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# More than a year into the pandemic: Do higher education students still practice protective behaviors against COVID-19?

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## Abstract:

**BACKGROUND:** The exponential increase of cases and the emergence of the new COVID-19 variants continue to be a challenge. It remains crucial to assess whether or not minimum health standards against COVID-19 are consistently followed. This study determined the higher education students' practice of protective measures against COVID-19 of more than a year into the pandemic.

**MATERIALS AND METHODS:** A questionnaire web survey, cross-sectional study was conducted among higher education students ( $n = 2309$ ) of a public university in the Philippines. Data were analyzed using the SPSS software.

**RESULTS:** Results indicated that students generally had a high practice of COVID-19 preventive measures. However, only 45.9% always practice physical distancing measures, and only 35.9% always seek information related to COVID-19 after more than a year into the pandemic. Female, married, graduate level, with a monthly family income of PHP 10,000 and above, and personal knowledge of someone who tested for COVID-19 had a significantly higher practice of COVID-19 protective measures. Older age, higher general self-reported health status, and higher intention to comply with recommended protective health behaviors were significantly correlated with higher practice of preventive measures against COVID-19.

**CONCLUSION:** After more than a year of being into the pandemic, students still practice preventive health behaviors, however, this is not done consistently. As the pandemic is still not over in the country and many parts of the world, continuous monitoring and a reminder to practice minimum protective health protocols are needed to mitigate and prevent the spread of COVID-19.

## Keywords:

COVID-19, pandemics, Philippines, students, universities

## Introduction

The COVID-19 outbreak has become a global and local health threat and presents a serious challenge to the economy and the educational system.<sup>[1-3]</sup> As an emerging hotspot of COVID-19 cases in the Western Pacific Region,<sup>[4]</sup> the Philippines has been severely affected. The country has witnessed a steady increase in the number of cases and deaths from the onset

of the pandemic.<sup>[5,6]</sup> At the end of July 2021, nearly 200 million and 1.6 million infections have been reported globally and in the Philippines, respectively.<sup>[7,8]</sup>

The COVID-19 outbreak in a resource-limited country with fragile and limited health system capacity poses significant concerns about effective pandemic resilience and response.<sup>[9]</sup> Nevertheless, behavioral practices, such as facemask wearing,

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handwashing, physical or social distancing measures, and information seeking, play essential roles in reducing infection rates and global response against COVID-19 transmission.<sup>[3,9,10]</sup> A better understanding of the health and safety protocols against the highly transmissible viral respiratory disease and the factors associated with adopting these practices are crucial for containing the disease outbreak and exposure to the virus.<sup>[11]</sup>

Meanwhile, there have been several studies conducted both locally and abroad that measured the practices against COVID-19. The majority of these investigations were conducted at the early onset of the pandemic.<sup>[6,10,12-14]</sup> Some studies targeted the general population<sup>[6,9,10]</sup> and health workers.<sup>[15-17]</sup> Studies among university and college students in the Philippines<sup>[11,13]</sup> and other countries such as Libya,<sup>[12]</sup> China,<sup>[18]</sup> Indonesia,<sup>[19]</sup> Japan,<sup>[20]</sup> the United Arab Emirates,<sup>[21]</sup> and Portugal<sup>[22]</sup> were also conducted. Published researches up to July 30, 2020, have also been reviewed in another study.<sup>[23]</sup> However, with the continued exponential increase of cases and the emergence of the new COVID-19 delta variant which reportedly affects more younger and unvaccinated age groups,<sup>[24,25]</sup> this situation raises a challenge and concern for public health experts, policymakers, government authorities, and even school administrators. Hence, ongoing assessment and research of whether practices against COVID-19 are consistently followed or not remain crucial.

Because of COVID-19, students find themselves in uncharted territory.<sup>[26]</sup> Nonetheless, apart from the social representations of university students, their COVID-19 preventive behaviors should be considered as they may also influence the behaviors of their family and community members.<sup>[3]</sup> Furthermore, university students and higher education institutions may play a pivotal role in disseminating key health messages and thus may have an important role in combating COVID-19.<sup>[11,18]</sup> Moreover, it may also be valuable to validate the results of prior investigations such that there are reports of some disconnect between identified and adopted preventive practices.<sup>[9]</sup>

Continuing behavioral assessment and up-to-date evidence regarding students' practices against COVID-19 are vital to make informed policies, strategically develop effective interventions, and prevent undesirable situations once the government, health, and university officials decide to open up schools.<sup>[3]</sup> This present investigation can provide useful data for planning communication messages and health education strategies regarding COVID-19 prevention among higher education students.<sup>[22]</sup> Hence, this study determined the practice of protective behaviors against COVID-19 among higher education students in the Philippines.

## Materials and Methods

### Study design and participants

An online cross-sectional survey research design was used in this study. A total of 2309 out of the 7361 undergraduate and graduate students in a public higher educational institution in the Western Visayas region of the Philippines consented and responded to the online survey. Inclusion for the study would entail: (a) officially enrolled students, (b) of legal age (18 years old and above), (c) with Internet access, and (d) agreed to participate in the study.

### Research instrument

The scales to measure intention and practice of preventive behaviors against COVID-19 were based on the works of earlier scholars.<sup>[27,28]</sup> Intention and practice to four important protective health behaviors (physical distancing, hand hygiene, facemask wearing, and information seeking) were measured. Four items using seven-point Likert response options ranging from 1 (strongly disagree) to 7 (strongly agree) were adopted to measure the participants' behavioral intention. To interpret the behavioral intention mean scores, the following scale of means was used: low = 1.00–3.00, moderate = 3.01–5.00, and high = 5.01–7.00. Another four items using five-point Likert response options ranging from 1 (never) to 5 (always) were adapted to measure the participants' extent of practice of COVID-19 preventive behaviors. The following scale was used to interpret practice mean scores: low = 1.00–2.33, moderate = 2.34–3.66, and high = 3.67–5.00. For this study, the Cronbach's  $\alpha$  for the intention and practice scales was 0.84 and 0.73, respectively. Sociodemographic data (age, sex, marital status, academic year level, family income, and location of residence) were collected. Participants were also asked about their general self-rated health status using a single-item question and were categorized in this study as poor to good and very good to high.<sup>[29,30]</sup> Items answerable by "yes" or "no" were also included asking about the presence of chronic illness or comorbidity, work status, COVID-19 status (if the participant had been diagnosed or tested positive for COVID-19), know personally someone who had COVID-19, and if the participant had a close contact with a COVID-19-positive person. Four research experts examined the instrument of the study to be valid and culturally acceptable.

### Data collection and ethical considerations

This study was conducted in accordance with the Helsinki Declaration and the Data Privacy Act of the Philippines. Clearance for academic research's sound and ethical conduct was granted by the public university where that data were collected. The anonymous web-based survey (Google Forms) was administered in the month

of July 2020. The web link was sent by the Director of Management Information Systems Office to the students' official university E-mail addresses. The survey link was also posted in online platforms (Facebook groups and Messenger), serving as a connection between the students and the university. A brief explanation of the study was given in the first part of the survey. It was made clear that nonparticipation would not be taken against the respondents and class standing would not be affected. Before the participants can proceed with the actual survey, they had to first agree that they are willing to participate voluntarily. A message encouraging the participants to share the survey link with their classmates and peers was enclosed at the end of the survey. Responses derived from the study were kept confidential. The online survey was closed by July 30, 2021, and no further responses were added at the end of the online data collection period.

### Statistical analysis

Frequency (f), percentage (%), mean (M), and standard deviation (SD) were used for descriptive purposes of the profile and practice scores of the participants. The independent sample *t*-test was utilized to test practice score differences according to participants' profiles, while the Pearson's correlation was employed to measure the relationship between variables. All data analyses were performed on the Statistical Package for the Social Sciences (SPSS) version 23. *P* < 0.05 was declared statistically significant.

### Results

Table 1 presents the characteristics of the 2309 participants. The majority of the participants were youth (76.3%), females (72.2%), undergraduate level (94.6%), with estimated monthly family income below 10,000 Philippine pesos or approximately below 200 USD (PHP 50 = 1 USD) (69.3%), residence located in the city area of the province (55.4%), rated very good to excellent general health status (85.6%), with no known chronic illness or unsure presence of comorbidity (84.1%), not working or are full-time students (73.2%), does not personally know some who had COVID-19 (58.7%), and had no close contact with a COVID-19-positive case (92.8%). Only 1.4% tested positive for COVID-19.

Table 2 shows that the mean scores in the intention and practice scales of COVID-19 preventive measures were 6.19 (SD = 1.08) and 4.38 (SD = 0.69), respectively. However, less 46.9% of the participants always practice physical distancing measures, and only 35.9% always seek information related to COVID-19 during the past week. Additionally, 68.3% always practice hand hygiene (wash their hands or use hand disinfectant), and just 73.5% always wear face mask.

Table 3 summarizes the association of independent factors on the practice of preventive measures against COVID-19. It is shown that there were significant differences in the practice of preventive measures against COVID-19 based on sex (*t* = 6.246; *P* = 0.000), marital status (*t* = 9.162; *P* = 0000), academic year level (*t* = 5.423; *P* = 0000), monthly family income (*t* = 5.389; *P* = 0009), and know personally some who had been diagnosed of COVID-19 (*t* = 2.879; *P* = 0004). Age (*r* = 0.115; *P* = 0000), general self-rated health status (*r* = 0.166; *P* = 0000), and intention to comply with recommended health-protective measures (*r* = 0.638; *P* = 0000) were significantly and positively correlated with practice of COVID-19 preventive behaviors. On the other hand, there were no significant differences (*P* > 0.05) in the practice of preventive measures against

**Table 1: Characteristics of participants**

Variables	Frequency (%)
Age (mean=23.66 [SD=6.20])	
Youth (18-24)	1762 (76.3)
Adults (25-58)	547 (23.7)
Sex	
Male	642 (27.8)
Female	1667 (72.2)
Marital status	
Single	2055 (89.0)
Married	254 (11.0)
Academic year level	
Undergraduate level	1953 (94.6)
Graduate level	356 (15.4)
Monthly family income	
PHP below 10,000	1600 (69.3)
PHP 10,000 and above	709 (30.7)
Residence	
City	1279 (55.4)
Town	1030 (44.6)
General self-rated health status (mean=4.08 [SD=0.71])	
Poor to good	333 (14.4)
Very good to excellent	1976 (85.6)
Known chronic illness or comorbidity	
Yes	137 (5.9)
No	2172 (94.1)
Working status	
Yes	1691 (73.2)
No	618 (26.8)
COVID-19 status	
Yes	33 (1.4)
No	2276 (98.6)
Know personally someone had COVID-19	
Yes	953 (41.3)
No	1356 (58.7)
Close contact with COVID-19 positive	
Yes	166 (7.2)
No	2143 (92.8)

SD=Standard deviation

**Table 2: Intention and practice of COVID-19 preventive measures**

Extent of intention and practice	Mean	SD	Strongly agree/always, frequency (%)
Intention	6.19	1.08	
Physical distancing			1283 (55.6)
Hand hygiene			1661 (71.9)
Mask wearing			1424 (61.7)
Information seeking			1432 (62.0)
Practice	4.28	0.69	
Physical distancing			1060 (45.9)
Hand hygiene			1599 (68.3)
Mask wearing			1698 (73.5)
Information seeking			828 (35.9)

SD=Standard deviation

COVID-19 according to location of residence, presence of chronic illness or comorbidity, working status, COVID-19 status, and close contact with a COVID-19-positive case.

### Discussion

This study looked into the practice of preventive health behaviors against COVID-19 among higher education students after almost 16 months from the onset of the COVID-19 pandemic. Our study found that higher education students generally had a high practice of COVID-19 preventive measures. Studies conducted in the Philippines and other countries during the first wave of the pandemic reported good to high preventive practices

**Table 3: Differences and correlates of practice of COVID-19 preventive measures**

Variables	Mean	SD	Test statistics	P
Age <sup>b</sup>				
Youth (18-24)	4.25	0.70	0.115*	0.000
Adults (25-58)	4.40	0.65		
Sex <sup>a</sup>				
Male	4.13	0.78	6.246*	0.000
Female	4.34	0.64		
Marital status <sup>a</sup>				
Single	4.25	0.70	-9.162*	0.000
Married	4.57	0.51		
Academic year level <sup>a</sup>				
Undergraduate level	4.25	0.70	-5.423*	0.000
Graduate level	4.44	0.59		
Monthly family income <sup>a</sup>				
PHP below 10,000	4.24	0.724	5.389*	0.009
PHP 10,000 and above	4.39	0.589		
Residence <sup>a</sup>				
City	4.30	0.69	1.190	0.234
Town	4.26	0.68		
General self-rated health status <sup>b</sup>				
Poor to good	4.14	0.71	0.166*	0.000
Very good to excellent	4.31	0.68		
Known chronic illness <sup>a</sup>				
Yes	4.30	0.76	0.388	0.698
No	4.28	0.68		
Working status <sup>a</sup>				
Yes	4.27	0.75	-0.622	0.534
No	4.29	0.66		
COVID-19 status <sup>a</sup>				
Yes	4.30	0.54	0.108	0.914
No	4.28	0.70		
Know personally someone had COVID-19 <sup>a</sup>				
Yes	4.32	0.64	2.879*	0.004
No	4.23	0.75		
Close contact with COVID-19 positive <sup>a</sup>				
Yes	4.23	0.65	-0.955	0.340
No	4.29	0.69		
Intention to comply <sup>b</sup>				
Low	2.69	1.17	0.638*	0.000
Moderate	3.60	0.67		
High	4.43	0.54		

<sup>a</sup>t-test for independent samples, <sup>b</sup>Pearson's r, \*P<0.05. SD=Standard deviation

among students. A study in the Philippines reported good preventive practices against coronavirus infection among university students.<sup>[11]</sup> Studies conducted in other countries like among Palestinian university students,<sup>[3]</sup> college students in Libya,<sup>[12]</sup> university students in Japan,<sup>[20]</sup> university students in the United Arab Emirates,<sup>[21]</sup> and undergraduate medical students in Egypt<sup>[31]</sup> similarly showed good precautionary and low-risk practices related to COVID-19. The good adherence to COVID-19 preventive measures among higher education students may be attributed to the massive health information campaigns and the presence of regulatory laws that mandate all members of the community including the students to comply with these containment measures.

Notably, despite the generally high practice of students in this study, looking at the proportion of the responses on the four protective health behaviors, these are not being consistently observed by the participants. Only less than half always practice physical distancing. A little over two-thirds always practice hand hygiene (wash hands or use hand disinfectant), and just nearly three-fourths wear face mask consistently when outside of their household. Comparatively, high proportions of physical distancing and mask wearing when leaving home during the early part of the pandemic were noted among the healthy Filipino population,<sup>[6]</sup> among Filipino college students,<sup>[13]</sup> and among employed Filipinos.<sup>[32]</sup> A higher proportion of handwashing among income-poor Filipino respondents<sup>[9]</sup> and university students<sup>[11,13]</sup> was also reported. Additionally, in our present study, only a little over one-third seek information related to COVID-19 during the past week. It may be possible that participants are already aware of COVID-19, hence the less information-seeking behavior. However, as fewer people are seeking COVID-19 information and following its development, concerns about misinformation may also impede public health responses.<sup>[9]</sup> Furthermore, the relatively long presence of COVID-19 led scholars and health experts to be concerned about the challenge of pandemic burnout and fatigue, in the face of which even good practice can waiver.<sup>[3,28,33,34]</sup> A study also noted a decreasing trend in students' self-restraint behavior over time.<sup>[22]</sup> Because several COVID-19 response approaches employed by rich countries are less likely to be feasible in limited-resource settings<sup>[9]</sup> and as the pandemic is still here to stay in the next few months, our findings highlight the need to continuously remind and encourage students to follow minimum health standard as a means of preventing the spread of COVID-19.

Consistent with other studies, we found significant differences and correlations in the practice of preventive health behaviors based on students' sociodemographics such as gender, marital status, monthly income, age, and

academic year level. In our study, older adult students, at the graduate level, and married had a higher level of practice. Perhaps, in our research, older students tended to be married and were taking graduate courses. Older, married, and graduate students may consider themselves at higher risk for COVID-related medical complications and mortality, thus they may have better adherence to COVID-19 preventive measures. A study in Saudi Arabia and Libya similarly found that older individuals and high-income groups or those with stable financial sources are likely to have better preventive practices.<sup>[10,12]</sup> Another study among Indonesian university students disclosed that being younger was associated with poor behavior practices against COVID-19.<sup>[19]</sup> Our result is also consistent with the literature in terms of gender differences in COVID-19 preventive practices. Studies conducted in the Philippines and elsewhere noted that men compared to women had less good practice toward COVID-19.<sup>[4,6,10,12,22,31]</sup> Gender is generally suggested in the literature as an important social determinant of health behavior.<sup>[35]</sup> Males are likely to perform activities that are detrimental to their health and may be discouraged from performing or complying with measures against COVID-19.<sup>[35]</sup> Male students should be given attention as males are at a higher risk of dying from COVID-19.<sup>[36]</sup>

Furthermore, students with higher self-reported general health status and those who personally know a COVID-19-positive person had a higher practice of COVID-19 preventive measures. Possibly, those with higher self-reported health ratings may be more capable of performing preventive behaviors. Alternatively, a higher practice of preventive health behaviors may also provide the participants with a better perception of their general health status. Correspondingly, better compliance with COVID-19 preventive measures was associated with better well-being.<sup>[17]</sup> A study even noted that practice of more preventive behaviors is associated with decreased depressive symptoms among Chinese university students.<sup>[14]</sup> Moreover, students who personally know a COVID-19-positive person may perceive themselves as at higher risk of acquiring the disease and thus may report better preventive practice. A study revealed that students who perceived themselves as at higher risk of infection were likely to adhere to COVID-19 preventive measures.<sup>[31]</sup>

In this study, we also found that higher behavioral intention was significantly correlated with a higher practice of protective measures against COVID-19. Other studies also found that intention to follow or comply with COVID-19 preventive measures was correlated with actual practice behavior.<sup>[37,38]</sup> Our study supports the theory of planned behavior that posits behavioral intentions immediately determine actual behavior.<sup>[39]</sup>

On the other hand, our research found no significant variation in the practice of preventive measures against COVID-19 based on location of residence, presence of chronic illness or comorbidity, working status, COVID-19 status, and close contact with a COVID-19-positive case. Some literature support and contradict our findings. For instance, similar to our result, residence was not associated with following COVID-19 preventive behaviors among the Egyptian population.<sup>[40]</sup> However, a study based in the United States of America disclosed COVID-19 preventive measures such as maintaining physical distance and limiting social gatherings significantly differed by employment status.<sup>[41]</sup> Additionally, while those with chronic medical conditions are at a high risk of dying due to COVID-19,<sup>[42]</sup> surprisingly, our study revealed no significant variation in the COVID-19 preventive practice among those with and without chronic medical illness. Furthermore, in our study, preventive practices against COVID-19 did not significantly vary by COVID-19 status and presence or absence of a close contact with a COVID-19-positive case. The unequal proportion of the categories in these variables may have influenced the result of this present investigation. Further research is required to validate these findings.

### Limitation and recommendation

Our present investigation has shortcomings. Despite the relatively large sample size, the generalizability of findings cannot be guaranteed. Our study involved a single site, evaluated only four behavioral practices, and relied on self-reported instead of actual observed practices of the participants. Students with limited or no Internet access may also be underrepresented. Furthermore, the cross-sectional design of the study has temporal limitations and cannot infer causality. Future researchers may pursue qualitative research designs to understand better the reasons for the nonobservance of hygiene issues by some groups and to identify the hidden layers of the issue. Despite the limitations, our study offers a timely and up-to-date understanding of the preventive health behaviors of students after a year of the COVID-19 pandemic.

### Conclusion

After more than a year of being into the pandemic, our study highlights that despite the generally high intention and practice of preventive health behaviors, university students do not always practice these behaviors. Moreover, some sociodemographic (age, sex, marital status, monthly family income, and academic year level) and health-related variables (general self-rated health status and knowing personally someone who had COVID-19) are associated with COVID-19 preventive practices. Noting the variables that contribute to the

practice measures against COVID-19 is important in the ongoing implementation of pandemic responses to direct public health interventions, specifically among higher education students. Public health practitioners, school nurses, and the administration of the university should give particular attention in the provision of timely health education communication messages on the consistent practice of preventive and safety measures toward COVID-19 to targeted group of students, particularly among the younger age cohort, men, and those from the low-income level. Additionally, the present study affirms prior research regarding behavioral intention as a sound determinant of actual behavior. As the pandemic is still not over in the country and in many parts of the world, continuous monitoring and constant reminders to practice minimum protective health protocols and safety measures are necessary as this can assist in mitigating the spread of the highly transmissible coronavirus. The unceasing investment by institutions of higher learning in preventive campaigns is needed to support good preventive measures among students.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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