COVID-19 VACCINE HESITANCY AMONG STUDENTS IN NON-HEALTH AND HEALTH PROFESSIONS IN A PHILIPPINE TERTIARY EDUCATIONAL INSTITUTION: A COMPARATIVE ANALYSIS

Angelica G. Frias[a], Angel Marinelle P. Oares[b], Jullien Everly P. Salas[c],
Lalaine M. Mendi[d], Mark Virgil B. Lobendino[e] *

[a] angu.frias.sjc@phinmaed.com, [b] anpe.oares.sjc@phinmaed.com, [c] jupe.salas.sjc@phinmaed.com, [d] lamo.mendi.sjc@phinmaed.com,
[e] mabo.lobendino.sjc@phinmaed.com
[abcde] PHINMA Saint Jude College, Don Quijote St., Sampaloc, Manila, 1008 PHILIPPINES

Abstract

Regardless of the fact that vaccination saves millions of lives each year, vaccine hesitancy on COVID-19 still affects a sizable portion of the population in the world, including the Philippines. The differences in COVID-19 vaccine hesitancy among students at PHINMA Saint Jude College in both non-health and health professions were investigated in this study. Four indicators were identified and used: knowledge of COVID-19, social factors, health-related factors, and geographical factors. A quantitative-descriptive study was conducted to see if there is a difference in how students from non-health and health professions perceive vaccine hesitancy to COVID-19. The data gathered were analyzed using SPSS. The Mann-Whitney U test, weighted mean, and simple percentage were performed. Lastly, statistical differences were accepted when p-values were < 0.05. Only 274 of the survey responses were analyzed in this study. The results show that 99.3% of the gathered participants were already vaccinated, compared to 0.7% who were still hesitant to be vaccinated. The findings also showed that knowledge of COVID-19 (p = 0.004), social factors (p = 0.042), health-related factors (p = 0.015), and geographical factors (p = 0.033) influenced the respondents' COVID-19 vaccination. The outcomes implied that all these factors influencing vaccine hesitancy, which had p-values < 0.05 level of significance, significantly differed among students in non-health and health professions. COVID-19 vaccine hesitancy is expectedly low among students in health professions compared to students in non-health professions, and it is significantly influenced by COVID-19 knowledge, social factors, health-related factors, and geographical factors.

Keywords: COVID-19; Non-health and Health professions; Philippines; Vaccine hesitancy

1. Introduction

During the last month of 2019, an unexplained pneumonia outbreak occurred in Wuhan, Hubei, China. The virus was later identified as a new beta-coronavirus, named 2019 novel coronavirus (2019-nCoV), and it is now recognized as SARS-CoV-2 (Wu, Chen & Chan, 2020). According to experts, SARS-CoV-2 was to blame for COVID-19, a condition that can result in respiratory problems (Wiersinga et al., 2020).

According to the World Health Organization, vaccination has consistently been highlighted as an essential public health strategy and is also one of the most convenient approaches to improving healthcare quality (Greenwood, 2014). The SAGE Working Group on Vaccine Hesitancy describes vaccine reluctance as "the lag in engaging or declining immunization besides the existence of routine immunization" (MacDonald, 2015). Unfortunately, regardless of the ability of vaccines to help in the establishment of herd immunity, vaccine trust is declining in a number of countries, most notably in the majority of low-and middle-income countries (LMICs) (Landicho-Guevarra et al., 2021). The reasons why it directly influences herd immunity and vaccination rates are associated with numerous fields, including various socioeconomic and demographic characteristics (Marzo et al., 2022).

In the first month of 2020, the WHO publicly announced the COVID-19 pandemic as a health crisis of global importance. As a result, higher education institutions are considered high-risk places for the COVID-19 pandemic due to the congested atmosphere of campuses with high social mobilization and limited space (Walke et al., 2020). To keep the virus from spreading, several countries closed schools for several weeks, months, or even a year or more, and the Philippines is one of those countries that has implemented online classes as one of many approaches to combatting the virus up until now.

In spite of the fact that school closures are regarded as among the most effective strategies for controlling the spread of SARS-CoV-2 infection, numerous concerns have been raised about how it might affect students' learning (Hammerstein et al., 2021). In relation to this, students act as ambassadors, delivering effective and powerful messages that will encourage

other people to raise awareness regarding vaccination. Acknowledging their knowledge and understanding of COVID-19 will aid in developing viable vaccination promotion tactics for the current pandemic (Peterson, et al., 2021).

1.1 Objectives of the Study

The researchers identified and used four indicators as factors that influence vaccine hesitancy: knowledge of COVID-19, social factors, health-related factors, and geographical factors, with the goal of understanding these factors that are critical for determining the influence of vaccine hesitancy on students in non-health and health professions. Specifically this study sought to answer the following specific problems:

1. Determine the demographic profile of the respondents in terms of:
    a. Age
    b. Sex
    c. Year Level
    d. Undergraduate Professions

2. What are the views of students in both non-health and health professions on COVID-19 vaccine hesitancy, according to:
    a. Knowledge of COVID-19
    b. Social factors
    c. Health-related factors
    d. Geographical factors

3. Do students in non-health and health professions have differing views on COVID-19 vaccine hesitancy?

2. Methodology

2.1 Research Design

This study employed a quantitative research design that is deemed to be definitive and can be used to test certain hypotheses and determine their attributes or functionality (Fluet, 2020). This study used a descriptive approach that focuses on the specifics of what, where, when, and why to determine whether there are difference in vaccine hesitancy between students in non-health and health professions (Holly, 2014).

This study applied a survey research methodology with demographic and Likert-scale questions, with the former used to collect qualitative data and the latter used to collect quantitative data to evaluate and interpret respondents' actual views on COVID-19 vaccine hesitancy.

2.2 Respondents of the Study

The researchers collected data from students in non-health and health professions at PHINMA Saint Jude College using Slovins' formula, that was used to determine the sample size given the population size and a margin of error, and stratified random, which was used to obtain strata, or subgroups, from a larger population while taking their college programs into account.

2.3 Data Gathering Procedures

A letter requesting approval to conduct the study and a participant consent form were written and submitted to the course adviser. Following approval, data collection began right away. Prior to data collection, the researcher ensured that all participants were aware of the study's purpose and agreed to participate voluntarily. Researchers used Google Forms to create a digital questionnaire in the form of a Likert-scale survey, which was used to collect data. The data obtained from the responses contained both qualitative and quantitative information
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Each student at PHINMA Saint Jude College received the link to the form that was emailed to their school Gmail accounts. The form's link was also sent to each college department's program heads' Messenger and Gmail accounts. As a result, the link was extensively disseminated across the college, reaching a significant number of students and allowing students who are willing to participate to respond. The data was collected for seven days from March 23rd to March 30th, 2022.

Demographic questions in the questionnaire were used to collect qualitative data, revealing, but not publicly disclosing the students' age, sex, year level, and college programs (Dobronte, 2013). Multiple choice questions were used to discern between volunteered participants who had already been vaccinated and those who were still hesitant. The Likert-scale questions in the questionnaire were used to collect quantitative data.

2.4 Research Instrument

The researchers created the survey questionnaire, which was used as an instrument in the data collection procedure for this study. The survey questions given to undergraduate students who voluntarily participated in this study were designed to generate an analysis that was used to test the study's hypothesis. The instrument was designed with a modified five-point scale, with numbers ranging from 5, 4, 3, 2, and 1. The survey responses will be graded on a five-point scale (strongly agree), a 4-point scale (agree), a 3-point scale (somewhat agree), a 2-point scale (disagree), and a 1-point scale (strongly disagree), with the necessary statistical treatment applied later. The Likert-scale was used to evaluate the survey questionnaire data.

Table 1. Five-point Likert-scale with equivalent range and verbal interpretation

Scale	Equivalent	Verbal Interpretation
5	4.21 - 5.00	Strongly Agree
4	3.41 - 4.20	Agree
3	2.61 - 3.40	Somewhat Agree
2	1.81 - 2.60	Disagree
1	1.00 - 1.80	Strongly Disagree

2.5 Data Analysis

The qualitative data analysis was used in the study to analyze the non-numerical information responses gathered. In contrast, the quantitative data information gathered was analyzed and interpreted by researchers using the following statistical tool:

1. Simple Percentage
    The demographic profile variables of the respondents were analyzed using the simple percentage.

2. Weighted Mean
    This statistical tool is used to compute the weight of the questionnaire responses assigned by respondents during the actual data collection procedure.

3. Mann-Whitney U Test
    This statistical tool is a non-parametric test that was used in this study to analyze ordinal data from the survey questionnaire responses of the participants. This is used to test the null hypothesis of this study.

3. Results and Discussion

The study was carried out to see if there was a significant difference in COVID-19 vaccine hesitancy between students from non-health and health professions. The data from the questionnaire responses of 274 participants regarding COVID-19 vaccine hesitancy were gathered, tallied, analyzed, tabulated, and then processed in response to the study's stated objectives.

3.1 Respondents' Demographic Profile

The survey received 274 responses from two subgroups of students: non-health and health professions, with health professions students participating at a higher rate (53.6%) while non-health professions only had 46.4%. The participants ranged in age from 15 to 29 years. The group of students from 15 to 19 years old had a total of 35.8%. In addition, majority of respondents (62.4%) were aged 20 to 24. Meanwhile, only 1.8% of students were from age group of 25 to 29 years. Furthermore, female students outnumbered male students by a margin of 67.9% to 32.1%. It should also be noted that in this study, freshmen obtained 50% of the responses in the electronic questionnaire. Sophomore students came in second with 21.5%. Junior students placed third with 19.7%. Only 6.9% were senior students, and those with more than four years had only 1.8%.

Table 2. Frequency Distribution of Respondents Demographic Profile

		Frequency	Percentage
Age			
	15-19 years old	98	35.8
	20-24 years old	171	62.4
	25-29 years old	5	1.8
Sex			
	Female	186	67.9
	Male	88	32.1
Year Level			
	1st Year	137	50.0
	2nd Year	59	21.5
	3rd Year	54	19.7
	4th Year	19	6.9
	Exceeded 4 years	5	1.8
Undergraduate Professions	Non-Health	127	46.4
	Health	147	53.6
N = 274			

3.2 Factors Influencing Willingness to Receive COVID-19 Vaccine

A. Knowledge of COVID-19 (Lin et al., 2020)

The knowledge of COVID-19 in relation to vaccine hesitancy is shown in Table 3 below. Overall, respondents agreed on the aforementioned statements with a weighted mean of 3.51. The statement with the highest weighted mean that implies the respondents have the most knowledge is "I believe that by getting the COVID-19 vaccine, I am protecting myself and others from contracting COVID-19." (4.06) interpreted as "Agree." However, the least weighted mean of the statement "I don't think I need to get vaccinated because my immune system is strong enough to keep me from getting COVID-19." (1.82) is interpreted as "Disagree." This revealed that, on average, respondents agreed with the above statements, demonstrating that the COVID-19 vaccine is an important factor in reducing the risk of infection and moving us closer to achieving herd immunity to COVID-19.

Table 3. Respondents' knowledge of COVID-19 and its influence to vaccine hesitancy

Criteria	Weighted Mean
1. I think I am at risk of contracting COVID-19 if I do not get vaccinated.	3.70
2. I don't think I need to get vaccinated because my immune system is strong enough to keep me from getting COVID-19.	1.82
3. Even though I have been vaccinated, I think I am still at risk of contracting COVID-19.	3.61
4. If I am not vaccinated and contract COVID-19, I think I will have serious health problems.	3.52
5. If I am vaccinated and contract COVID-19, I think I will experience mild to moderate health problems.	3.60
6. I think that by getting the COVID-19 vaccine, I am protecting myself and others from contracting COVID-19.	4.06
7. I think that by getting the COVID-19 vaccine, I will be able to go outside with fewer restrictions and increase my social contacts.	3.47
8. I think that receiving the COVID-19 vaccine is my moral obligation.	3.68
9. If I chose not to get the COVID-19 vaccine, I would feel guilty if I contracted the disease and infected others.	3.67
10. I think that by receiving the COVID-19 vaccine, we will be able to reduce the infection rate in the Philippines.	3.97
Average	**3.51**

Legend: "(1.00-1.80) Strongly Disagree", "(1.81-2.60) Disagree", "(2.61-3.40) Somewhat Agree", "(3.41-4.20) Agree", "(4.21-5.00) Strongly Agree"

B. Social Factors (King & Leask, 2017; Cox, 2021; Migriño et al., 2020)

Table 4 depicts respondents' perceptions of the influence of social factors on COVID-19 vaccine hesitancy. According to the findings, respondents strongly disagreed with the above statements on average, with a weighted mean of 1.69. The statements read, "My classmates and friends do not believe that the COVID-19 vaccine can protect us from COVID-19 infection, so I decided not to get vaccinated." "I decided not to get vaccinated after seeing numerous posts on social media about the various side effects of the COVID-19 vaccination." Both received the same weighted mean of 1.72. However, the statement read, "Even if the government claims the COVID-19 vaccine is effective and safe, I will not get vaccinated because I trust my family and friends more and believe the COVID-19 vaccine has negative effects on the body." (1.66) has the lowest weighted mean. The statements are all interpreted as "strongly disagree." This revealed that, in general, respondents disagreed with the aforementioned statements, demonstrating that family, friends, and social media have no influence on respondents' views on COVID-19 vaccine hesitancy.

Table 4. Influence of social factors to respondents' COVID-19 vaccine hesitancy

Criteria	Weighted Mean
1. My family does not believe that the COVID-19 vaccine can protect us from COVID-19 infection, so I decided to not get vaccinated.	1.68
2. My classmates and friends do not believe that the COVID-19 vaccine can protect us from COVID-19 infection, so I decided to not get vaccinated.	1.72
3. I decided not to get vaccinated after seeing numerous posts on social media about the various side effects of the COVID-19 vaccination.	1.72
4. Even if the government claims the COVID-19 vaccine is effective and safe, I will not get vaccinated because I trust my family and friends more and believe the COVID-19 vaccine has adverse effects on the body.	1.66
Average	**1.69**

Legend: "(1.00-1.80) Strongly Disagree", "(1.81-2.60) Disagree", "(2.61-3.40) Somewhat Agree", "(3.41-4.20) Agree", "(4.21-5.00) Strongly Agree"

C. Health-related Factors (Migriño et al., 2020; Capulong, 2021)

Table 5 shows the respondents' understanding of the impact of health-related factors on COVID-19 vaccine hesitancy. The results show that, on average, respondents strongly disagreed with the above statements, with a weighted mean of 1.68. "I chose not to be vaccinated because I have a serious health condition and I am concerned that the COVID-19 vaccine will harm my health," the statement with the highest weighted mean that implies the most disagreement from respondents (1.80). Statements such as "I chose not to be vaccinated because I do not trust the brand of COVID-19 vaccine available in my town or city." And "I decided against getting the COVID-19 vaccine because I already have a strong immune system and believe that getting vaccinated would only weaken it." They have the same weighted mean of 1.63. The statements are all interpreted as "strongly disagree." This demonstrated that, in general, respondents disagreed with the above statements, indicating that they may not have existing serious health problems, a distrust of the COVID-19 vaccine brand provided by their LGUs, or previous personal experiences with other vaccines, which will not influence respondents' views on COVID-19 vaccine hesitancy.

Table 5. Influence of health-related factors to respondents' COVID-19 vaccine hesitancy

Criteria	Weighted Mean
1. I chose not to be vaccinated because I have a serious health condition and I am concerned that the COVID-19 vaccine will harm my health.	1.80
2. I decided against getting vaccinated because I believe the COVID-19 vaccine contains the SARS-CoV-2 virus, which may be harmful to my body.	1.68
3. I chose not to be vaccinated against COVID-19 because I've had negative experiences with other vaccines in the past.	1.68
4. I chose not to be vaccinated because I do not trust the brand of COVID-19 vaccine available in my town/city.	1.63
5. I decided against getting the COVID-19 vaccine because I already have a strong immune system and I believe that getting vaccinated would only weaken it.	1.63
Average	**1.68**

Legend: "(1.00-1.80) Strongly Disagree", "(1.81-2.60) Disagree", "(2.61-3.40) Somewhat Agree", "(3.41-4.20) Agree", "(4.21-5.00) Strongly Agree"

D. Geographical Factors

Table 6 shows the respondents' understanding of the impact of geographical factors on COVID-19 vaccine hesitancy. The results show that, on average, respondents strongly disagreed with the above statements, with a weighted mean of 1.65. The statement with the highest weighted mean (1.69) says "I chose not to be vaccinated against COVID-19 because there are no available vaccination sites in the city/town where I live, and the nearest vaccination site is a long distance away." However, the least weighted mean is for the statement "I don't think I need to get vaccinated against COVID-19 because we live far away from our neighbors and the neighborhood is safe" (1.62). The influence of geographical factors on COVID-19 vaccine hesitancy obtained an overall weighted mean of 1.65 with a verbal interpretation of "Strongly Disagree," indicating that, in general, respondents disagreed with the above statements, and they may also have easy access to both public and private transportation, which can influence students' COVID-19 vaccine hesitancy.

Table 6. Influence of geographical factors to respondents' COVID-19 vaccine hesitancy

Criteria	Weighted Mean
1. I chose not to be vaccinated against COVID-19 because there are no available vaccination sites in the city/town where I live, and the nearest vaccination site is a long distance away.	1.69
2. I chose not to be vaccinated due to my limited mobility to health facilities that provide COVID-19 vaccinations.	1.66
3. I don't think I need to get vaccinated against COVID-19 because we live far away from our neighbors and the neighborhood is safe.	1.62
4. I decided not to get vaccinated against COVID-19 because I have family members who are afraid to go out in crowded places.	1.64
5. I decided not to get vaccinated against COVID-19 because I live in a rural area and I didn't need to travel to the city.	1.64
Average	**1.65**

Legend: "(1.00-1.80) Strongly Disagree", "(1.81-2.60) Disagree", "(2.61-3.40) Somewhat Agree", "(3.41-4.20) Agree", "(4.21-5.00) Strongly Agree"

Table 7. Summary of the means of computed items according to indicators

Indicators	Weighted Mean	Verbal Interpretation
Knowledge of COVID-19	3.51	Agree
Social factors	1.69	Strongly Disagree
Health-related factors	1.68	Strongly Disagree
Geographical factors	1.65	Strongly Disagree
Average	2.13	Disagree

Legend: "(1.00-1.80) Strongly Disagree", "(1.81-2.60) Disagree", "(2.61-3.40) Somewhat Agree", "(3.41-4.20) Agree", "(4.21-5.00) Strongly Agree"

Table 7 provides a summary of the computed means of all items and its verbal interpretation according to the indicators used in the computation.

3.3 Differences of COVID-19 Vaccine Hesitancy Between Students of Non-health and Health Professions

Using a Mann-Whitney U test, Table 8 shows the significant difference between the factors influencing respondents' vaccine hesitancy in relation to their undergraduate professions. The data showed that all of the results were found to be significant for all factors, such as "knowledge on COVID-19" (0.004), "social" (0.042), "health-related" (0.015), and "geographical" (0.033), with p-values all less than the 0.05 level of significance, leading to the rejection of the null hypothesis, which gives a significant result.

Table 8. Mann-Whitney U Test for determination of the difference between the COVID-19 vaccine hesitancy of the students between non-health and health professions

Factors	Undergraduate Professions	Mean Rank	p-value
Knowledge of COVID-19	Non-Health	168.39	0.004
	Health	131.27	
Social	Non-Health	116.51	0.042
	Health	141.73	
Health-related	Non-Health	112.74	0.015
	Health	142.5	
Geographical	Non-Health	116.3	0.033
	Health	141.78	

Note: If p-value is less than or equal to 0.05 level of significance, reject H_0, otherwise, failed to reject H_0

4. Conclusion and Recommendation

Based on survey data analysis, the researchers discovered that the factors influencing the students' COVID-19 vaccine hesitancy from both non-health and health professions were all significant. This was investigated using the 274 survey responses that demonstrated a p-value of less than 0.05 level of significance for the following factors: "knowledge on COVID-19" (0.004), "social" (0.042), "health-related" (0.015), and "geographical" (0.033), thus rejecting the study's null hypothesis. In light of the findings, the researchers strongly advise schools to prioritize research into the factors influencing vaccine hesitancy, not just for the COVID-19 vaccine, which is important not only for students in health programs, but also for students in non-health programs. According to the findings, the factors influencing vaccine hesitancy among students may differ depending on the study's subject. To increase vaccine acceptance, the researchers propose creating an advocacy program that will engage in vaccine information dissemination to reduce vaccine hesitancy not only in schools but also in the community.

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