724-1.937	0.152	This might be due to the resource management in Bagmati Province. In a study, Devkota et al. (2020) found that				
Have y	ou taken the CO	OVID-19 vaccine?	Participants fr (OR=3.87) of a	om Bagmati pro inxiety in Karnali	vince reported a hi Province.	igher level		
Yes	1.00 (ref)			Simila	arly, students resi	ding in Lumbini Provider than these	ovince had	
No	2.883	0.133-4.070	0.046	Province, poss	ibly due to the pr	ovince's proximity t	o high-risk	

areas in India during the COVID-19 pandemic. This is matched with a study conducted in Italy during the COVID-19 pandemic found that individuals living in areas with high infection rates had higher levels of anxiety, depression, and stress (Mazza et al., 2020).

The finding that students who were not infected with COVID-19 had higher odds of anxiety disorder than those who were infected is an interesting result that warrants further investigation. It could be that students who were not infected were more anxious about the possibility of contracting the virus, or that they were experiencing other stressors related to the pandemic such as social isolation or economic insecurity. A study conducted in China during the COVID-19 pandemic found that individuals who perceived themselves to be at higher risk of infection had higher levels of anxiety and depression (Wang et al., 2020). This supports the idea that anxiety in individuals who were not infected with the virus in our study may have been driven by fear of infection.

Similarly, the students who had not taken the COVID vaccine had 2.8 times higher anxiety than those who had taken the COVID vaccine. This finding is consistent with previous research that has found a positive association between vaccine hesitancy and anxiety during the COVID-19 pandemic (Lin et al., 2021). Another possible explanation is that students who had not taken the vaccine may have been more concerned about contracting the virus and its potential consequences, which could have contributed to their higher levels of anxiety. A study conducted in Iran during the COVID-19 pandemic found that fear of contracting the virus was associated with higher levels of anxiety and depression (Taghrir et al., 2020).

The study findings suggest that there is a significant association between perceived risk due to COVID-19 and the likelihood of developing anxiety disorder among students. Students who reported no perceived risk were found to be at a significantly higher risk of developing anxiety disorder than those who reported yes, with a 6.87 times higher likelihood. This result is consistent with previous research that has shown a relationship between perceived risk and anxiety in various populations (Brosschot et al., 2006; Neria et al., 2008).

7. Conclusion

The study found that a significant number of participants (47.7%) had anxiety disorders. The likelihood of experiencing anxiety disorder was associated with factors such as age, religion, province of residence, COVID-19 infection status, and COVID-19 vaccination status. Older students seemed to have better-coping mechanisms and life experience, making them less prone to anxiety disorders. Province of residence was also an important predictor, with students in some areas more likely to suffer from anxiety due to factors like resource management and proximity to high-risk areas during the pandemic. Interestingly, anxiety was higher in students who had not been infected with COVID-19, likely due to increased fear of contracting the virus. Similarly, those who had not received the COVID-19 vaccine were more anxious than those who had, possibly because the vaccine gives them a sense of safety and empowerment.

8. Policy Implication

The course content on psychosocial counseling (or psychological first aid) and other preventive measures about the pandemic, is necessary to include in the school to universitylevel curricula. Similarly, the state should prioritize students in terms of health care, including vaccines for any emerging pandemics. As the closure of educational institutions is not the best preventive measure, the government should pay attention to public health to run the educational institution maintaining adequate health safety measures and physical distancing to reduce the level of anxiety.

Acknowledgment

This article is based on the research "Stress, anxiety and depression among university youth students due to COVID-19" funded by Research Division, Tribhuvan University (TU). Therefore, the authors are grateful to Research Division, TU. Besides, the authors are also grateful to Prof. Dr. Chitra Bahadur Budhathoki, Dean, Faculty of Education, TU, for his valuable technical feedback on this research.

References:

- Alon, T., Deopke, M., Olmstead-Rumsey, J., & Tertilt, W. (2020). The impact of COVID-19 on gender equality. *National Bureau of Economic Research*. Retrieved https://www.nber.org/papers/w26947
- Batista, P., Duque, V., Luzio-Vaz, A., & Pereira, A. (2021). Anxiety impact during COVID-19: a systematic review. *Journal of Infection in Developing Countries*, 15(3), 320–325. https://doi.org/10.3855/jidc.12730
- Brosschot, J. F., Gerin, W., & Thayer, J. F. (2006). The perseverative cognition hypothesis: A review of worry, prolonged stress-related physiological activation, and health. *Journal of Psychosomatic Research*, 60 (2), 113-124
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, H., Dong, J. & et Al. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research* Retrieved from www.elsevier.com/locate/psychres
- CDOED (2021). Unpublished official record of student's enrolment. Kirtipur: CDOED.
- Chaturvedi, K., Vishwakarma, D.K., & Singh, N. (2021). COVID-19 and its impact on education, social life and mental health of students: A survey. *Child Youth Serv Rev.* DOI: 0.1016/j.childyouth.2020.105866.
- Chen, L., Zhang, G., Cheng, B., & Ma, J. (2019). An exploratory study of social media fatigue and academic performance among undergraduate students. *Educational Technology Research and Development*, 67(3), 513-530. https://doi.org/10.1007/s11423-019-09704-w
- Courtney, D., Watson, P, & Battaglia, M. (2020). COVID-19 Impacts on child and youth anxiety and depression: Challenges and opportunities. *Canadian Journal of Psychiatry*. https://doi.org/10.1177/0706743720935646
- Devkota, H.R., Sijali, T.R., Bogati, R., Ahmed, M., Shakya, K.L. & Adhikary, P. (2020). The impact of COVID-19 on mental health outcomes among hospital fever clinic attendants across Nepal: A community-based cross-

sectional study. *MedRxiv* 2020.07.28.20163295; doi: https://doi.org/10.1101/2020.07.28.20163295

- Dhakal, S. &, Karki, S. (2020). Early epidemiological features of COVID-19 in Nepal and public health response. In *Frontiers in Medicine*, 11 August 2020 <u>https://doi.org/10.3389/fmed.2020.00524</u>
- Gao, J., Zheng, P., Jia, Y., Chen, H., Mao, Y., Chen, S., ... & Dai, J. (2020). Mental health problems and social media exposure during COVID-19 outbreak. *PLoS One*, 15(4), e0231924.
- Ghazawy, ER, Ewis, AA, Mahfouz, EM, Khalil, DM, Arafa, A, Mohammed & et al., Psychological impacts of COVID-19 pandemic on the university students in Egypt, *Health Promotion International*, 36(4), August 2021, Pages 1116–1125, https://doi.org/10.1093/heapro/daaa147
- Han, J., Meyer, B.D. & Sullivan, J.X. (2020). Income and poverty in the COVID-19 pandemic. Retrieved https://www.nber.org/papers/w27729, doi: <u>10.3386/w27729</u>
- Hoofman, J., & Secord, E. (2021). The effect of COVID-19 on education. *Pediatric clinics of North America*, 68(5), 1071–1079. https://doi.org/10.1016/j.pcl.2021.05.009
- Hosmer, D., & Lemeshow, S. (2000). Applied logistic regression (2nd ed.). New York: Wiley.
- Kansakar, S. Dumre, S.P., Raut, A., & Huy, N.T. (2021). From lockdown to vaccines: Challenges and response in Nepal during the COVID-19 pandemic. *Elsevier Public Health Emergency Collection* <u>Lancet Respir Med.</u> 2021 Apr 28, doi: <u>10.1016/S2213-2600(21)00208-3</u>
- Krzysztofik, R, Pietraga, I.K. & Tomasz, S. (2020). Spatial and functional dimensions of the COVID-19 epidemic in Poland. *Eurasian Geography and Economics*. https://doi.org/10.1080/15387216.2020.1783337
- Lowe B, Decker O, Muller S, Brahler E, Schellberg D, Herzog W, Herzberg PY. Validation and standardization of the generalized anxiety disorder screener (GAD-7) in the general population. *Med Care*. 2008;**46**(3):266–274. doi: 10.1097/MLR.0b013e318160d093.
- Mazza, M. G., De Lorenzo, R., Conte, C., Poletti, S., Vai, B., Bollettini, I., ... & Benedetti, F. (2020). Anxiety and depression in COVID-19 survivors: Role of inflammatory and clinical predictors. Brain, behavior, and immunity, 89, 594-600.
- Minitab Express Support (2019). Odds ratios for binary logistic regression. Retrieved from https://support.minitab.com/en-us/minitabexpress/1/help-and-how-to/modelingstatistics/regression/how-to/binary-logisticregression/interpret-the-results/all-statistics-andgraphs/odds-ratios/
- National HIV Curriculum (2021a). Generalized anxiety disorder 7-item (GAD-7). Retrieved from https://www.hiv.uw.edu/page/mental-healthscreening/gad-7

- Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: a systematic review. *Psychological medicine*, 38(4), 467-480.
- Paudel, P. (2021). Online education: Benefits, challenges and strategies during and after COVID-19 in higher education. International Journal on Studies in Education (IJonSE), 3(2), 70-85.DOI: https://doi.org/10.46328/ijonse.32
- Planning Directorate/TU (2020). *Tribhuvan University* 61st annual report. Kirtipur: Planning Directorate/TU
- Price, G.N. (2020). Introduction to the special issue: COVID-19 and its impact on racial/ethnic groups. *Journal of Economics, Race, and Policy*. Retrieved from https://link.springer.com/journal/41996
- Rudestam, K. E. & Newton, R. R. (1992). Surviving your dissertation. London: Sage.
- Serafini, G., Parmigiani, B., Amerio, A., Aguglia, A., Sher, L., &, Amore, M. (2020). The psychological impact of COVID-19 on the mental health in the general population. *QJM. 2020 Jun 22;113*(8):531–7. doi: <u>10.1093/qimed/hcaa201.</u>
- Singh, P., Cumberland, W.G., Ugarte, D., Bruckner, T.A., & Young, S.D. (2020). Association between generalized anxiety disorder scores and online activity among US adults during the COVID-19 pandemic: a crosssectional analysis. J Med Internet Res. 2020;22(9):e21490. doi: 10.2196/21490.-
- Statistics Solution (2021). *Binary logistic regression*. Retrieved from https://www.statisticssolutions.com/binarylogistic-regression/
- Sun, S., Goldberg, S.B., Lin, D. et al. (2021). Psychiatric symptoms, risk, and protective factors among university students in quarantine during the COVID-19 pandemic in China. *Global Health* 17, 15 (2021). https://doi.org/10.1186/s12992-021-00663-x
- Taghrir, M. H., Borazjani, R., Shiraly, R., & COVID-19 Investigators. (2020). COVID-19 and Iranian medical students; a survey on their related-knowledge, preventive behaviors and risk perception. Archives of Iranian medicine, 23(4), 249-254.
- Tribhuvan University (2021). *About us.* Retrieved from https://tribhuvanuniversity.edu.np/page/5_5dd4e523dc74a
- UN (2020). Policy brief: Education during COVID-19 and beyond. Retrieved from https://www.un.org/development/desa/dspd/wpcontent/uploads/sites/22/2020/08/sg __policy_brief_covid-19_and_education_august_2020.pdf.
- Unger, K. (2007). Handbook on supported education: Providing services for students with psychiatric disabilities. Charleston, SC: BookSurge Publishing.
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., McIntyre, R. S., ...
 & Ho, C. S. (2020). Immediate psychological responses and associated factors during the initial stage

of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, *17*(5), 1729.

- Worldometer (2020). *Corona cases*. Retrieved from <u>https://www.worldometers.info/coronavirus/</u>
- Xionga, J., Lipsitzc, O., Nasric, F., Luic, L.M.W., Gillc, H., Phanc, L...Roger S. Mc Intyre, R.S.M. (2020). Impact of COVID-19 pandemic on mental health in the general population: Asystematic review. *Journal of Affective Disorders* 277 (2020). <u>https://doi.org/10.1016/j.jad.2020.08.001</u>