Linkages between stress and stress coping strategies among Nepalese during COVID-19 lockdown: A nationwide cross- sectional study

Kushalata Baral [a], Maginsh Dahal [b,*], Sudip Khanal [a], Poonam Subedi [a], Kabita Pathak [c], Akriti Kafle [d]

[a] Department of Public Health, Nobel College, Pokhara University, Sinamangal, Kathmandu, Nepal
[b] School of Public Health, Nanjing Medical University, Nanjing 211166, China
[c] Department of Humanities, Pashupati Multiple Campus, Tribhuwan University, Kathmandu, Nepal
[d] Department of Nursing, Charak Academy, Purbanchal University, Pokhara, Nepal

ABSTRACT

Aim: With the increase in confirmed cases of COVID-19, the universities and colleges have been shut down posing uncertainty and unpredictability contributing to stress and increased morbidity of mental problems. Students are restricted from regular academic involvement, social interaction and are confined at home to reduce the transmission of the virus which in turn tends to provoke stressors and coping strategies. We aimed to assess the linkage between stress and coping strategies among youth students during COVID-19 lockdown.
Subject and methods: Web-based cross-sectional study was conducted among 2520 university-level students of Nepal. Standard tools like Perceived Stress Scale (PSS) and Stress Coping Resources Inventory (SCRI) were used for collecting information. The final data was analyzed with the help of R-studio (version 1.2.5033). Univariate, bivariate, and multivariate statistics (polytomous logistic regression) were computed to find out the linkages between stress and stress coping strategies.
Results: The results show that students less than 23 years old, females, and living without parents were found to be more likely to have moderate to high levels of stress. The higher the stress level, the lesser was the possibility of practicing stress coping strategies. Active coping was the most preferred coping strategy while social ease was the least preferred.
Conclusions: To conclude, Active coping was the most preferred coping strategy involving active information seeking, readiness to take charge of the disease-related situation along with the realization that such event is a result of chance while social ease was the least preferred strategy which suggests that the students prefer to seek help from their friends or relatives.

1. Introduction

The unprecedented novel coronavirus, named COVID-19, an outbreak that started in Wuhan, China has caused a huge impact not only on the health of the infected and those around them, and the outbreak also shadowed its daunting effects on the psychosocial status of the people across the globe. After the declaration of the outbreak as a "Public Health Emergency of International concern on 30th January 2020, Nepal registered its first index case on 23rd January 2020 and first mortality on 17th May 2020. Nepal initiated a nationwide lockdown including travel restrictions and social distancing after the isolation of the second case of COVID-19 on 23rd March 2020 [1].To date (June 10, 2022), the COVID-19 pandemic took a death toll of 6,305,358 and 532,201,219 were suffering worldwide [2]. Consequently, with the increase in confirmed cases of COVID-19, there has been an increase in mental health problems including a higher

level of stress [3]. People are restricted from social gatherings, face-to-face meetings affecting daily regular schedules, and asked to stay home to alleviate the transmission of the virus. An unknown and unexpected situation such as the COVID-19 outbreak can create a stressful environment and result in an increased level of perceived stress.

The increase in the uncontrollable and unpredictable situation of a person's life relates to changes in circumstances they have to deal with like irritating hassles, change in one's life, and confidence in one's ability to deal with problems [4]. However, the stress coping strategies selected by an individual determines the consequences on the physical and mental health. Following the outspread of the disease from China, many countries have adopted similar preventive measures and have imposed a lockdown restricting people from mobilizing outside their homes except for essential supplies for day-to-day life. Nepal is also one of those countries reporting confirmed cases of COVID-19 and has imposed a nationwide lockdown

since March 24, 2020. Studies show that the repercussions of quarantine measures such as limiting people to staying home and having no contact with other individuals, even with their friends and families have had an adverse influence on their mental health [3,5]. The outbreaks of infectious disease such as COVID-19 is associated with mental illness [6] and could elicit mental disorders such as anxiety and depressive disorders [7]. In the context of educational institutions, schools, colleges, and universities are the most crowded place. The gathering of the students in the conventional education setting that is a plethora of students in a classroom setting within the college, aids for the spread of the COVID-19 on a large scale. Due to this reason, the universities and colleges have been shut down. The uncertainty, seriousness and unpredictability, and social confinement are, therefore, contributing to stress and morbidity of mental problems [8].

The unprecedented widespread of coronavirus disease have adverse mental health consequences [6]. A survey on mental health consequences during the initial stage of the 2020 Coronavirus pandemic was conducted in Spain. This study that assessed the psychological impact, discrimination, loneliness, social support, spiritual wellbeing, self-compassion, and sense of belonging was completed online. The results showed 13.9% of the sample declared that they had suffered symptoms compatible with the disease, while only, 7% had been tested positive by COVID-19 [9]. However, 28.3% did have a family member or close relative who had been diagnosed, with almost 3% of the sample having to live with an infected person [9]. Having COVID-19 symptoms and having a family member or close relative diagnosed and living with him was positively related to the symptomatology of anxiety, depression, and post-traumatic stress disorder symptoms [9]. The study also showed that being a student was found to be a positive predictor for depression [9]. Meanwhile, social factor was one of the key factors among young adults which was more significantly associated with distress rather than the disease itself [10].

In the Nepalese context of COVID-19, a study conducted on the risk factors among the adolescents and young people presents deficient youth mental health services funding; social media use; a suddenly-imposed lockdown; lack of understanding of lockdown restrictions; sudden work/ student life changes; abrupt postponement of the Secondary Education Examination (SEE); on the other hand, mentioning cultural acceptance of facemasks; family structure; school space repurposing; and availability of free counseling as the protective factors for mental health in Nepal [11]. The pandemic has led to various psychological impacts among individuals irrespective of their origin, profession, or any other social background. In a like manner, most economically and physically active population groups i.e. post-secondary or higher-level students experience a higher level of psychological stress [1].Every individual is as much stressed as the outbreak situation is not yet in control. In this study we have chosen the college students because universities are shut down due to the lockdown, education method has shifted from traditional classroom settings to online learning and exams are on hold which is why getting promoted to next semesters or starting new academic sessions are also on hold. The study findings will provide significant evidence for the families, concerned authorities like colleges and universities to address the mental health concerns of the college students. With this study, we aimed to assess the linkage between perceived stress and coping strategies taken by college students amidst the corona crisis, and the COVID-19 lockdown.

2. Methods

2.1. Participants and procedures

Data were drawn from the web-based survey (via Google forms) and respondents gave consent before filling up questionnaires online. The preparation, maturity, and reporting of the survey followed the Checklist for Reporting Results of Internet E-survey (CHERRIES) guidelines [12]. Efforts were made to enhance response rates via Facebook, Twitter and encouraged others to do the same. In addition, we took help from other health professionals, teachers, professors as well as journalists to ensure the validity of the study with a considerable response rate. Data presented here includes

results from the survey collected between June 5 and 20, 2020, approximately 2 months after the initiation of lockdown across Nepal, while the continuation of lockdown still existed. Students who were 18 years or older, able to read and understand the English language enrolled in any University/College in Nepal were considered eligible for the study. The prevalence of stress due to COVID-19 was considered as 50%. With a 5% maximum allowable error and 5% level of significance, the power of the test for this study is (90%)[13]. After computing the sample size of n = 1050, a power analysis with a two-tailed alpha was set to 0.05 provided that the sample of n = 1050 can provide 1.28 (90%) power. Adjusting the sample by design effect (n_1) = 2x1050 = 2100. Considering 20% response error: 2100x0.20 = 420, the exact sample size was calculated as (n_2) = 2100 + 420 = 2520.A total of 2520 responses were collected after approval by the Institutional review committee of Nobel College (Ref No.-FPHIRC 304/2020).Internal consistency was checked for both the tools using Cronbach's alpha with value 0.86 and 0.75 for the level of stress and level of stress coping respectively. The consent form was included in the initial part of the Google form including general information related to the purpose and importance of this study for ensuring voluntary participation in the study. As we have already considered a 20% response error so, there was no question of a decrease in response rate. For confidentiality of the data, respondents were assured that the responses will be deleted from the online assessment portal. The resulting data file that was used for data analysis was free from any of the identifiers including IP addresses or other electronic identifiers.

2.2. Measurement areas

2.2.1. Independent variables and their categorization

Respondents provided details on age, sex, religion, ethnicity, official marital status, household composition, educational details (Field, Level, University), Residence details (Province wise representation, Urban/Rural residence, Place of residence, Residential situation, Residence (stage of community transmission), lockdown restrictions during COVID-19, lockdown. It also includes the COVID-19 status of the respondents and their family members. Stage of community transmission was categorized as a. First Stage (When cases are only imported from affected countries test positive.) b. Second Stage (Local transmission including relatives/ friends of people who traveled abroad) c. Third Stage and above (Community transmission from the above two leading to the epidemic). Similarly, Lockdown restrictions were categorized as a. Complete restriction (not stepping out of the house except for buying necessities, reducing the number of trips outside, and ideally only a single, healthy family member making the trips when necessary) b. Partial restriction (stepping out of the house other than for buying necessities, reducing the number of trips outside the house only to some extent, and not always limiting to only one single healthy person making trips) c. Restriction not maintained at all (not adhering to any of the restrictions)

2.2.2. Level of stress

This measure assessed whether respondents experienced stressful conditions during the COVID-19 lockdown. For those who experienced, ratings of the degree of the stressfulness of each item from 0 (Never) to 4 (Very often) were identified. The items on the Perceived Stress Scale (PSS) tool reflected various areas of stressful conditions like being upset, feeling of nervousness, coping abilities, irritations, and its control, angered of things getting out of control, and reaction to difficulties that were piling up due to the COVID-19 lockdown was assessed [14]. The Perceived Stress Scale (PSS) tool developed by Sheldon Cohen [14] was used to collect data according to the purpose of the study. It is a measure of the degree to which situations in one's life are appraised as stressful. This tool is important because the perception of what is happening in our life is a significant predictor of stress. In this study, the stressful situation of college students due to COVID-19 lockdown was appraised using this tool. The tool was intended to bring about the level of stress students faced during 2 months of lockdown. English version of the tool was used in this study. The level of stress

(Based on the PSS "10 items scale") was categorized into "No stress", "Moderate stress", and "High stress" based on analysis of the individual scores. This study included a total of "7 items" from the PSS based on the relevance with the study objectives. Considering "7 items", the individual scores on the PSS can range from 0 to 28 with a higher score indicating higher perceived stress.

2.2.3. Level of stress coping

As remarkable differences can be noted in people's responses to potentially stressful events, some people might come out of a stressful condition with much strength and positivity while at the same instance; some might face extreme emotional difficulties. The questions used in the stress-coping resources inventory relate to factors most closely associated with the capacity to cope successfully with stress [15]. Out of the "32 items" included in the standard Stress Coping Resources Inventory: A Self- Assessment Tool, "18 items" were chosen based on the relevance with this study objectives which specifically included "7 items"-Wellness Scale which included questions related to sleep, exercise, energy, nutritious diet, use of tobacco and alcohol, "4 items"- Thought Control Scale which included questions related to history of coping, emotions control, nature of the problem, measures to calm down, "3 items"- Active Coping Scale which included questions like likeliness of taking charge of the problem, seeking information, belief about the problem, "1 item"- Social Ease Scale including question about seeking support from friends and relatives", "2 items"- Tension Reduction Scale which includes awareness about practical ways of relaxing and frequency of pursuing some highly relaxing practice", "1 item- Spiritual Practice Scale which includes question about involvement in various forms of spiritual practices (prayer, meditation, inspirational reading)".

2.3. Data management and analysis

Data were extracted and cleaned using Microsoft Excel. The final data was analyzed with the help of R-studio (version 1.2.5033). The data analysis was carried out using descriptive statistics and inferential statistics. Univariate statistics (mean, standard deviation, and percentages) bivariate statistics (chi-square tests and bivariate correlation), and multivariate statistics (polytomous logistic regression) were computed[16].

$$ln\left(\frac{p}{1-p}\right) = \alpha + \beta_1 x_1 + \beta_2 x_2 \dots\dots + \beta_p x_p$$

$$P_{(y_k)} = \frac{\exp\left(\alpha + \beta_1 x_1 + \beta_2 x_2 \dots\dots + \beta_p x_p\right)}{1 + \exp\left(\alpha + \beta_1 x_1 + \beta_2 x_2 \dots\dots + \beta_p x_p\right)}$$

Odds ratio: $OR = \exp^\beta$

Confidence interval: $\exp\left[\hat{\beta} \pm Z_{1-\alpha_2} \times \widehat{SE}\left(\hat{\beta}\right)\right]$

To determine the statistical relationship between the level of stress, symptoms of stress, level of stress coping, and its domains, a p-value of less than 0.05 was considered statistically significant. Those variables that were significant at a 5% level of significance in bivariate analysis were included in multivariate analysis. We calculated the correlation between age and other stress variable because these variables were in the ratio scale. For ratio scale variable we were aware about the correlation between the variables. The problem of multicollinearity was tested by Variance inflection factor (VIF), VIF greater than 2 were excluded in multivariate analysis. Also, Karl Pearson's correlations coefficients were obtained to find the correlation between stress and different coping domains.

2.4. Ethics approval

The study was approved by the Institutional review committee of Nobel College; application number (Ref No.-FPHIRC 304/2020). Written consent was obtained from all the participants before collecting information.

3. Results

Table 1 Based on the statistical analysis there is a significant relationship between age, gender, household composition, level of education, university of education, permanent address, place of residence during COVID-19, residential situation during the lockdown, stage of transmission, level of lockdown restriction and COVID-19 status of a family member with a level of stress (p<0.05). Similarly, age ethnicity, religion, the field of education, university of education, and COVID-19 status of respondents have a significant association with the level of stress coping and level of stress coping (p<0.05).

Table 2 represents a statistically significant relationship between age and the level of stress As per the polytomous logistic regression of different independent variables with the level of stress carried out, the respondents representing the age group less than 23 years were 1.40 times more likely to have a moderate level of stress and 1.71 times more likely to have a high level of stress. The gender-based analysis shows that females were 1.41 times more likely to have a moderate level of stress and 2.33 times more likely to have a high level of stress. Similarly, those living without parents were 0.58 times less likely to have a moderate level of stress. Likewise, the study suggests that the respondents residing in the community where the transmission of COVID- 19 reached the most vulnerable stage i.e. the third and above were 2.01 times more likely to have a moderate level of stress. Moreover, the respondents residing in the community with second, third, and above the stage of transmission of COVID-19 were 1.73 times and 2.08 times more likely to have a high-stress level. Regarding restriction followed during the COVID-19 lockdown, the calculated odds ratio represents that the respondents residing in the community undergoing partial restriction were 0.61 times less likely to have a moderate level of stress. Whereas, with no restriction, the odds of having a moderate level of stress was 1.31 times more. This study relates to the fact that respondents whose family members were in quarantine/isolation were 0.55 times less likely to moderate level of stress. Respondents at the age ($\geq$ 23 years) were 2.11 times likely to be superior stresscopers. Dalit/Janajatis ethnic groups were 0.45 times less likely to be superior stresscopers and those having family members at quarantine/isolation were 0.45 times less likely to be above average stresscopers.

Table 3 illustrates that three domains were significantly correlated with age by Karl Pearson correlation. The coping domain: Thought control, Active coping, Tension Reduction and Overall coping was statistically significant with age. In conclusion, the main predictors of coping include thought control, active coping, tension reduction along overall coping having a positive correlation with age indicates that an increase in age among students tends to increase their stress coping skills. Similarly, the result showed that all six domains were significantly correlated with stress. The coping domains: Overall coping, Active coping, Thought control, Wellness, Spiritual practice, Tension reduction and Social Ease were statistically significant with stress. In conclusion, all the coping domains indicated that with the increase in stress among the respondents the practice of following stress coping skills seemed to decrease.

4. Discussion

Findings reflect that three- fourth of the students have a moderate level of stress and most of them have average stress coping strategies. Findings from a study in Spain also show moderate to extremely severe scores of stress reflecting a higher psychological impact among college students [18]. While, a study in Nepal accord with the findings showing a moderate level of stress among students mainly linking to factors like suddenly imposed lockdown and uncertain academia [19]. Compared to study from Malaysia, key contributors to high anxiety and stress among students were sudden move to online classes, poor internet connection, and dilemma about completion of semester and graduation [20]. Although the level of stresscopers is less reported in other studies, a study in India reveals that most of the participants were having moderate coping strategies score [21].

Table 1

Respondent's characteristics, Residential characteristics, COVID-19 status, Level of stress, and Level of stress coping (n = 2520)

Variables	Category	Level of Stress			P-value (χ²)	Level of Stress Coping			Total	p-value (χ²)
		No stress (%)	Moderate Stress (%)	High Stress (%)		Average Stresscoper (%)	Above Average Stresscoper (%)	Superior StressStresscoper (%)		
Age	Mean ± SD	22.9 ± 3.5								
	< 23	137(9.5)	1084(75.2)	221(15.3)	0.000*	102(7.1)	1223(84.8)	117(8.1)	1442(57.2)	0.000*
	≥ 23	161(14.9)	795(73.8)	122(11.3)		60(5.6)	873(80.9)	145(13.5)	1078(42.8)	
Gender	Male	125(16.1)	581(75.0)	69(8.9)	0.000*	58(7.5)	633(81.7)	84(10.8)	775(30.75)	0.293
	Female	173(9.9)	1298(74.4)	274(15.7)		104(6.0)	1463(83.8)	178(10.2)	1745(69.25)	
Ethnicity	Brahmin/Chhetri	206(11.6)	1332(75.3)	232(13.1)	0.500	113(6.4)	1462(82.6)	195(11.0)	1770(70.2)	0.008*
	Dalit/Janajatis	77(12.3)	451(72.2)	97(15.5)		37(5.9)	541(86.6)	47(7.5)	625(24.8)	
	Madhesi	15(12.0)	96(76.8)	14(11.2)		12(9.6)	93(74.4)	20(16.0)	125(5.0)	
Religion	Hindu	287(12.0)	1762(74.2)	327(13.8)	0.100	153(6.5)	1985(83.5)	238(10.0)	2376(94.3)	0.039*
	Others	11(7.6)	117(81.3)	16(11.1)		9(6.2)	111(77.1)	24(16.7)	144(5.7)	
Marital Status	Married	51(14.9)	240(70.4)	50(14.7)	0.100	17(5.0)	298(87.4)	26(7.6)	341(13.5)	NA
	Unmarried	247(11.3)	1639(75.2)	293(13.5)		145(6.7)	1798(82.5)	236(10.8)	2179(86.5)	
Household Composition	Living with parents	257(11.1)	1746(75.2)	318(13.7)	0.000*	150(6.5)	1931(83.2)	240(10.3)	2321(92.1)	0.930
	Living without parents	41(20.6)	133(66.8)	25(12.6)		12(6.0)	165(82.9)	22(11.1)	199(7.9)	
Level of Education	Bachelor	251(11.2)	1677(74.8)	314(14.0)	0.009*	140(6.2)	1866(83.3)	236(10.6)	2242(89.0)	0.495
	Masters	47(16.9)	202(72.7)	29(10.4)		22(7.9)	230(82.7)	26(9.4)	278(11.0)	
Field of Education	Medical Sciences	79(12.7)	470(75.4)	74(11.9)	0.093	33(5.3)	512(82.2)	78(12.5)	623(24.7)	0.000*
	Allied/Social Sciences	159(11.6)	1031(75.6)	174(12.8)		68(4.9)	1163(85.3)	133(9.8)	1364(54.1)	
	Management/Laws/humanities	37(11.3)	232(70.9)	58(17.4)		40(12.2)	271(82.9)	16(4.9)	327(13.0)	
	Engineering, Manufacturing, and Construction	23(12.2)	146(70.9)	37(17.9)		21(10.2)	150(72.8)	35(17.0)	206(8.2)	
University	A	86(13.3)	454(70.0)	108(16.7)	0.001*	56(8.6)	519(80.1)	73(11.3)	648(25.7)	0.024*
	B	94(8.7)	734(76.3)	142(15.0)		51(5.2)	831(85.7)	88(9.1)	970(37.0)	
	C	11(9.2)	98(80.9)	12(9.9)		11(9.1)	101(83.5)	9(7.4)	121(3.8)	
	D	96(14.3)	507(75.8)	66(9.9)		34(5.1)	557(83.2)	78(11.7)	669(26.5)	
	Others	11(16.6)	86(73.7)	15(9.7)		10(8.9)	88(78.6)	14(12.5)	112(6.9)	
Permanent Address	Province 1	28(9.2)	230(75.4)	47(15.4)	0.003*	15(4.9)	249(81.6)	41(13.4)	305(12.1)	NA
	Province 2	38(15.1)	197(78.5)	16(6.4)		21(8.3)	204(81.3)	26(10.4)	251(10.0)	
	Province 3	109(10.7)	759(74.5)	151(14.8)		88(8.7)	844(82.8)	87(8.5)	1019(40.4)	
	Province 4	46(10.5)	330(75.3)	62(14.2)		15(3.4)	365(83.3)	58(13.3)	438(17.4)	
	Province 5	38(13.6)	199(71.3)	42(15.1)		8(2.8)	246(88.2)	25(9.0)	279(11.1)	
	Province 6	10(17.8)	36(64.4)	10(17.8)		2(3.6)	43(76.8)	11(19.6)	56(2.2)	
	Province 7	29(16.9)	128(74.4)	15(8.7)		13(7.6)	145(84.3)	14(8.1)	172(6.8)	0.133
Place of residence during lockdown	Metropolitan City	112(9.8)	891(77.9)	141(12.3)	0.006*	72(6.3)	944(82.5)	128(11.2)	1144(45.4)	NA
	Municipality (Nagarpalika)	139(13.4)	753(72.3)	149(14.3)		75(7.2)	858(82.4)	108(10.4)	1041(41.3)	
	Rural Municipality	15(13.9)	70(64.8)	23(21.3)		2(1.9)	100(92.6)	6(5.4)	108(4.3)	
	Sub metropolitan city	32(14.1)	165(72.7)	30(13.2)		13(5.7)	194(85.5)	20(8.8)	227(9.0)	
Urban/Rural residence	City/Town (Sahar)	236(11.7)	1530(75.4)	262(12.9)	0.080	130(6.4)	1702(83.9)	196(9.7)	2028(80.5)	0.050
	Village (Gaun)	62(12.6)	349(70.9)	81(16.5)		32(6.5)	394(80.1)	66(13.4)	492(19.5)	
Residential situation during lockdown	Away From Family	37(17.7)	155(74.2)	17(8.1)	0.003*	17(8.1)	167(79.9)	25(12.0)	209(8.3)	0.394
	With family	261(11.3)	1724(74.6)	326(14.1)		145(6.3)	1929(83.5)	237(10.2)	2311(91.7)	
Stage of transmission of COVID-19	First Stage	230(13.2)	1300(74.4)	217(12.4)	0.002*	117(6.7)	1443(82.6)	187(10.7)	1747(69.3)	0.825
	Second Stage	49(10.2)	356(74.0)	76(15.8)		27(5.6)	408(84.8)	46(9.6)	481(19.1)	
	Third and above	19(6.5)	223(76.4)	50(17.1)		18(6.2)	245(83.9)	29(9.9)	292(11.6)	
Level of lockdown restriction	Complete Restriction	114(12.7)	647(72.2)	135(15.1)	0.009*	57(6.4)	749(83.6)	90(10.0)	896(35.6)	0.074
	Partial Restriction	29(21.3)	90(66.2)	17(12.5)		12(8.8)	101(74.3)	23(16.9)	136(5.4)	
	No Restriction	155(10.4)	1142(76.8)	191(12.8)		93(6.3)	1246(83.7)	149(10.0)	1488(59.0)	
COVID-19 status of respondents	Normal at Home	278(11.7)	1775(75.0)	314(13.3)	0.101	145(6.1)	1973(83.4)	249(10.5)	2367(93.9)	0.043*
	Quarantine/Isolation	20(13.1)	104(68.0)	29(18.9)		17(11.1)	123(80.4)	13(8.5)	153(6.1)	
COVID-19 status of family members	Normal at Home	282(11.5)	1833(75.0)	330(13.5)	0.014*	152(6.2)	2040(83.4)	253(10.4)	2445(97.0)	NA
	Quarantine/Isolation	16(21.3)	46(61.3)	13(17.4)		10(13.3)	56(74.7)	9(12.0)	75(3.0)	

* Statistically significant at p<0.05 for chi-square test

A highly robust relation exists between age and the level of stress. Younger students (<23 years) were more likely to have stress levels ranging from moderate to high compared to older ones. However, students (>23 years) were superior stresscopers suggesting that the likelihood of stress coping increases with the increase in age. The findings are in part consistent with studies from Spain, China, and Nepal that people with the highest levels of stress were the young adults and are even presented with the highest distress [19,22,23]. As for, three-fourth of lifetime mental health conditions are considered to appear by the age of 24 [24]. Based on a web-based survey, young people are intolerant and more sensitive to lockdown conditions leading to greater psychological distress than older ones [25]. However, a study from Greece reveals that students are more likely to report depression irrespective of their age [26].

Findings reveal a strong association between gender and level of stress where females were more likely to have moderate to a high levels of stress as compared to the male respondents. Similar studies conducted in China, Switzerland reveals a significantly higher psychological distress among female respondents [10,23,27] reporting female gender as a significant predictor of stress [28]. Similar studies suggest that female students get more negatively affected by a situation and rely more on support networks at the time of crisis as compared to males [27].

In our study, those living without parents during COVID-19 lockdown were more likely to experience a moderate level of stress. Additionally, a study in France, revealed that students living alone reported general stress at moderate or severe levels compared to those living with their parents [17]. However, living with a partner predicted significantly greater social

Table 2

Estimated effects of selected variables with the level of stress and stress coping using a polytomous logistic regression model

Variables	Categories	Moderate Stress OR	95% Confidence interval		High Stress OR	95% Confidence interval	
			Lower bound	Upper bound		Lower bound	Upper bound
Effects of selected variables with the level of stress							
Age(≥ 23)	< 23	1.40*	1.06	1.84	1.71**	1.20	2.45
Gender(Male)	Female	1.41**	1.09	1.84	2.33***	1.62	3.35
Household composition(with parents)	Without parents	0.58*	0.38	0.90	0.90	0.49	1.63
Level of Education(Bachelor)	Masters	0.84	0.58	1.24	0.78	0.45	1.33
Place of residence during lockdown(with family)	Away from Family	1.01	0.64	1.57	0.53	0.27	1.03
Stage of transmission of COVID-19(First stage)	Second Stage	1.33	0.95	1.86	1.73**	1.15	2.62
Restriction(Complete)	Third and above	2.01**	1.23	3.30	2.08***	1.59	4.94
COVID-19 status of family members(Normal)	Partial Restriction	0.61*	0.38	0.99	0.62	0.33	1.26
	No Restriction	1.31*	1.00	1.7	1.08	0.77	1.51
	Quarantine/Isolation	0.45**	0.25	0.81	0.71	0.33	1.55
Effects of selected variables with the level of stress coping							
Age(< 23 years)	≥ 23 years	1.23	0.88	1.71	2.11***	1.41	3.16
Ethnicity (Brahmin/Chhetri)	Dalit/Janajati	1.17	0.77	1.78	0.55*	0.32	0.95
	Madhesi	0.64	0.34	1.2	0.98	0.46	2.11
Religion(Hindu)	Others	0.8	0.38	1.71	2.34	0.96	5.67
COVID-19 status of the family members(Normal at Home)	Quarantine/Isolation	0.55*	0.32	0.94	0.44*	0.21	0.94

*, **, *** significant at 5%, 1% and 0.1% level; OR: Odd's Ratio

( ) reference category;

Note: The variables which are significant on the chi-square test are used in the regression model. The variables' level of education, religion, and place of residence during lockdown was dropped out due to a presence in multicollinearity. The multicollinearity was accessed by the VIF factor.

connectedness and psychological health during the lockdown [29]. Shreds of evidence claim that students living alone during the lockdown are more likely to develop mental health problems [27].

Our study suggests that the respondents residing in the community where the transmission of COVID- 19 reached the most vulnerable stage were more likely to have moderate to a high level of stress compared to the community at the first stage of transmission. This finding holds similarity with a study in Spain [22] illustrating the higher level of stress, anxiety, and depression as confinement increases showing the difference in the vulnerability of the disease. Also, a moderate level of stress was reported by individuals residing in areas with rigid lockdown restrictions as compared to those following complete restriction. Given the findings from a study conducted in Switzerland, a higher stress level was seen among individuals who denied confinement measures [30] and did not see any positive aspects of the lockdown [30].

The least proportion of respondents whose family members were in Quarantine/Isolation were less likely to moderate level of stress. However, recent findings in China are in stark contrast showing higher DASS stress subscale scores on people having high levels of concern about family members getting COVID-19. In this instance, despite getting worried about their family members, respondents believed that they would survive if infected [31]. Meanwhile, a study conducted in Switzerland shows that the COVID-19 health risk of a loved one is associated with an increase in perceived stress among young adults [10]. Furthermore, a level of stress exists and it might be due to stigmatization and societal rejection towards the person under quarantine or isolation in forms of discrimination, avoidance by a neighborhood along with separation from loved ones, suspicion, and fear of withdrawal from social events even after getting cured.

Table 3

Correlation between age and stress with stress coping domains

Domains	Age	p-value	Stress	p-value
Wellness	-0.027	0.1783	-0.19	0.000***
Thought Control	0.109	0.000***	-0.23	0.000***
Active Coping	0.091	0.000***	-0.26	0.000***
Social Ease	0.023	0.2541	-0.05	0.020**
Tension reduction	0.068	0.000***	-0.14	0.000***
Spiritual Practice	0.038	0.058	-0.16	0.000***
Overall	0.082	0.000***	-0.26	0.000***

, * significant at 1% and 0.1% level

Karl Pearson's correlation analysis revealed that there is a significant association between different domains of stress coping and the age of respondents. The result showed that three domains were significantly correlated with age. The main predictors were thought control, active coping, tension reduction, and overall coping which indicate that an increase in age tends to increase the stress coping skills. Similar to a prior study on COVID-19, Young adults are engaged in less productive coping strategies such as substance use, behavioral disengagement, and humor with very small to medium effect size [32]. However, young adults need to be given higher attention as this segment of the population needs to adhere to more adaptive coping strategies. Likewise, all the six domains of stress coping were significantly correlated with stress. All the coping domains indicated that when the stress level is higher, the practice of stress coping mechanisms tends to be lower. Particularly, active coping can be noted as the most preferred coping strategies which confront skills like active information seeking, taking charge when confronted with COVID-19 situation along having positivity about such events. Likewise, social ease can be found as the least preferred measure of stress coping which includes the likelihood of seeking help from friends or relatives. Compared to a study conducted in Switzerland, young adults facing more pandemic and lockdown distress more frequently practiced several coping measures like seeking social support, engaging in distractions, and seeking professional help. Similarly, practicing these coping strategies was associated with lower distress [10]. Additionally, other studies from China suggest that active coping positively predicts life satisfaction and overcome the negative impact posed by the stressors [33] suggesting a higher impact of the event and DASS stress subscale measures among students during the COVID-19 pandemic [31]. At the instance, study findings from a study in the United States illustrate that adaptive coping like acceptance and proactive behaviors have a positive impact on mental health. Hence, self-management of problems by the use of digital technologies and telehealth applications is considered preferable for students for mitigating mental health issues due to COVID-19 [34]. However, as the virus continues to spread, it demands more sense of responsibility towards the management of mental health problems in the future.

5. Conclusions

This study is elemental with stress and stress coping among students in Nepal whilst the COVID-19 lockdown. In the course of obligatory lockdown, the higher the stress level, the lesser was the possibility of practicing

stress coping strategies. Active coping was the most preferred coping strategy involving active information seeking, readiness to take charge of the disease-related situation along with the realization that such event is a result of chance while social ease was the least preferred strategy which suggests that the students prefer to seek help from their friends or relatives. The study findings will provide significant evidence for the families, concerned authorities like colleges and universities to address the mental health concerns of the college students.

6. Limitations

Web-based surveys are considered harder to validate as compared to studies conducted face to face. The poor response rate was common which might be due to survey fatigue which is one of the major problems with web-based surveys [35] as we faced the same for our study. Moreover, respondent's features i.e. students being avid internet users were considered as enthusiastic form fillers, the survey features i.e. in line with the existing COVID-19 situation intending to document new phenomena due to new scenario and investigator's features i.e. requiring prompt data generation taking into concern the peak of confinement due to lockdown restriction for 2 months and no possibility available for face to face survey with the students were the considerations of our study.

Ethics approval

Ethical approval was obtained from the Institutional Review Committee of Nobel College, Pokhara University, Nepal.

Consent to participate

Written informed consent was taken from each participant. Participation in this study was fully voluntary. Confidentiality of the information was ensured and maintained by coding system.

Consent for publication

Consent for publication does not apply for this manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Code availability

The software application or custom codes used in the research are available from the corresponding author (MD), upon reasonable request.

Authors contribution

Principal investigator: K.B. Conceived of the study, participated in its design and coordination and drafted the manuscript; M.D. Conceived of the study, participated in its design and coordination and drafted the manuscript, supervision; S.K. participated in the design of the study and performed the statistical analysis; P.S., K.P. and A.K. Participated in its design and coordination and helped to draft the manuscript. All authors revised the draft critically and have approved the final text.

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