

Vaccine Hesitancy Perception among a Mid-Major University

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Abstract: *The purpose of this study is to measure the attitude and perception of university students regarding potential vaccine hesitancy toward the COVID-19 vaccine and determine if identified hesitancy can be associated with influence factors such as contextual, individual/group, or vaccine/vaccination specific issues. Participants were asked to complete a 23 question self-reported survey that asked questions related to their perception of the COVID-19 pandemic, and the safety of the COVID-19 vaccine. Respondents N= 11,548 consisted of students, faculty, administrative staff, and civil service employees of a mid-major university. Of the sent emails, 40 (.04) individuals opted out of the survey, 4,370 (44%) opened the survey; and of that group 151(3.5%) did not sufficiently complete; creating an N of 1,465 (34%) who completed the survey. ANOVA analyses were conducted yielding statistically significant differences among the subgroup's perception of "vaccine is threat to health", "right to decide" and "refuse to be vaccinated". Understanding the rationale of individuals who are vaccine hesitant will provide a better understanding to provide the needed information, tools, and activities to reduce individual hesitancy.*

Keywords—Vaccine Hesitancy, Vaccine, Covid-19, Student Perception, Student Attitude

INTRODUCTION

Vaccine hesitancy is an issue that affects millions of Americans due to skepticism and previous unethical behavior from the government. This issue is important, now, as the COVID-19 pandemic has become the most recent infection to prompt widespread vaccination. Vaccines are effective—and have been for many years—against the spread of illness and complications of preventable infectious diseases (Malone & Hinman, 2003). A vaccination's role is to provide individual resistance, as it delivers efficacious immunity against specified pathogens. Although resistance against vaccinations has been a continuous debate, the disagreement over vaccination has exacerbated in the last two years.

Vaccines have established some credibility since the late 18th century, and many view it as one of the prime public health achievements throughout the twentieth century. DeStefano, Bodenstab, and Offit (2019) argue that the safety concerns over vaccination are not supported. Their article details how some of the most common vaccines have been able to dispute the claims of their critics. Vaccines have been around since 1796 when Edward Jenner injected a 13-year-old-boy with cowpox, and demonstrated immunity to smallpox (Malone & Hinman, 2003).

Mandatory youth vaccinations have shielded children from measles, chicken pox, pneumococcal infection, and other deadly diseases. Throughout the modern age vaccines have proven to be successful against specified infectious diseases. There are epidemiological data and successful vaccination campaigns that prove the success of vaccination (D'Amelio, et al, 2016). The incidence of infectious diseases such as Rabies, Tetanus, Polio, Measles, Mumps, and many other endemic contagious diseases have been significantly reduced through a rigorous vaccination policy and concern for the general health of communities.

Since the early 1800's the U.S. government has recognized the importance of disease prevention to protect the health of the public. The Act to Encourage Vaccination, passed in 1813 was the first national effort to mitigate the spread of smallpox (Lanzarotta & Ramos, 2018). This Act, arguably, ultimately turned into the catalysis that created distrust in medical experts and question the veracity of vaccinations due to the physician providing tainted vaccine that resulted in ten deaths. The Act was ultimately repealed in 1822 due to this tragic error, mounting resistance from the medical community creating a debate among the legislators with arguments such as "Were there not some doctors, or quacks, who pretended that vaccination is wholly useless?"; "'despotic' power European governments used to coerce or obligate their citizens to undergo vaccination."; "let the people who are both able and willing, take care of themselves." (Lanzarotta & Ramos, 2018, p. 745).

The U.S. Supreme Court's Jacobson v Massachusetts decision codified the government's role in Constitutional protection in four converging areas: "necessity, reasonable means, proportionality, and harm avoidance" (Gostin, 2005, p.579). Singularly, the Jacobson decision placed paramount concern regarding government authority in social welfare and police power regulation (Gostin, 2005). The Jacobson decision is somewhat controversial because many believe that it erodes public autonomy over their health decisions; however, other people view it as an effective way for the government to prevent the spread of disease and protect their citizens. Necessity suggests that the government must have a proven need (health threat) before it requires any health mandates, including vaccination. Reasonable means suggests a linear relationship between the threat and action taken or the action taken could be construed to infringe on individual rights. Proportionality is the balance between the mandated action and the burden that action imposes on individuals. If the imposed action is proved to be over arduous or repressive the

court could determine the mandate unconstitutional. Thus, the threat must be severe enough to ensure that the protections from it are more beneficial than the harm of the threat. If the harm is disproportional to the benefits, the constitutionality of the action could be in question. Harm avoidance is the construct that any mandated action by the government should not cause harm. This concept then faces the question of what is acceptable risk? The standards identified by the Court has laid the precedence for other health mandated government actions solidifying the idea that anything related to protecting the public health, must show a balance between the government's interests and the rights of the citizens (Gostin, 2005).

VACCINE HESITANCY

Vaccine hesitancy as defined by SAGE Working Group on Vaccine Hesitancy (2014) is: “.the delay in acceptance or refusal of vaccines despite availability of vaccination services” (p.7). Vaccine hesitancy is a result of decision making processes that are influenced by a host of factors that can be placed in three hesitancy categories (SAGE Working Group on Vaccine Hesitancy, 2014). The decision on whether to accept, refuse, or change decision on receiving a vaccination can be influenced by the contextual stimuli one may receive; individual and group influences one may associate with; and vaccine/vaccination specific issues (SAGE Working Group on Vaccine Hesitancy, 2014).

Contextual influences are those extrinsic stimuli that exist in an individual's environment that might impact a person's hesitancy. Those moderators may include social, cultural, economic or political stimuli (ECDC, 2015). According to the European Centre for Disease Prevention and Control (ECDC) (2015), conspiracy theories was the most often mentioned variable (7) in a literature review of contextual influences citing “fear that vaccines are introduced to serve the economic and/or political interests of pharmaceutical companies, Western countries government, or a belief that vaccines are implemented as a strategy to reduce world population” (ECDC, 2015, p. 4).

Individual and group influences are the perceptions or beliefs individuals have toward the vaccine and the integration of their environment. Beliefs that vaccines are unsafe or can cause severe disease, and the societal benefit does not offset the risk are examples (ECDC, 2015).

Vaccine and vaccination specific issues involves perceived need, access, and potential mitigating comorbidities. Issues such as design and delivery, reliability of the vaccine and reputation of the healthcare professionals that are promoting the vaccine impact this area (SAGE Working Group on Vaccine Hesitancy, 2014).

Purpose

The purpose of this study is to measure the attitude and perception of university students regarding potential vaccine hesitancy toward the COVID-19 vaccine and determine if

identified hesitancy can be associated with influence factors such as contextual, individual/group, or vaccine/vaccination specific issues.

METHODOLOGY

This retrospective study attempted to measure vaccine hesitancy among a university student population. College students represent a diverse population that demographically can represent the demography of the country. The survey results produced quantitative data that highlights participant opinions, feelings, and experiences involving the process of the government implementation of the COVID-19 vaccine. The data also attempted to collect participant responses about their overall perception on COVID-19 vaccination process and to identify if there might be some bias based on influencing factors that impact vaccine hesitancy. The survey consisted of 23 questions using a mixture of yes/no and Likert-scale 1-5 responses. Examples of the survey questions ranged from: “I feel overwhelmed with information overload related to the safety of the COVID-19 vaccines” to “I believe Ivermectin is a good option for preventing COVID-19”. This methodology is appropriate for the study by providing the quantitative data that allows for the exploration of descriptive analysis among the variables and provides the ability to examine correlations and ANOVAs between and among the variables. The survey was developed in SurveyMonkey for distribution and data collection. Prior to distribution of the survey the project was submitted and approved by the researcher's Institutional Review Board.

The researchers, submitting a Freedom of Information request, obtained an email list of all undergraduate and graduate students, as well as all employees from a mid-western university. The participants were sent an email containing a cover letter introducing the study, with a statement that indicated the survey was voluntary with completion and submission providing consent. Anonymous responses were obtained via the password protected SurveyMonkey account of one researcher. No personal identifying information was obtained. Emails were sent to 11,548 individuals that were students or employees of a mid-western university. Of the sent emails, 40 (.04) individuals opted out of the survey, 4,370 (44%) opened the survey; and of that group 151(3.5%) did not sufficiently complete; creating an n of 1,465 (34%) who completed the survey.

DATA ANALYSIS

All data was transferred into a Microsoft Excel spreadsheet. Once organized, the data was then transferred into SPSS-Version 27 for analysis. The researchers used descriptive, correlations, and Analysis of Variants to explore the data.

Findings

Of the 1,453 participants responding to their university status; 1,122 (77.2%) reported as students; 43 (3.0%) faculty; 133 (9.2%) administrative staff; and 155 (10.7%) civil service.

The respondents gender distribution consisted of 812 (55.8%) females; 554 (38.1%) males; 49 (3.4%) non-binary; 4 (.3%) none of the listed options; and 35 (2.4%) chose not to answer. Of the age range to select; 855 (60%) are 18-24 years; 293 (20.6%) 25-34 years; 161 (11.3%) 45-54 years; 85 (6 %) 55-64 years; and 30 (2.1%) 65 years and over. Ethnicity consisted of 1,151 (79.6%) white; 105 (7.3%) black; 83 (5.7%) Hispanic; 57 (3.9%) Asian; 12 (.8%) American Indian or Alaska Native; 1 (.1%) reported as Native Hawaiian or other Pacific Islander; while 37 (2.6%) selected none of the above. These results indicate a sample group composed of approximately 81% between the ages of 18-34; somewhat homogenous ethnicity with 79.6% reporting as white; with respondents 55.8% as female; resulting in a majority sample group of young adult white females.

Table 1 shows the frequency responses regarding the contextual variables and are associated with social, cultural, economic or political factors. 95 (6.5%) of the respondents reported a religious objection to receiving the COVID-19 vaccination, while a majority 806 (55.2%) reported they knew someone who had died from COVID. When asked whether the U.S. is experiencing a significant health crisis 1,078 (73.9%) either agreed or strongly agreed with the statement. Interestingly, when asked their political leaning participants identified with 367 (25.3%) preferred not to answer; while 476 (32.5%) leaned toward liberal, 381 (26%) toward moderate and 226 (15.4%) leaned toward conservative. The researchers conducted a Pearson Correlation to determine if any association existed between the contextual variables and found relationships between the variables to be slightly linear with health crisis and religious objection to have a weak negative relationship, $r = -.29$, $p = .01$.

A means analysis was then utilized to investigate the identified contextual variables to participants identified “university status”. The analysis indicated potential differences in belief among the variables “experiencing a significant health crisis” and “know of anyone who has died from COVID-19” further analysis involving ANOVA was utilized. Results indicate a significant difference among the subgroups in the “university status” variable. A post-hoc Bonferroni was conducted to identify where the difference may exist. Results indicate differences were found in “university status” and “experience a significant health crisis” among students and administrative staff ($MD = .360$, $p = .01$, $CI = .08$ to $.64$). No other significant difference was found. Exploring “university status” and “know of anyone who has died from COVID-19” found differences among student and administrative staff ($MD = .231$, $p = .01$; $CI = .09$ to $.37$); and civil service ($MD = .170$, $p = .01$, $CI = .04$ -. $.30$)

Table 2 highlights the frequency responses regarding the individual/group variables are associated with individual beliefs. 436 (29.9%) agree or strongly agree that they are experiencing information overload as it relates to the safety of the COVID-19 vaccines while 665 (45.7%) disagree or strongly disagree. Perceived threat of the vaccine reveals 986 (67.6%) disagreed or strongly disagreed while the perceived threat of the virus shows 997 (67.1%) agree or strongly agree. There appears to be consistency among the respondents toward the notion the virus possesses a threat to their health and little or no perceived threat from the vaccine. There does appear to be inconsistency among those who agree or strongly agree between virus threat to health 67.1% and U.S. experiencing a health crisis 73.9%. It appears there are some respondents who believe while there is a health crisis that threat does not pertain to them. This belief could be further reinforced by the responses associated with whether respondents believed the mortality statistic of over 700,000 deaths; 288 (19.8%) did not believe the statement and 295 (20.3%) were not sure. These results might support the contentious nature of COVID-19 related information and the processing methodology of the participants. Slightly less than a third (447, 30.6%) of respondents disagree or strongly disagree with the belief the government mandate to be a positive action in preventing the spread of the virus. There appears to be consistency in responses to the previous variable and the belief the respondents’ right to decide whether they receive the vaccination is more important than contributing to stopping the pandemic. 449 (31%) agree or strongly agree their right to decide supersedes stopping the pandemic; while another 273 (18.9%) neither agree nor disagree. Regarding participants belief on those who refuse to be vaccinated are prolonging the pandemic 441 (30.3%) disagree or strongly disagree than not being vaccinated contributes to the longevity of the pandemic. Person Correlation was conducted on the variables resulting in strong to moderate association between the variables. A strong association, $r = .839$, $p = .01$ was found between “mandate was a positive action” and “refuse to be vaccinated prolonging the pandemic” indicating

Table 1

Contextual Variable Frequency					
Religious objection to receiving COVID-19 vaccination					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	95	6.5	6.5	6.5
	No	1362	93.0	93.5	100.0
	Total	1457	99.5	100.0	
Missing	System	8	0.5		
Total		1465	100.0		
Know of anyone who has died from COVID-19?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	806	55.0	55.2	55.2
	No	591	40.3	40.5	95.8
	Not sure	62	4.2	4.2	100.0
	Total	1459	99.6	100.0	
Missing	System	6	0.4		
Total		1465	100.0		
U.S. is experiencing a significant health crisis.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	683	46.6	46.8	46.8
	Agree	395	27.0	27.1	73.9
	Neither agree nor disagree	180	12.3	12.3	86.2
	Disagree	134	9.1	9.2	95.4
	Strongly disagree	67	4.6	4.6	100.0
	Total	1459	99.6	100.0	
Missing	System	6	0.4		
Total		1465	100.0		
Which political leaning do you identify with:					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Conservative	226	15.4	15.6	15.6
	Liberal	476	32.5	32.8	48.4
	Moderate	381	26.0	26.3	74.7
	Prefer not to answer	367	25.1	25.3	100.0
	Total	1450	99.0	100.0	
Missing	System	15	1.0		
Total		1465	100.0		

agreement in responses of these two variables. Other strong associations include; “vaccines a threat to my health” and “approval process safe and reliable”, $r=-.780$, $p=.01$; “vaccines a threat to my health” and “refuse to be vaccinated are prolonging the pandemic”, $r=-.757$, $p=.01$; “right to decide” and “refuse to be vaccinated”, $r=-.781$, $p=.01$.

Individual/Group Variable Frequency					
Overwhelmed with information overload					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	136	9.3	9.3	9.3
	Agree	300	20.5	20.6	29.9
	Neither agree nor disagree	355	24.2	24.4	54.3
	Disagree	425	29.0	29.2	83.5
	Strongly disagree	240	16.4	16.5	100.0
	Total	1456	99.4	100.0	
Missing	System	9	0.6		
Total		1465	100.0		
COVID-19 vaccines to be a threat to my health					
Valid	Strongly agree	93	6.3	6.4	6.4
	Agree	146	10.0	10.0	16.4
	Neither agree nor disagree	233	15.9	16.0	32.4
	Disagree	333	22.7	22.8	55.2
	Strongly disagree	653	44.6	44.8	100.0
	Total	1458	99.5	100.0	
Missing	System	7	0.5		
Total		1465	100.0		
COVID-19 virus to be a threat to my health					
Valid	Strongly agree	550	37.5	37.7	37.7
	Agree	427	29.1	29.3	67.1
	Neither agree nor disagree	171	11.7	11.7	78.8
	Disagree	191	13.0	13.1	91.9
	Strongly disagree	118	8.1	8.1	100.0
	Total	1457	99.5	100.0	
Missing	System	8	0.5		
Total		1465	100.0		

Approval process was safe and reliable					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	397	27.1	27.2	27.2
	Agree	484	33.0	33.2	60.4
	Neither agree nor disagree	235	16.0	16.1	76.5
	Disagree	173	11.8	11.9	88.4
	Strongly disagree	169	11.5	11.6	100.0
	Total	1458	99.5	100.0	
Missing	System	7	0.5		
Total		1465	100.0		
Do you believe the COVID-19 mortality statistic					
Valid	Yes	872	59.5	59.9	59.9
	No	288	19.7	19.8	79.7
	Not sure	295	20.1	20.3	100.0
	Total	1455	99.3	100.0	
	Missing	System	10	0.7	
Total		1465	100.0		
Mandate positive action preventing the spread					
Valid	Strongly agree	528	36.0	36.2	36.2
	Agree	303	20.7	20.8	56.9
	Neither agree nor disagree	182	12.4	12.5	69.4
	Disagree	150	10.2	10.3	79.7
	Strongly disagree	297	20.3	20.3	100.0
	Total	1460	99.7	100.0	
Missing	System	5	0.3		
Total		1465	100.0		
Right to decide more important than contributing					
Valid	Strongly agree	273	18.6	18.9	18.9
	Agree	176	12.0	12.2	31.0
	Neither agree nor disagree	273	18.6	18.9	49.9
	Disagree	327	22.3	22.6	72.5
	Strongly disagree	398	27.2	27.5	100.0
	Total	1447	98.8	100.0	
Missing	System	18	1.2		
Total		1465	100.0		
Refuse to be vaccinated are prolonging pandemic					
Valid	Strongly agree	542	37.0	37.3	37.3
	Agree	313	21.4	21.5	58.8
	Neither agree nor disagree	159	10.9	10.9	69.7
	Disagree	185	12.6	12.7	82.4
	Strongly disagree	256	17.5	17.6	100.0
	Total	1455	99.3	100.0	
Missing	System	10	0.7		
Total		1465	100.0		

A means analysis was then utilized to investigate the identified individual/group variables to participants identified “university status”. The analysis indicated potential differences among “university status” and “vaccine is threat to health”, “right to decide”, and “refuse to be vaccinated” and an ANOVA were used to investigate potential difference. Results indicate significant difference between “university status” and each of the dependent variables; “vaccines threat to health” ($F_3, 1446=11.01$, $p=.01$); “right to decide” ($F_3, 1439=14.50$, $p=.01$); and “refuse to be vaccinated” ($F_3, 1446=9.66$, $p=.01$). A post-hoc Bonferroni was conducted to identify where the

difference may exist. Results indicate group difference among the “vaccines threat to health” variable show difference between student and: faculty ($MD=-.640$, $P=.01$, $CI=-1.15$ to $-.13$); administrative staff ($MD=-.509$, $p=.01$; $CI=-.81$ to $-.21$); “right to decide” between student and: faculty ($MD=-.942$, $p=.01$, $CI=-1.53$ to $-.35$); administrative staff ($MD=-.538$, $p=.01$, $CI=-.89$ to $-.19$); and civil service ($MD=-.494$, $p=.01$, $CI=-.82$ to $-.17$); “refuse to be vaccinated” between student and; faculty ($MD=.850$, $p=.01$, $CI=.35$ to 1.53); and administrative staff ($MD=.520$, $p=.01$, $CI=.16$ to $.88$).

Table 3 shows the frequency responses regarding vaccine and vaccination specific issues variables are associated with need, access, reliability of the vaccine and or reputation of healthcare professionals. 212 (14.6%) of the participants reported they agree or strongly agree with the statement about being confused about the information related around the safety of the COVID-19 vaccines. Two questions pertained to the Center for Disease Control and Prevention (CDC) regarding “providing current and accurate information” and whether participant “trusts information provided by the CDC”. 365 (24.9%) disagree or strongly disagree that the CDC is providing current and accurate information, while 332 (22.8%) disagree or strongly disagree that they trust the information provided by the CDC and 212 (14.6%) agree or strongly agree they are confused about the information related around the safety of the COVID-19 vaccines. Some of the skepticism could be attributed toward the participants’ perceived belief in how the vaccines were developed. 557 (38.5%) believe the vaccine was developed too fast; 767 (53%) thought it was developed just in time. When surveyed whether participants are vaccinated 1,192 (82%) reported they were fully vaccinated and 224 (15.4%) reported they will not get the vaccination. When asked whether their health status exempted them from receiving the vaccination 29 (2%) reported yes. These results possibly reinforce SAGE Working Group on Vaccine Hesitancy, (2014) citing that reliability of the vaccine, reputation of the healthcare professionals, and introduction of new vaccine can influence vaccine hesitancy. Person Correlation was conducted on the variable producing in strong to moderate association between the variables. There is strong association ($r=.835$, $p=.01$) between “trust the COVID-19 virus information” and “CDC has provided current and accurate information”; moderate correlation with “are you vaccinated” and “trust information” yielded $r=.569$, $p=.01$. A moderately negative ($r=-.529$, $p=.01$) association was found between “trust information” and “how the vaccine was developed”.

A means analysis was then utilized to investigate the identified vaccine and vaccination specific issues variables to participants’ identified “university status”. The analysis indicated potential differences among “university status” and “accurate information”, “trust information”, “vaccine development timeline” and “vaccinated” an ANOVA were used to investigate potential difference. Results indicate significant difference between “university status” and each of the dependent variables; “accurate information” (F_3 ,

1446=5.92, $p=.01$); “trust information” ($F3, 1447=6.54, p=.01$); “vaccine development timeline” ($F3, 1437=15.78, p=.01$); and “vaccinated” $F3, 1445=7.35, p=.01$). A post-hoc Bonferroni was conducted to identify where if any, the difference may exist. Results indicate group difference among the “accurate information” variable show difference between student and administrative staff ($MD=.389, p=.01, CI=.09$ to $.69$); “trust information” faculty ($MD=5.39, p=.05, CI=.05$ to 1.14) and administrative staff ($MD=.423, p=.01, CI=.10$ to $.75$); “vaccine development timeline” faculty ($MD=-.555, p=.01, CI=-.95$ to $-.16$); administrative staff ($MD=-.487, p=.01, CI=-.72$ to $-.25$), and civil service ($MD=-.263, p=.01, CI=-.48$ to $-.04$); “vaccinated” faculty ($MD=.498, p=.05, CI=.05$ to $.94$) and administrative staff ($MD=.341, p=.01, CI=.08$ to $.60$). The researchers decided to conduct an ANOVA with the variables “are you vaccinated” and “university status”. Results indicate significant difference between the groups ($F4, 1447=189.34, p=.01$). A post-hoc Bonferroni analysis indicates differences among student and faculty ($MD=.498, p=.05, CI=.05$ to $.94$) and administrative staff ($MD=.341, p=.01, CI=.08$ to $.60$).

DISCUSSION

The influences to vaccine hesitancy can be categorized into three groupings; contextual, individual/group, and vaccine/vaccination issues (SAGE Working Group on Vaccine Hesitancy, 2014). Variables within each of these groups can impact an individual’s perception of the importance or efficacy of a vaccine. Examples with the contextual category includes factors such as social, cultural, economic, and political influencers having a potential direct impact on an individual’s acceptance or rejection of a vaccine. The result found in this investigation does support the existence of these influencers. There was a slight correlation ($r=.29, p=.01$) between “experiencing a significant health crisis” and having a “religious objection” to the vaccine. Further analysis revealed a difference among “university status” and “experience a significant health crisis” between students and administrative staff ($MD=.360, p=.01, CI=.08$ to $.64$) and “know of anyone who has died from COVID-19” among student and administrative staff ($MD=.231, p=.01; CI=.09$ to $.37$); and civil service ($MD=.170, p=.01, CI=.04-.30$). These results would support the construct that contextual factors do influence vaccine related information.

Individual and group influencers such as belief the vaccines are unsafe, cause disease, or societal benefit does not offset the risk were also identified. There were strong correlations ($r=.839, p=.01$) between “mandate was a positive action” and “refuse to be vaccinated prolonging the pandemic” which might imply those who view the mandate as positive also viewed those who refuse the vaccine as prolonging the pandemic. Strong negative correlations between “vaccines a threat to my health” and “approval process safe and reliable” ($r=-.780, p=.01$); “vaccines a threat to my health” and “refuse to be vaccinated are prolonging the pandemic”, ($r=-.757, p=.01$); “right to decide” and “refuse to be vaccinated”, ($r=-.781, p=.01$). These results support the potential hesitancy in the vaccination process in that those who view the vaccines a threat to their health also did not view the approval process as safe and reliable, nor did the respondents believe that refusing to be vaccinated prolonged the pandemic. This might reinforce the idea that belief in the information provided and acceptance of information from various information outlets were discounted to some extent. To further reinforce this ideation the “right to decide” and “refuse to be vaccinated” indicates the individual right to decide supersedes societal need to control the pandemic. ANOVAs conducted on “university status” and “vaccine is threat to health”, “right to decide”, and “refuse to be vaccinated” and yielded significant difference among the participants; “vaccines threat to health” ($F3, 1446=11.01, p=.01$); “right to decide” ($F3, 1439=14.50, p=.01$); and “refuse to be vaccinated” ($F3, 1446=9.66, p=.01$) a post hoc analysis further found group difference among the “vaccines threat to health” variable show difference between student and: faculty ($MD=-.640, P=.01, CI=-1.15$ to $-.13$); administrative staff ($MD=-.509, p=.01; CI=-.81$ to $-.21$); “right to decide” between student and: faculty ($MD=-.942,$

Table 3

Vaccine/vaccination specific Variable Frequency					
Confused about the information related to safety vaccines					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	83	5.7	5.7	5.7
	Agree	129	8.8	8.9	14.6
	Neither agree nor disagree	194	13.2	13.3	27.9
	Disagree	511	34.9	35.1	63.1
	Strongly disagree	537	36.7	36.9	100.0
	Total	1454	99.2	100.0	
Missing	System	11	0.8		
Total		1465	100.0		
CDC providing current/accurate information regarding vaccines					
Valid	Strongly agree	269	18.4	18.4	18.4
	Agree	562	38.4	38.5	57.0
	Neither agree nor disagree	262	17.9	18.0	75.0
	Disagree	207	14.1	14.2	89.2
	Strongly disagree	158	10.8	10.8	100.0
	Total	1458	99.5	100.0	
Missing	System	7	0.5		
Total		1465	100.0		
Trust the COVID-19 virus information provided by CDC					
Valid	Strongly agree	443	30.2	30.4	30.4
	Agree	474	32.4	32.5	62.9
	Neither agree nor disagree	210	14.3	14.4	77.2
	Disagree	156	10.6	10.7	87.9
	Strongly disagree	176	12.0	12.1	100.0
	Total	1459	99.6	100.0	
Missing	System	6	0.4		
Total		1465	100.0		

Development of the vaccine was:					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Too fast	557	38.0	38.5	38.5
	Too slow	98	6.7	6.8	45.2
	Just in time	767	52.4	53.0	98.2
	Should not have been developed	26	1.8	1.8	100.0
	Total	1448	98.8	100.0	
	Missing	System	17	1.2	
Total		1465	100.0		
Are you vaccinated against the COVID-19 virus?					
Valid	Yes, I am fully vaccinated	1192	81.4	82.0	82.0
	I have received the first injection	18	1.2	1.2	83.2
	Not yet, but planning on getting	20	1.4	1.4	84.6
	No will not get the vaccination	224	15.3	15.4	100.0
	Total	1454	99.2	100.0	
Missing	System	11	0.8		
Total		1465	100.0		
Health status exempt you from vaccination?					
Valid	Yes	29	2.0	2.0	2.0
	No	1425	97.3	98.0	100.0
	Total	1454	99.2	100.0	
Missing	System	11	0.8		
Total		1465	100.0		

$p=.01$, $CI=-1.53$ to $-.35$); administrative staff ($MD=-.538$, $p=.01$, $CI=-.89$ to $-.19$); and civil service ($MD=-.494$, $p=.01$, $CI=-.82$ to $-.17$); “refuse to be vaccinated” between student and: faculty ($MD=.850$, $p=.01$, $CI=.35$ to 1.53), and administrative staff ($MD=.520$, $p=.01$, $CI=.16$ to $.88$). This indicates student perception or attitude toward beliefs the vaccines are a threat to their health and their right to decide to receive the vaccination supersedes control of the pandemic and their refusal to be vaccinated does not prolong the pandemic are significantly different than the other sub-groups. These difference possibly could be contributed to risk perception, subjective norm, or lack of knowledge about illness and vaccination (White, 2021).

Vaccine and vaccination specific issues pertaining to examples of vaccine design and delivery, reliability of the vaccine and reputation of the healthcare professionals promoting the vaccine indicate a strong correlation ($r=.835$, $p=.01$) between “trust the COVID-19 virus information” and “CDC has provided current and accurate information” as well as a moderate correlation between “are you vaccinated” and “trust information” ($r=.569$, $p=.01$), while a moderately negative ($r=-.529$, $p=.01$) association between “trust information” and “how the vaccine was developed”. These results reinforce the strength of acceptance of the vaccine information impacts beliefs. Further ANOVA analysis indicate significant difference between “university status” and each of the dependent variables; “accurate information” ($F3$, $1446=5.92$, $p=.01$); “trust information” ($F3$, $1447=6.54$, $p=.01$); “vaccine development timeline” ($F3$, $1437=15.78$, $p=.01$); and “vaccinated” $F3$, $1445=7.35$, $p=.01$). A post-hoc Bonferroni indicate group difference among the “accurate information” variable show difference between student and: administrative staff ($MD=.389$, $p=.01$, $CI=.09$ to $.69$); “trust information” faculty ($MD=5.39$, $p=.05$, $CI=.05$ to 1.14); administrative staff ($MD=.423$, $p=.01$, $CI=.10$ to $.75$); “vaccine development timeline” faculty ($MD=-.555$, $p=.01$, $CI=-.95$ to $-.16$); administrative staff ($MD=-.487$, $p=.01$, $CI=-.72$ to $-.25$); and civil service ($MD=-.263$, $p=.01$, $CI=-.48$ to $-.04$); “vaccinated” faculty ($MD=.498$, $p=.05$, $CI=.05$ to $.94$); and administrative staff ($MD=.341$, $p=.01$, $CI=.08$ to $.60$). Once again this indicates the student sub-group’s beliefs or perception is statistically different from the other sub-groups. This difference could be attributed to risk/benefit perception, introduction of a new vaccine, reliability of vaccine, or reputation of the healthcare professionals.

A final ANOVA was conduct on the variables “are you vaccinated” and “university status” yielding a difference between the groups ($F4$, $1447=189.34$, $p=.01$). Result from a Bonferroni analysis showed differences among student and: faculty ($MD=.498$, $p=.05$, $CI=.05$ to $.94$) and administrative staff ($MD=.341$, $p=.01$, $CI=.08$ to $.60$). While not conclusive, this result could possibly be derived from the consistent statistical differences among the sub-group student and the interaction of all the contextual, personal and group, and vaccine and vaccination influencers.

LIMITATION AND CONCLUSION

There were limitations to this study. This was not a randomized study; it was a snapshot of a mid-major university’s attitude and perception regarding potential vaccine hesitancy toward the COVID-19 vaccine and determine if identified hesitancy can be associated with influence factors such as contextual, individual/group, or vaccine/vaccination specific issues; therefore, generalization of the findings are limited. Due to survey development error, age group 35-44 years was not included, therefore no analysis using age was conducted.

Vaccine hesitancy is national health concern. Understanding the rationale of individuals who are vaccine hesitant will provide a better understanding to provide the needed information, tools, and activities to reduce individual hesitancy. Of the student respondents (890), 21.7% (193) reported they would not get the vaccination, the highest of all subgroups. This might suggest the influencers of social and cultural stimuli have a more significant impact on students than the other subgroups in the study. While results indicate differences among the participant subgroups further studies are need to determine what influencers impact hesitancy and how those variables can be used to positively reduce vaccine hesitancy.

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