

COVID-19 vaccination intentions among nursing students in the context of a public health emergency



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ABSTRACT

COVID-19 vaccination emerged as a critical public health strategy to mitigate the impact of the COVID-19 pandemic and reduce disease-related morbidity and mortality. This study aimed to determine nursing students' intentions to receive the COVID-19 vaccine and the factors associated with these intentions. A descriptive cross-sectional study design was used, and 189 nursing students enrolled at a selected university participated in the study. Survey questionnaires were used to collect the required data, which were analyzed using descriptive and inferential statistics. The study showed a moderate intention to get vaccinated ($M = 3.34$, $SD = 1.43$), with just over half (56.6%) indicating that they were likely to receive the vaccine. Further, vaccination intention differed significantly according to religious affiliation ($p = 0.006$), with Roman Catholic students reporting higher vaccination intentions than non-Roman Catholic students. Attitude toward vaccination was significantly associated with vaccination intention ($\rho = -0.379$, $p < 0.001$). Multiple regression analysis showed that attitude toward vaccination, perceived threat of COVID-19, and religious affiliation were independently associated with vaccination intention. More negative attitudes toward vaccination were associated with lower vaccination intention. Overall, COVID-19 vaccination intention was moderate, and willingness to vaccinate was higher for vaccines described as having greater effectiveness. Improving vaccination uptake may involve addressing concerns about side effects and building trust in the vaccination process.

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1. Introduction

Vaccination is widely recognized as one of the most effective public health interventions for preventing infectious diseases and reducing their associated burden (WHO, 2026). Despite strong evidence supporting vaccine safety and

effectiveness, vaccine hesitancy remains a persistent global concern (Brewer et al., 2017). Recent studies among nursing and healthcare students have reported varying levels of COVID-19 vaccine acceptance, with concerns about vaccine safety, effectiveness, and adverse effects, as well as trust in health authorities, remaining important factors associated with vaccine hesitancy (Galanis et al., 2021; Patelarou et al., 2021). Recent public health emergencies have underscored the substantial health, social, and economic impacts of infectious diseases worldwide (WHO, 2026). Vaccination remains one of the most effective strategies for reducing disease transmission, preventing complications, and lowering mortality rates (Plotkin,

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2014). Despite the availability of effective vaccines, achieving optimal vaccination coverage remains challenging due to safety concerns, misinformation, and limited trust in health systems (Larson et al., 2014). These challenges highlight the importance of understanding behavioral and psychosocial factors associated with vaccination uptake.

Despite these advances, vaccine hesitancy continues to challenge immunization programs globally and is influenced by factors such as confidence, complacency, and convenience (Larson et al., 2014). In the Philippines, variability in vaccination uptake has been observed, reflecting broader issues related to public trust and health communication (Yu et al., 2021). Evidence from recent studies suggests that nursing students generally demonstrate moderate to high acceptance of COVID-19 vaccination; however, hesitancy persists among some students because of concerns about vaccine safety, long-term effects, and misinformation (Biswas et al., 2021; Patelarou et al., 2021).

Sustained vaccination efforts require a deeper understanding of the behavioral and psychosocial factors that influence vaccine acceptance. The Health Belief Model (HBM) provides a useful framework for examining these factors, suggesting that health-related actions are influenced by perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy. Previous studies have demonstrated that these constructs are significantly associated with vaccination intentions and uptake across various populations (Donadiki et al., 2014; Schaefer Ziemer and Hoffman, 2013). Thus, this study aimed to explore factors associated with COVID-19 vaccination intentions among nursing students.

2. Research methodology

The study used a descriptive cross-sectional design. An a priori sample size calculation was conducted using G*Power version 3.1.9.7 for multiple linear regression analysis (fixed model, R^2 deviation from zero). The calculation was based on a medium effect size ($f^2 = 0.15$), a significance level of 0.05, statistical power of 0.80, and 11 predictors included in the regression model. The analysis indicated that a minimum sample of 123 participants was required. In total, 189 nursing students participated in the study, which exceeded the minimum required sample size.

The study utilized a number of instruments adopted from previous research. The instruments were retained in their original COVID-19-specific form to preserve validity. Accordingly, the findings of this study should be interpreted specifically within the context of COVID-19 vaccination rather than vaccination in general. Demographic Information Sheet: This includes questions pertaining to age, sex, year level, type of school, and religious affiliation. General Health Perception or SRH (Bombak, 2013): A single-item, "In general, would you say your health

is" with the response items "1-poor" to 5-excellent." Perceived Severity of COVID-19 (Olagoke et al., 2020): This was measured using a single item that asked respondents, "Coronavirus is a serious infection for me to contract." Response options ranged from "1 -Strongly disagree" to "5-Strongly agree." Perceived coronavirus threat (Conway et al., 2020): This self-report measure includes 6 items that load on a single factor and assess COVID-19 threat perceptions. In this study, the measure is scored using a 5-point Likert scale, "1-Not true of me to "5-Very true of me." For this study, the scale has an α of 0.83. Health Locus of Control (Olagoke et al., 2020): The external LOC was assessed using 3 items: (i) No matter what I do, if I am going to get sick, I will get sick, (ii) God controls whether one falls sick or not, and (iii) If it is meant to be, I will stay healthy. Responses were assessed on a 5-point Likert scale, from strongly agree (1) to strongly disagree (5). Responses were reverse-coded and averaged to a range of 1 to 5, with lower numbers indicating higher levels. The authors report a reliability of 0.70 for the tool, while this study found an alpha of 0.54.

Vaccine Attitude Examination (VAX) Scale (Martin and Petrie, 2017): The VAX scale consists of 12 items measuring four distinct vaccination attitudes. Items were presented in the form of statements, with responses on a 6-point Likert-type scale ranging from "1-strongly agree" to "6-strongly disagree." Higher scores reflect negative attitudes towards vaccination. The scale for this study has a Cronbach's alpha of $\alpha = 0.89$, with each subscale reporting the following reliability indices: trust/mistrust of vaccine benefits ($\alpha = 0.84$), worries about unforeseen future effects ($\alpha = 0.84$), concerns about commercial profiteering ($\alpha = 0.81$), and preference for natural immunity ($\alpha = 0.71$). Intention to Vaccinate: COVID-19 vaccination intention was assessed with a single item that asked participants, "If there is a preventive vaccine against COVID-19, how likely are you to receive the vaccine?" (Olagoke et al., 2020). Responses were assessed on a 5-point Likert scale ranging from extremely unlikely to extremely likely. A general question was also asked: Are you likely to get the COVID-19 vaccine once available? Are you likely to get vaccinated for a 95% effective COVID-19 vaccine? Participants were asked if they would accept a free vaccine that was 95 or 50% effective (Harapan et al., 2020).

2.1. Data collection procedure

Before data collection, permission to use the research instruments was obtained from the respective authors. After receiving permission, ethical clearance was obtained to ensure that the study complied with ethical guidelines for research involving human participants. The researchers then contacted the Deans of the selected Colleges of Nursing where the study was conducted. After obtaining permission from the Deans, the researchers coordinated with them to determine suitable dates for data collection. The participants

were then screened according to the established inclusion and exclusion criteria. Eligible participants were given 30 minutes to complete the self-administered questionnaire.

2.2. Data analysis

For data analysis, IBM SPSS version 26 was employed. For the purposes of description, frequencies (percentages) and means (with standard deviations) were employed. To compare the means, the independent-samples t-test and the one-way analysis of variance (ANOVA) were used. Pearson's r correlation was used to assess bivariate associations among the study variables. A subsequent multiple linear regression analysis was conducted to identify factors independently associated with COVID-19 vaccination intention.

3. Results

Table 1 shows an average age of 20.45 among participants. The majority were female (81%), attended public school (80.4%), and had a Roman Catholic religious affiliation (83.2%). There were 38.6% in the first year, 36% in the second year, and 25.4% in the third year.

Table 1: Demographic profile of the participants (n = 189)

Variable	n/M	Percentage/SD
Age, years	20.45	3.76
Sex: male	36	19.0
Sex: female	153	81.0
Year level: first year	73	38.6
Year level: second year	68	36.0
Year level: third year	48	25.4
Type of school: public	152	80.4
Type of school: private	37	19.6
Religious affiliation: Roman Catholic	157	83.2
Religious affiliation: non-Roman Catholic	32	16.9

Age is reported as M (SD); categorical variables are reported as n (%)

Table 2 shows a generally good perceived health status (M = 4.15, SD = 0.75) and moderate locus of control (M = 3.37, SD = 0.96) among participants. However, participants perceived infectious diseases as highly severe (M = 4.14, SD = 1.01) and highly threatening (M = 3.96, SD = 0.87). In terms of attitude, participants generally have an ambivalent attitude towards vaccination (M = 3.68, SD = 1.00).

Table 2: Descriptives of major variables

Variables	M	SD
General health perception	4.15	0.75
Perceived severity	4.14	1.01
Perceived threat	3.96	0.87
Health locus of control	3.37	0.96
Attitude to vaccination	3.68	1.00
Trust/mistrust of vaccine benefit	3.42	1.32
Worries over unforeseen future effects	4.45	1.25
Concerns about commercial profiteering	3.46	1.30
Preference for natural immunity	3.40	1.14

Table 3 shows a moderate intention to get vaccinated (M = 3.34, SD = 1.43), with just over half (56.6%) likely to receive the vaccine once available. Only 23.8% were likely to get vaccinated for a 50% effective COVID-19 vaccine, although 67.2% were likely to get vaccinated for a 95% effective COVID-19 vaccine.

Table 3: Intention to vaccinate

Question/indicator	Response format	M	SD	Yes, n	Yes, %
Preventive COVID-19 vaccine: likelihood of receiving the vaccine	5-point scale	3.34	1.43	—	—
COVID-19 vaccine once available	Yes/No	—	—	107	56.6
COVID-19 vaccine with 50% effectiveness	Yes/No	—	—	45	23.8
COVID-19 vaccine with 95% effectiveness	Yes/No	—	—	127	67.2

The first item uses a 5-point likelihood scale. The remaining items are reported as yes/no responses

Bivariate analyses indicated that vaccination intention differed significantly according to religious affiliation ($p = 0.006$), with Roman Catholic students reporting higher vaccination intentions than non-Roman Catholic students. Vaccination attitude was significantly associated with vaccination intention ($p = -0.379$, $p < 0.001$). Specifically, greater mistrust of vaccine benefits ($p = -0.382$, $p < 0.001$), stronger worries regarding unforeseen future effects ($p = -0.274$, $p < 0.001$), greater concerns regarding commercial profiteering ($p = -0.334$, $p < 0.001$), and stronger preference for natural immunity ($p = -0.199$, $p = 0.006$) were associated with lower vaccination intentions. No significant associations were observed between vaccination intention and sex, year level, type of school, age, general health perception, perceived severity, perceived threat, or health locus of control (all $p > 0.05$) (Table 4).

Table 4: Bivariate analysis of intention to vaccinate

Variable	Statistical test	Test statistic	p-value
Sex	Independent-samples t-test	-1.08	0.282
Year level	One-way ANOVA	1.07	0.346
Type of school	Independent-samples t-test	2.72	0.101
Religious affiliation	Mann-Whitney U test*	2.78	0.006
Age	Pearson's r	-0.024	0.745
General health perception	Pearson's r	0.065	0.376
Perceived severity	Pearson's r	0.014	0.847
Perceived threat	Pearson's r	0.129	0.076
Health locus of control	Pearson's r	-0.040	0.581
Attitude to vaccination	Pearson's r	-0.379	< 0.001
Trust/mistrust of vaccine benefit	Pearson's r	-0.382	< 0.001
Worries over unforeseen future effects	Pearson's r	-0.274	< 0.001
Concerns about commercial profiteering	Pearson's r	-0.334	< 0.001
Preference for natural immunity	Pearson's r	-0.199	0.006

*: Reports mean ranks for religious affiliation (Roman Catholic = 99.31; non-Roman Catholic = 73.84), suggesting a Mann-Whitney U analysis

A multiple linear regression analysis was conducted to identify factors independently associated with COVID-19 vaccination intention. The overall regression model was statistically significant, $F(18, 170) = 3.24$, $p < 0.001$, explaining 25.6% of the variance in vaccination intention ($R^2 = 0.256$; Adjusted $R^2 = 0.177$) (Table 5).

Upon adjusting for demographic and psychosocial factors, attitude toward vaccination ($B = -0.437$, $\beta = -0.383$, $p < 0.001$), perceived threat of COVID-19 ($B = 0.196$, $\beta = 0.150$, $p = 0.048$), and religious affiliation ($B = -0.566$, $p = 0.008$) exhibited

significant associations with vaccination intention. More negative attitudes toward vaccination were associated with lower vaccination intentions, whereas heightened perceptions of the COVID-19 threat were associated with higher vaccination intentions. Students who are not Roman Catholic indicated lower intentions to vaccinate compared to their Roman Catholic counterparts. Age, sex, educational level, type of institution, general health perception, perceived severity, and health locus of control were not significantly associated with vaccination intention.

Table 5: Multiple linear regression analysis of factors associated with COVID-19 vaccination intention (n = 189)

Predictor	B	SE	β	t	p
Age	-0.007	0.021	-0.022	-0.320	0.749
General health perception	0.005	0.104	0.003	0.047	0.963
Perceived severity	-0.058	0.081	-0.052	-0.719	0.473
Perceived threat	0.196	0.098	0.150	1.996	0.048*
Health locus of control	0.099	0.084	0.084	1.176	0.241
Attitude to vaccination	-0.437	0.081	-0.383	-5.429	< 0.001***
Sex (male vs. female)	0.209	0.197	0.184	1.057	0.292
Year level (2nd vs. 1st)	0.248	0.208	0.219	1.194	0.234
Year level (3rd vs. 1st)	-0.094	0.215	-0.083	-0.437	0.663
Religious affiliation (non-RC vs. RC)	-0.566	0.211	-0.498	-2.686	0.008**
Type of school (public vs. private)	-0.289	0.226	-0.254	-1.279	0.203

Model statistics: $R = 0.505$; $R^2 = 0.256$; Adjusted $R^2 = 0.177$; $F(18, 170) = 3.24$; $p < 0.001$; B: Unstandardized coefficient; SE: Standard error; β : Standardized coefficient; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$

4. Discussion

Vaccine hesitancy remains a persistent challenge in public health, influencing the success of immunization programs worldwide. Healthcare students, particularly nursing students, are an important population to study, as they will play a critical role in promoting vaccination and shaping patient attitudes toward immunization (Brewer et al., 2017). This study examined factors associated with COVID-19 vaccination intentions among nursing students and provides preliminary descriptive evidence regarding vaccination attitudes and intentions in this population.

This finding is comparable with recent studies among nursing and healthcare students, which reported that willingness to receive COVID-19 vaccines was strongly associated with perceptions of vaccine effectiveness and safety (Galanis et al., 2021; Patelarou et al., 2021). Consistent with previous research, vaccination intention has been associated with perceptions of risk, susceptibility, and vaccine attributes (Al-Amer et al., 2022).

Participants generally had an ambivalent attitude toward vaccination. In the present study, attitude toward vaccination emerged as the strongest independent correlate of COVID-19 vaccination intention in the multivariable analysis. Students who reported more negative attitudes toward vaccination were significantly less likely to intend to receive the vaccine. This finding is consistent with previous studies demonstrating that vaccine attitudes, particularly concerns regarding safety, effectiveness, and adverse effects, are closely associated with vaccine acceptance among nursing and healthcare students. Patelarou et al. (2021) found that positive attitudes toward COVID-19 vaccination were

significantly associated with greater vaccination acceptance among nursing students across seven European countries. Similarly, Galanis et al. (2021) reported that confidence in vaccine effectiveness and safety was positively associated with vaccine uptake among healthcare workers. These findings highlight the importance of addressing vaccine-related misconceptions and concerns to improve vaccination acceptance among future healthcare professionals.

Among the attitude dimensions, mistrust of vaccine benefits demonstrated the strongest association with vaccination intention. This finding suggests that confidence in vaccine effectiveness and protective value may play a particularly important role in shaping vaccination decisions among nursing students. Concerns regarding vaccine safety, future adverse effects, and commercial motives also showed significant associations with vaccination intention, highlighting the multifaceted nature of vaccine hesitancy.

The Filipino mistrust and hesitancy toward vaccination could be attributed to the Dengvaxia controversy in 2017. The Dengvaxia controversy may have contributed to reduced public confidence in vaccination in the Philippines. Previous studies suggest that this event led to increased mistrust toward health institutions and long-term vaccine hesitancy (Yu et al., 2021).

Religious affiliation remained significantly associated with vaccination intention even after controlling for demographic and psychosocial factors. Specifically, non-Roman Catholic students reported lower vaccination intentions than Roman Catholic students. This finding remained significant in both the bivariate and multivariable analyses, suggesting that religious affiliation may independently contribute to vaccination attitudes

and intentions in this population. Previous research has suggested that religious beliefs and affiliations may influence health-related attitudes and behaviors, including vaccination decisions. Rutjens et al. (2018) reported that religious worldviews may shape perceptions of health risks and trust in scientific recommendations, thereby affecting vaccine acceptance. Similarly, Wombwell et al. (2015) found that religious beliefs may contribute to vaccine hesitancy in certain populations. Nevertheless, this finding should be interpreted cautiously because the non-Roman Catholic subgroup in the present study was relatively small.

Some of the strongest predictors of vaccine hesitancy and vaccine uptake are attitudes and beliefs derived from the Health Belief Model (HBM) and the reasoned action approach (RAA). The present findings partially support the Health Belief Model, particularly the association of perceived barriers and attitudes with vaccination intentions. Similar studies have reported that perceived benefits and lower perceived barriers are associated with higher vaccination uptake (Donadiki et al., 2014; Schaefer Ziemer and Hoffman, 2013).

Interestingly, perceived threat of COVID-19 emerged as a significant independent correlate of vaccination intention in the multivariable analysis, even though it was not significant in the bivariate analysis. Students who perceived COVID-19 as a greater threat were more likely to report intentions to receive the vaccine. This finding is consistent with the Health Belief Model, which posits that perceived threat, encompassing perceived susceptibility and severity, is associated with preventive health behavior engagement. Previous studies have similarly reported that higher perceived risk and threat of COVID-19 were associated with stronger intentions to receive COVID-19 vaccines (Al-Amer et al., 2022; Olagoke et al., 2021). These findings suggest that perceptions of personal vulnerability to infectious diseases may continue to shape vaccination decisions among nursing students.

5. Limitations

This study has certain limitations that must be acknowledged when interpreting the findings. First, the study was conducted at a single university, potentially limiting the generalizability of the findings to nursing students at other institutions and in other geographic areas. Second, the comparatively limited number of non-Roman Catholic participants relative to Roman Catholic participants may have compromised the reliability of comparisons based on religious affiliation, and such comparisons should be approached with caution. Third, the Health Locus of Control scale demonstrated relatively low internal consistency ($\alpha = 0.54$), which may have reduced the precision of measurement of this construct. Fourth, the cross-sectional design precludes any conclusions about causation or temporal correlations among the analyzed variables. Thus, the results are to be regarded as correlations rather than causal

relationships. Finally, the use of self-report measures may have introduced social desirability bias, leading participants to respond in ways deemed socially acceptable, especially in light of the public health environment and the professional obligations associated with nursing education. Future research should encompass multiple institutions, diverse samples, longitudinal designs, and additional strategies to mitigate response bias, thereby enhancing the database on COVID-19 vaccination intentions among nursing students.

6. Conclusions

COVID-19 vaccination intention among nursing students was moderate and was higher when vaccine effectiveness was perceived to be greater. In the multivariable analysis, religious affiliation, perceived threat of COVID-19, and attitudes toward vaccination were significantly associated with vaccination intention. More negative attitudes toward vaccination, including mistrust of vaccine benefits, concerns about side effects, concerns regarding commercial profiteering, and preference for natural immunity, were associated with lower vaccination intention. The findings suggest that concerns about vaccine safety and efficacy, as well as about trust in health systems, warrant further investigation when developing strategies to promote COVID-19 vaccination among nursing students.

List of abbreviations

α	Cronbach's alpha
ANOVA	Analysis of variance
B	Unstandardized coefficient
F	F-statistic
HBM	Health belief model
LOC	Locus of control
M	Mean
p	p-value
R	Multiple correlation coefficient
R ²	Coefficient of determination
RAA	Reasoned action approach
RC	Roman Catholic
SD	Standard deviation
SE	Standard error
SPSS	Statistical Package for the Social Sciences
SRH	Self-rated health
t	t-statistic
VAX	Vaccination attitudes examination
WHO	World Health Organization
β	Standardized coefficient

Compliance with ethical standards

Ethical considerations

Ethical approval was obtained from the San Beda University Research Ethics Board (SBU-REB No. 2021-026, 15, August 2021) prior to the start of data collection. Participation in the study was completely voluntary, and no coercion was used. Informed consent has been obtained from all the participants.

They were made aware of their rights to withdraw from the study at any time without repercussions. Confidentiality and anonymity were strictly upheld throughout the study. No identifying information was collected, and completed questionnaires were encoded to ensure participant confidentiality. All data were securely stored and accessible only to the research team.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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