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COVID-19 vaccine uptake among female students at Pwani University in Kilifi, Kenya

Version 2

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ABSTRACT

Introduction: COVID-19 infection in pregnant women increases the risk for maternal complications and they are also more likely to suffer from more severe disease. Reasons for COVID-19 vaccine acceptance and hesitancy are well-studied in the general population. However, few studies have studied the COVID-19 vaccine uptake among females of reproductive age.

Aim: This study aimed to describe the uptake of COVID-19 vaccine and factors associated with vaccine acceptance and hesitancy among female students at Pwani University in Kilifi, Kenya.

Methods: A self-administered questionnaire was designed using Google Forms and shared with all female students at Pwani University, with the aim of receiving 351 responses. After data cleaning, 243 responses remained. A bivariate analysis between vaccinated and unvaccinated students was performed.

Results: 65% of the study participants had received a COVID-19 vaccine. Among the vaccinated students, it was more common to have lost someone due to COVID-19. Furthermore, the vaccinated students seemed to agree more that COVID-19 vaccines are safe and effective to prevent disease. They also have greater trust in recommendations and information about COVID-19 given by the healthcare sector.

The most common reason for COVID-19 vaccine hesitancy was fear of potential side effects. More education and information about COVID-19 vaccines were suggestions for encouraging more people to take a COVID-19 vaccine.

Conclusions: This study indicates that COVID-19-vaccinated female students at Pwani University have more personal experiences of COVID-19. The vaccinated students also have greater trust in COVID-19 vaccines and in associated information and recommendations given by the healthcare sector.

Keywords: *COVID-19 vaccine, vaccine acceptance, vaccine hesitance, female university students, women of childbearing age.*

INTRODUCTION

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), also widely known as “COVID-19”, has been stated as a pandemic by the World Health Organization (WHO) since January 2020 [1]. More than 600 million confirmed cases and 6.5 million deaths due to COVID-19 have been reported by October 2022. One year after the beginning of the pandemic, many countries in West, such as the United States of America (USA) and the United Kingdom, started to vaccinate against COVID-19 [2].

When the COVID-19 vaccination first started, in most countries, the initial vaccination was recommended to individuals with the highest risk of infection, e.g., older people, persons with health issues, and health workers [3]. In the early trials, pregnant women were excluded and therefore there was a lack of information about safety and adverse effect for this population, leading to that pregnant women initially were not recommended to get vaccinated [4].

Covid-19 infection in pregnant women has been shown to increase the risk of pregnancy complications such as pre-eclampsia, intrauterine growth restriction (IUGR), preterm birth, stillbirth, and developmental defects [5, 6]. Pregnant women that get infected with COVID-19 during their pregnancy are also more likely to have a more severe course of the disease, with a higher risk for renal failure, sepsis, disseminated intravascular coagulation (DIC), longer hospital stay, and are more likely to die from the infection [7]. For these reasons, vaccination for COVID-19 in pregnant individuals has become an important way to prevent infection.

Israel and the United Kingdom, among other countries, were early to recommend COVID-19 vaccines even for pregnant women since they considered that the benefits outweighed the risk [8, 9]. Sweden, for example, has been recommending vaccines for all pregnant women since May 2021, although they were recommended to wait until after 12 weeks of gestation [10]. WHO authorized that COVID-19 vaccine could be given to pregnant women soon after the U.S. Centers for Disease Control and Prevention (CDC) published data, in August 2021, indicating that the vaccine is safe to administer during pregnancy [11]. Thereafter, Kenya among other countries, made COVID-19 vaccines eligible for pregnant women [12].

A cohort study made in Sweden and Norway, two high-income countries, showed that among women giving birth, 74% in Sweden and 80% in Norway had been receiving at least two doses of vaccine at delivery [13]. This is comparable to the statistics of the general population, where 72% in Sweden and 76% in Norway are fully vaccinated [2]. This shows

that there is a slightly higher vaccine coverage among pregnant women compared to the general population in these two countries.

The lowest COVID-19 vaccine uptake among the general population is in African countries [11]. For example, in Kenya, only 19% are considered fully vaccinated according to WHO's data from the 20th of September 2022 [2].

Reasons for vaccine refusal are many. In previous studies, described reasons for COVID-19 vaccine hesitancy in the general population are fear that the vaccine is not safe enough and fear of adverse effects. Moreover, a lack of belief in the vaccine's effect is a contributing factor [11, 14, 15]. Among pregnant individuals, other reasons, such as fear of possible harm to the fetus, have become other aspects influencing the decision-making process on whether to receive a vaccine or not [16].

In Kenya, COVID-19 vaccine uptake and hesitancy among pregnant women or females of reproductive age are not as well described as among the general population. Therefore, this study assessed factors of vaccine acceptance and hesitancy among a study population of female students, representing the population of women of childbearing age. The study findings might be used as support for future research in this area, which in turn might help achieve a higher vaccine uptake among women of childbearing age.

AIM

This study aimed to describe the uptake of COVID-19 vaccine and factors associated with vaccine acceptance and hesitancy among female students at Pwani University in Kilifi, Kenya.

MATERIALS AND METHODS

Study Design and Setting

A mixed method study, including both a qualitative and a quantitative part, was conducted at Pwani University in Kilifi, Kenya. Kilifi is located along the coast, approximately 60 kilometers north of Mombasa, and is considered as a rural part of Kenya. Pwani University

was established in 2007 and today consist of eight different school of studies. Students attending Pwani University are from all parts of Kenya.

Questionnaire Development

A questionnaire was devised after examining already existing reviews on the area and the questions were adapted to fit the chosen study population; female students [17, 18]. The self-administered questionnaire was in English, which is one of the two official languages in Kenya [19], and consisted of three parts (appendix A). The first two parts were multiple-choice and open questions, one about sociodemographic characteristics and the other about health history of COVID-19 and vaccination. The last part consisted of beliefs and attitudes towards COVID-19 and COVID-19 vaccine and was designed on a Likert scale. We aimed to keep the questionnaire short to enable as many respondents as possible. The questionnaire was pilot tested among a group of anonymous students. Some of the questions were removed or modified afterwards to better fit the study purpose.

Study Samples

The questionnaire was sent to all female students at Pwani University. The study population was selected to represent women of childbearing age. The sample size was calculated using an online sample size calculator [20]. Approximately 4000 female students attend Pwani University, based on this assumption it was estimated that 351 responses were needed to have a 95% confidential level and a 5% margin of error. The survey was open between the 14th of October to 7th of November 2022. A total of 306 female students completed the survey.

Data Cleaning

To identify suspicious and fraudulent responses, exclusion criteria were designed. Responses that were excluded from the analysis fulfilled at least one of the criteria mentioned in Table 1. After data cleaning, 243 responses remained for final analysis.

Table 1: Defined exclusion criteria and the number of excluded responses.

Exclusion Criteria	Excluded responses
Responded being attending to a course that do not exist at Pwani University.	$N=1$
Contradictive responses. Fulfilled the following two criteria:	$N=2$

<ol style="list-style-type: none"> 1. Responded yes to “lost someone” and no to “knowing anyone infected with COVID-19”. 2. Vaccinated students responded “strongly disagree” for the statement “COVID-19 vaccines are safe”. 	
<p>Suspicious survey time interval (a). Fulfilled the following two criteria:</p> <ol style="list-style-type: none"> 1. At least 6 responses completed within 3 minutes in a row. 2. The responses reported from different schools. 	<i>N=15</i>
<p>Suspicious survey time interval together with remarkable answers (b). Fulfilled the following three criteria:</p> <ol style="list-style-type: none"> 1. Responses submitted within a time period of 1 hour. 2. At least 50% of the responses had answered yes to either “chronic disease” or “lost someone due to COVID-19”. 3. The responses reported from different schools. 	<i>N=31</i>
<p>Responses submitted after one another where the answers were the same or in a certain pattern. The responses reported from different schools.</p>	<i>N=14</i>

Data Analysis

SPSS (Version 26.0, IBM Corp, Armonk NY USA) was used for the quantitative data analysis. To describe the sociodemographic and the baseline characteristics, descriptive statistics were used. The vaccinated students were compared to the unvaccinated students in a bivariate analysis. For analysis, the five-point Likert scale was coded as the following: “1” assigned for “Strongly Disagree”, “2” for “Disagree”, “3” for “Neutral”, “4” for “Agree”, and “5” for “Strongly agree”. The mean values were calculated for the vaccinated and the unvaccinated students. To calculate p-values, Chi-Square and independent t-test were used. Statistical significance was defined at $p < 0.05$.

The open questions were analyzed using a qualitative thematic analysis. Each answer was put into different groups based on shared opinions. The groups were then arranged into specific themes.

Ethical Considerations

This study has ethical approval from Pwani University Ethics Review Committee in Kilifi, Kenya, approval number ISERC/BSc/063/2022. Participation in the study was voluntary and to answer the questionnaire, the students had to give electronic consent for participation. All information collected was anonymized.

RESULTS

Baseline Characteristics of Participants

Table 2 shows the sociodemographic and health history characteristic of the participants. Of the 243 responses, 159 (65%) stated that they had received a COVID-19 vaccine.

Table 2: Baseline demographic and other characteristics of the study participants (n=243).

Variable	Distribution ^a
Age	21.8 years (2.3)
School of studies	
School of Agribusiness and Agricultural Sciences	16 (6.6)
School of Business and Economics	33 (13.6)
School of Education	61 (25.1)
School of Environmental and Earth Sciences	18 (7.4)
School of Health and Human Sciences	28 (11.5)
School of Graduate Studies	3 (1.2)
School of Pure and Applied Sciences	46 (18.9)
School of Humanities and Social Sciences	38 (15.6)
Religion	
Christianity	191 (78.6)
Islam	35 (14.4)
Traditional African religion	5 (2.1)
Nonreligious	8 (3.3)
Other	4 (1.6)
Parents place of residence	
Rural	162 (66.7)
Urban	81 (33.3)
Chronic disease	
Yes	28 (11.5)
No	215 (88.5)
Been infected with COVID-19	
Yes	24 (9.9)
No	219 (90.1)

Have had a family member, a friend or a classmate infected with COVID-19.	
Yes	109 (44.9)
No	134 (55.1)
Have lost a family member, a friend or a classmate due to COVID-19.	
Yes	63 (25.9)
No	180 (74.1)
Received a COVID-19 vaccine.	
Yes	159 (65.4)
No	84 (34.6)

^a Mean (\pm SD) for continuous variables and number (%) for categorical variables.

Bivariate analysis between vaccinated and unvaccinated students

The vaccinated students were compared to the unvaccinated students in a bivariate analysis (Table 3 and 4). The statistically significant factors were if they had lost a family member, a friend, or a classmate due to COVID-19 (Table 3) and all the statements in the Likert scale (Table 4). Among the vaccinated students, approximately 31% answered that they had lost someone due to COVID-19, compared to 17% among the unvaccinated students ($p = 0.017$).

Other variables showed insignificant trends of being more common among vaccinated students, including having been infected with COVID-19 and having a family member, a friend, or a classmate that has been infected with COVID-19. To have a chronic disease was more frequently reported among unvaccinated students, although this result was not statistically significant either.

Table 3: Bivariate analysis between vaccinated and unvaccinated students. Chi-Square test was used to calculate p-values for all variables except age, for which independent t-test was used.

Variable	Received a COVID-19 vaccine ^a		p-value
	Yes (n=159)	No (n=84)	
Age	21.8 (2.4)	21.9 (2.3)	0.413 ^b
School of studies			
Agribusiness and Agricultural Sciences	10 (6.3)	6 (7.1)	0.576 ^c
Business and Economics	22 (13.8)	11 (13.1)	
Education	40 (25.2)	21 (25.0)	
Environmental and Earth Sciences	11 (6.9)	7 (8.3)	
Health and Human Sciences	22 (13.8)	6 (7.1)	
Graduate Studies	3 (1.9)	0 (0)	
Pure and Applied Sciences	30 (18.9)	16 (19.0)	
Humanities and Social Sciences	21 (13.2)	17 (20.2)	

Religion			
Christianity	129 (81.1)	62 (73.8)	0.052 ^c
Islam	23 (14.5)	12 (14.3)	
Traditional African religion	2 (1.3)	3 (3.6)	
Nonreligious	5 (3.1)	3 (3.6)	
Other	0 (0)	4 (4.8)	
Parents place of residence			
Rural	102 (64.2)	60 (71.4)	0.252 ^c
Urban	57 (35.8)	24 (28.6)	
Chronic disease			
Yes	16 (10.1)	12 (14.3)	0.327 ^c
No	143 (89.9)	72 (85.7)	
Been infected with COVID-19			
Yes	18 (11.3)	6 (7.1)	0.299 ^c
No	141 (88.7)	78 (92.9)	
Have had a family member, a friend, or a classmate infected with COVID-19.			
Yes	76 (47.8)	33 (39.3)	0.204 ^c
No	83 (52.2)	51 (60.7)	
Have lost a family member, a friend, or a classmate due to COVID-19.			
Yes	49 (30.8)	14 (16.7)	0.017^c
No	110 (69.2)	70 (83.3)	

^a Mean (\pm SD) for continuous variables and number (%) for categorical variables.

^bIndependent *t*-test

^cChi-Square test

The vaccinated students agreed to a greater extent with all statements about COVID-19 and the vaccines (all statements $p \leq 0.001$), as shown in Table 4. The vaccinated students considered the risk to get infected and getting severely ill in COVID-19 to be higher compared to unvaccinated students, even though they did not see the risk itself to be high since the mean value was below 3, which is equal to the answer “neutral”.

Moreover, vaccinated students agree more that COVID-19 vaccines are safe and a good way to get protection against a COVID-19 infection. They also have greater trust in the information and recommendations given by the healthcare workers about COVID-19, that they get enough information and that the benefits of a vaccine outweigh any potential side effects.

Table 4: Bivariate analysis between vaccinated and unvaccinated students of statements presented in a Likert Scale. Mean values are calculated for both vaccinated and unvaccinated students and are used for the bivariate analysis. 1 = “Strongly Disagree”, 2 = “Disagree”, 3 = “Neutral”, 4 = “Agree”, 5 = “Strongly agree”. Independent t-test was used to assess p-values.

Statements	Received a COVID-19 vaccine ^a		p-value ^b
	Yes (n=159)	No (n=84)	
I consider the risk for me to get infected with COVID-19 is high.	2.82 (1.57)	2.12 (1.17)	≤0.001
I consider the risk for me to get severe ill in COVID-19 is high.	2.70 (1.47)	2.11 (1.18)	≤0.001
COVID-19 vaccines are safe.	4.27 (1.14)	2.62 (1.15)	≤0.001
I get enough information about COVID-19 vaccines and their safety.	3.92 (1.32)	2.96 (1.32)	≤0.001
Getting vaccines is a good way to protect myself from COVID-19 disease.	4.33 (1.22)	2.93 (1.28)	≤0.001
The benefits of COVID-19 vaccines outweigh their potential side effects/adverse reactions.	4.23 (1.27)	3.12 (1.30)	≤0.001
I trust the information and recommendations given from the healthcare workers about COVID-19 vaccine.	4.08 (1.25)	2.90 (1.22)	≤0.001

^a Mean (± SD)

^b Independent t-test

Reasons for not taking COVID-19 vaccine

Out of the 243 participants, 35% reported that they had not received a COVID-19 vaccine. The most reported reason for COVID-19 vaccine hesitancy, approximately a third of the answers, was fear of possible side effects. The fear seemed to have its origin in both personal experiences and from rumors in society. This is captured in the two following quotes:

“The vaccine really made my sisters sick and weak and I was afraid to go for it.”

“Fear of the side effects from the rumors shared.”

Of the side effects mentioned, a couple of students reported that people were afraid to get vaccinated since they had heard that the vaccine could reduce fertility in females.

“Superstition that it was meant to reduce fertility in women.”

A lack of good access or availability of the vaccine as well as a lack of information are other reasons stated for why some people stay unvaccinated. One student reported that she went to the hospital three different times on different working days, but she could not access the vaccine any of these times. Another student reported that it was not possible for her to access

medical services and therefore could not receive a vaccine. Multiple students reported that the information about COVID-19 vaccines is inadequate and unreliable.

Some students also reported that they themselves or people they know do not believe that COVID-19 exists, as stated in the following quotes:

“I think everything was invented when it comes to covid”.

“They don’t believe covid is real”.

Additional reasons reported by several students were hesitancy due to personal health issues, fear of injections, and lack of trust in the effect of the vaccine. One student reported that religious beliefs could be a reason for vaccine hesitancy and another student mentioned influences from families as a reason.

Improvements for increasing COVID-19 vaccine uptake

The students were asked about things that could be done to make it easier for them to take a COVID-19 vaccine. The most given suggestions were more information and education about the vaccines and their side effects.

“Create awareness of how the vaccine is important even in the rural areas to get rid of the myths and misconception that people have.”

A lot of students wanted to have an assurance of the safety of the vaccine before taking a COVID-19 vaccine. Others mentioned that they wanted more research to be done, as captured in the following quote:

“More studies and clinical trials on the vaccine would give me more confidence in the effectiveness of the vaccine.”

Other suggestions were on how to make the vaccine more available. Examples given were letting the practitioners walk door to door offering vaccination as well as offering vaccination services at institutions such as the University.

“The COVID-19 vaccination services should be made available within the school compound.”

Several students also reported that producing an oral vaccine would enable more people to take the vaccine since it is common to fear injections. Additionally, another suggestion was to make the COVID-19 vaccination compulsory.

DISCUSSION

This study reported a COVID-19 vaccine coverage of 65%, which is very high compared to the vaccination status of the general population, which is only 19% according to WHO's data of the 20th of September [2]. Reasons explaining this difference could be that university students might be more willing to accept vaccines. The data from WHO also applies to the entire population, including children below 18 years of age and people living in rural villages. People living in rural areas have been shown to be less willing to accept vaccines [21], perhaps because it is more difficult for them to receive appropriate information and to have easy access to vaccine facilities. Besides, already vaccinated students might be more willing to participate in a study about COVID-19 vaccines, which is a factor that might contribute to the difference in vaccine coverage. Furthermore, this study population has or will have a higher education level compared to the population in general, and as shown in previous studies, higher levels of education are associated with vaccine acceptance [21, 22]. The education level might therefore be another explaining factor for the difference in vaccine coverage.

When it comes to personal experiences of COVID-19, the only statistically significant difference was to have lost someone due to COVID-19. Among the vaccinated students, 31% reported having lost a family member, a friend, or a classmate due to COVID-19, which was more common compared to the unvaccinated student where 17% had lost someone. In both groups, the outcome was surprisingly common. One question arising from this is how the students themselves defined "lost a family member, a friend, or a classmate due to COVID-19". Students might have interpreted the question as losing a relationship with a person rather than a person dying. This theory is strengthened by data indicating that by the end of 2022, less than 5700 COVID-19-caused deaths were reported in Kenya [23], which is a low number in relation to the entire population. However, despite possible different interpretations of the question, the students who responded yes to the question have the perception that COVID-19 did take someone from them.

The percentage of students that have been infected with COVID-19 is low, but in a similar pattern to the total number of confirmed cases of COVID-19 in Kenya, which is less than 350 000 confirmed cases [2]. The low number of confirmed cases might depend on the availability of self-testing for COVID-19. When talking to people living in Kilifi, testing opportunities were available, but it was not common to get tested.

According to older African traditions, some people might have gotten offended when being asked direct questions in the questionnaire about their COVID-19 vaccination status. This was a factor considered when creating the questionnaire, but after discussing this topic with students at Pwani University, the decision was to keep the questions directly asked. The option was to design the questions in the format of “do you know anyone...” instead of asking “have you...”. This might have created a risk that some students might not have responded to the questionnaire accurately.

As predicted, vaccinated students agreed more with all the statements about COVID-19 and the vaccines. The statement with the greatest difference between vaccinated and unvaccinated students was about the safety of COVID-19 vaccines. Unvaccinated students consider COVID-19 vaccines more unsafe, which also is consistent with the specified reasons for vaccine refusal in the open questions. In the qualitative part, approximately a third stated that potential side effects were the main reason for not taking a vaccine, which is in line with previous studies about COVID-19 vaccine hesitancy in Kenya [24] and in other parts of the world [25-27]. Therefore, this aspect should definitely be considered in the efforts to achieve higher COVID-19 vaccine coverage among female students.

The strengths of the study are its anonymity and the easy accessibility of the questionnaire. Since it was online, all students were able to respond to it wherever or whenever it fitted them. Additionally, the length of the questionnaire was quite short, which probably enabled more people to find the time to respond.

The limitations of this study are mostly related to the study method. It is not known how many female university students knew about the questionnaire and had the opportunity to respond. To reach as many students as possible, the questionnaire was shared with class representatives who in turn shared it with their female classmates, students from different schools did help to share the questionnaire with their friends and different WhatsApp groups were used. Additionally, posters with information about the questionnaire were shared on the university campus.

Second, since the questionnaire was online and anonymous, it cannot be guaranteed that only female students responded. Male students or even people that did not attend Pwani University might have responded. In order to avoid this, there was no reward issued for fulfilling the questionnaire. Third, most certainly did a few students respond to the questionnaire multiple times, probably with the aim of helping increase the number of respondents. Hopefully, most of these answers were removed in the data cleaning, but the risk is that also a few “true” responses got removed in the cleaning.

Additionally, the study sample was below 351, which was the goal to be able to have a 95% confidence level and a 5% margin of error. Therefore, the study sample is too small to ensure that it represents the study population in general. More research is needed in the area to be able to make reliable and convincing conclusions. Nevertheless, this study can be used as a pilot for other studies about COVID-19 vaccine uptake among females of reproductive age.

CONCLUSION

This study indicates that COVID-19-vaccinated female students at Pwani University have more personal experiences of COVID-19. The vaccinated students also have greater trust in COVID-19 vaccines and in associated information and recommendations given by the healthcare sector.

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APPENDICES

Appendix A

The questionnaire that was shared with the female students. Page 18-24.

2023-01-12 11:50 COVID-19 VACCINE UPTAKE AMONG FEMALE STUDENTS AT PWANI UNIVERSITY

COVID-19 VACCINE UPTAKE AMONG FEMALE STUDENTS AT PWANI UNIVERSITY

Hello, my name is Julia Eriksson. I'm a medical student from Örebro University in Sweden, and I'm here at Pwani University for ten weeks to do my master project. The aim of the project is to describe the uptake of COVID-19 vaccine among female students at Pwani University. Therefore, it would be of great help if you would kindly fill in the form, it only takes around 3 minutes. All information provided is anonymous and confidential. Thank you!

Note, this questionnaire is only intended for female students.

**Required*

1. Consent *

Mark only one oval.

By checking this box, I consent to participate in the study

Section 1

<https://docs.google.com/forms/d/1cfjpcjcdVShhgUEctCx-fCPKE0atlZojQlpj2Ko0KD4/edit> 1/7

2. What is your age? *

Mark only one oval.

- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30
- 31
- 32
- 33
- 34
- 35
- 36
- 37
- 38
- 39
- 40
- 41
- 42
- 43
- 44
- 45

- 46
- 47
- 48
- 49
- 50

3. What is your school of studies? *

Mark only one oval.

- School of Agribusiness and Agricultural Sciences
- School of Business and Economics
- School of Education
- School of Environmental and Earth Sciences
- School of Health and Human Sciences
- School of Graduate Studies
- School of Pure and Applied Sciences
- School of Humanities and Social Sciences

4. Which religion do you identify with? *

Mark only one oval.

- Christianity
- Islam
- Traditional African religion
- Nonreligious
- Other

5. Where is your parents place of residence? *

Mark only one oval.

- Rural
 Urban

6. Do you have any chronic disease? *

Mark only one oval.

- Yes
 No

Section 2 - COVID-19 history and vaccine

7. Have you ever been infected with COVID-19? *

Mark only one oval.

- Yes
 No

8. Have you ever had a family member, a friend or a classmate that has been infected with COVID-19? *

Mark only one oval.

- Yes
 No

9. Have you ever lost a family member, a friend or a classmate due to COVID-19? *

Mark only one oval.

Yes

No

10. Have you received a COVID-19 vaccine? *

Mark only one oval.

Yes

No

11. If you have not received a COVID-19 vaccine *OR* if you know anyone that has not received a COVID-19 vaccine, what were the main reasons for refusal?

12. Are there any things that could be done to make it easier for you to get COVID-19 vaccines for yourself?

Section 3 - COVID-19 vaccine

13. How much do you agree with the following statements? (If you are using mobile phone, you might have to scroll to the right to see all options). *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I consider the risk for me to get infected with COVID-19 is high.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider the risk for me to get severe ill in COVID-19 is high.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you believe COVID-19 vaccines are safe for yourself?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you feel you get enough information about COVID-19 vaccines and their safety?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Getting vaccines is a good way to protect myself from COVID-19 disease.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think the benefits of COVID-19 vaccines outweigh their potential side effects/adverse reactions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I trust the information and recommendations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**that are given
from the
healthcare
workers about
COVID-19
vaccine.**

This content is neither created nor endorsed by Google.

Google Forms

Cover Letter

Örebro, Sweden, 12-02-2022

Dear Editor,

I kindly ask you to consider the manuscript entitled “COVID-19 vaccine uptake among female students at Pwani University in Kilifi, Kenya” by Julia Eriksson et al for publication in the journal The New England Journal of Medicine.

Achieving a high COVID-19 vaccine coverage among women of childbearing age is important since COVID-19 infection during pregnancy increases the risk for maternal complications and severe disease. In this paper, we describe COVID-19 vaccine uptake and factors associated with COVID-19 vaccine acceptance and hesitancy among female students at Pwani University in Kilifi, Kenya. In this study, female students represented women of childbearing age.

Given the importance of COVID-19 vaccine acceptance globally, we think that the study findings presented in our paper will appeal to scientists reading and citing papers published in The New England Journal of Medicine. We believe that the study findings can be used as support for future research in this area, which in turn might help achieve a higher vaccine uptake among women of childbearing age.

I confirm that this manuscript is original and has not been published before, nor is it under consideration by another journal. The authors have no conflicts of interest to disclose.

Thank you for your consideration of this manuscript.

Yours sincerely,

Julia Eriksson

Master Student, School of Medical Sciences.

Örebro University, Sweden

Etisk Reflektion

Alla studiedeltagare fick ge ett elektroniskt medgivande till att delta i studien innan de fortsatte att fylla i formuläret. Inga personuppgifter som kan härledas till specifika personer efterfrågades. All information som insamlades hanterades anonymt.

Frågeformuläret delades med hjälp av olika WhatsApp grupper, affischer på universitetsområdet samt med hjälp av studenter och lärare som delade formuläret till kvinnliga studenter på Pwani University. Detta sistnämnda tillvägagångssätt kan ha lett till att de studenter som fick personlig förfrågan om att delta i studien, till exempel en student som uppmanade en annan student att svara på formuläret, kan ha känt sig pressade till att svara. Detta kan även tänkas gälla för andra liknande studier där online frågeformulär och liknande tillvägagångssätt använts.

Studenter som har valt att inte ta vaccin kan eventuellt också ha upplevt studien som anklagande mot dem. Detta då studien var tänkt att undersöka vaccinationstäckning för COVID-19 bland kvinnor i fertil ålder, då studier visat på att det finns ökade risker för gravida kvinnor att bli infekterade med COVID-19. Dessa ovaccinerade studenter kan då eventuellt ha upplevt att studien ifrågasatte deras val att inte ta vaccin och därmed dömer dem för det. Däremot stod det inget om dessa ökade risker i formuläret och det är därför troligt att de flesta studenterna inte ens är medvetna om riskerna som finns vid en COVID-19 infektion hos gravida. Därmed bör de då inte heller känna sig utpekade för att ha valt att inte vaccinera sig. Det finns inte heller några andra antydningar i frågeformuläret om att det ena skulle vara mer rätt eller fel. Frågorna var sakligt och opartiskt ställda.

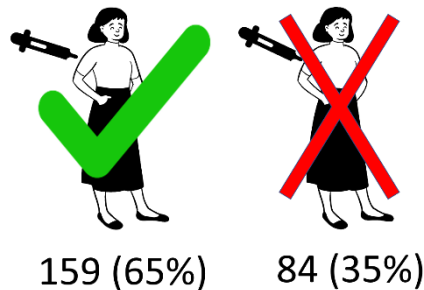
För deltagarna personligen, varken tjänar eller förlorar de särskilt mycket på att delta i studien, eventuellt förlorar studiedeltagarna tiden det tar för dem att svara på formuläret. Däremot finns det en altruistisk nytta med att delta i studien, där ens deltagande i framtiden kan bidra till högre vaccinationstäckning bland kvinnor i fertil ålder och därmed eventuellt även till lägre incidens av komplikationer relaterade till COVID-19 infektion hos gravida kvinnor.

Populärvetenskaplig sammanfattning

Vaccinationstäckning för COVID-19 bland kvinnliga studenter på Pwani University i Kilifi, Kenya

På Pwani University, ett universitet i Kilifi, Kenya, visade en nyligen gjord studie på att 65% av de kvinnliga studenterna är vaccinerade mot COVID-19. Anledningen till att studien studerade just kvinnliga universitetsstudenter var för att de fick representera kvinnor i fertil ålder som eventuellt kan komma att bli gravida i framtiden. Vid graviditet är det fördelaktigt att skydda sig mot COVID-19 då en infektion under graviditeten ökar risken för komplikationer, både för modern och barnet. Att vara vaccinerad kan därför vara en viktig del i att minska risken för COVID-19-infektion under graviditet.

Studien undersökte bland annat vilka faktorer som verkade för vaccinationsvilja samt vaccinationsmotstånd. Det visade sig att det var vanligare bland vaccinerade studenter att ha förlorat en familjemedlem, en vän eller en klasskompis i COVID-19. Vaccinerade studenter hade även större tilltro för vaccinen och litade i större utsträckning på information som gavs kring COVID-19 och vaccination.



Anledningen till att studenter valt att inte ta vaccin var främst en rädsla inför potentiella biverkningar från vaccinet, men även andra aspekter rapporterades. Bland annat rykten kring att vaccinet kunde minska fertilitet hos kvinnor och även att COVID-19 i sin helhet var påhittat. Mer frekvent rapporterades det även att det kunde vara svårt att få tag på vaccinet samt att informationen som gavs ut inte var tillräcklig för att känna sig säker på vaccinets säkerhet och effektivitet. Dock var studiepopulationen för liten för att dra några generella slutsatser kring vaccinationstäckning för COVID-19 bland kvinnor i fertil ålder och mer forskning behövs inom området.