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COVID-19 Vaccination Status among University Students in Jamaica

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Abstract

This study seeks to explore vaccine hesitancy among university students at a tertiary institution in Jamaica since the effects of COVID-19. Specifically, it seeks to ask the following questions: What is the vaccination status of male and female respondents against COVID-19? What are the characteristics of the unvaccinated respondents against COVID 19? What reasons did the respondents give for their current unvaccinated position? A descriptive and web-based cross sectional research design was used to conduct a study on the vaccination status among university students in Jamaica, where a sample of 1200 students out of a total population of 3500 was surveyed during the period November 2021. The study used a convenience non-probability sampling procedure. A standardized instrument was developed and tested for validity and reliability and then sent to the students emails as well as their WhatsApp numbers. Only the questionnaires that were answered and returned become part of the study. The Statistical Package for the Social Sciences (SPSS) for Windows, Version 27.0 was used to analyze the data. The data were analyzed by way of frequencies, per cents, and cross-tabulations, and displayed via tables and graphs. A p-value of 5 per cent (2-tailed) was used to determine the level of statistical significance. The results indicated that, the majority of the respondents are not vaccinated (56.8%), with only a few being fully-vaccinated against COVID-19 (28.6%). However, majority of them were planning to be vaccinated (41.9%), although 29.2% expressed

being afraid of the vaccines. Fear of the unknown about the COVID-19 vaccine is fundamental reason for the hesitancy among sampled university students.

Keywords: University students, college students, vaccine hesitancy, vaccine acceptance, anti-vaccination, vaccination coverage rates, COVID-19, coronavirus, SARS-CoV-2, vaccine rejection.

Introduction

Since the outbreak of the COVID-19 pandemic almost two years ago, attitudes toward vaccines continues to evolve. Globally, the initiative for vaccination against the COVID-19 disease is shrouded in differing perspectives, confusion, and misinformation in the "courtroom of public opinion". These responses toward the COVID-19 vaccine acceptance varies in countries, with researchers reporting COVID-19 acceptance rates "below 60%," in some regions(Taye et al., 2021). Holder(2021) of the New York Times indicated that as of November 21, 2021, the vaccination rate in the world is 55% (fully-vaccinated, 43%) and that this is 22% in Jamaica (17% fully-vaccinated), 70% in the United States and Canada, 66% in Latin America, Asia-Pacific (64%), Europe (62%), Middle-East (45%), and 9.7% in Africa. Ritchie, Mathieu, Rodés-Guirao, et al. (2021) indicated that 53.2% of the peoples in the world have been at least partly vaccinated (see also, Johns Hopkins University and Medicine, 2021; Pettersson, Manley, Hernandez, et al., 2021), which is marginally different from what was reported by Holder (2021). Additionally, some researchers argue that a low acceptance rate may present challenges in efforts to mitigate the COVID-19 pandemic. The Middle East, Eastern Europe and Russia showed low COVID-19 vaccine acceptance rates, while high acceptance rates occurred in East and South-East Asia. These findings indicate that a higher response rate to vaccine acceptance may help in the control of the COVID-19 pandemic (Sallam, 2021; Taye et al., 2021)

Amid the ongoing global turmoil toward vaccination of the world's population against this resilient virus, there continues to be growing evidence of "vaccine hesitancy". Vaccine hesitancy is a "*delay in acceptance or refusal of vaccination despite availability of vaccination services*" (MacDonald, 2015). Through continued measures by world leaders to protect their populations, vaccination initiatives continue to evolve, as does the phenomenon of vaccination hesitancy. The prevalence of vaccination hesitancy toward the COVID-19 vaccine is of interest to many researchers and governments because it is a vital factor in the global vaccination initiative among nations (Baccolini et al., 2021; Sallam, 2021).

Despite the nationwide efforts underway for increased vaccine acceptance among the Jamaican population, there remain levels of distrust and hesitancy in taking the vaccine (partly vaccinated, 22%; fully-vaccinated, 17%-Holder, 2021). There is limited information on Jamaican university students' attitudes toward vaccination and their tendency toward acceptance inspite of widespread media coverage that they should take the vaccine (The Gleaner, 2021). However,

according to the City of Cambridge (2021) vaccination rates among students and staffers at Harvard University and Massachusetts Institute of Technology (MIT) have reached at least 90% as of August 2021 (fully-vaccinated).

This research study seeks to further explore vaccine acceptance and hesitancy among university students at a tertiary institution in Jamaica since the effects of COVID-19 on this population had been a challenge. Vaccine hesitancy that perpetuates resulting in a person being unvaccinated could be interpreted as an ethical issue as it becomes a public health issue and not just a personal one. To better understand the concept of vaccine hesitancy, it is essential to incorporate a theoretical approach.

Theoretical Framework

As the negative impacts of the COVID-19 virus continue globally, more discussion and measures are indicating the intention of the Jamaican government and other stakeholders in making vaccination against COVID-19 mandatory. However, conversations concerning a public mandate continue amid growing resistance as some see it as a threat to their civil liberties. For universities seeking to increase the vaccination response among their student population, it is critical to understand steps in changing behaviours toward vaccine hesitancy by introducing informed decision-making among students.

Behavioural change interventions are effective when anchored by a theoretical approach (Glanz & Bishop, 2010). The researchers of this current study incorporated the behavioural change framework to guide the study. More specifically, the Theoretical Domains Framework (TDF) underpins the study because it aides in the identification of the barriers and facilitators to behaviour change while considering social and environmental factors. The utilization of TDF in addressing the concept of vaccine hesitancy may aid in the development of a comprehensive health education approach for university students. However, identifying individual attributes and their environment is imperative for successful educational programmes as these areas influence behavioural patterns. According to Bandura (1977), “social norms, social relationships, and social networks” heavily influence a persons’ behaviour and maybe long term. A deeper understanding of attitudes among university students and the impact of their environment on their behaviours may aid in explaining vaccine hesitancy. Furthermore, this deeper understanding may guide the development of interventions that address the needs of the university student population while addressing their concerns about the COVID-19 virus and the decision about vaccination.

Literature review

Vaccination has long been a public health initiative worldwide and is a critical focus in preventing childhood diseases or protecting against seasonal ailments such as the flu. In many countries, children must receive childhood vaccinations to protect themselves and the greater public. Despite the historical practice of vaccination globally, the COVID-19 vaccine presents a

unique challenge because its acceptance is enshrouded in conspiracy theories, ongoing mistrust and political mandates due to the global pandemic (WHO, 2016). The World Health Organization identified vaccination hesitancy as a possible threat to global health. The rapid development of the COVID-19 vaccines and the continued adverse reactions occurring worldwide further propels justification for the vaccine hesitancy among people. Due to the evolving nature of vaccine hesitancy, researchers recommend that this phenomenon be studied over time to assess whether it will decrease as the vaccines become widespread among the world population (Baccolini et al., 2021; WHO, 2020).

Though much discussion about vaccine hesitancy exists in the general population, this phenomenon is less studied among college or university students in developing nations. The university student population is of vital interest because they are now part of a vulnerable population. Although the younger population mainly presents as asymptomatic, they are a vital factor in spreading the COVID-19 virus based on current evidence. Whether or not hesitancy among students exists, it is essential to ascertain if vaccine hesitancy impacts the long-term decision to be vaccinated.

Added to this predicament is the fact that universities worldwide are moving to mandates requiring students to be fully vaccinated if they intend to return to campus life. The belief is that herd immunity can occur through a concerted effort for widespread vaccination among university students (Silva, 2021; Taye et al., 2021). Other factors such as educational level, openness to behavioural change and risk perceptions should be explored for further research on this population. Coincidentally, current studies indicated less hesitancy among healthcare students. Overall, more hesitancy was noted at the initial launch of COVID-19 vaccines, but the current hesitancy needs further exploration (Baccolini et al., 2021; Taye et al., 2021).

According to Taye et al. (2021), global changes occurred on university campuses to mitigate the spread of the virus. University campuses foster a culture of togetherness. Students live and study in closer proximity than they would normally. This proximity resulted in the spread of the COVID-19 virus, which led to the closing of many physical universities globally with a transition to online learning in an effort to ensure social distance while mitigating the spread.

The development of the vaccines to counteract the virus was a significant step in the fight against COVID-19, providing possibilities of a return to “normal” to include reopening of physical university campuses. However, this monumental step of developing vaccines occurred amid many factors, such as vaccine hesitancy among the public. Vaccine hesitancy exists among university students even though the factor behind such hesitancy is not entirely clear as it differs among countries and cultures. Therefore, it is essential to consider the factors impacting vaccine hesitancy among university students and their perceived barriers toward their decision in becoming vaccinated.

Vaccine hesitancy continues to evolve as the COVID-19 pandemic remains a challenge for countries across the globe. In a study of Italian university students, researchers found that

vaccine hesitancy was more prevalent among male students than females. The majority of the study participants agreed with scientific recommendations suggesting natural immunity did not negate the need to get vaccinated. Researchers argue that effective control of the pandemic is based on the safety and efficacy of vaccines and the willingness of the population to get vaccinated (Sallam, 2021). Among African university students, acceptance of the vaccine was influenced by the use and access to current updates via social media.

The cultural and religious beliefs of the students were considered as possible influences as well. The study found that the more exposure students had to current information, the more likely they were to consider being vaccinated as a measure of mitigating the impact of the disease (Taye et al., 2021). Further results showed that the vaccine acceptance rate among Ethiopian(68.3%; Taye, et al., 2021) and Nigerian university students (30.5%; Chiedozie, et al., 2021) were lower when compared to countries such as Australia (85.5%; Dodd,et al., 2020) and Denmark (79%;Ardens, 2021). In 2020, university students accounted for over 300 000 positive COVID-19 cases in the United States (Sanchez, et al., 2021; Villegas, et al., 2021). However, the actual number of cases was a lot higher because of community spread (Silva et al., 2021).

Methods and Materials

This study employed a descriptive and web-based cross sectional research design. A descriptive web-based research design is a method in which researchers use the internet for data collection. Among the growing body of literature in medical research, web-based surveys, also known as e-surveys, is becoming more commonplace. Surveys are used both in quantitative and qualitative research design for data collection. The initial use of web-based survey was via email in 1986, with this method becoming more widely used over time (Maymone et al., 2018; Salkind, 2010), with the Web as a means began in the mid-1990s (Salkind, 2010). According to Maymone et al. (2018), their popularity exists due to the appeal of convenience and quick development and deployment during the data collection phase, ease of analysis and cost-effectiveness. Furthermore, this method minimizes the chances of error through automated data collection. Currently, the use of this method is gaining traction in clinical and academic disciplines, and as such justifies its usage in evaluating undergraduate students' perception of COVID-19 vaccination.

According to Caetano and Noel(2018)the use of web-based population surveys have become a permanent fixture in academic research and is seen as a new reality. Whether they will fully replace face-to-face computer-assisted interviews (CAPI) or samples based on random digit dialing (RDD) and computer-assisted telephone interview (CATI) methods remains to be seen. However, the method of sampling certainly provides an inexpensive and rapid means to reach many potential respondents. From a scientific viewpoint, the increased costs of face-to-face household surveys in the United States makes web-based surveys more attractive, and some types of RDDs cannot be conducted given NIH budget restrictions. Although the benefits are undeniable, the limitations cannot be overlooked. The use of email is limited to disseminating

questionnaires and survey methods, while the Web allows for media, conducting full experiments, and implementing various methods (Salkind, 2010). Due to the automaticity in its approach, this method increases the chance of low response rates from the sample population. Further compounding possible limitation is the issue of technology literacy among the sample's population and "demographic biases" among researchers. Technological device and usage of technology are features of e-learning among students in tertiary institutions across the globe, particularly since 2020. As such, this meant that technology and technological devices in collecting data was not a limitation for the current study as all the students are required to use various technological devices for classes.

When considering the use of this method, researchers must decide whether the advantages outweigh the disadvantages. One major benefit of using a web-based research design is accessing more diverse and larger population samples. Also, there is ease and speed of survey administration, high-quality data collections, and there can be a rapid response. Consequently, the use of a web-based research design can effectively yield valid data results when analyzed. On the other hand, some factors could prevent the researcher from reaching its targeted sampling population, such as access issues and how beneficial the research will be in making decisive changes to the current system (Wright, 2017). This could have been the common denominator for the Jamaican population after a descriptive web-based research design was used to conduct a study on the vaccination status among university students in Jamaica, where a sample of 1200 students (out of a total population of 3500) was surveyed. The population at the university was 3,500 students as of November 2021, using a 95% confidence level and a 3% margin of error, this gave a sample of 818 people. The research team employed exhaustive sampling in order to be able to generalize the results in which the instrument was sent to the entire student population both in their student email as well as their WhatsApp number. People were reminded of the survey via an e-Bulletin message, which was posted on the intranet as well as in their email. This chosen method allowed for a cost-effective and efficient way to access the appropriate sample size, which could be generalized to the larger student population.

A standardized instrument was developedby a methodologist and statisticians in keeping with the objectives of the study. These were vetted by other academicswho examined the items for readability, content and criterion validity, correctness, and preciseness of the items in relations to the research questions. The comments of the scholars were incorporated into the initial design, and a modified questionnaire emerged based on a consensus of all the members of the research team. After which, the research team also submitted the instrument for vetting by scholars and once again corrections were incorporated to the previously modified items. A final instrument emerged that was later forwarded to the emails of students.

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Findings

Sampled Respondents

Table 1 presents a cross tabulation on selected matters relating to the COVID-19 vaccination and gender of respondents. COVID-19 vaccine hesitancy is high among the sampled respondents (56.8%, n=583), with there being no statistical association between vaccinated against COVID-19 and gender and 582 respondents were used for the bivariate analysis ($\chi^2(2) = 2.673$, $P = 0.263$).The findings also revealed that only 28.6% (n=260) of the sampled respondents have been fully-vaccinated and 258 were used for the bivariate analysis, with more females being vaccinated (73.4%, n=548) than males (61.4%, n=94) - $\chi^2(4) = 11.265$, $P = 0.004$. Only 29.2% (n=238) of the sampled respondents indicated being afraid of vaccines, and 29.5% (n=153) are desirous of wanting the COVID-19 vaccine.

Table 1.Cross tabulation on selected matters on COVID-19 vaccine by Gender of respondents

Details	Gender			Total
	Male	Female	Other	
	% (n)	% (n)		% (n)
Vaccinated status against COVID-19[1]				
Yes	46.8 (81)	42.6 (358)	22.2 (2)	43.1 (441)
No	53.2 (92)	57.4 (483)	77.8 (7)	56.9 (582)
Fully-vaccinated status against COVID-19[2]				
Yes	38.6 (59)	26.6 (199)	0.0 (0)	28.5 (258)
No	61.4 (94)	73.4 (548)	100.0 (6)	71.5 (648)
Planning of being vaccinated[3]				
Yes	37.5 (39)	42.8 (262)	28.6 (2)	41.9 (303)
May be	32.7 (34)	34.4 (211)	28.6 (2)	34.1 (247)
No	29.8 (31)	22.8 (140)	42.8 (3)	24.0 (174)
Desire of partially vaccination[4]				
Yes	25.0 (22)	30.1 (128)	50.0 (3)	29.5 (153)
May be	35.2 (31)	36.2 (154)	0.0 (0)	35.6 (185)
No	39.8 (35)	33.7 (143)	50.0 (3)	34.9 (181)
Afraid of being vaccinated[5]				
Yes	26.6 (34)	29.6 (201)	50.0 (3)	29.2 (238)
May be	10.9 (14)	15.7 (107)	0.0 (0)	14.9 (121)
No	62.5 (80)	54.7 (372)	50.0 (3)	55.9 (455)

[1] $\chi^2(2) = 2.673$, $P = 0.263$
[2] $\chi^2(4) = 11.265$, $P = 0.004$
[3] $\chi^2(4) = 3.862$, $P = 0.425$
[4] $\chi^2(4) = 4.882$, $P = 0.300$
[5] $\chi^2(4) = 4.997$, $P = 0.288$

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Of the sampled respondents (n=1,027), the response rate to the question 'Have you beenfully-vaccinated against COVID-19' was 88.6% (n=910), and 28.6% (n=260) indicated yes to the question. A cross tabulation between vaccinated status against COVID-19 and fully-vaccinated status against COVID-19 is presented in Table 2. Table 2 reveals much information on the COVID-19 vaccine status of the sampled respondents. Of those vaccinated against COVID-19, 40.9% (n=180 of 440) were partially vaccinated.

Table 2.Cross tabulation between vaccination status against COVID-19 and fully-vaccinated status against COVID-19

Vaccinated status against COVID-19		Fully-vaccinated status against COVID-19		Total
		Yes	No	
		% (n)	% (n)	% (n)
	Yes	59.1 (260)	40.9 (180)	100.0 (440)
	No	0.0 (0)	100.0 (470)	100.0 (470)
Total		260	650	910

Unvaccinated Sampled Respondents

The respondents were asked to provide a reasons for their current unvaccinated position, and these perspectives are depicted in Figure 1. Of unvaccinated sampled respondents (n=583), 72.0% (n=420) provided a rationale for their reluctance in being vaccinated against COVID-19. The majority of them indicated that they fear the unknown in regard to the vaccine (35.2%, n=148), 27.1% (n=114) believed that the COVID-19 vaccine is for depopulation, and 24.3% stating no interest in being vaccinated against COVID-19, with only 5.2% (n=22) stating medical or religious reasons.

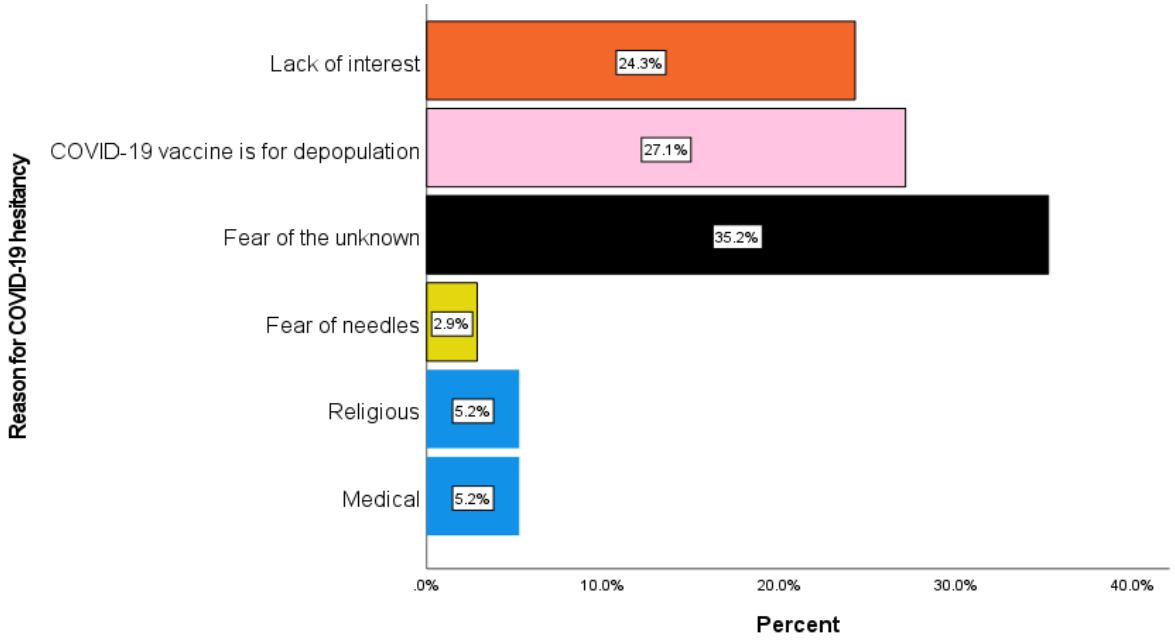

Figure 1.Reason for current COVID-19 hesitancy

The characteristics of the unvaccinated sampled respondents are presented in Table 3. Of the unvaccinated respondents, 41.0% (n=229) indicated that they were afraid of the COVID-19 vaccines, 25.7% (n=142) want to be vaccinated, 42.7% (n=236) were uncertain of wanting to be vaccinated against COVID-19, 35.2% (n=148) fear the unknown of the vaccines, 27.1% (n=114) believe the vaccine is for depopulation, and 24.3% (n=102) lacked an interest in being vaccinated against COVID-19

Table 3.Characteristics of the Unvaccinated Sampled Respondents, n=583

Details	**% (n)**
Gender	
Male	15.8 (92)
Female	83.0 (483)
Other	1.2 (7)
Afraid of being vaccinated against COVID-19	
Yes	41.0 (229)
Maybe	19.7 (110)
No	39.4 (220)
Planning on being vaccinated against COVID-19	
Yes	25.7 (142)
Maybe	42.7 (236)
No	31.6 (175)
Planning on partial vaccination against COVID-19	
Yes	25.8 (125)
Maybe	37.1 (180)
No	37.1 (180)
Reason for current COVID-19 hesitancy	
Medical	5.2 (22)
Religious	5.2 (22)
Fear of needles	2.9 (12)
Fear of the unknown	35.2 (148)
COVID-19 vaccine is for depopulation	27.1 (114)
Lack of interest	24.3 (102)

Of the unvaccinated sampled respondents (n=583), 83.0% (n=519) of them were used for the cross tabulation between considering being vaccinated against COVID-19 and gender. Almost 30% (n=153) of them indicated a desire in wanting to vaccinate against COVID-19 and 35.6% being undecided, with 34.9% being anti-COVID-19 vaccine respondents. Furthermore, no significant statistical relationship emerged between the two afore-mentioned variables ($\chi^2(4) = 3.549$, $P = 0.470$) suggesting that people's gender does not determine their decision on COVID-19 vaccination (Table 2).

Table 4.Cross tabulation between considering being vaccinated against COVID-19 and gender considering being vaccinated against COVID-19

		Gender			Total
		Male	Female	Other	
		% (n)	% (n)	% (n)	% (n)
	Yes	25.0 (22)	30.1 (128)	50.0 (3)	29.5 (153)
	Maybe	35.2 (31)	36.2 (154)	0.0 (0)	35.6 (185)
	No	39.8 (35)	33.6 (143)	50.0 (3)	34.9 (181)
Total		88	425	6	519

Discussion

The initiative and acceptance rates for vaccination against the COVID-19 has shown variation in various countries (Holder, 2021; Johns Hopkins University and Medicine, 2021; Pettersson, Manley, Hernandez, et al., 2021). The rates of COVID-19 vaccination range from 17% for those who are fully-vaccinated to 22% for partially vaccinated Jamaicans (Holder, 2021), which indicated a high vaccine hesitancy. For the current study the vaccination status against COVID-19 showed that, majority of the respondents 56.9% were not vaccinated against COVID-19 and only 43.1% were vaccinated. Likewise, majority of the respondents 71.5% were not fully vaccinated and only 28.5 % were fully vaccinated. Therefore, the vaccination rates for the current sampled university students are some similar to those in France (35%; Detoc et al., 2020) and Jordon (39.5%, Almaaytah & Salama, 2021; 36.3%, El-Elimat, et al., 2020); but substantially lower than those in Australia (85.5%; Dodd,et al., 2020) and Denmark (79%; Ardens, 2021).

Based on Holder's study and this one, at least 90% more Jamaicans are unvaccinated against COVID-19 compared to the university students in the current work. An examination of the literature revealed no study on the characteristics of unvaccinated students, particularly those in tertiary educational institutions, and so this study will provide some critical insights into this cohort. Unvaccinated respondents revealed various characteristics regarding vaccination. For this study, majority 41.9% were planning on being vaccinated, while 34.1% expressed a neutral position of being vaccinated and 24.0% were not planning to be vaccinated. Continuing, most of the students respondents are not afraid of being vaccinated 55.9% and 14.9% not sure whether they are afraid or not afraid however 29.2 percent are afraid of being vaccinated. These results are supported by Taye et al., (2021), whose studies reported COVID-19 acceptance range "below 60%" in regions. Likewise, the same study revealed of low COVID-19 vaccine acceptance rates among middle Easta, Eastern Europe and Russia, while high acceptance rates occurred in East and South-East Asia. It is evidence according to the studies that, higher response rate to vaccine acceptance may help in the control of the COVID-19 pandemic (Sallam, 2021; Taye et al., 2021).

When asked the current reasons for unvaccinated position among the current sampled university students, majority of the respondents (35.2%) was afraid of the unknown, others lacked interest (24.3%), and still others expressed that the COVID -19 vaccine is for depopulation (27.1%). A

study by Synnott (2021) also supported the lack of information being a deterrent to vaccines hesitancy among students, which concurs with the current research. A lot needs to be done to make the respondents develop positive attitude of being vaccinated because according to the study done by Sallam effective control of a pandemic is based on the willingness of the population to get vaccinated. Furthermore, respondents were influenced by cultural and religious beliefs by expressing that COVD-19 vaccine is for depopulation as supported by Taye et al (2021) who emphasized that the more exposure students had to current information, the more likely they were to consider being vaccinated.

Regarding gender, more sampled male university students (46.8%) than female(42.5) are vaccinated, more female (42.8%) than male (37.5%) are planning to be vaccinated and more female (29.6%) than male (26.6%) are afraid of being vaccinated. However, there was no statistically significant difference between male and female ($\chi^2(4) = 3.549$, $P = 0.470$) about their decision on COVID-19 vaccination. Therefore, the results suggest that people's gender does not determine their decision on COVID-19 vaccination. The current study is not supported by a study that was done of Italian University students (Sallam, 2021), that showed the vaccine hesitancy was more prevalent among male students than females.

Conclusion

From the results of the current study, it can be concluded that, majority of the students respondents are not vaccinated fully against COVID-19. However, many of the unvaccinated respondents are desirous of being vaccinated, but they indicated that more information is required on the vaccines. For the unvaccinated respondents, they expressed fear of the unknown as reason to their being unvaccinated. The descriptive statistic revealed gender differences regarding vaccination such that, more males than females are vaccinated, more females than males are planning to be vaccinated and more females than males are more afraid of being vaccinated. However, the inferential statistic did not show any significant difference between male and female about their decision of COVID-19 vaccination.

Recommendation

Universities have a role to develop students who are critical thinkers in applying scientific facts and research evidence. This kind of knowledge will help the students see the importance of vaccination versus consequences faced by not being vaccination. The Ministry of Health and Wellness should come up with strategies of encouraging University students to accept being vaccinated.

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