University personnel and students' perspective on COVID-19 vaccine acceptability

Jomell M. Santiago[1], Angelo R. Santos[2]
[1]College of Education, Nueva Ecija University of Science and Technology San Isidro Campus, San Isidro, Nueva Ecija, Philippines
[2]College of Management and Business Technology, Nueva Ecija University of Science and Technology San Isidro Campus, San Isidro, Nueva Ecija, Philippines

Article Info	ABSTRACT
	Vaccines are life-saving technology that has led to the eradication, containment, or control of infectious illnesses around the globe. Many factors affect the vaccine acceptability of an individual. Thus, this study was conducted to determine the coronavirus disease 2019 (COVID-19) vaccine acceptability and the willingness of the students, faculty and staff of Nueva Ecija University of Science and Technology (NEUST) to get vaccinated. A descriptive study approach and total sampling were adopted. A questionnaire was constructed to collect data on the respondents' profile, their source of information and statements regarding their acceptability and willingness to get vaccinated by the COVID-19 vaccine. Informed consent and permission to conduct were acquired. Various statistical tools were used to analyze the data. The vaccine acceptability was generally high and most was willing to get vaccinated. Their primary source of information was from television and social media on the internet. Their willingness to get vaccinated was influenced by their age, gender and the group where they belong in the university. Although more respondents are willing to get vaccinated, some still do not want to get vaccinated. Therefore, health education campaigns and vaccine promotion should be conducted to improve vaccine acceptance during the roll-out of the COVID-19 vaccine. *This is an open access article under the <u>CC BY-SA</u> license.*

Corresponding Author:

Jomell M. Santiago
College of Education, Nueva Ecija University of Science and Technology San Isidro Campus
3106 Poblacion, San Isidro, Nueva Ecija, Philippines
Email: jomellsantiago8854@gmail.com

1. INTRODUCTION

The virus that causes coronavirus disease 2019 (COVID-19) is the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1]. Due to the spread of this viral disease, which has affected all parts of life across the globe, the world is seeing a vast global humanitarian calamity. The coronavirus disease 2019 outbreak has caused the terrible loss of many lives and massive economic and social upheaval around the world [2], [3]. Many nations have established severe precautions, legislation, and non-pharmaceutical interventions to combat the spread of COVID-19, including the mandatory use of a face cover or mask, social separation, and other measures [4], [5]. However, the preventive measures done were neither enough nor sufficient to stop the contagion. Therefore, the development and deployment of vaccines, one of the most promising health intervention strategies to confine and stop the pandemic, is indeed necessary as soon as possible [6], [7].

Vaccinations are one of the most effective and cost-efficient public health interventions ever developed that save hundreds of millions of lives each year [8], [9]. Vaccines are life-saving technology that

has led to the eradication, containment, or control of infectious illnesses around the globe [10]. Following the discovery of the severe acute respiratory syndrome coronavirus (SARS-CoV-2) genome sequence in early 2020 [11] and the World Health Organization's (WHO) announcement of the pandemic in March 2020 [12], scientists and pharmaceutical companies around the world are racing against time to develop vaccines [13], [14]. A vaccine is a substance that encourages a person's immune system to produce immunity to a certain disease, therefore protecting them from it [15].

Countries worldwide are working hard to create a vaccine to combat the COVID-19 virus [16], [17]. Although the development and deployment of vaccines are badly needed as quickly as possible, it is still vital to ensure that vaccines must be developed without compromising their safety and efficacy. They underwent rigorous clinical trials before the public would use them. Many of COVID-19 vaccines are currently in human trials. The Pfizer/BioNtech comirnaty vaccine was added to the WHO's emergency use list on December 31, 2020. AstraZeneca follows it on February 16, 2021, and Moderna on April 30, 2021 [18]. The first vaccines to be marketed were the Pfizertozinameran Comirnaty® [19] and Moderna [20] vaccines, followed by the vaccines from AstraZeneca Vaxzevria® [21]. Pfizer-BioNTech, Oxford-AstraZeneca, CoronaVac (Sinovac), Gamaleya Sputnik V, Johnson & Johnson's Janssen, Bharat BioTech, Novavax, and Moderna were among the COVID-19 vaccines receiving emergency use authorization (EUA) clearances by the Philippine Food and Drug Administration [22].

With the recent approval of COVID-19 vaccines, there is a growing sense of optimism that herd immunity will bring the pandemic to an end [23], [24]. As of June 17, 2021, there are 14,205,870 total doses delivered in the Philippines. The government aims to vaccinate 70% of Filipinos in 2021 to acquire herd immunity [25]. As of June 20, 2021, nearly 6.3 million Filipino have already received the first of two doses of the COVID-19 vaccine, representing more than 4% of the country's population and roughly 2.2 million have already received both doses of the vaccine [26]. According to national research findings, reaching the vaccination coverage required to achieve herd immunity is hampered by uncertainty and unwillingness to be vaccinated against COVID-19 [27]. Several studies about vaccine acceptability have been carried out. However, the study about the acceptability of the COVID-19 vaccine among Filipinos is still rare. Therefore, this study aimed to determine the COVID-19 vaccine acceptability and the willingness to get vaccinated of the students, faculty and staff of Nueva Ecija University of Science and Technology (NEUST) and the socio-demographic factors that affect their willingness to get vaccinated.

2.   RESEARCH METHOD

During the roll-out of the COVID-19 vaccine in the Philippines, a descriptive research approach was utilized to analyze the acceptance and willingness of students, teachers, and staff at Nueva Ecija University of Science and Technology. It was initiated in February and completed in June, 2021. Total sampling was used and the target population was all the students, faculty and staff who have an active Messenger account and internet access. There were 1,976 participated and gave consent to take part in the study.

The questionnaire made for the study was based on numerous related literatures. The questionnaire was divided into four sections: the first contained questions about their profile (age, gender, respondents' type, and campus where they are affiliated) [28]; the second contained questions about the source of information from which the respondents learned about the COVID-19 vaccine; and the third contained statements about their acceptability of the COVID-19 vaccine, which included the efficacy rate [29], [30], vaccine type [31], and the country of origin. Following an extensive study of the literature published in English and expert opinions, the questionnaire were modified for content, language, and cultural appropriateness. Pre-testing and revisions were made to the questionnaire. Due to the continuous implementation of community quarantine in the entire country, which resulted in the suspension of face-to-face classes and adoption of work from the home scheme for most university personnel, the data was gathered using a Google Form as a questionnaire.

The Office of the University President was approached for permission. The respondent required to give informed consent before they could answer the questionnaire. The subjects' privacy and confidentiality were respected, and they were given sufficient time to respond to the questions.

All completed questions were validated and double-checked. The information from the Google Form was then imported into statistical packages for social sciences (SPSS). The author double-checked and cleansed all data files until they were ready for evaluation. The responses to their COVID-19 vaccine acceptability in terms of its five parameters using the Likert scale was measured their level of acceptability by nine statements which stand for the nine COVID-19 vaccine brands. A single question measured the response to their willingness to get a COVID-19 vaccine. Frequency and percentage were calculated for the socio-demographic profile and information sources. A one-way analysis of variance (ANOVA) was used to determine if there were any significant differences in their profiles when it came to their willingness to get

vaccinated with the COVID-19 vaccine. Pearson correlation was used to see if there was a link between their vaccine acceptability and their willingness to get vaccinated with the COVID-19 vaccine.

3.   RESULTS AND DISCUSSION
3.1.   Socio-demographic profile of the respondents

A total of 1,976 people were chosen to participate in the study. Majority (96.7%) belong to the youth group where the age ranges from 15 to 47 years of age and (57.3%) were females. Most of them (92.1%) were students and almost all respondents are from Sumacab and General Tinio Campus, both reside in the city of Cabanatuan, 537 (27.2%) and 523 (26.5%), respectively as presented in Table 1.

Table 1. Socio-demographic profile of the respondents

Socio-demographic profile	Frequency (f)	Percentage (%)
Age		
Pediatric group (0-14)	26	1.3
Youth group (15-47)	1,911	96.7
Middle-age group (48-63)	39	2.0
Gender		
Male	817	41.3
Female	1,132	57.3
Prefer not to say	27	1.4
Type of respondent		
Student	1,819	92.1
Faculty	126	6.4
Non-teaching staff	28	1.4
Administration	3	0.2
Campus		
Sumacab	537	27.2
General Tinio	523	26.5
Atate	2	0.1
Gabaldon	142	7.2
Fort Magsaysay	12	0.6
San Isidro	368	18.6
San Antonio	190	9.6
San Leonardo	3	0.2
Caranglan	38	1.9
Papaya	161	8.16

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

Table 2 shows the source of knowledge of the respondents. Based on the result, their primary source of knowledge, or 1,596 (80.8%), is from the news they watch on television. The studies of [32], [33] supported the result, wherein their respondents responded that their information about the COVID-19, which included the COVID-19 vaccine, was obtained through traditional media like television. It is followed by the articles they read on different social media platforms like Facebook. The same result was obtained by [34], [35] that the internet and TV were the main sources of their participants' information about COVID-19 and its vaccine. Furthermore, most of the available information was in English, making it more understandable to the respondents [36].

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

Sources of information	Frequency (f)	Percentage (%)
Television	1,596	80.8
Radio	22	1.1
Newspaper	164	8.3
Social media	1,520	76.9
Scientific articles	374	18.9
Pharmaceutical report	138	7.0
Healthcare providers	502	25.4

3.3.   COVID-19 vaccine acceptability of the respondents

According to the study's findings, the acceptability of the respondents towards all the nine brands of COVID-19 vaccine in terms of its efficacy rate was acceptable with an overall weighted mean of 2.83. The brand that obtained the highest weighted mean (3.10) was the Pfizer–BioNTech vaccine with a 95% efficacy

rate as shown in Table 3. The possible reason for this is that individuals prefer vaccines with higher efficacy rates as they believe that a vaccine with higher efficacy is more effective than those with a lower efficacy. According to the article written by [37], scientists define vaccine efficacy as how well it performs in a carefully controlled trial and they mistakenly believe that it is equivalent to the vaccine's effectiveness or performance in the real world.

Table 3. COVID-19 vaccine acceptability in terms of its efficacy rate

COVID–19 vaccine brand	Efficacy rate	Very acceptable		Acceptable		Not acceptable		Not very acceptable		Weighted mean	Verbal interpretation
		F	%	F	%	F	%	F	%		
1. Pfizer–BioNTech	95%	495	25.1	1,223	61.9	211	10.7	47	2.4	3.10±0.67	Acceptable
2. Moderna	94.5%	387	19.6	1,273	64.4	264	13.4	52	2.6	3.01±0.66	Acceptable
3.Oxford-AstraZeneca	70% (2nd dose)	235	11.9	1,228	62.1	442	22.4	71	3.6	2.82±0.67	Acceptable
4. CoronaVac/Sinovac	50.38% in Brazil and 65 % in Indonesia	173	8.8	1,068	54.0	601	30.4	134	6.8	2.65±0.73	Acceptable
5. Sputnik V	91.4 %	315	15.9	1,259	63.7	335	17.0	67	3.4	2.92±0.68	Acceptable
6.Johnson & Johnson/Janssen	72% in USA	173	8.8	1,105	55.9	582	29.5	116	5.9	2.68±0.72	Acceptable
7. Novavax	90.4%	240	12.1	1,262	63.9	392	19.8	82	4.1	2.84±0.68	Acceptable
8. Sinopharm	79.34% (Overall)	164	8.3	1,129	57.1	572	28.9	111	5.6	2.68±0.70	Acceptable
9. Bharat Biotech/Covaxin	70% (for symptomatic)	195	9.9	1,190	60.2	496	25.1	95	4.8	2.75±0.69	Acceptable
Overall efficacy rate acceptability										2.83±0.56	Acceptable

Legend: F = Frequency; % = Percentage; 3.26 – 4.00 = Very acceptable, 2.51 – 3.25 = Acceptable, 1.76 – 2.50 = Not acceptable

Next, in terms of its vaccine type, all brands of COVID-19 vaccine were also acceptable, with an overall weighted mean of 2.89. The brand that obtained the highest weighted mean was the Pfizer–BioNTech (3.09) and Moderna (3.01) vaccine; both were mRNA-based vaccines as shown in Table 4. This could be because Messenger RNA vaccines, often known as mRNA vaccines, were the first COVID-19 vaccines to be approved for use. Aside from being the first COVID-19 vaccine developed, it is a new type of vaccine that protects an individual against infectious diseases like COVID-19. Many vaccines put a weakened or inactivated germ into our bodies to trigger an immune response. On the other hand, mRNA vaccines tell our cells how to make a protein—or even just a piece of a protein—that triggers an immune response in our bodies. If a virus penetrates our bodies, the immune response, which produces antibodies, shields us from infection. The benefit of mRNA vaccines, as with other vaccines, is that people who are vaccinated obtain protection without ever having to incur the serious consequences of contracting COVID-19. The live virus that causes COVID-19 is not used in mRNA vaccines, and it never enters the nucleus of the cell, which is where our DNA (genetic material) is maintained [38].

Table 4. COVID-19 vaccine acceptability in terms of its vaccine type

COVID-19 vaccine brand	Vaccine type	Very acceptable		Acceptable		Not acceptable		Not very acceptable		Weighted mean	Verbal interpretation
		F	%	F	%	F	%	F	%		
1. Pfizer–BioNTech	mRNA-based	489	24.7	1,226	62.0	216	10.9	45	2.3	3.09±0.66	Acceptable
2. Moderna	mRNA-based	394	19.9	1,256	63.6	283	14.3	43	2.2	3.01±0.66	Acceptable
3. Oxford –AstraZeneca	Viral vector	322	16.3	1,252	63.4	354	17.9	48	2.4	2.94±0.66	Acceptable
4. CoronaVac/Sinovac	Inactivated virus-based	245	12.4	1,229	62.2	438	22.2	64	3.2	2.84±0.67	Acceptable
5. Sputnik V	Viral vector	256	13.0	1,241	62.8	423	21.4	56	2.8	2.86±0.66	Acceptable
6. Johnson & Johnson/Janssen	Viral vector	222	11.2	1,204	60.9	479	24.2	71	3.6	2.80±0.68	Acceptable
7. Novavax	Protein-based	239	12.1	1,278	64.7	397	20.1	62	3.1	2.86±0.65	Acceptable
8. Sinopharm	Inactivated virus-based	202	10.2	1,187	60.1	519	26.3	68	3.4	2.77±0.67	Acceptable
9. Bharat Biotech/Covaxin	Viral vector	180	9.1	1,239	62.7	487	24.6	76	3.5	2.77±0.65	Acceptable
Overall vaccine type acceptability										2.89±0.54	Acceptable

Legend: F = Frequency; % = Percentage; 3.26 – 4.00 = Very acceptable, 2.51 – 3.25 = Acceptable, 1.76 – 2.50 = Not acceptable

Next, in terms of its country of origin, all brands of COVID-19 vaccine were also acceptable, with an overall weighted mean of 2.91. The brand that obtained the highest weighted mean was the Pfizer–BioNTech (3.11) from the USA and Germany as presented in Table 5. The result was supported by the news from [39], [40]. There are only 19% of Filipinos were eager to be vaccinated, with the highest level of trust in vaccinations from the United States (41%) [39]. In addition, 63% of Filipinos prefer COVID-19 vaccines made in the United States, such as those made by Pfizer and Moderna [40].

Table 5. COVID-19 vaccine acceptability in terms of its country of origin

COVID-19 vaccine brand	Country of origin	Very acceptable		Acceptable		Not acceptable		Not very acceptable		Weighted mean	Verbal interpretation
		F	%	F	%	F	%	F	%		
1. Pfizer–BioNTech	USA and Germany	502	25.4	1,229	62.2	200	10.1	45	2.3	3.11±0.66	Acceptable
2. Moderna	USA	429	21.7	1,273	64.4	233	11.8	41	2.1	3.06±0.64	Acceptable
3. Oxford–AstraZeneca	UK and Sweden	380	19.2	1,267	64.1	288	14.6	41	2.1	3.01±0.65	Acceptable
4. CoronaVac/Sinovac	China	231	11.7	1,192	60.3	455	23.0	98	5.0	2.79±0.71	Acceptable
5. Sputnik V	Russia	266	13.5	1,294	65.5	362	18.3	54	2.7	2.90±0.65	Acceptable
6. Johnson & Johnson/ Janssen	USA and Netherlands	282	14.3	1,246	63.1	395	20.0	53	2.7	2.89±0.66	Acceptable
7. Novavax	USA	323	16.3	1,243	62.9	355	18.0	55	2.8	2.93±0.67	Acceptable
8. Sinopharm	China	205	10.4	1,160	58.7	511	25.9	100	5.1	2.74±0.71	Acceptable
9.Bharat Biotech/Covaxin	India	231	11.7	1,223	61.9	444	22.5	78	3.9	2.81±0.68	Acceptable
Overall country of origin acceptability										2.91±0.54	Acceptable

Legend: F = Frequency; % = Percentage; 3.26 – 4.00 = Very acceptable, 2.51 – 3.25 = Acceptable, 1.76 – 2.50 = Not acceptable

Meanwhile, in terms of its price, all brands of COVID-19 vaccine were also acceptable, with an overall weighted mean of 2.74. The brand that obtained the highest weighted mean was the Oxford–AstraZeneca (2.92), with a price that amounted to P610 or $13 as shown in Table 6. According to [41], the cost of the vaccine is one of the most critical variables that will inspire more individuals to adopt the vaccine and get vaccinated. An individual may have confidence in a vaccine's safety and be motivated to get vaccinated, but not being able to afford the vaccine's price may result in them choosing not to get vaccinated [42]. If the vaccines were provided freely, many would like to be vaccinated [43]. The COVID-19 vaccine being provided by the Philippine government, regardless of brand, was free of charge.

Table 6. COVID-19 vaccine acceptability in terms of its price

COVID-19 vaccine brand	Price	Very acceptable		Acceptable		Not acceptable		Not very acceptable		Weighted mean	Verbal interpretation
		F	%	F	%	F	%	F	%		
1. Pfizer–BioNTech	Up to P1,000 or $19.50	325	16.4	1,122	56.8	460	23.3	69	3.5	2.86±0.72	Acceptable
2. Moderna	Up to P1,250 or $25	193	9.8	1,057	53.5	648	32.8	78	3.9	2.69±0.70	Acceptable
3. Oxford–AstraZeneca	Up to P100 or $2.15	356	18.0	1,172	59.3	380	19.2	68	3.4	2.92±0.71	Acceptable
4. CoronaVac/Sinovac	Up to P3,000 or $60	153	7.7	1,017	51.5	662	33.5	144	7.3	2.60±0.74	Acceptable
5. Sputnik V	Up to P500or $10	206	10.4	1,176	59.5	521	26.4	73	3.7	2.77±0.68	Acceptable
6. Johnson & Johnson/Janssen	Up to P500or $10	249	12.6	1,177	59.6	468	23.7	82	4.1	2.81±0.70	Acceptable
7. Novavax	Up to P800 or $16	196	9.9	1,151	58.2	542	27.4	87	4.4	2.74±0.69	Acceptable
8. Sinopharm	Up to P7,200 or $150	143	7.2	907	45.9	743	37.6	183	9.3	2.52±0.76	Acceptable
9. Bharat Biotech/Covaxin	Up to P100 or $2	264	13.4	1,139	57.6	486	24.6	87	4.4	2.80±0.72	Acceptable
Overall price acceptability										2.74±0.58	Acceptable

Legend: F = Frequency; % = Percentage; 3.26 – 4.00 = Very acceptable, 2.51 – 3.25 = Acceptable, 1.76 – 2.50 = Not acceptable

Last, the overall acceptability of the respondents towards all the nine brands of COVID-19 vaccine was acceptable, with an overall weighted mean of 2.88. The brand that obtained the highest weighted mean was the Pfizer–BioNTech (3.10) as presented in Table 7. It is not surprised to come up with the result since

Pfizer–BioNTech vaccine was the top choice of the respondents in almost all aspects. The study of Bautista *et al.* [44] also in line with the current result. They found that Comirnaty or the Pfizer–BioNTech vaccine was the most preferred type of COVID-19 vaccine.

Table 7. COVID-19 vaccine acceptability in terms of its overall acceptability

COVID-19 vaccine brand	Very acceptable		Acceptable		Not acceptable		Not very acceptable		Weighted mean	Verbal interpretation
	F	%	F	%	F	%	F	%		
1. Pfizer–BioNTech	510	25.8	1,212	61.3	207	10.5	47	2.4	3.10±0.67	Acceptable
2. Moderna	378	19.1	1,268	64.2	286	14.5	44	2.2	3.00±0.65	Acceptable
3. Oxford –AstraZeneca	347	17.6	1,263	63.9	316	16.0	50	2.2	2.97±0.66	Acceptable
4. CoronaVac/Sinovac	255	12.9	1,216	61.5	422	21.4	83	4.2	2.83±0.69	Acceptable
5. Sputnik V	245	12.4	1,255	63.5	420	21.3	56	2.8	2.85±0.66	Acceptable
6. Johnson & Johnson/ Janssen	210	10.6	1,240	62.8	458	23.2	68	3.4	2.81±0.66	Acceptable
7. Novavax	214	10.8	1,251	63.3	442	22.4	69	3.5	2.81±0.66	Acceptable
8. Sinopharm	179	9.1	1,195	60.5	522	26.4	80	4.0	2.75±0.67	Acceptable
9. Bharat Biotech/Covaxin	188	9.1	1,229	62.2	484	24.5	75	3.8	2.77±0.66	Acceptable
Overall Acceptability									2.88±0.54	Acceptable

Legend: F=Frequency; %=Percentage; 3.26 – 4.00=Very acceptable, 2.51 – 3.25=Acceptable, 1.76–2.50=Not acceptable

3.4. Willingness of the respondents to get vaccinated by COVID-19 vaccine

Table 8 illustrates the respondents' willingness to be vaccinated with the COVID-19 vaccine. Demographic factors influenced people's willingness to get vaccinated. Half of the pediatric group or 13 (50%) somewhat agree to get vaccinated, and most or 21 (53.8%) of the respondents from the middle-age group completely agree to get vaccinated. However, only 699 (36.6%) somewhat agree and 465 (24.3%) completely agree to get vaccinated in the youth group. Of the male respondents, most or 307 (37.6%) and 408 (35.7%) among the female respondents somewhat agree to get vaccinated. Among the students, 676 (37.2%) somewhat agree and 398 (21.9%) completely agree to get vaccinated. Half to more than half completely agree for the faculty and staff, while all of the respondents from administration completely agree to get vaccinated as shown in Table 8.

Table 8. Willingness of the respondents to get vaccinated by COVID-19 vaccine

Variables		Completely agree to get vaccinated		Somewhat agree to get vaccinated		Somewhat disagree to get vaccinated		Completely disagree to get vaccinated		p-value
		F	%	F	%	F	%	F	%	
Age	Pediatric group	3	11.5	13	50.0	4	15.4	6	23.1	
	Youth group	465	24.3	699	36.6	443	23.2	304	15.9	0.00*
	Middle-age group	21	53.8	12	30.8	5	12.8	1	2.6	
Gender	Male	231	28.3	307	37.6	146	17.9	133	16.3	
	Female	249	21.8	408	35.7	301	26.4	174	15.2	0.04*
	Prefer not to say	9	33.3	9	33.3	5	18.5	4	14.8	
Type of respondent	Student	398	21.9	676	37.2	440	24.2	305	16.8	
	Faculty	74	58.7	36	28.6	12	9.5	4	3.2	
	Non-teaching staff	14	50.0	12	42.9	0	0.0	2	7.1	0.00*
	Administration	3	100.0	0	0.0	0	0.0	0	0.0	

However, results of the Kruskal-Wallis's test for the age, gender and type of respondent showed significant differences in the respondents' demographic characteristics and their willingness to get vaccinated by COVID-19 vaccine. In terms of the age, the middle-age group or those between 48 to 63 earned higher percentages for those who completely agree to get vaccinated than the two age groups and the difference is significant. The result was in contrast to the study of [45], [46]. According to them, older adults lack understanding of vaccination's benefits, thereby affecting their willingness to get vaccinated. In terms of gender, the data showed more male participants who completely and somewhat agree to get vaccinated than their female counterparts. The result was supported by the study of [47], [48]. According to them, males were more likely than females to take the vaccine and participate in COVID-19 vaccine clinical trials in 2020 [49]. Last, in terms of the type of respondent, the faculty, non-teaching staff and part of the administration obtained higher percentages for those who completely agree to get vaccinated than the student participant and the difference is significant.

One of the main reasons for these is that educational institutions play a vital role in helping promote COVID-19 vaccinations. They are gatekeepers for the health and safety of employees. Without teachers and staff getting vaccinated against COVID-19, there is no such thing as a safe return to work. Meanwhile, possible reasons students have less percentage in terms of their willingness to get vaccinated is due to the safety and effectiveness of the vaccine. In addition, vaccine anxieties stoked by the Dengvaxia scare had lowered immunization rates in the country, even for vaccines that had been proven safe [50].

Table 9 depicts the association between respondents' willingness to be vaccinated with the COVID-19 vaccine and their vaccine acceptance. Based on the result, all the parameters that describe the vaccine acceptability significantly correlate with the respondents' willingness to get vaccinated. It only means that those who have responded positively to the different parameters that describe their vaccine acceptability are willing to get vaccinated by the COVID-19 vaccine. For them, if the efficacy rate, type of vaccine, country of origin and the price of the vaccine and its overall acceptability were acceptable, they are willing to get vaccinated. It only means that when they accept the vaccine, in general, they are also willing to get vaccinated.

Table 9. Relationship between the willingness of the respondents to get vaccinated by COVID-19 vaccine to their vaccine acceptability

Variables	Correlation coefficient	p-value
Efficacy rate of the COVID-19 vaccine	0.370	0.000*
Type of vaccine	0.344	0.000*
Country of origin of the COVID-19 vaccine	0.344	0.000*
Price of the COVID-19 vaccine	0.311	0.000*
Overall acceptability of the COVID-19 vaccine	0.368	0.000*

Legend: *significant at $p \leq 0.05$

4. CONCLUSION

This study found that among the students, faculty members and staffs of the Nueva Ecija University of Science and Technology, the COVID-19 vaccine acceptability was generally high and most is willing to get vaccinated. Their primary source of information about the COVID-19 vaccine was from television and social media on the internet. The respondent's willingness to get vaccinated by the COVID-19 vaccine was influenced by their age, gender, and the group they belong in the university. The willingness is relatively high for those respondents who belong to the youth group, who are male and a faculty and staff in the university compare to their counterparts. The association between their vaccine acceptability and their willingness to get vaccinated is positive. This implies that when the efficacy rate, type of vaccine, country of origin, price, and overall acceptability of the vaccine are acceptable, they are more likely to get vaccinated. Although more respondents are willing to get vaccinated, some still do not want to get vaccinated. Therefore, health education campaigns and vaccine promotion should be conducted to improve vaccine acceptance during the roll-out of the COVID-19 vaccine.

REFERENCES

[1]   Y. A. Helmy, M. Fawzy, A. Elaswad, A. Sobieh, S. P. Kenney, and A. A. Shehata, "The COVID-19 pandemic: A comprehensive review of taxonomy, genetics, epidemiology, diagnosis, treatment, and control," *Journal of Clinical Medicine*, vol. 9, no. 4, p. 1225, Apr. 2020, doi: 10.3390/jcm9041225.

[2]   M. K. Al-Hanawi *et al.*, "Psychological distress amongst health workers and the general public during the COVID-19 pandemic in Saudi Arabia," *Risk Management and Healthcare Policy*, vol. 13, pp. 733–742, Jul. 2020, doi: 10.2147/RMHP.S264037.

[3]   J. V. Lazarus *et al.*, "A global survey of potential acceptance of a COVID-19 vaccine," *Nature Medicine*, vol. 27, no. 2, pp. 225–228, Feb. 2021, doi: 10.1038/s41591-020-1124-9.

[4]   M. K. Al-Hanawi *et al.*, "Knowledge, attitude and practice toward COVID-19 Among the public in the Kingdom of Saudi Arabia: A Cross-Sectional Study," *Frontiers in Public Health*, vol. 8, May 2020, doi: 10.3389/fpubh.2020.00217.

[5]   S. M. Sherman *et al.*, "COVID-19 vaccination intention in the UK: results from the COVID-19 vaccination acceptability study (CoVAccS), a nationally representative cross-sectional survey," *Human Vaccines and Immunotherapeutics*, vol. 17, no. 6, pp. 1612–1621, Jun. 2021, doi: 10.1080/21645515.2020.1846397.

[6]   N. Lurie, M. Saville, R. Hatchett, and J. Halton, "Developing COVID-19 Vaccines at pandemic speed," *New England Journal of Medicine*, vol. 382, no. 21, pp. 1969–1973, May 2020, doi: 10.1056/nejmp2005630.

[7]   Y. Yang *et al.*, "The deadly coronaviruses: The 2003 SARS pandemic and the 2020 novel coronavirus epidemic in China," *Journal of Autoimmunity*, vol. 109, p. 102434, May 2020, doi: 10.1016/j.jaut.2020.102434.

[8]   I. Hajj Hussein *et al.*, "Vaccines Through Centuries: Major Cornerstones of Global Health," *Frontiers in Public Health*, vol. 3, 2015, doi: 10.3389/fpubh.2015.00269.

[9]   C. M. C. Rodrigues and S. A. Plotkin, "Impact of vaccines; health, economic and social perspectives," *Frontiers in Microbiology*, vol. 11, Jul. 2020, doi: 10.3389/fmicb.2020.01526.

[10]   E. Dubé, "Addressing vaccine hesitancy: the crucial role of healthcare providers," *Clinical Microbiology and Infection*, vol. 23, no. 5, pp. 279–280, May 2017, doi: 10.1016/j.cmi.2016.11.007.

[11] F. Wu *et al.*, "A new coronavirus associated with human respiratory disease in China," *Nature*, vol. 579, no. 7798, pp. 265–269, Mar. 2020, doi: 10.1038/s41586-020-2008-3.

[12] D. Cucinotta and M. Vanelli, "WHO declares COVID-19 a pandemic," *Acta Biomedica*, vol. 91, no. 1, pp. 157–160, 2020, doi: 10.23750/abm.v91i1.9397.

[13] J. C. and S.-L. W. Carl Zimmer, "Coronavirus Vaccine Tracker," *The New York Times*, 2021. [Online]. Available: http://www.nomeofficinapolitica.it/wp-content/uploads/2020/10/Vaccini_NYT.pdf (accessed Apr. 06, 2021).

[14] A. Coustasse, C. Kimble, and K. Maxik, "COVID-19 and Vaccine Hesitancy: A Challenge the United States Must Overcome," *Journal of Ambulatory Care Management*, vol. 44, no. 1, pp. 71–75, Jan. 2021, doi: 10.1097/JAC.0000000000000360.

[15] National Center for Immunization and Respiratory Diseases (NCIRD), "Immunization Basics | CDC," *National Center for Immunization and Respiratory Diseases (NCIRD)*, 2021. [Online]. Available: https://www.cdc.gov/vaccines/vac-gen/imz-basics.htm (accessed Apr. 06, 2021).

[16] T. Thanh Le *et al.*, "The COVID-19 vaccine development landscape," *Nature Reviews Drug discovery*, vol. 19, no. 5, pp. 305–306, May 2020, doi: 10.1038/d41573-020-00073-5.

[17] H. R. Sharpe *et al.*, "The early landscape of coronavirus disease 2019 vaccine development in the UK and rest of the world," *Immunology*, vol. 160, no. 3, pp. 223–232, Jul. 2020, doi: 10.1111/imm.13222.

[18] World Health Organization, "Coronavirus disease (COVID-19): Vaccines," 2021. [Online]. Available: https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-vaccines?=gclid&topicsurvey=v8kj13) (accessed Apr. 06, 2021).

[19] F. P. Polack *et al.*, "Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine," *New England Journal of Medicine*, vol. 383, no. 27, pp. 2603–2615, Dec. 2020, doi: 10.1056/nejmoa2034577.

[20] L. R. Baden *et al.*, "Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine," *New England Journal of Medicine*, vol. 384, no. 5, pp. 403–416, Feb. 2021, doi: 10.1056/nejmoa2035389.

[21] M. Voysey *et al.*, "Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: an interim analysis of four randomised controlled trials in Brazil, South Africa, and the UK," *The Lancet*, vol. 397, no. 10269, pp. 99–111, Jan. 2021, doi: 10.1016/S0140-6736(20)32661-1.

[22] Department of Health, "Know your vaccines (Vaccine matrix: Current evidence)," 2021. [Online]. Available: https://doh.gov.ph/vaccines/know-your-vaccines (accessed Jun. 02, 2021).

[23] S. B. Omer, I. Yildirim, and H. P. Forman, "Herd Immunity and Implications for SARS-CoV-2 Control," *JAMA - Journal of the American Medical Association*, vol. 324, no. 20, pp. 2095–2096, Nov. 2020, doi: 10.1001/jama.2020.20892.

[24] P. Fine, K. Eames, and D. L. Heymann, "'Herd immunity': A rough guide," *Clinical Infectious Diseases*, vol. 52, no. 7, pp. 911–916, Apr. 2011, doi: 10.1093/cid/cir007.

[25] C. A. H. Buhat *et al.*, "Using constrained optimization for the allocation of COVID-19 vaccines in the Philippines," *Applied Health Economics and Health Policy,* vol. 19, no. 5, pp. 699-708, doi: 10.1007/s40258-021-00667-z.

[26] Statista Research Department, "Philippines: COVID-19 vaccine rollout 2021," *Statista*, 2021. https://www.statista.com/statistics/1236727/philippines-coronavirus-covid19-vaccine-rollout/ (accessed Jun. 20, 2021).

[27] E. Paul, A. Steptoe, and D. Fancourt, "Attitudes towards vaccines and intention to vaccinate against COVID-19: Implications for public health communications," *The Lancet Regional Health - Europe*, vol. 1, p. 100012, Feb. 2021, doi: 10.1016/j.lanepe.2020.100012.

[28] Z. Lin *et al.*, "Establishment of age group classification for risk stratification in glioma patients," *BMC Neurology*, vol. 20, no. 1, p. 310, Dec. 2020, doi: 10.1186/s12883-020-01888-w.

[29] T. Burki, "Equitable distribution of COVID-19 vaccines," *The Lancet Infectious Diseases*, vol. 21, no. 1, pp. 33-34.

[30] K. Katella, "Comparing the COVID-19 vaccines: How are they different," *Yale Medicine,* vol. 22, 2021.

[31] G. Forni and A. Mantovani, "COVID-19 vaccines: where we stand and challenges ahead," *Cell Death & Differentiation*, vol. 28, no. 2, pp. 626-639, 2021.

[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, Jun. 2020, doi: 10.7189/JOGH.10.011007.

[33] 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 Science*, vol. 10, no. 3, pp. 670–678, Sep. 2021, doi: 10.11591/ijphs.v10i3.20844.

[34] E. Hager, I. A. Odetokun, O. Bolarinwa, A. Zainab, O. Okechukwu, and A. I. Al-Mustapha, "Knowledge, attitude, and perceptions towards the 2019 Coronavirus Pandemic: A bi-national survey in Africa," *PLOS ONE*, vol. 15, no. 7, p. e0236918, Jul. 2020, doi: 10.1371/journal.pone.0236918.

[35] 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 Science*, vol. 9, no. 4, pp. 421–428, Dec. 2020, doi: 10.11591/ijphs.v9i4.20545.

[36] 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.

[37] World Health Organization, "Vaccine efficacy, effectiveness and protection. WHO | World Health Organization," 2021. [Online]. Available: https://www.who.int/news-room/feature-stories/detail/vaccine-efficacy-effectiveness-and-protection (accessed Jun. 20, 2021).

[38] CDC, "Understanding mRNA COVID-19 Vaccines | CDC," *Understanding mRNA COVID-19 Vaccines*, 2021. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/mrna.html (accessed Jun. 20, 2021).

[39] A. Caple *et al.*, "Interrogating COVID-19 vaccine hesitancy in the Philippines with a nationwide open-access online survey," *medRxiv*, 2021.

[40] M. Galingana, "Willingness of the Senior High School Teachers to be Vaccinated against COVID-19," *Health Notions,* vol. 5, no. 8, pp. 267-274, 2021.

[41] C. Halpin and B. Reid, "Attitudes and beliefs of healthcare workers about influenza vaccination," *Nursing Older People*, vol. 31, no. 2, pp. 32–39, Mar. 2019, doi: 10.7748/nop.2019.e1154.

[42] World Health Organization, "What influences vaccine acceptance: A model of determinants of vaccine hesitancy," 2013. https://www.who.int/immunization/sage/meetings/2013/april/1_Model_analyze_driversofvaccineConfidence_22_March.pdf.

[43] H. Harapan *et al.*, "Acceptance of a COVID-19 vaccine in Southeast Asia: a cross-sectional study in Indonesia," *Frontiers in Public Health*, vol. 8, Jul. 2020, doi: 10.3389/fpubh.2020.00381.

[44] A. P. Bautista Jr., D. G. Bleza, D. M. Balibrea, and C. Equiza, "Acceptability of vaccination against COVID-19 among se- lected residents of the cities of caloocan, malabon, and navotas, Philippines," *Preprints*, no. February, 2021, doi:

10.20944/preprints202104.0702.v1.

[45] T. M. Doherty *et al.*, "Vaccination programs for older adults in an era of demographic change," *European Geriatric Medicine*, vol. 9, no. 3, pp. 289–300, Jun. 2018, doi: 10.1007/s41999-018-0040-8.

[46] E. de Gomensoro, G. Del Giudice, and T. M. Doherty, "Challenges in adult vaccination," *Annals of Medicine*, vol. 50, no. 3, pp. 181–192, Apr. 2018, doi: 10.1080/07853890.2017.1417632.

[47] A. A. Malik, S. A. M. McFadden, J. Elharake, and S. B. Omer, "Determinants of COVID-19 vaccine acceptance in the US," *EClinicalMedicine*, vol. 26, p. 100495, Sep. 2020, doi: 10.1016/j.eclinm.2020.100495.

[48] T. El-Elimat, M. M. AbuAlSamen, B. A. Almomani, N. A. Al-Sawalha, and F. Q. Alali, "Acceptance and attitudes toward COVID-19 vaccines: A cross-sectional study from Jordan," *PLoS ONE*, vol. 16, no. 4 April, p. e0250555, Apr. 2021, doi: 10.1371/journal.pone.0250555.

[49] R. K. Abu-Farha, K. H. Alzoubi, and O. F. Khabour, "Public willingness to participate in COVID-19 vaccine clinical trials: A study from Jordan," *Patient Preference and Adherence*, vol. 14, pp. 2451–2458, Dec. 2020, doi: 10.2147/PPA.S284385.

[50] M. B. Zaidi and L. Flores-Romo, "The growing threat of vaccine resistance: a global crisis," *Current Treatment Options in Infectious Diseases*, vol. 12, vol. 2, pp. 122-134, 2020.

BIOGRAPHY OF AUTHOR

Jomell Miranda Santiago graduated Bachelor's Degree in Secondary Education major in General Science at Nueva Ecija University of Science and Technology San Isidro Campus and finished a Master's Degree in Biology Education at Central Luzon State University. He is currently connected with Nueva Ecija University of Science and Technology as Instructor for two (4) years and has been active in the field of research in recent years. He can be reached by email address: jomellsantiago8854@gmail.com.

Angelo R. Santos graduated Bachelor's Degree in Business Administration major in Marketing Management at Wesleyan University, Philippines. He finished a Master's Degree in Business Administration at the same school, currently pushing his Doctor of Philosophy in Business Administration at NEUST. He is presently affiliated with NEUST for two (3) years as Instructor and Head of the University ISO Unit and has been involved in the field of research in recent years. He can be reached by email address: alopogssantos@gmail.com.