

COVID-19 vaccine hesitancy among the university students and personnel

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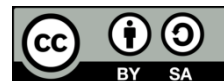
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ABSTRACT

A delay in accepting or refusing a vaccination despite the availability of vaccination services is described as vaccine hesitancy. The vaccine hesitancy among the Filipinos is a significant challenge to achieving herd immunity. Thus, this study was conducted to determine the COVID-19 vaccine hesitancy of Nueva Ecija University of Science and Technology students and staff. Total sampling and descriptive study methodology were employed. To gather information about the profile, information sources, and hesitation regarding the COVID-19 vaccine, a questionnaire was created. Both informed consent and permission to conduct were secured. Researchers used a variety of statistical tools to assess the data. The respondents' likely reasons to get vaccinated were to protect themselves and others, and the recommendation from a healthcare provider can help encourage those hesitant to get vaccinated. Moreover, the main reasons for their hesitancy were their fear of the side effects, and poor knowledge about the vaccine. With this, educational programs meant to educate those individuals who had vaccine hesitancy must be conducted. Moreover, vaccine hesitancy must be monitored, as it is expected to vary over time. Therefore, campaigns to disseminate the importance of the vaccine in the nation's public health must be continuously conducted for all types of diseases.

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1. INTRODUCTION

A horrifying number of lives have been lost as a result of the COVID-19 outbreak, which has also caused severe economic and social disruption around the world. [1], [2]. Globally, many countries, including the Philippines, impose different interventions, including restrictions of people's movement, mandatory use of face masks, physical distancing, quarantine and lockdowns to prevent the spread of the virus [3]–[5]. The existing measures made by many countries to control the transmission of COVID-19 are damaging to the economy [6] and resulting in a considerable reduction in physical and psychological well-being [7]. Such stop-and-go tactics are expected to persist until herd immunity is achieved and SARS-CoV-2 can no longer circulate [8].

One of the most successful public health campaigns ever created, vaccinations prevent hundreds of millions of deaths each year [9], [10]. Vaccines helped to eradicate, contain, or control infectious diseases all over the world [11]. With the COVID-19 vaccines recently approved, there is growing hope that herd immunity may put an end to the pandemic [12], [13] and that it can only be achieved by mass vaccination [14]. If vaccination is properly deployed, it can potentially lessen the pandemic's impact swiftly and effectively [15],

[16]. However, vaccine hesitancy poses a significant obstacle to vaccine undertaking, which is required to achieve herd immunity.

Despite the availability of vaccination services, vaccine hesitancy is defined by the World Health Organization (WHO) Strategic Advisory Group of Experts on Immunization as a "delay in acceptance or refusal of vaccination" in 2015 [17]. Vaccine hesitancy is becoming a global concern [2]; it was listed as one of the top 10 global health hazards for 2019 by the World Health Organization [18]. Herd immunity is hindered significantly by vaccine skepticism and misinformation [19], [20]. Misinformation disseminated through numerous channels could significantly impact the acceptance of a COVID-19 vaccine [21]. Several studies found that vaccine hesitancy is associated with several factors, including the vaccine's side effects, fallacies about the need for vaccination, a lack of trust in the health system, a lack of vaccine and disease literacy, the vaccine's safety and efficacy, and whether the government offers the vaccine for free [22].

In the Philippines, according to the articles published by [23]–[25], vaccine hesitancy among the Filipinos was still an issue and a significant challenge to achieve herd immunity. These findings underscore the importance of distributing accurate information about the COVID-19 vaccine to the general public via various channels (news, social media, and government websites). For implementing the most effective vaccination strategy to achieve herd immunity, there is a need to determine why they are hesitant to have their COVID-19 vaccine. Therefore, this study aimed to determine the vaccine hesitancy of Nueva Ecija University of Science and Technology students and staff towards the COVID-19 vaccine.

2. RESEARCH METHOD

2.1. Study design and sample size

The COVID-19 vaccine hesitancy of the Nueva Ecija University of Science and Technology students and staff was evaluated during the roll-out of the COVID-19 vaccine in the Philippines using the descriptive research design. It was started in May and finalized in November 2021. The target population was all students, faculty, and staff with active Messenger accounts and internet access. Total sampling was employed, however, only 2,085 individuals agreed to participate in the study and gave their consent.

2.2. Instrumentation and data collection

The study's questionnaire was based on a wide range of pertinent literature. The questionnaire was divided into four sections: The first part consisted of queries about their profile (age, sex, and the respondents' type); the second part was about the source of information from which the respondents learned about the COVID-19 vaccine; the third part was about the reasons which affect the hesitancy of the respondents about the COVID-19 vaccine which is divided into two sections: the reasons why they want and do not want to get vaccinated; and the last part was comprised statements about the different factors that will encourage them to get vaccinated by the COVID-19 vaccine [26]–[28]. An extensive assessment of the English-language literature as well as professional comments led to changes being made to the questionnaire's substance, wording, and cultural appropriateness. The questionnaire was pre-tested and revised. Data collection was done online using a Google form as the questionnaire due to the nationwide adoption of community quarantine, which led to the suspension of in-person teaching and the adoption of a work from home policy for most university staff.

2.3. Ethical consideration.

The Office of the university president was approached for permission. The respondents were required to provide informed consent to answer the questionnaire. The subjects' confidentiality and privacy were upheld, and they had enough time to respond to the questions.

2.4. Data and statistical analysis

The validity of each completed questionnaire was verified twice. After that, statistical packages for social sciences (SPSS) were used to enter the data from the Google form. The author double-checked and cleaned all data files before to evaluation. To check for accuracy, consistency, and missing values and variables, data cleaning was done. The statements about the reasons why they want and do not want to get vaccinated by COVID-19 vaccine and the factors that encourage or will encourage them to get vaccinated with ten questions each were measured using a 4-point Likert scale which is composed of strongly agree, agree, strongly disagree, and disagree responses. The statements were assessed by computing the ten questions' mean and determining their equivalent. If the mean is between 3.26–4.00, it means they completely agree; if it is between 2.51–3.25, they agree; if it is 1.76–2.50, they disagree; and if it is between 1.00–1.75, it means they strongly disagree. Frequency and percentage were computed for the sources of information and sociodemographic profile. One-way analysis of variance (ANOVA) was used to determine whether significant differences existed in their profile concerning their hesitancy to get vaccinated.

3. RESULTS AND DISCUSSION

3.1. Socio-demographic profile of the respondents

A total of 2085 people participated in the study. The majority of them, amounted 1,183 (56.7%) were female and 1,959 (94.0%) were 18 to 59 years of age, and most of them or 1,880 (90.2%) were students. The data is shown in Table 1.

Table 1. Socio-demographic profile of the respondents

Socio-demographic profile	Frequency (f)	Percentage (%)
Sex		
Male	902	41.9
Female	1,183	56.7
Age		
<18 years old	121	5.8
18–59 years old	1,959	94.0
> 60 years old	5	0.2
Type of respondent		
Student	1,880	90.2
Staff	205	9.8

3.2. Source of information of the respondents about COVID-19 vaccine

Table 2 displays that the primary source of information of the respondents about the COVID-19 vaccine was from the news from television (80.8%) and the various social media platforms found on the internet (77.2%). Researchers found that among their participants, information about COVID-19 and its vaccine were commonly obtained from the internet and television [29]–[34]. Additionally, the majority of the data was in English, which made it simpler for the respondents to understand [35].

Table 2. Source of information of the respondents about COVID-19 vaccine

Source of Information	Frequency (f)	Percentage (%)
Television	1,684	80.8
Radio	22	1.1
Newspaper	176	8.4
Family and friends	954	45.8
Social media	1,609	77.2

3.3. Hesitancy of the respondents on getting vaccinated by the COVID-19 vaccine

The study's findings show that the respondents concurred with every assertion made about the benefits of receiving the COVID-19 vaccine vaccination, shows in Table 3. The highest weighted mean, 3.18, was achieved for items statements 7 and 5, which are about protecting one's own and other people's health. The result was supported by the study of [36], [37]. According to them, the most prevalent reason their respondents wanted to get vaccinated by the COVID-19 vaccine was to protect themselves and others. Also, a survey conducted in May 2021 showed that most Filipinos are willing to get vaccinated to prevent getting the illness and ensure the safety of their family [38]. With a weighted mean of 2.74, item statement number 6, which discusses a major adverse effect of the vaccine, received the lowest rating. The participants were concerned that the vaccine development process was moving too quickly, leaving insufficient time for adequate testing to ensure the vaccine's short and long-term safety [36]–[37]. In addition, there is uncertainty among them to get vaccinated because they may not trust the vaccine, which means that convincing communities to accept vaccination will require substantial proof of vaccine safety and efficacy [39]. The data also showed that they want to get vaccinated if the government and health authorities advise it. This was supported by [2], [40]–[41]. According to them, because their respondents trust their nation's health system and health-related information from government bodies, they are convinced to get vaccinated. In connection with this, the Department of Health garnered 76% approval according to Pulse Asia Research's November 23–December 2, 2020, Ulat ng Bayan Report putting them at number one among national government agencies, which signify that Filipinos trust the government's response to the pandemic [42].

Table 4 reveals that the respondents agreed on all the statements regarding the reasons why they do not want to get vaccinated by the COVID-19 vaccine. The COVID-19 vaccination was the topic of item statement number 2, which received the highest weighted mean equivalent of 3.26, followed by item statement number 3, which discussed their ignorance or lack of understanding regarding the COVID-19 vaccine. The result was supported by the study of [3], [36], [37], [43]–[48]. According to them, their participants' most

common concern about the COVID-19 vaccine was its safety and effectiveness. Also, [49] state that no vaccine is 100% effective. With this, the doubt of the Filipinos on the side effects and its effectiveness is evident. In addition [50], [51] found that most of their respondents did not know the safety, efficacy, and side effects of the COVID-19 vaccine. Also, in the interview made by [41] about the reason for refusing the COVID-19 vaccine, their participants stated that they did not have enough information about the vaccine. An educational intervention was needed to address this concern since it is one of the most tested interventions, resulting in a statistically significant improvement in vaccine uptake [52]-[53]. The lowest weighted mean, equivalent to 2.81, was achieved for item statement number 4, "Personal immunization is not needed if all in its area get vaccinated." The article published by [54] mentioned the necessity of the vaccines cited as reasons for vaccine refusal.

Table 3. Reasons why the respondent want to get vaccinated by the COVID-19 vaccine

Item statements	Strongly agree		Agree		Disagree		Strongly disagree		Weighted mean	Verbal interp.
	F	%	F	%	F	%	F	%		
1. Advice by the Government Officials	530	25.4	1300	62.4	209	10.0	46	2.2	3.11±0.66	Agree
2. It is safe and effective.	458	22.0	1239	59.4	344	16.5	44	2.1	3.01±0.68	Agree
3. Advice from family, friends, and colleagues.	288	13.8	1192	57.2	528	25.3	77	3.7	2.81±0.71	Agree
4. Vaccination may become a requirement in schooling/working.	471	22.6	1165	55.9	355	17.0	94	4.5	2.97±0.76	Agree
5. To protect others by helping to attain herd immunity.	603	28.9	1232	59.1	211	10.1	39	1.9	3.15±0.67	Agree
6. It has no serious side-effect.	283	13.6	1081	51.8	617	29.6	104	5.0	2.74±0.75	Agree
7. To protect your health	635	30.5	1223	58.7	193	9.3	34	1.6	3.18±0.66	Agree

Legend: F = Frequency; 3.26–4.00 = Completely agree, 2.51–3.25 = Agree, 1.76–2.50 = Disagree; 1.00–1.75 = Strongly disagree

Table 4. Reasons why the respondent do not want to get vaccinated by the COVID-19 vaccine

Item statements	Strongly agree		Agree		Disagree		Strongly disagree		Weighted mean	Verbal interp.
	F	%	F	%	F	%	F	%		
1. Distrust to the government and government officials.	504	24.2	1095	52.5	435	20.9	51	2.4	2.98±0.74	Agree
2. Fear of the side effects and safety of the vaccine and it is not 100% effective.	787	37.7	1076	51.6	189	9.1	33	1.6	3.26±0.68	Agree
3. Poor or lack of knowledge about COVID-19 vaccine.	544	26.1	1117	53.6	366	17.6	58	2.8	3.04±0.74	Agree
4. Personal vaccination is not needed if all in its vicinity gets vaccinated.	342	16.4	1107	53.1	532	25.5	104	5.0	2.81±0.76	Agree
5. Vaccines are expensive/lack of financial resources.	513	24.6	1181	56.6	340	16.3	51	2.4	3.03±0.71	Agree
6. The relatively quick development of COVID-19 vaccine might mean safety measures were skipped.	418	20.0	1249	59.9	367	17.6	51	2.4	2.98±0.69	Agree
7. Fear in needles, injection, syringe and pain.	422	20.2	1084	52.0	459	22.0	120	5.8	2.87±0.80	Agree

Legend: F = Frequency; 3.26–4.00 = Completely agree, 2.51–3.25 = Agree, 1.76–2.50 = Disagree; 1.00–1.75 = Strongly disagree

3.4. Factors that encourage or will encourage the respondents to get vaccinated by the COVID-19 vaccine

Table 5 lists the factors that will persuade respondents to receive the COVID-19 vaccine vaccination. They concurred with all of the assertions in light of the outcome. The suggestion made by their doctor, item statement number 1, received the highest weighted mean, or 3.18, followed by item statement number 5, which discussed the additional test the vaccine must pass. The result was supported by the study of [36], [55], [56]. In their research, their participants indicated that they wanted to get vaccinated if it was recommended by the government or healthcare workers. Also, [46] found that the speed at how vaccines were developed raised their concerns about the adequacy of research and testing, negatively impacting vaccine efficacy and safety. In addition, [57] also found that their respondents would only receive the COVID-19 vaccines after many others had received them. The lowest weighted mean, equal to 2.71, was attained by item statement number 4, which discusses the reward or incentive for people who will receive vaccinations. It reveals that giving rewards or incentives may only offer a little help to encourage participants since it is the least factor, they considered to be an encouraging factor to get vaccinated and this was supported by [58]. However, according to [59], giving incentives were not a significant motivator to encourage an individual to get vaccinated. Also, if the mode of vaccine administration can be done through oral can also encourage them to get vaccinated since there are individuals who have a fear of needles which makes them avoid getting vaccinated [60].

Table 6 (see in Appendix) compares the respondents' demographics and their hesitation to receive the COVID-19 vaccine. In items statement number 1, only the type of the respondent had a significant difference which means that the staff who are part of the government believe in the advice of the government officials and at the same time, they distrust them. They believe that getting vaccinated is good for their welfare. In

addition, distrust of the government is also a factor in becoming hesitant towards the COVID-19 vaccine [61]. In items statement number 2, the students have a much lower agreement regarding the safety and effectiveness of the vaccine. The study of [53], whose respondents were likewise university students who were reluctant to get immunized, supported the findings. On the other hand, males were more likely to take the vaccine because they needed protection since they were more exposed to COVID-19 since they always went outside for work [62], [63]. In items statement number 3, they agreed that the advice from their family and friends could support the vaccination. The result was supported by [31] that their friends' and colleagues' endorsement is one reason why some want to get vaccinated. Also, the data shows that those whose age was above 60 and students had lower agreement than their counterparts. The explanation for this is that those whose age was above 60 had a firm decision whether they would get vaccinated or not, which means they rely less on the advice of the others while most of the students' decisions depend on their parents' decisions. On the other hand, their profile has nothing to do with their hesitancy about their lack of knowledge about vaccination.

Table 5. Factors that encourage or will encourage the respondents to get vaccinated by COVID-19 vaccine

Item statements	Strongly agree		Agree		Disagree		Strongly disagree		Weighted mean	Verbal interp.
	F	%	F	%	F	%	F	%		
1. Recommended by your doctor or healthcare provider.	613	29.4	1247	59.8	202	9.7	23	1.1	3.18±0.64	Agree
2. If higher-rank government officials get vaccinated in public	503	24.1	1178	56.5	342	16.4	62	3.0	3.02±0.72	Agree
3. If the government will mandate vaccinations or impose some type of sanction for non-complying with vaccination.	443	21.2	1233	59.1	374	17.9	35	1.7	3.00±0.68	Agree
4. If government will give a reward or any kind of incentive.	309	14.8	1009	48.4	627	30.1	140	6.7	2.71±0.80	Agree
5. If the vaccine undergone an additional comprehensive test for its safety and efficacy.	636	30.5	1202	57.6	218	10.5	29	1.4	3.17±0.66	Agree

Legend: F = Frequency; % = Percentage; 3.26–4.00 = Completely agree, 2.51–3.25 = Agree, 1.76–2.50 = Slightly disagree

In items statement number 4, the staff had higher agreement than their counterparts because they believe that vaccination will be mandatory to stay in their job [64]. Moreover, their agreement about personal vaccination is not needed if all in its vicinity get vaccinated; all the profile variables pose no significant difference. The explanation for this is that the country will soon attain herd immunity; thus, personal vaccination is unnecessary. In item number 5, the students had lower agreement than their counterparts because they perceived that they do not belong to a high-risk group and that pandemic is not a public health concern [65]. Meanwhile, the cost of the vaccine was perceived less by the staff since they were much aware that the COVID-19 vaccine was free. Also, the cost of the vaccine was the least important factor to get vaccinated [45]. In item statement number 6, the result showed that males believe it has no serious side effects than their female counterparts. The possible explanation for these is that females had higher beliefs in conspiracy-related theories about the pandemic [66]. The student also had lower agreement than their counterpart since they feared the vaccine's possible side effects [53]. On the other hand, no variables pose a significant difference in terms of their agreement about the speed of the development of the COVID-19 vaccine, which may mean that safety measures were skipped. Overall, they consider this hesitant, just like in the study of [32], [46]. Last, in items statement number 7, those whose age was 18-59 years old and are students had a lower agreement that they wanted to get vaccinated to protect their health since they perceived that they do not belong to a high-risk group [65].

4. CONCLUSION

This study determined the COVID-19 vaccine hesitancy of the Nueva Ecija University of Science and Technology students and staff. Their primary source of information about the COVID-19 vaccine was from television and social media on the internet. Protecting themselves and others was the likely reason they wanted to get vaccinated. Moreover, the top reason for their vaccine hesitancy was their fear of the side effects, safety, and poor knowledge about the COVID-19 vaccine. A more in-depth research study is necessary to analyze and investigate the reasons for their vaccine hesitancy. Also, the study found that recommendations from a doctor or healthcare provider can help encourage those hesitant to get vaccinated.

To further increase the vaccine coverage of the government, educational programs meant to educate those individuals who had vaccine hesitancy must be conducted. Moreover, vaccine hesitancy not only for COVID-19 but also to other diseases like polio, hepatitis and many more must be monitored, as it is expected to vary over time. Ending the present pandemic does not mean no more pandemics will happen again in the future. Therefore, organizing health education programs and campaigns to disseminate the importance of the vaccine in the nation's public health must be continuously conducted not only for COVID-19 but also for all types of diseases.

REFERENCES




- [1] M. Kaushik and N. Guleria, "The impact of pandemic COVID-19 in workplace," *European Journal of Business and Management*, vol. 12, no. 15, pp. 1–10, 2020, doi: 10.7176/EJBM/12-15-02.
- [2] Z. Yu, A. Razaq, A. Rehman, A. Shah, K. Jameel, and R. S. Mor, "Disruption in global supply chain and socio-economic shocks: a lesson from COVID-19 for sustainable production and consumption," *Operations Management Research*, vol. 15, no. 1, pp. 1–16, 2021, doi: 10.1007/s12063-021-00179-y.
- [3] S. Kaur, H. Bherwani, S. Gulia, R. Vijay, and R. Kumar, "Understanding COVID-19 transmission, health impacts and mitigation: timely social distancing is the key," *Environment, Development and Sustainability*, vol. 23, no. 5, pp. 6681–6697, 2021, doi: 10.1007/s10668-020-00884-x.
- [4] L. Ocampo and K. Yamagishi, "Modeling the lockdown relaxation protocols of the Philippine government in response to the COVID-19 pandemic: An intuitionistic fuzzy DEMATEL analysis," *Socio-Economic Planning Sciences*, vol. 72, 2020, doi: 10.1016/j.seps.2020.100911.
- [5] H. R. Güner, İ. Hasanoglu, and F. Aktaş, "COVID-19: Prevention and control measures in community," *Turkish Journal of Medical Sciences*, vol. 50, no. 9, pp. 571–577, 2020, doi: 10.3906/sag-2004-146.
- [6] C. A. Tisdell, "Economic, social and political issues raised by the COVID-19 pandemic," *Economic Analysis and Policy*, vol. 68, pp. 17–28, 2020, doi: 10.1016/j.eap.2020.08.002.
- [7] M. C. A. Melo and D. de Sousa Soares, "Impact of social distancing on mental health during the COVID-19 pandemic: An urgent discussion," *International Journal of Social Psychiatry*, vol. 66, no. 6, pp. 625–626, 2020, doi: 10.1177/0020764020927047.
- [8] H. Salje *et al.*, "Estimating the burden of SARS-CoV-2 in France," *Science*, vol. 369, no. 6500, pp. 208–211, 2020, doi: 10.1126/science.abc3517.
- [9] I. Hajj Hussein *et al.*, "Vaccines through centuries: major cornerstones of global health," *Front Public Health*, vol. 3, p. 269, 2015, doi: 10.3389/fpubh.2015.00269.
- [10] C. M. C. Rodrigues and S. A. Plotkin, "Impact of Vaccines; Health, Economic and Social Perspectives," *Frontiers in Microbiology*, vol. 11, p. 1526, 2020, doi: 10.3389/fmicb.2020.01526.
- [11] E. Dubé, "Addressing vaccine hesitancy: the crucial role of healthcare providers," *Clinical Microbiology and Infection*, vol. 23, no. 5, pp. 279–280, 2017, doi: 10.1016/j.cmi.2016.11.007.
- [12] S. B. Omer, I. Yildirim, H. P. Forman, "Herd Immunity and Implications for SARS-CoV-2 Control," *JAMA*, vol. 324, no. 20, pp. 2095–2096, 2020, doi: 10.1001/jama.2020.20892.
- [13] P. Fine, K. Eames, and D. L. Heymann, "Herd immunity": a rough guide," *Clinical Infectious Diseases*, vol. 52, no. 7, pp. 911–916, 2011, doi: 10.1093/cid/cir007.
- [14] C. M. Saad-Roy *et al.*, "Immune life history, vaccination, and the dynamics of SARS-CoV-2 over the next 5 years," *Science*, vol. 370, no. 6518, pp. 811–818, 2020, doi: 10.1126/science.abd7343.
- [15] E. E. Walsh *et al.*, "Safety and Immunogenicity of Two RNA-Based Covid-19 Vaccine Candidates," *New Engl. J. Med.*, vol. 383, no. 25, pp. 2439–2450, 2020, doi: 10.1056/NEJMoa2027906.
- [16] S. Jain, H. Batra, P. Yadav, S. Chand, "COVID-19 Vaccines Currently under Preclinical and Clinical Studies, and Associated Antiviral Immune Response," *Vaccines*, vol. 8, no. 4, p. 649, 2020, doi: 10.3390/vaccines8040649.
- [17] N. E. MacDonald, "Vaccine hesitancy: Definition, scope and determinants," *Vaccine*, vol. 33, no. 34, pp. 4161–4164, 2015, doi: 10.1016/j.vaccine.2015.04.036.
- [18] World Health Organization, "Ten Threats to Global Health in 2019," *World Health Organization*, Geneva, 2019. [Online]. Available at: <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>.
- [19] H. J. Larson, C. Jarrett, E. Eckersberger, D. M. Smith, and P. Paterson, "Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: a systematic review of published literature, 2007–2012," *Vaccine*, vol. 32, no. 19, pp. 2150–2159, 2014, doi: 10.1016/j.vaccine.2014.01.081.
- [20] S. Lane, N. E. MacDonald, M. Marti, and L. Dumolard, "Vaccine hesitancy around the globe: Analysis of three years of WHO/UNICEF Joint Reporting Form data-2015–2017," *Vaccine*, vol. 36, no. 26, pp. 3861–3867, 2018, doi: 10.1016/j.vaccine.2018.03.063.
- [21] W. Cornwall, "Officials gird for a war on vaccine misinformation," *Science*, vol. 369, no. 6499, pp. 14–15, 2020, doi: 10.1126/science.369.6499.14.
- [22] C. Halpin and B. Reid, "Attitudes and beliefs of healthcare workers about influenza vaccination," *Nursing Older People*, vol. 34, no. 3, 2021, doi: 10.7748/nop.2019.e1154.
- [23] M. B. Cahapay, "To get or not to get: Examining the intentions of Philippine teachers to vaccinate against COVID-19," *Journal of Human Behavior in the Social Environment*, vol. 32, no. 3, pp. 325–335, 2022, doi: 10.1080/10911359.2021.1896409.
- [24] R. R. Marzo *et al.*, "Hesitancy in COVID-19 vaccine uptake and its associated factors among the general adult population: a cross-sectional study in six Southeast Asian countries," *Tropical Medicine and Health*, vol. 50, no. 1, pp. 1–10, 2022, doi: 10.1186/s41182-021-00393-1.
- [25] K. Fatima and N. I. Syed, "Dengvaxia controversy: impact on vaccine hesitancy," *Journal of Global Health*, vol. 8, no. 2, 2018, doi: 10.7189/jogh.08-020312.
- [26] G. Di Martino *et al.*, "Knowledge and attitude towards vaccination among healthcare workers: a multicenter cross-sectional study in a southern Italian region," *Vaccines*, vol. 8, no. 2, p. 248, 2020, doi: 10.3390/vaccines8020248.
- [27] E. Y. Abu-Rish, E. R. Elayeh, L. A. Mousa, Y. K. Butanji, and A. M. Albsoul-Younes, "Knowledge, awareness and practices towards seasonal influenza and its vaccine: implications for future vaccination campaigns in Jordan," *Family Practice*, vol. 33, no. 6, pp. 690–697, 2016, doi: 10.1093/fampra/cmww086.
- [28] S. J. Cvjetkovic, V. L. Jeremic, and D. V. Tiosavljevic, "Knowledge and attitudes toward vaccination: A survey of Serbian students," *Journal of Infection and Public Health*, vol. 10, no. 5, pp. 649–656, 2017, doi: 10.1016/j.jiph.2017.05.008.
- [29] O. Yaqub, S. Castle-Clarke, N. Sevdalis, and J. Chataway, "Attitudes to vaccination: a critical review," *Social Science & Medicine*, vol. 112, pp. 1–11, 2014, doi: 10.1016/j.socscimed.2014.04.018.
- [30] J. M. Santiago and A. R. Santos, "Knowledge, attitude and practices of the university students about COVID-19 during the Luzon lockdown in the Philippines," *International Journal of Public Health*, vol. 10, no. 3, pp. 321–328, 2021, doi: 10.11591/ijphs.v10i3.20844.

- [31] J. M. Santiago and R. L. Cajucom, "Knowledge about COVID-19 among university students before the implementation of the enhanced community quarantine in Philippines," *International Journal of Public Health*, vol. 9, no. 4, pp. 321–328, 2020, doi: 10.11591/ijphs.v9i4.20545.
- [32] L. L. Lau *et al.*, "Knowledge, attitudes and practices of COVID-19 among income-poor households in the Philippines: a cross-sectional study," *Journal of Global Health*, vol. 10, no. 1, 2020, doi: 10.7189/jogh.10.011007.
- [33] J. M. Santiago and A. R. Santos, "University personnel and students' perspective on COVID-19 vaccine acceptability," *International Journal of Public Health*, vol. 11, no. 2, pp. 663–671, 2022, doi: 10.11591/ijphs.v11i2.21120.
- [34] J. M. Santiago and A. R. Santos, "Knowledge and Attitudes towards COVID-19 vaccines among university students, faculty and staff," *International Journal of Public Health*, vol. 11, no. 2, pp. 654–662, 2022, doi: 10.11591/ijphs.v11i2.21169.
- [35] J. M. Santiago and E. S. David, "The Use of Two Media of Instruction in Biology: A Quasi-Experimental Study," *International Journal of Advanced Engineering, Management and Science*, vol. 5, no. 2, pp. 111–115, 2019, doi: 10.22161/ijaems.5.2.3.
- [36] S. Bell, R. Clarke, S. Mounier-Jack, J. L. Walker, and P. Paterson, "Parents' and guardians' views on the acceptability of a future COVID-19 vaccine: A multi-methods study in England," *Vaccine*, vol. 38, no. 49, pp. 7789–7798, 2020, doi: 10.1016/j.vaccine.2020.10.027.
- [37] C. Lin, P. Tu, and L. M. Beitsch, "Confidence and receptivity for COVID-19 vaccines: a rapid systematic review," *Vaccines*, vol. 9, no. 1, p. 16, 2021, doi: 10.3390/vaccines9010016.
- [38] Statista Research Department, "Philippines: Motivations to receive COVID-19 vaccine 2021," 2021. [Online]. Available at: <https://www.statista.com/statistics/1238243/philippines-reasons-to-be-vaccinated-versus-coronavirus/>.
- [39] J. D. Ditekemena *et al.*, "COVID-19 vaccine acceptance in the Democratic Republic of Congo: a cross-sectional survey," *Vaccines*, vol. 9, no. 2, p. 153, 2021, doi: 10.3390/vaccines9020153.
- [40] M. Al-Mohaithef and B. K. Padhi, "Determinants of COVID-19 vaccine acceptance in Saudi Arabia: a web-based national survey," *Journal of Multidisciplinary Healthcare*, vol. 13, p. 1657, 2020, doi: 10.2147/JMDH.S276771.
- [41] S. Kreps *et al.*, "Factors associated with US adults' likelihood of accepting COVID-19 vaccination," *JAMA Network Open*, vol. 3, no. 10, 2020, doi: 10.1001/jamanetworkopen.2020.25594.
- [42] Department of Health (DOH). "DOH garners 2nd highest approval rating among select NGAs according to pulse Asia," 2021. [Online]. Available: <https://doh.gov.ph/press-release/DOH-GARNERS-2ND-HIGHEST-APPROVAL-RATING-AMONG-SELECT-NGAs-ACCORDING-TO-PULSE-ASIA> (accessed Dec, 2021).
- [43] R. Shekhar *et al.*, "COVID-19 Vaccine Acceptance among Health Care Workers in the United States," *Vaccines*, vol. 9, no. 2, p. 119, Feb. 2021, doi: 10.3390/vaccines9020119.
- [44] M. C. Navin, J. A. Wasserman, M. Ahmad, and S. Bies, "Vaccine education, reasons for refusal, and vaccination behavior," *American Journal of Preventive Medicine*, vol. 56, no. 3, pp. 359–367, 2019, doi: 10.1016/j.amepre.2018.10.024.
- [45] D. Dong *et al.*, "Public preference for COVID-19 vaccines in China: A discrete choice experiment," *Health Expectations*, vol. 23, no. 6, pp. 1543–1578, 2020, doi: 10.1111/hex.13140.
- [46] D. Freeman *et al.*, "COVID-19 vaccine hesitancy in the UK: the Oxford coronavirus explanations, attitudes, and narratives survey (Oceans II)," *Psychological Medicine*, pp. 1–15, 2020, doi: 10.1017/S0033291720005188.
- [47] P. L. Reiter, M. L. Pennell, and M. L. Katz, "Acceptability of a COVID-19 vaccine among adults in the United States: How many people would get vaccinated?," *Vaccine*, vol. 38, no. 42, pp. 6500–6507, 2020, doi: 10.1016/j.vaccine.2020.08.043.
- [48] K. Wang *et al.*, "Intention of nurses to accept coronavirus disease 2019 vaccination and change of intention to accept seasonal influenza vaccination during the coronavirus disease 2019 pandemic: A cross-sectional survey," *Vaccine*, vol. 38, no. 45, pp. 7049–7056, 2020, doi: 10.1016/j.vaccine.2020.09.021.
- [49] Immunisation Advisory Centre, "Vaccines: Efficacy and effectiveness," 2020. [Online]. Available at: <https://www.immune.org.nz/vaccines/efficacy-effectiveness>.
- [50] L. I. Anorue, A. C. Ugwu, S. U. Ugboaja, U. O. Nwabunze, C. C. Ugwulor-Onyinyechi, and C. Njoku, "Communicating COVID-19 vaccine safety: Knowledge and attitude among residents of South East, Nigeria," *Infection and Drug Resistance*, vol. 14, p. 3785–3794, 2021, doi: 10.2147/IDR.S329183.
- [51] N. Dereje *et al.*, "COVID-19 vaccine hesitancy in Addis Ababa, Ethiopia: a mixed-method study," *BMJ Open*, vol. 12, no. 5, 2022, doi: 10.1136/bmjopen-2021-052432.
- [52] L. Y. Fu, L. A. Bonhomme, S. C. Cooper, J. G. Joseph, and G. D. Zimet, "Educational interventions to increase HPV vaccination acceptance: a systematic review," *Vaccine*, vol. 32, no. 17, pp. 1901–1920, 2014, doi: 10.1016/j.vaccine.2014.01.091.
- [53] R. A. Bednarczyk, S. L. Chu, H. Sickler, J. Shaw, J. A. Nadeau, and L. A. McNutt, "Low uptake of influenza vaccine among university students: evaluating predictors beyond cost and safety concerns," *Vaccine*, vol. 33, no. 14, pp. 1659–1663, 2015, doi: 10.1016/j.vaccine.2015.02.033.
- [54] K. M. Edwards *et al.*, "Countering vaccine hesitancy," *Pediatrics*, vol. 138, no. 3, 2016, doi: 10.1542/peds.2016-2146.
- [55] P. J. Smith, S. Stokley, R. A. Bednarczyk, W. A. Orenstein, and S. B. Omer, "HPV vaccination coverage of teen girls: the influence of health care providers," *Vaccine*, vol. 34, no. 13, pp. 1604–1610, 2016, doi: 10.1016/j.vaccine.2016.01.061.
- [56] P. Paterson, F. Meurice, L. R. Stanberry, S. Glismann, S. L. Rosenthal, and H. I. Larson, "Vaccine hesitancy and healthcare providers," *Vaccine*, vol. 34, no. 52, pp. 6700–6706, 2016, doi: 10.1016/j.vaccine.2016.10.042.
- [57] A. Caple *et al.*, "Interrogating COVID-19 vaccine hesitancy in the Philippines with a nationwide open-access online survey," *PeerJ*, 2021, doi: 10.7717/peerj.12887.
- [58] S. I. Lee *et al.*, "Factors affecting medical students' uptake of the 2009 pandemic influenza A (H1N1) vaccine," *Influenza Research and Treatment*, vol. 2012, pp. 1–10, 2012, doi: 10.1155/2012/753164.
- [59] K. A. Ryan, S. L. Filipp, M. J. Gurka, A. Zirulnik, and L. A. Thompson, "Understanding influenza vaccine perspectives and hesitancy in university students to promote increased vaccine uptake," *Heliyon*, vol. 5, no. 10, 2019, doi: 10.1016/j.heliyon.2019.e02604.
- [60] A. S. Forster, L. A. Marlow, J. Wardle, J. Stephenson, and J. Waller, "Interest in having HPV vaccination among adolescent boys in England," *Vaccine*, vol. 30, no. 30, pp. 4505–4510, 2012, doi: 10.1016/j.vaccine.2012.04.066.
- [61] P. Peretti-Watel *et al.*, "A Future Vaccination Campaign against COVID-19 at Risk of Vaccine Hesitancy and Politicisation," *The Lancet Infect. Dis.*, vol. 20, no. 7, pp. 769–770, 2020, doi: 10.1016/S1473-3099(20)30426-6.




- [62] A. M. N. Qattan, N. Alshareef, O. Alsharqi, N. Al Rahahleh, G. C. Chirwa, and M. K. Al-Hanawi, "Acceptability of a COVID-19 vaccine among healthcare workers in the Kingdom of Saudi Arabia," *Frontiers in Medicine*, vol. 8, pp. 1–12, 2021, doi: 10.3389/fmed.2021.644300.
- [63] J. Wang *et al.*, "Acceptance of COVID-19 Vaccination during the COVID-19 Pandemic in China," *Vaccines*, vol. 8, no. 3, p. 482, Aug. 2020, doi: 10.3390/vaccines8030482.
- [64] L. E. Smith, R. K. Webster, J. Weinman, R. Amlôt, J. Yiend, and G. J. Rubin, "Psychological factors associated with uptake of the childhood influenza vaccine and perception of post-vaccination side-effects: A cross-sectional survey in England," *Vaccine*, vol. 35, no. 15, pp. 1936–1945, Apr. 2017, doi: 10.1016/j.vaccine.2017.02.031.
- [65] G. Bonaccorsi *et al.*, "Predictive factors associated with the acceptance of pandemic and seasonal influenza vaccination in health care workers and students in Tuscany, Central Italy," *Human Vaccines & Immunotherapeutics*, vol. 9, no. 12, pp. 2603–2612, Dec. 2013, doi: 10.4161/hv.26036.
- [66] M. Sallam *et al.*, "COVID-19 misinformation: Mere harmless delusions or much more? A knowledge and attitude cross-sectional study among the general public residing in Jordan," *PLOS ONE*, vol. 15, no. 12, p. e0243264, Dec. 2020, doi: 10.1371/journal.pone.0243264.

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Appendix

Table 6. Difference between the profile of the respondents and their hesitancy towards the COVID-19 vaccine

Statement no. 1	Variables	Advice by the Government Officials		Distrust to the government and government official	
		Mean ± S.D.	p-value	Mean ± S.D.	p-value
Sex	Male	3.11 ± 0.67	0.948	2.99 ± 0.72	0.909
	Female	3.11 ± 0.64		2.98 ± 0.75	
Age	>18 years old	3.21 ± 0.61	0.181	3.02 ± 0.66	0.054
	18–59 years old	3.10 ± 0.66		2.98 ± 0.74	
	<60 years old	3.00 ± 0.71		2.90 ± 0.84	
Type of respondent	Student	3.10 ± 0.66	0.003*	3.00 ± 0.73	0.014*
	Staff	3.24 ± 0.62		2.86 ± 0.83	

Table 6. Difference between the profile of the respondents and their hesitancy towards the COVID-19 vaccine

Statement no. 1	Variables		Advice by the Government Officials		Distrust to the government and government official	
			Mean ± S.D.	p-value	Mean ± S.D.	p-value
Statement no. 2	Variables		It is safe and effective		Fear of the side effects and safety of the vaccine/Vaccine is not 100% effective	
			Mean ± S.D.	p-value	Mean ± S.D.	p-value
	Sex	Male	3.04 ± 0.69	0.360	3.19 ± 0.69	0.003*
		Female	3.00 ± 0.68		3.30 ± 0.67	
	Age	>18 years old	3.10 ± 0.68	0.293	3.36 ± 0.63	0.175
		18–59 years old	3.01 ± 0.69		3.25 ± 0.69	
		<60 years old	3.20 ± 0.84		3.40 ± 0.55	
	Type of respondent	Student	2.99 ± 0.69	0.000*	3.26 ± 0.68	0.204
		Staff	3.19 ± 0.61		3.25 ± 0.70	
Statement no. 3	Variables		Advice from family, friends, and colleagues		Poor or lack of knowledge about COVID-19 vaccine	
			Mean ± S.D.	p-value	Mean ± S.D.	p-value
	Sex	Male	2.85 ± 0.71	0.229	3.03 ± 0.72	0.056
		Female	2.79 ± 0.71		3.03 ± 0.76	
	Age	>18 years old	2.97 ± 0.60	0.020*	3.07 ± 0.67	0.747
		18–59 years old	2.80 ± 0.71		3.03 ± 0.74	
		>60 years old	2.40 ± 0.55		3.20 ± 0.45	
	Type of respondent	Student	2.79 ± 0.71	0.000*	3.03 ± 0.74	0.850
		Staff	2.99 ± 0.65		3.04 ± 0.75	
Statement no. 4	Variables		Vaccination may become a requirement in schooling/working		Personal vaccination is not needed if all in its vicinity gets vaccinated	
			Mean ± S.D.	p-value	Mean ± S.D.	p-value
	Sex	Male	2.99 ± 0.74	0.343	2.85 ± 0.74	0.015*
		Female	2.95 ± 0.77		2.79 ± 0.77	
	Age	>18 years old	3.09 ± 0.76	0.074	2.83 ± 0.72	0.793
		18–59 years old	2.96 ± 0.76		2.81 ± 0.77	
		<60 years old	3.40 ± 0.55		3.00 ± 0.71	
	Type of respondent	Student	2.95 ± 0.76	0.005*	2.82 ± 0.76	0.126
		Staff	3.11 ± 0.70		2.90 ± 0.75	
Statement no. 5	Variables		To protect others by helping to attain herd immunity		Vaccines are expensive/lack of financial resources	
			Mean ± S.D.	p-value	Mean ± S.D.	p-value
	Sex	Male	3.15 ± 0.68	0.392	3.03 ± 0.67	0.952
		Female	3.15 ± 0.65		3.04 ± 0.73	
	Age	>18 years old	3.21 ± 0.62	0.541	3.09 ± 0.65	0.510
		18–59 years old	3.15 ± 0.67		3.03 ± 0.71	
		<60 years old	3.20 ± 0.84		2.80 ± 0.84	
	Type of respondent	Student	3.13 ± 0.67	0.000*	3.05 ± 0.70	0.005*
		Staff	3.33 ± 0.63		2.90 ± 0.77	
Statement no. 6	Variables		It has no serious side-effect		The relatively quick development of COVID-19 vaccine might mean safety measures were skipped	
			Mean ± S.D.	p-value	Mean ± S.D.	p-value
	Sex	Male	2.82 ± 0.74	0.000*	2.98 ± 0.67	0.117
		Female	2.68 ± 0.75		2.98 ± 0.69	
	Age	>18 years old	2.73 ± 0.81	0.966	3.05 ± 0.66	0.361
		18–59 years old	2.74 ± 0.75		2.97 ± 0.69	
		<60 years old	2.80 ± 0.84		3.20 ± 0.45	
	Type of respondent	Student	2.72 ± 0.75	0.005*	2.98 ± 0.68	0.109
		Staff	2.89 ± 0.70		2.90 ± 0.75	
Statement no. 7	Variables		To protect your health		Fear in needles, injection, syringe, and pain	
			Mean ± S.D.	p-value	Mean ± S.D.	p-value
	Sex	Male	3.17 ± 0.67	0.112	2.84 ± 0.79	0.196
		Female	3.18 ± 0.64		2.89 ± 0.80	
	Age	>18 years old	3.34 ± 0.64	0.016*	2.95 ± 0.79	0.489
		18–59 years old	3.17 ± 0.66		2.86 ± 0.80	
		<60 years old	3.40 ± 0.55		2.80 ± 1.10	
	Type of respondent	Student	3.16 ± 0.66	0.000*	2.87 ± 0.80	0.204
		Staff	3.33 ± 0.66		2.80 ± 0.81	