Education Quarterly Vol: 5, **DOI:** https://doi.org/10.3126/jeqtu.v5i1.76745

Knowledge, Attitude and Practices of Masters Level Students on the COVID-19 Pandemic

Rajan Binayek Pasa[1], Shanti Prasad Khanal[2*], Bishnu Bahadur Khatri[3], Devendra Adhikari[4], Suman Kharel[5], Mohan Kumar Sharma[6], Edwin van Teijlingen[7]

[1]Central Department of Rural Development, Tribhuvan University, Nepal

[2]Central Department of Education, Tribhuvan University, Nepal

ORCID: 0000-0001-6001-9502

[3]Central Department of Rural Development, Tribhuvan University, Nepal

[4]Central Department of Rural Development, Tribhuvan University, Nepal

[5]Central Department of Rural Development, Tribhuvan University, Nepal

[6]New, ERA, Kalopul, Kathmandu, Nepal

[7]Bournemouth University, UKCGE, United Kingdom

***Corresponding Author:** khanalshanti100@gmail.com

Abstract

Research on knowledge, attitude, and practices (KAP) is crucial for disease control. Despite extensive studies on COVID-19 among healthcare workers, adults, and migrants, it remains under-researched at higher academic levels in Nepal. This cross-sectional study uses multistage sampling to ascertain the KAP of 315 Masters level students during the second wave of the COVID-19 pandemic at the University Campus in Kirtipur of Nepal. Data, collected through self-administered questionnaires were analyzed using summative analysis, composite indices, and multiple regression models. The study found high mean values ($\bar{x}$ 3.70 to $\bar{x}$ 4.85) across all KAP variables, indicating strong knowledge, positive attitudes and appropriate COVID-19 preventive behaviors among university students. These outcomes were significantly influenced by factors such as religion and specialization subjects. However, KAP indices were not generally distributed among students from various faculties and central departments. The findings suggest potential policy implications for the relevant departments.

Keywords: Knowledge, Attitude, Practice, Covid-19 Pandemic, Higher Education

Introduction

Coronavirus is a highly infectious disease that can cause severe acute respiratory infections in people (World Health Organization, 2019). The COVID-19 outbreak has had a significant worldwide impact since its start in 2019 (Clark et al., 2020). Nepal, one of the least developed countries in the world, witnessed a considerable health crisis due to the pandemic. As of May 03, 2024, 1,003,450 people have been infected with COVID-19 in Nepal, and 12,925 have died due to it (Worldmeter, 2024). During this pandemic, various studies have been conducted to assess the knowledge, attitude, and practices (KAP) in different regions of the world (Hussain et al., 2020; Joseph et al., 2021; Reuben et al., 2020; Shi et al., 2020; Zhong et al., 2020). This study assesses Nepali university students' knowledge, attitude, and practice regarding the COVID-pandemic.

Appropriate KAP about diseases at an individual level makes it easier to adapt to health threats. Knowledge of disease is a cognitive factor that includes a range of information-based beliefs (Szymona-Pałkowska et al., 2016). KAP plays a crucial role in limiting the spread of diseases. Knowing the source of a disease, its symptoms, and potential prevention methods might help people take preventative measures more effectively (Angelo et al., 2021; Szymona-Pałkowska et al., 2016). Preventive measures are affected by people's KAP (Asraf et al., 2020), and students are considered a vulnerable population in the COVID-19 pandemic (Browning et al., 2021).

We have access to an overwhelming amount of information during this COVID-19 pandemic, but unfortunately, not all of it is accurate due to misinformation about COVID-19 (Acharya et al., 2022; Mahato et al., 2023). Such misinformation can lead to confusion and panic and prevent people from taking the necessary precautions to protect themselves and others. Universities often have adapted education delivery during the pandemic to protect students (Angelo et al., 2021). The pandemic has had a lasting impact on students and universities (Appleby et al., 2022)., such as mental health challenges that could have long-term consequences for their health and education (Browning et al., 2021). One study showed that specific knowledge gaps and misconceptions exist among students about SARS-CoV-2 and COVID-19, as well as negative attitudes toward people with COVID-19 (Middleton et al., 2021; Simkhada et al., 2022). In the United Arab Emirates (UAE), students demonstrated adequate knowledge, as evidenced by their knowledge scores, and also possess good attitudes and low-risk practices toward preventing COVID-19 (Hasan et al., 2021). In Pakistan, most students have adequate knowledge and take better preventive measures against COVID-19 (Faisal et al., 2021).

In Nepal, COVID-19 has been studied in groups such as health workers (Basnet et al., 2020; Shrestha et al., 2021), adults (Asraf et al., 2020) and migrants (Khanal et al., 2021, Khanal et al., 2024) but not university students and sufficient academic level (Karkose, 2021) globally. This research evaluates students' KAP behavior in the COVID context during the second wave of the pandemic from April to August 2021. Therefore, this study's measurement indicators and statistical tools can be reference materials for researchers, academicians, and professionals.

Materials and Methods

A cross-sectional study (Setia, 2016) was conducted in selected Departments of Tribhuvan University (Table 1). The sample size was determined by the principle that at least 100 participants should be identified for each major sub-group in the population and between 20 and 50 for each minor sub-group (Borg & Gall, 1979; Cohen et al., 2007). Hence, 315 postgraduate students were selected from three Faculties (Table 1).

Table 1. *Sample Size Determination*

Faculty (strata)	Departments (cluster)	Sample number
Institute of Science & Technology	Physics	34
	Botany	34
	Computer science	34
Faculty of Education	Education	35
	Health education	35
	Game and sports	35
Faculty of Humanities & Social Sciences	Anthropology	36
	Rural development	36
	English	36
Total		315

Data Collection Tool

The study received consent from the concerned head of the department (Table 1). After that, we also received participants' consent before collecting data, having assured them of confidentiality. The respondents were visited in the Department and hostel premises. The questionnaires were completed by 315 respondents in April and May 2021. It took 25 to 36 minutes to complete our highly reliable (Cronbach's alpha 0.99) questionnaire (Taber, 2017). Moreover, content validity and correlation between knowledge items (r = .52-.98), attitude items (r = .54-.92), and practice items (r =. 54-.95) were also significant at the 0.01 level (Cohen et al., 2018).

We used SPSS version 25 to analyze the data. The normal distribution was found using the Kolmogorov–Smirnov test (N = 315<2000), and we applied descriptive and inferential statistical tools such as central tendency, summative/Likert scale analysis and developed the composite indices (Chakrabartty, 2014; Sava, 2016). We focused on the characteristics of the respondents, KAP, and measurement of association: Normality of KAP index, based on strata and multiple regression models for describing KAP index (DV) and based on characteristics of the respondents (IV).

We also ran normality tests and multiple regression models (Das & Imon, 2016) to establish associations. Geary (1947) claimed there was and would never be a normal data distribution. Moreover, normality is generally not observed in data generated from the Likert Scale. Hence, we applied a composite index (function f from $Rn \rightarrow R$ corresponding to the n-number of component variables) to obtain a single index value from multiple Likert scale variables (Sava, 2016).

Data Collection and Analysis

The study received consent from concerned head of the department (Table 1). After that, before collecting data, we also received participants' consent having assured them of confidentiality. The respondents were visited in the Department and hostel premises. The questionnaires were completed by 315 respondents in April and May 2021. It took 25 to 36 minutes to complete our highly reliable (Cronbach's alpha 0.99) questionnaire (Taber, 2017). Moreover, content validity, correlation between knowledge items (r = .52-.98), attitude items (r = .54-.92) and practice items (r =. 54-.95) were also significant at the 0.01 level (Cohen et al., 2018).

We used SPSS version 25 to analyze the data. The normal distribution was found using the Kolmogorov–Smirnov test (N = 315<2000), and we applied descriptive and inferential statistical tools such as central tendency, summative/Likert scale analysis and developed the composite indices (Chakrabartty, 2014; Sava, 2016). We focused on the characteristics of the respondents, KAP, and measurement of association: Normality of KAP index, based on strata and multiple regression models for describing KAP index (DV) and based on characteristics of the respondents (IV).

We also ran normality test and multiple regression models (Das & Imon, 2016) to establish associations. Geary (1947) claimed there never was and never will be a normal distribution of data. More so, normality is generally not observed from data generated from the Likert Scale. Hence, we applied a composite index (function f from $Rn \rightarrow R$ corresponding to n-number of component variables) to obtain a single index value from multiple Likert scale variables (Sava, 2016).

Results

Background Information

The majority (59.2%) of the students were originally from outside Kathmandu Valley, aged 22-29y (58.9%) and male (58.5%). Fewer than one-fifth of students (18.9%) did not have family comorbidities. i.e. suffering from more than one disease such as diabetes, hypertension, renal failure, cancer. Less than half (40.70%) of the students had a joint family system. The majority (82.6%) of students were from financially middle-class families. Furthermore, less than one-fourth of students (23.7%) did not suffer during the pandemic, and two-thirds (65.8%) returned to their village during the lockdown period, whilst all respondents got a PCR test and vaccine (Table 2).

Table 2. *Background Characteristics of the Respondents*

Variables	Attributes	Frequency	Percent
Permanently from	Outside valley	187	59.2
	Inside valley	128	40.5
Age	22-24 age group	186	58.9
	≥25 years	129	40.8
Gender	Male	181	57.3
	Female	131	41.5
Associated comorbidities	Yes	256	81.0
	No	59	18.91
Religion	Hindu	251	79.4
	Buddhist	57	18
	Christian	5	1.6
Caste group	Janajati	199	63.0
	Dalits	9	2.8
Family system	Nuclear family	185	58.5
	Joint family	127	40.70
Family economic wellbeing	Medium	261	82.6
	High	39	12.3
	Low	4	1.3
Family monthly income	<100000 Rs.	131	41.5
	100000-199000 Rs	96	30.4
Levels of suffering during pandemic	200000-299000 Rs	32	10.1
	Some suffering	195	61.7
	Severely suffered	45	14.2
Return to outside valley during lock down	Yes	123	65.77
	No	64	34.22
PCR test/vaccination	Yes	315	100.00
	No	0	0.00

Indicator Wise KAP Measurement

This study applied Likert indexing variables to measure KAP regarding Coronavirus. We developed constructs containing seven-item variables, each with a minimum score of 0 (not applicable) and a maximum of 5 (strongly agree); see details in Table 3.

Table 3. *Descriptive Statistics on Knowledge, Attitude, and Practice Variables*

Indicators	Knowledge		Attitude		Practice	
	N	$\bar{x}$	N	$\bar{x}$	N	$\bar{x}$
Social distancing	315	4.24	315	3.98	313	3.91
Masking &gloving behavior	311	4.05	313	3.89	311	4.02
Hand washing & sanitizing	312	4.03	313	4.52	315	4.07
Physical exercise	310	4.63	313	4.71	313	4.84
PCR test/vaccination	315	4.85	315	3.97	314	4.12
Health seeking behavior	313	4.49	313	4.06	313	4.18
Comorbidities	308	3.09	314	3.83	308	3.70
Total	296		307		303	

Table 3 shows that statements related to PCR test/vaccination ($\bar{x}$ = 4.85), physical exercise ($\bar{x}$ = 4.63), health-seeking behaviour ($\bar{x}$ = 4.49) and social distancing ($\bar{x}$ = 4.23) showed the highest mean values suggesting appropriate knowledge levels were dominant. The statements related to social distancing ($\bar{x}$ = 3.98), PCR test/vaccination ($\bar{x}$ = 4.63), masking and globing behaviour ($\bar{x}$ = 3.89), and associated comorbidities ($\bar{x}$ = 3.83) got slightly lower mean value comparing to other indicators ($\bar{x}$ = 4.06 to 4.71) again suggesting positive views were highly prevalent. Likewise, for measuring practices, most of the statements related to measurement indicators (except social distancing $\bar{x}$ = 3.91 and associated comorbidities $\bar{x}$ = 3.70) received high mean values ($\bar{x}$ = 4.02 to 4.84) nearer to 5-point Likert scales suggesting very positive behaviour. However, to maintain social distancing, the University authorities implemented online classes during the pandemic. Karakose (2021) also suggested adopting an online emergency and remote teaching approach by institutions offering higher education globally.

Normality of Knowledge, Attitude and Practices Indexes

We found the normality of the knowledge index (N=296; Min=0; Max=5; $\bar{x}$= 4.19) concerning family wellbeing, attitude index (N=298; Min=0; Max=5; $\bar{x}$=4.13) concerning gender and practice index (N=296; Min=0; Max=5; $\bar{x}$=4.12) concerning affected from Coronavirus pandemic have been observed.

Table 4. *Normality of Indexes of KAP*

Index	Family wellbeing	Kolmogorov–Smirnov		
		Statistic	Df	Sig.
Knowledge	High	.76	39	.00
	Medium	.80	242	.00
	Low	.80	4	.10
Attitude	Female	.81	126	.00
	Male	.84	178	.00
Practice	Not suffered	.65	74	.00
	Simply suffered	.82	186	.00
	Severely suffered	.79	43	.00

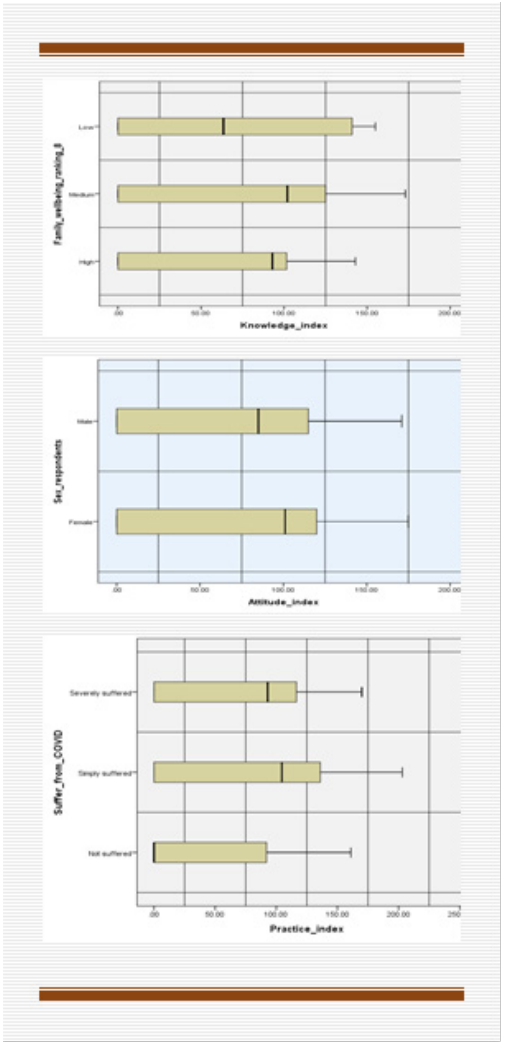

Table 4 depicts the normality of the knowledge index related to their family's social class found in/significant ($p<0.05$) for the high, medium, and low groups (**p>**0.05). We reject the null hypothesis for high and medium family well-being but accept it for low family well-being, which means that the knowledge index is not/ normally distributed. According to the Box plot, the lower limit was high inAgain, medium group, and comparatively low in the high and low groups. The interquartile range was positive for high (103.00), medium (125.25), and low (148.00). Similarly, the upper limit was found to be nil for all groups. However, the box plot contains no outliers, and the data are not symmetric, skewed to the left for the low group and skewed to the right for the medium and high groups.

Table 4 also highlights the normality of the attitude index concerning gender, which was insignificant ($p<0.05$) for both female and male groups. Again, we reject the

null hypothesis, which,h, means that the attitude index is not normally distributed. According to the Box plot, males' lower limit was comparatively higher. The interquartile range was positive for females (120.00) and males (115.25). Similarly, the upper limit was relatively low for all groups. However, the box plot contains no outliers for each group, and the data are not even symmetric, which is skewed to the right for female (0.04) and male (0.02) groups. The normality of practices index of the respondents concerning their suffering during the COVID-19 pandemic was also found to be insignificant ($p<0.05$) for those who did not suffer, those experiencing moderate suffering, and those severely suffered groups. This means that the practice index is not normally distributed. According to the Box plot, the lower limit was almost equal in groups that did not suffer and suffered. The interquartile range was positive for females (120.00) and males (115.25). Similarly, the upper limit was found to be nil for all groups. However, the box plot contains no outliers for each group, and the data are not even symmetric, which is skewed to the right for those who suffered moderately (-0.27) and those who suffered severely (0.15) and skewed to the left for those who did not suffer (0.88).

Multiple Regression Model for Practice Index

The practice index (N=296; Min=0; Max=5; $\bar{x}$=4.12) of 35 Likert scale variables is? related to seven measurement indicators (social distancing, masking and globing behaviour, hand washing and sanitizing, physical exercise, PCR test and vaccination, health-seeking behaviour, and associated comorbidities). The regression model for the dependent variable concerning 11 independent variables (suffering from COVID-19, caste, age, subject studied, employment status, family comorbidities, family system, stayed-in-home quarantine, gender, family well-being, and religious group) is given below. The multiple linear regression presented in Tables 5 and 6, indicating that there was a collective significant effect between independent variables suffering from COVID, caste, age, subject studied, employment status, family comorbidities, family system, stayed-in-home quarantine, sex group, family well-being, religious group) with the dependent variable practice index with $F(11, 31) = 40.69$, $p<0.05$, and adjusted $R^2 = 0.91$.

Table 5. *Model Summary*

	SS	df	Mean Square	F	Sig	R= 0.96 R^2 = 0.93
Regression	230536.72	11	20957.88	40.69	.00[b]	Adjusted R^2 = 0.91
Residual	15963.45	31	514.95			Std. Error of the estimate = 22.69
Total	246500.18	42				Durbin-Watson =1.23

Table 6. *Coefficients for Predictors to Define Practice Index*

	B	SE B	T	Sig.	Tolerance	VIF
(Constant)	302.31**	39.23	7.70	.00		
Age	-3.86	4.27	-.90	.37	.51	1.94
Gender	-1.76	9.39	-.18	.85	.54	1.83
Family comorbidities	-.29	7.26	-.04	.96	.59	1.68
Religion	5.48*	7.71	.71	.04	.53	1.86
Caste	-2.04	4.91	-.41	.68	.47	2.09
Family system	-5.16	8.31	-.62	.53	.78	1.26
Family economic wellbeing	14.86*	13.68	1.08	.02	.55	1.80
Employment status	-2.49	5.84	-.42	.67	.84	1.17
Subject studied	-43.53**	2.26	19.21	.00	.85	1.16
Stay in home quarantine	-7.69	13.58	-.56	.57	.77	1.29
Suffered from COVID	7.99	6.75	1.18	.24	.70	1.41

Family economic well-being (t= 1.08, $p<0.05$), religion (t= 0.71, $p<0.05$), and subject studied (t= 19.21, $p<0.01$) are the significant predictors in the model. The model presented in Table 6 has no issue of multicollinearity, as the VIF for each predictor was less than 2.09. Moreover, the accepted level of autocorrelation (Durbin-Watson = 1.23) (Table 5) signifies that the practice index is 91 percent, explained by the above-mentioned predictor variables. The result shows that the practice index is largely defined by the variable subject studied (Table 6). That means the students studying health, games, and sports-related subjects are on top of practices regarding the coronavirus pandemic; their practice index was significantly higher. Interestingly, students who stayed in home quarantine negatively contributed to the practice index. They might not have suffered or lightly suffered from the Coronavirus pandemic. At the same time, they might have medium family well-being as the relative risk of death from COVID-19 was highly correlated with income and social status (Karmakar et al., 2021).

Discussion

It is evident that university students in our study had extensive knowledge and appropriate practice (Khanal, 2019) of COVID-19. A recent study shows Nepalese education has suffered dramatically from COVID-19 (Adhikari et al., 2023). However, Nepali students with advanced knowledge of COVID-19 had a similar KAP as international students (REF to this study), suggesting that despite differences in cultural backgrounds and educational systems, students with advanced knowledge of the Corona virus can maintain a similar understanding and behavior towards it. Our research found that the results are consistent with a study conducted on medical students by Fatima et al. (2023). Based on the findings of this study, the students possessed adequate knowledge, positive attitudes, and appropriate practices regarding COVID-19. However, another similar study conducted in Bangladesh showed that half of university students did not know this, and one-third (41%) showed poor behavior (Patwary et al., 2022). One-fourth of the students of a higher level in India demonstrated only low and moderate levels of knowledge, negative attitudes, and undesirable practices in preventing COVID-19 (Padmanaban et al., 2022). Studies in Japan (Hatabu et al., 2020) and Vietnam (Doan et al., 2022) indicated that university students had a comprehensive understanding and positive attitude toward taking necessary measures to prevent its spread. They actively implemented preventative practices in their daily lives.

Many socio-demographic factors were associated with KAP, including age, gender, education, income, and occupation. In our study, most of the students were originally from outside Kathmandu, and most returned home to their village during lockdown. This study has found that religion, family economic well-being, and the studied subjects play a significant role in shaping an individual's response to COVID-19. The social class of the respondents also plays a vital role in an individual's COVID-19 KAP. Family members may share information about the Corona virus and how to prevent its spread. They may also provide emotional support during these challenging times, which can help individuals cope with the stress and anxiety associated with the pandemic. According to this study, other societal factors are not significantly related to participants' COVID-19 KAP. One of the reasons for this lack of relationship could be the extensive media coverage and public health messages about COVID-19. The information has been widely and consistently disseminated to the public, regardless of age, gender, or other social factors, leading to a more uniform understanding of the virus and its transmission. However, another study showed that students' KAP scores significantly varied by age, gender, primary, and sources of COVID-19 information

(Doan et al., 2022). Based on our recent findings (Padmanaban et al., 2022), KAP was associated with some socio-demographic variables. A recent study conducted in Bangladesh has revealed that several factors play a significant role in determining students' COVID-19 knowledge and attitudes. The study found that students' gender, Department, and residency were important factors that explained their level of knowledge regarding the novel coronavirus (Ahmed et al., 2023). In Afghanistan, university years, young age, males, and living in urban areas are the factors associated with good KAP regarding COVID-19. However, most Afghan students had poor practices regarding COVID-19 (Sirat et al., 2023).

A study in Saudi Arabia demonstrated moderate knowledge about COVID-19 in health students, with significant differences between the responses of males and females and among the urban and rural populations (Moukhyer et al., 2023). In the Philippines, college students were aware of the importance of vaccination, social distancing measures, following health protocols, and the essentiality of compliance with government agencies' guidelines (Villarino et al., 2023). A study of university students in Lebanon demonstrated that knowledge influences attitudinal statements while attitude influences practice toward COVID-19 (Nocari et al., 2023). Albanian university students had good knowledge, positive attitudes, and appropriate preventive practices against COVID-19 (Merkuri et al., 2023). Our findings indicate that Nepalese postgraduate students had better knowledge about the COVID-19 pandemic than people in India (Gautam & Tiwari, 2023; Koul et al., 2017) and China (Zhong et al., 2020). According to this study, university students have shown themselves responsible for practicing protective measures against COVID-19. These measures include social distancing, mandatory mask-wearing, and frequent hand-washing. According to a recent study, university students are responsible for practicing COVID-19 protective measures. It is argued that university students are often stereotyped as irresponsible and carefree. These findings are encouraging and suggest that university students are taking COVID-19 seriously and doing their part to keep themselves and others safe. This trend must continue as we all work together to overcome this pandemic. There are several reasons behind this, and one of the main ones is the fear of contracting the virus, the perceived seriousness and severity of vulnerability (Khanal et al., 2021; Khanal et al., 2022), and the potential consequences of contracting it. This has led them to take precautions, such as wearing masks and practicing/maintaining social distancing. Another reason is peer pressure. The study found that students tend to follow the lead of their peers. If their peers take COVID-19 seriously, they are also more likely to do so.

For the attitude, the statements related to social distancing, PCR test/vaccination, masking and globing behavior, and associated comorbidities got comparatively lower mean values as the majority of the responses are/were consistently closer to agree points. This means the respondents had a positive attitude toward getting prevented from the pandemic diseases, which encouraged them to apply preventive measures. The practices such as social distancing and associated comorbidities had the highest mean value as most of the responses were/were consistently closer to agreeing on points strongly. Both female and male youths applied preventive measures such as avoiding crowded areas, practicing proper hand hygiene, and masking. This demonstrates that individuals tended to modify their behavior in response to the pandemic diseases. Out of the four established COVID-19 protective behaviors, mask-wearing, self-isolation, physical distancing, and hand washing, not wearing a mask was punishable, even in Nepal.

Regarding the normality test, the knowledge index of the respondents concerning their high and medium family well-being was found not customarily distributed but distributed generally in the low family well-being group. However, the lower limit was found to be high in the medium group and comparatively low in the high and low groups. The data are skewed to the left for the low group and to the right for the medium and high groups. The attitude index of the respondents concerning gender was not normally distributed. The lower limit was found to be comparatively higher in the male group. The Interquartile range was positive for the female and male groups. The data are skewed to the right for female and male groups. The practices index of the respondents concerning their suffering from the Coronavirus pandemic was also found not normally distributed for both not suffered, suffered, and severely suffered groups. The lower limit was almost equal in not suffered and suffered groups. The data are skewed to the right for suffered and severely suffered groups and skewed to the left for not suffered groups. This result is consistent with studies conducted in China, which also found that gender affected practice scores (Shi et al., 2020), and women are significantly more likely than men to engage in preventive behavior. However, the preventive behaviors of females and males worldwide were observed and attributed to the human propensity to avoid risk-taking (Parrish, 2020).

While measuring the association between variables, the practice index is well explained by the predicted variables: suffering from COVID, caste, age, subject studied, employment status, family comorbidities, family system, stayed-in-home quarantine, gender, family well-being, religious group. However, among them, family well-being and religion are the significant predictors in the model. Besides, the practice index is

primarily defined by the variable subject studied. That means the students studying health, as well as games and sports-related subjects, had a high practice index, which means they performed physical activities to be physically fit, which would help them to prevent the COVID-19 pandemic.

Strengths and Limitations

The study was conducted during the second wave of the coronavirus pandemic in Nepal. To the best of our knowledge, there were no KAP studies of COVID-19 in university graduates at the time. This study provides insight into the KAP of university students about COVID-19 and its determinants, although its limitations must be acknowledged. Since the study was conducted at the Departments of Kathmandu Valley, the findings may not apply to other parts of Nepal. Another limitation of this study is the sampling method. The study utilized multistage com quota sampling, which is unlikely to represent the entire student population. The study also relied on self-reported data, which may be subject to social desirability bias, and the study only assessed knowledge about COVID-19 at a single point in time.

Conclusion

The study provided a comprehensive appraisal of the university campus/department. Graduates' knowledge, attitude, and practices regarding the coronavirus pandemic, including safety measures toward the virus spread. The graduates (both female and male) had thoughtfully nourished their horizon of knowledge and attitude related to spreading the virus, which helped them to adopt safety measures. They started adopting social distancing, masking, hand washing, and sanitizing precautions while visiting public places. They started doing physical exercises regularly and suggested maintaining health-friendly, health-seeking behaviors for the members associated with comorbidities, including others. They also disseminated knowledge and information about the vaccine's effectiveness among the family members and neighbors. Having good knowledge and a positive attitude to prevent the coronavirus pandemic and effectively help in developing resiliency of the students pursuing Master Degrees in University Campuses, the Departmental authorities of the Universities are recommended to allocate research funds for conducting such type of empirical research in order to reveal appropriate solutions to the higher educational problems being faced during the pandemic and other similar crises that may arise in the future.

Finally, knowledge about COVID-19 is constantly evolving. Therefore, further research with larger, more representative samples and more robust research designs is

needed to understand university students' knowledge about COVID-19 fully. We want to highlight the impact of vaccines, the presence of the masked face and behaviors, health-seeking behavior, and physical exercises as the potential areas for future research.

References

Acharya, D., Budhathoki, C.B., & Khanal, S.P. (2022). Factors associated with acceptance and willingness to pay for COVID-19 vaccine in Nepal. *Journal of Preventive Medicine & Hygiene*, *63*(2), E240–E256. https://doi.org/10.15167/2421-4248/jpmh2022.63.2.2284

Adhikari, D., Poudyal, C. S. & Pasa, R. B. (2023). COVID-pandemic in Nepal: An opportunity to institutionalise local governance in school education. *Research in Education*, *116*(1), 90–110. https://doi.org/10.1177/00345237231160079

Ahmed, M. N. Q., Lalin, S. A. A., & Ahmad, S. (2023). Factors affecting knowledge, attitude, and practice of COVID-19: A study among undergraduate university students in Bangladesh. *Human Vaccines & Immunotherapeutics*, *19*(1), Article 2172923. https://doi.org/10.1080/21645515.2023.2172923

Angelo, A. T., Alemayehu, D. S., & Dacho, A. M. (2021). Knowledge, attitudes, and practices toward COVID-19 and associated factors among university students at Mizan Tepi University. *Infection and Drug Resistance, 14*, 349–360. https://doi.org/10.2147/IDR.S299576

Appleby, J. A., King, N., Saunders, K. E., Bast, A., Rivera, D., Byun, J., Cunningham, S., Khera, C., & Duffy, A. C. (2022). Impact of the COVID-19 pandemic on the experience and mental health in Canada and the UK: A cross-sectional study. *BMJ Open, 12*(1), Article e050187. https://doi.org/10.1136/bmjopen-2021-050187

Asraf, H., Tripathi, G., Singh, B. M., Ram, R., & Tripti, R. P. (2020). Knowledge, attitudes, and practices towards COVID-19 among Nepalese residents: A quick online cross-sectional survey. *Asian Journal of Medical Science, 11*(3), 6–11.

Basnet, S., Dahal, S., Tamrakar, D., Shakya, Y. R., Jacobson, C., Shrestha, J., & Shrestha, S. K. (2020, Covid-19 special issue). Knowledge, attitude, and practices related to COVID-19 among healthcare personnel in a tertiary care hospital in Nepal: A cross-sectional survey. *Kathmandu Univ Med J (KUMJ), 18*(70), 21–28.

Browning, M. H. E. M., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., Cloutier, S., Vu, T. M., Thomsen, J., Reigner, N., Metcalf, E. C., D'Antonio, A., Helbich, M., Bratman, G. N., & Alvarez, H. O. (2021).

Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PLOS ONE, 16*(1), Article e0245327. https://doi.org/10.1371/journal.pone.0245327

Browning, M. H. E. M., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., Cloutier, S., Vu, T. M., Thomsen, J., Reigner, N., Metcalf, E. C., D'Antonio, A., Helbich, M., Bratman, G. N., & Alvarez, H. O. (2021). Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PLOS ONE, 16*(1), Article e0245327. https://doi.org/10.1371/journal.pone.0245327

Chakrabartty, S. N. (2014). Scoring and analysis of Likert scale: Few approaches. *Journal of Knowledge Management & Information Technology,1*(2),31–44. https://bit.ly/3s8Y8sT

Clark, A., Jit, M., Warren-Gash, C., Guthrie, B., Wang, H. H. X., Mercer, S. W., Sanderson, C., McKee, M., Troeger, C., Ong, K. L., Checchi, F., Perel, P., Joseph, S., Gibbs, H. P., Banerjee, A., Eggo, R. M., Nightingale, E. S., O'Reilly, K., Jombart, T., Edmunds, . . . Jarvis, C. I. (2020). Global, regional, and national estimates of the population at increased risk of severe COVID-19 due to underlying health conditions in 2020: A modeling study. *The Lancet Global Health, 8*(8), e1003–e1017. https://doi.org/10.1016/S2214-109X(20)30264-3

Cohen, L., Manion, L., & Morrison, K. (2018). *Research method in education* (7th ed.). Routledge.

Das, K. D. &Imon. A. H. M. R. (2016). A brief review of tests for normality. *American Journal of Theoretical and Applied Statistics, 5*(1), 5–12. https:// doi: 10.11648/j.ajtas.20160501.12

Doan, D.A., Ho, H. H., & Tran, L.D. (2016, 2022). Knowledge, attitudes, and practices of university students regarding COVID-19: A cross-sectional study in Vietnam. *BMC Public Health 22*,. https://doi.org/10.1186/s12889-022-14442-9

Eichenberg, C., Grossfurthner, M., Andrich, J., Hübner, L., Kietaibl, S., & Holocher-Benetka, S. (2021). The relationship between the implementation of statutory preventative measures, perceived susceptibility of COVID-19, and personality traits in the initial stage of corona-related lockdown: A german and austrian population online survey. *12*(20), 1–12. https://doi.org/10.3389/ fpsyt.2021.596281

Faisal, S., Khotib, J., & Zairina, E. (2021). Knowledge, attitudes, and practices (kap) towards COVID-19 among university students in Pakistan: A cross-sectional study. *Journal of Basic and Clinical Physiology and Pharmacology, 32*(4), 681–686. https://doi.org/doi:10.1515/jbcpp-2020-0436

Fatima, M., Habib, A., Khan, S., Butt, M. H., Mallhi, T. H., & Khan, Y. H. (2023). Knowledge, attitude, practice, behavior and risk perception of COVID-19 pandemic among medical and non-medical university students. *Disaster Medicine and Public Health Preparedness*, *17*, Article e101. http://doi.org/10.1017/dmp.2022.1

Gautam, U. & Tewari, D. (2023). Public knowledge, attitudes, and practices toward COVID-19 pandemic: A cross-sectional study in Delhi and National Capital Region (NCR), India. *Sage Open, 13*(1). https://doi: 10.1177/21582440231153370

Geary, R. C. (1947). ‘‘Testing for normality.’’ *Biometrika34*, 209–242. https://bit.ly/3EUgdjz

Hasan, H., Raigangar, V., Osaili, T., Neinavaei, N. E., Olaimat, A. N., & Aolymat, I. (2021). A cross-sectional study on university students’ knowledge, attitudes, and practices toward COVID-19 in the United Arab Emirates. *The American Journal of Tropical Medicine and Hygiene, 104*(1), 75–84. https://doi.org/10.4269/ajtmh.20-0857

Hatabu, A., Mao, X., Zhou, Y., Kawashita, N., &Wen, Z. (2020). Knowledge, attitudes, and practices toward COVID-19 among university students in Japan and associated factors: An online cross-sectional survey. *Plos One 15*(12), Article e0244350. https://doi.org/10.1371/journal.pone.0244350

Hussain, A., Garima, T., Singh, B. M., Ram, R. & Tripti, R. P. (2020). Knowledge, attitudes, and practices towards COVID-19 among Nepalese Residents: A quick online cross-sectional survey. *Asian Journal of Medical Sciences*, *11*(3), 6–11. https://doi.org/10.3126/ajms.v11i3.28485

Hussain, A., Garima, T., Singh, B. M., Ram, R., & Tripti, R. P. (2020). Knowledge, attitudes, and practices towards COVID-19 among Nepalese residents: A quick online cross-sectional survey. *Asian Journal of Medical Sciences*, *11*(3), 6–11. https://doi.org/10.3126/ajms.v11i3.28485

Joseph, R., Lucca, J. M., Alshayban, D. & Alshehry, Y. A. (2021). The immediate psychological response of the general population in Saudi Arabia during COVID-19 pandemic: A cross-sectional study. *Journal of Infection and Public Health*, *14*(2), 1–8. https://doi.org/10.1016/j.jiph.2020.11.017

Karakose, T. (2021). The impact of the COVID-19 epidemic on higher education: Opportunities and implications for policy and practice. *Educational Process: International Journal, 10*(1), 7–12. http://dx.doi.org/10.22521/edupij.2021.101.1

Khanal, S. P. (2019). Irregular attendance of university students at class and its relation to their academic achievement. *Tribhuvan University Journal*, 33(1), 115–128.

Khanal, S. P., Budhathoki, C. B., & Acharya, D. (2022). Risk perception and intent to take precautionary actions against COVID-19 among the adult population during the pandemic in Nepal. *Journal of Health Promotion*, *10*(1), 113–126.

Khanal, S. P., van Teijlingen, E., Sharma, M. K., Acharya, J., & Sharma, S. (2021). Perceived threats towards COVID-19 pandemic among Nepali migrant workers returned from India. *Journal of Health Promotion*, *9*(01), 87–99. https://doi.org/10.3126/jhp.v9i01.40970

Khanal, S. P., van Teijlingen, E., Sharma, M. K., Acharya, J., & Sharma, S. (2021). Perceived threats towards the COVID-19 pandemic among Nepali migrant workers returned from India. *Journal of Health Promotion, 9*(01), 87-99. https://doi.org/10.3126/jhp.v9i01.40970

Khanal, S. P., van Teijlingen, E., Sharma, M., Acharya, J., Sharma, C., Kharel, S., Gaulee, U., Bhattarai, K., Pasa, R. B. and Bohora, P.(2024). Risk perception and protective health measure regarding COVID-19 among Nepali labour migrants' returnee from India. *KMC Journal*, *6*(1), 313–330. https://doi.org/10.3126/kmcj.v6i1.62364

Koul, P. A., Mir, H., Saha, S., Chadha, M. S., Potdar, V., Widdowson, M. A., Lal, R. B. & Krishnan, A. (2017). Influenza not MERS CoV among returning Hajj and Umrah pilgrims with respiratory illness, Kashmir, north India, 2014–15. *Travel Medicine & Infectious Disease*, *15*, 45–47. https://doi.org/10.1016/j.tmaid.2016.12.002

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology.* https://legacy.voteview.com/pdf/Likert_1932.pdf.

Mahato P., Adhikari B., Marahatta S.B., Bhusal S., Kunwar K., Yadav R.K., Baral, S., Adhikari, A., van Teijlingen, E. (2023) Perceptions around COVID-19 and vaccine hesitancy: A qualitative study in Kaski district, Western Nepal. *PLOS Global Public Health 3*(2), Article e0000564. https://doi.org/10.1371/journal.pgph.0000564

Merkuri, L., Puca, E., Kamberi, F., Alimehmeti, I., Qorri, E., & Borshi, X. (2023). Albanian University students' knowledge, attitudes, and practices regarding COVID-19 infection and vaccine: A cross-sectional study. *The Journal of Infection in Developing Countries, 17*(01), 10–17. https://doi.org/10.3855/jidc.17587

Middleton, N., Tsioutis, C., Kolokotroni, O., Heraclides, A., Theodosis-Nobelos, P., Mamais, I., Pantelidou, M., Tsaltas, D., Christaki, E., Nikolopoulos, G., & Dietis, N. (2021). Gaps in knowledge about sars-cov-2 & covid-19 among university students are associated with negative attitudes toward people with

covid-19: A cross-sectional study in cyprus. *Frontiers in Public Health, 9*. https://doi.org/10.3389/fpubh.2021.758030

Moukhyer, M., Mahfouz, M. S., Habibullah, M. M., Abuhadi, N. H., Khamjan, N. A., Madkhali, A. M., ... & Mukhayer, A. (2023). Evaluation of the knowledge, attitudes, and resulting behavior changes in response to COVID-19 among students at the college of Applied Medical Sciences (CAMS), Jazan University, Saudi Arabia. *Journal of Multidisciplinary Healthcare*, 1075–1084. https://doi 10.2147/JMDH.S405633

Nocari, I., Fadel, D., Dano, D., El-Bikai, R., & Abbas, N. (2023). Knowledge, attitudes, and practices (KAP) toward COVID-19: A cross-sectional study among university students in Lebanon. *Journal of Human Behavior in the Social Environment*, 1–13. 10.1080/10911359.2023.2187913

Padmanaban, S., Rajendran, P., Davis, P., & Velayutham, P. (2022). Knowledge, attitude and practices towards COVID-19 among higher education students in India: A cross sectional study. *Zeitschrift fur Gesundheitswissenschaften= Journal of Public Health*, *30*(7), 1661–1673. https://doi.org/10.1007/s10389-021-01561-7

Parrish, E. (2020). The next pandemic: COVID-19 mental health pandemic. *Perspectives in Psychiatric Care*, *56*, 485–485. https://doi.org/10.1111/ppc.12571

Patwary, M. M., Disha, A. S., Bardhan, M., Haque, M. Z., Kabir, M. P., Billah, S. M., Hossain, M. R., Alam, M. A., Browning, M. H. E. M., Shuvo, F. K., Piracha, A., Zhao, B., Swed, S., Shah, J., & Shoib, S. (2022). Knowledge, attitudes, and practices toward coronavirus and associated anxiety symptoms among university students: A cross-sectional study during the early stages of the COVID-19 pandemic in Bangladesh. *Frontiers in Psychiatry*, *13*, Article 856202. https://doi.org/10.3389/fpsyt.2022.856202

Qin, W., Wang, E. & Ni, Z. (2021). Chinese consumers' willingness to get a COVID-19 vaccine and willingness to pay for it. *PLoS ONE*, *16*, Article e0250112. https://doi.org/10.1371/journal.pone.0250112

Reuben, R. C., Danladi, M. M. A., Saleh, D. A. & Ejembi, P. E. (2020). Knowledge, attitudes and practices towards COVID-19: An epidemiological survey in North-Central Nigeria. *Journal of Community Health*, *46*, 457–470. https://doi.org/10.1007/s10900-020-00881-1

Sava, A. M. (2016). Weighting method for developing composite indices: Application for measuring sectoral specialization. *Journal of Applied Quantitative Methods, 11*(3), 77–84. On https://bit.ly/3swl9or

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology*, *61*(3), 261–264. https://doi.org/10.4103/0019-5154.182410

Shi Y., Wang J., Yang Y., Wang Z., Wang G., Hashimoto K., Zhang K. & Liu, H. (2020). Knowledge and attitudes of medical staff in Chinese psychiatric hospitals regarding COVID-19. *Brain, Behavior, & Immunity – Health*, *4*, Article 100064. https://doi.org/10.1016/j.bbih.2020.100064

Shrestha, A., Thapa, T. B., Giri, M., Kumar, S., Dhobi, S., Thapa, H., Dhami, P. P., Shahi, A., Ghimire, A., & Rathaur, E. S. (2021). Knowledge and attitude on prevention of COVID-19 among community health workers in Nepal-a cross-sectional study. *BMC Public Health, 21*(1), Article 1424. https://doi.org/10.1186/s12889-021-11400-9

Simkhada P, Tamang P, Timilsina L, et al. (2022) Factors influencing COVID-19 vaccine uptake among Nepali people in the UK: A Qualitative study. *Vaccines,* 10(5) Article 780. doi:10.3390/vaccines10050780

Sirat, R., Sahrai, M.S., Rahimi, B.A. et al. (2023). Knowledge, attitudes and practices of university students toward COVID-19 in Southern region, Afghanistan: A cross-sectional study. *BMC Med Educ 23*, 171. https://doi.org/10.1186/s12909-023-04164-w

Szymona-Pałkowska, K., Janowski, K., Pedrycz, A., Mucha, D., Ambroży, T., Siermontowski, P., Adamczuk, J., Sapalska, M., Mucha, D., & Kraczkowski, J. (2016). Knowledge of the disease, perceived social support, and cognitive appraisals in women with urinary incontinence. *BioMed Research International, Article* 3694792. https://doi.org/10.1155/2016/3694792

Taber, K. S. (2017). *The use of cronbach's alpha when developing and reporting research instruments in science education.* https://bit.ly/3D2LJKu

Villarino, R. T., Villarino, M. L., Temblor, M. C., Bernard, P., & Plaisent, M. (2023). College students' knowledge, attitude, and practices on COVID-19 prevention post e-health education program. *International Journal of Public Health*, *12*(2), 568–575. 10.11591/ijphs.v12i2.22774

World Health Organization. (2020). *Coronavirus disease (COVID-19): Health and safety in the workplace*. https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-covid-19-health-and-safety-in-the-workplace

World Health Organization. (2019). *Coronavirus disease (COVID-19) advice for the public.* https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

World Health Organization. (2019). *Coronavirus disease 2019 (COVID-19) papua new guinea situation report 6*. Https://www.who.int/docs/default-source/

wpro%2d%2d-documents/countries/papua-new-guinea/covid-19/png-covid-19-health-situation-report-06.pdf.

World Universsity Ranking. (2022). *The impact of coronavirus on higher education*. https://www.timeshighereducation.com/hub/keystone-academic-solutions/p/impact-coronavirus-higher-education

Worldmeter. (2024). *Total coronavirus cases in Nepal.* https://www.worldometers.info/coronavirus/country/nepal/

Zhong, B. L., Luo, W., Li, H. M., Zhang, Q. Q., Liu, X. G., Li, W. T. & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional survey. *International Journal of Biological Sciences*, *16*(10), 1745–1752. https://doi.org/10.7150/ijbs.45221

Zhong, B. L., Luo, W., Li, H. M., Zhang, Q. Q., Liu, X. G., Li, W. T. & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional survey. *International Journal of Biological Sciences*, *16*(10), 1745–1752. https://doi.org/10.7150/ijbs.45221