

## RESEARCH ARTICLE

# Public awareness about coronavirus vaccine, vaccine acceptance, and hesitancy

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**Abstract**

Measurement of the population's general knowledge of the coronavirus vaccine is very important to improve public acceptance and decrease vaccine hesitancy in confronting the disease. This study aimed to evaluate the knowledge, attitude, and practices of the participants towards the coronavirus vaccine. Data were collected using an online survey, in the form of a structured questionnaire, conducted during April–May 2021 in Egypt, and subjects from all over Egypt participated. The questionnaire was divided into three parts to assess the knowledge and attitude regarding coronavirus. The first part was to assess participants' experience about coronavirus infection (eight items), the second was to assess the health beliefs about coronavirus and vaccine (16 items) and the third was to assess general knowledge, attitude, and practices of the participants towards vaccine (28 items). A total of 871 (465 females) participants participated, 81% of them were still committed to the precautionary measures for protection. Eighty-eight percent of them accepted to take the vaccine. Eighty-three percent of the participants answered that they will encourage family, friends, and colleagues to get the vaccine. Ninety-four percent knew that the coronavirus vaccine provides immunity against infection for a period of 6–12 months. 91.9% believed that the current infection with coronavirus is one of the main contraindications to vaccination. Eighty-nine percent believed that both pregnant women and chronic disease patients can get vaccinated and also that there is no specific age for a specific type of vaccination. Ninety-four percent of them knew that subjects taking immunosuppressive drugs should be prescribed Sinopharm, not AstraZeneca vaccine. The median score of this survey was 20/22 regarding knowledge about the coronavirus vaccine. Overall, the study participants had good knowledge about the coronavirus vaccine and accepted to take the vaccine, which indicates the highly commendable efforts to confront the coronavirus.

**KEYWORDS**

COVID-19 vaccine, Egypt, FDA, public awareness

## 1 | INTRODUCTION

The hesitation towards vaccination with the COVID-19 vaccine remains a problem worldwide. Lack of clinical trials for the vaccine, fear of vaccine side effects, and rumors of the presence of active viruses in vaccines are some leading obstacles that obstruct the success of

the COVID-19 vaccine campaign. Vaccine hesitancy is a major obstacle in the face of the COVID-19 vaccination programs.<sup>1</sup>

As the lockdown is not possible for some countries because it disrupts economic conditions, vaccination may be the way to limit the pandemic infection. Due to poor knowledge between populations about types of vaccine, its dosing recommendations, and the poor

commitment to hygiene practices, the national and international health organizations are organizing campaigns to increase the public awareness level about the COVID-19 vaccines.<sup>2,3</sup> The vaccination program campaigns include advertisements on social media and television to increase the population's awareness of COVID-19 vaccines and show the importance of public vaccination to limit the spread of coronavirus infections.<sup>1</sup>

At the beginning of the availability of the vaccine doses, there was little vaccination program campaign coverage, providing the opportunity to study the public awareness with COVID-19 vaccines. But now, there is more coverage and an increase in public awareness.<sup>4,5</sup> This study aimed to evaluate the public awareness, attitudes, and practices regarding the COVID-19 vaccines.

## 2 | METHODS

### 2.1 | The study design

An online survey was conducted during April–May 2021 in Egypt.

### 2.2 | Sampling technique

An online survey was applied and the participants were included from all over Egypt to take part in the study.

### 2.3 | Data collection

Data were collected using an online survey in the form of a structured questionnaire to collect the data from all over Egypt. The time required to fill the questionnaire was 15 min. The questionnaire items were designed according to the information and instructions published by Food and Drug Administration.<sup>6</sup>

The questionnaire was divided into four parts:

1. Participants' demographic data: age in year, gender, marital status, educational level, current place of residence (city or country), job.
2. Participants' experience about coronavirus infection.
3. Health beliefs about coronavirus and its vaccine among participants.
4. General knowledge, attitude, and practices of the participants towards the vaccine.

Responses to the last three parts of the survey were mostly written as (Yes), (No), and (I don't know). For the assessment of the total knowledge; the participant was given a score = 1 if he/she answered the question correctly and zero score if he/she could not report the correct answer or did not know the correct answer to end up with a total ranging from 0 to 22. Finally, the participant was classified as having good knowledge about the disease if he/she scored >18 (>80%) points and not having good knowledge if the score was less than this as was suggested previously.<sup>2,3</sup>

## 3 | RESULTS

### 3.1 | Participants' demographic data

A total of 871 (465 females) participants completed the study. The majority of them were in the age group of 35–45 years (44.8%). 63.8% of them were married and graduated from College; 50% were working in jobs other than the medical field and 74.1% were living in cities. Table 1 shows the participant's demographic data percentages.

### 3.2 | Participant's experiences with coronavirus infection

The majority of the participants (89.2%) answered that they were infected with the coronavirus. 74.1% answered that they do not have chronic diseases. Of all participants, 89% had one of their close family members infected with the coronavirus. It took about 3–4 weeks for someone in the family of 54.1% of subjects to recover from a coronavirus infection and more than 4 weeks for 43.2% of the participants. Fifty-four percent have one of their family members needed to be hospitalized after contracting a coronavirus infection. Post-COVID-19 syndromes which are reported for their family were: 73% were exhausted, 78.2% were depressed, 21.6% had increased blood sugar levels, 32.4% had inflammation or redness of the eye, 10.8% developed blood clots, and 67.6% suffered from shortness of breath, 78.4% cough, 64.9% chest pain, 51.4% difficulty concentrating or thinking, 51.2% an increase in heart rate, 16.2% hair loss, 27% nausea and 32.5% headache, 51.4% taste problems, and 45.9% smell problems. However, 24.3% did not suffer from any post-COVID-19 syndromes. 48.5% of the participants had died case with coronavirus in their family. The majority of the participants (81%) are still committing to the precautionary measures for protection from SARS-CoV-2 infection. Table 2 shows the participant's experiences with coronavirus infection.

### 3.3 | Health beliefs about coronavirus and vaccine

Eighty-nine percent answered that person can be infected with coronavirus more than one time. Of all participants, 86.5% believed that people who have been vaccinated against the coronavirus may get coronavirus infection again; 62% believed that herd immunity is enough to protect everyone from the coronavirus, and 79% thought that immunity after infection with the virus is better than vaccine immunity. Of all participants, 44.8% answered that the effectiveness of the current vaccines for the coronavirus is high, 48.3% answered that it is moderate and 6.9% answered that it is low. The majority of the participants (82.8%) knew that it is necessary to wear masks after taking the coronavirus vaccine and 81% answered that it is necessary to take the coronavirus vaccine even if the person has already been infected with the

**TABLE 1** Participant's demographic data

Characteristics	Percentage
<b>Gender</b>	
Male	46.6
Female	53.4
<b>Age (years)</b>	
18–35	29.3
35–45	44.8
45–55	20.7
>55	5.2
<b>Educational level</b>	
Colleague student	15.5
Bachelor	63.8
Master/PhD	20.7
<b>Marital status</b>	
Unmarried	24.1
Married	63.8
Divorced	5.2
Widower	6.9
<b>Current place of residence</b>	
City	74.1
Country	25.9
<b>Job</b>	
No work	17.2
I work in the medical field	32.8
I work in another field	50

coronavirus. Of all participants, 69% believed that the vaccine itself may infect them with coronavirus; 93% believed that the vaccine will eradicate the coronavirus pandemic and 96% answered that the vaccine is the best way to protect against the coronavirus and its complications. Of all participants, 86% have doubts about vaccines in general without specific reasons, 81% were concerned about the effectiveness of the coronavirus vaccine, and concerned that there is not enough clinical data about the vaccine. 84.5% were concerned about the side effects of the coronavirus vaccine. 46.5% of the participants answered that they do not need the vaccine because they take the preventive measures seriously. Table 3 shows the health beliefs about coronavirus and vaccines.

### 3.4 | General knowledge, attitude, and practices of the participants towards vaccine

The majority of the participants (88%) answered that they will take the vaccine if available. 58.6% of the subjects were sure that they do not have an allergy to vaccines and 53.4% answered that they are not

**TABLE 2** Participant's experience with corona infection

Question	%
<b>1. Have you infected with the coronavirus?</b>	
• Yes	89.2
• No	10.8
<b>2. Do you have chronic diseases (such as diabetes, hypertension, heart, lung, and kidney disease)?</b>	
• Yes	25.9
• No	74.1
<b>3. Has any of your close family members been infected with coronavirus?</b>	
• Yes	89
• No	11
<b>4. How long did it take for someone in your family to recover from a corona infection?</b>	
• 1–2 weeks	2.7
• 3–4 weeks	54.1
• More than 4 weeks	43.2
<b>5. Did any of your family members need to be hospitalized after contracting a corona infection?</b>	
• Yes	54
• No	46
<b>6. Did any of your family members suffer from any complications after recovering from the corona infection?</b>	
• He did not suffer from any effects	24.3
• Exhaustion	73
• Shortness of breath	67.6
• Cough	78.4
• Chest pain	64.9
• Difficulty concentrating or thinking	51.4
• Depression	78.2
• Increase in heart rate	51.2
• Smell problems	45.9
• Taste problems	51.4
• High blood sugar levels	21.6
• Inflammation or redness of the eye	32.4
• Blood clots	10.8
• Hair loss	16.2
• Nausea	27
• Headache	32.5
<b>7. Has any of your family members died of corona infection?</b>	
• Yes	48.5
• No	51.5

(Continues)

TABLE 2 (Continued)

Question	%
8. Are you still committed to the precautionary measures for protection from COVID-19 infection?	
• Yes	81
• No	8
• To some extent	11

obligated to take the coronavirus vaccine in their workplace. There was a gap difference in the result of the question "Where do you get your information about the coronavirus vaccine?" 50% answered that they got their information from Ministry of Health instructions, 20.7% from the media, 15.5% from social media, 10% from the circle of acquaintances and friends. The majority of the participants (94%) knew that the coronavirus vaccine provides immunity against infection for a period of 6–12 months. Eighty-six percent answered that they will take the vaccine to protect themselves from serious infection with the coronavirus, 88% answered that they will be vaccinated to protect those close to them from contracting the coronavirus and 83% said that they will encourage family, friends, and colleagues to get the vaccine. The majority of the participants (73%) believed that the vaccine should be mandatory for everyone.

91.9% knew that the current infection with coronavirus is one of the main contraindications to vaccination and 94.6% knew the current pregnancy or planning to become pregnant within 1 year are also contraindications to vaccination. Also, 91.5% knew that one of the contraindications to getting the coronavirus vaccine is to have any other vaccination within the last 14 days. The majority of the participants (94%) agreed that the vaccine is not for people less than 18 years of age. 86.5% knew that breastfeeding mothers for children under 6 months are warned to receive the coronavirus vaccine. Eighty-nine percent agreed that pregnant women and chronic disease patients can get vaccinated and also agreed that there is no specific age for a specific type of vaccination. The majority of the participants (86.5%) said that those recovering from coronavirus can receive the vaccine after approximately 3 months. The item "Who receives the first dose and then becomes infected with the virus must wait until he recovers and then receives the second dose" was approved by 97% of the participants. The majority of the participants (92%) knew that there was no scientific basis for taking aspirin or anticoagulant drugs with the AstraZeneca vaccination. "Anti-allergic or cortisone is used if any allergic symptoms occur within the first 15 min of vaccination" was known by 91%. Ninety-four percent of the subjects believed that there is no need to do an immunoglobulin G (IgG) test after or before receiving the vaccination and agreed that cases that take immunosuppressive drugs are prescribed Sinopharma. For the example "In cases of kidney transplantation receiving immunosuppressive drugs, Sinopharm is prescribed only" 91.9% answered "Yes." However, 97.3% agreed that "Cases of hemodialysis can receive AstraZeneca" and agreed that "HIV/AIDS patients

TABLE 3 Health beliefs about coronavirus and vaccine

Question	%
1. Do you think that a person can be infected with corona more than once?	
• Yes	89
• No	11
2. Do you think that people who have been vaccinated against the coronavirus may get corona infection again?	
• Yes	86.5
• No	8.3
• May be	5.2
3. Is herd immunity enough to protect everyone from the coronavirus?	
• Yes	62
• No	22.5
• I don't know	15.5
4. The effectiveness of the current vaccines for the coronavirus is	
• High	44.8
• Moderate	48.3
• Low	6.9
5. Is it necessary to wear masks after taking the coronavirus vaccine?	
• Yes	82.8
• No	10.3
• May be	6.9
6. Is it necessary to take the coronavirus vaccine even if you have already been infected with the coronavirus?	
• Yes	81
• No	15.5
• May be	3.5
7. I think immunity after infection with the virus is better than immunity after taking the vaccine?	
• True	79
• False	21
8. I think the vaccine itself infects us with the coronavirus	
• True	69
• False	31
9. I think a vaccine will eradicate the coronavirus pandemic	

**TABLE 3** (Continued)

Question	%
• True	93
• False	7
10. I think that the vaccine is the best way to protect against the coronavirus and its complications?	
• True	96
• False	4
11. I have doubts about vaccines in general without specific reasons?	
• Yes	86
• No	14
12. I am Concerned about the effectiveness of the coronavirus vaccine	
• Yes	81
• No	19
13. I am concerned that there is not enough clinical data	
• Yes	81
• No	19
14. I am concerned about the side effects of the coronavirus vaccine	
• Yes	84.5
• No	15.5
15. I do not need the vaccine because I take the preventive measures seriously	
• Yes	46.5
• No	53.5

receive immunostimulating drugs can receive any type of vaccination." Also, 94.5% agreed that there is no scientific basis that whoever received the vaccination is isolated because it is a cause of transmission of infection. Eighty-nine percent believed that the effect of the vaccination begins 2 weeks after receiving the second dose. Table 4 shows the general knowledge, attitude, and practices of the participants towards vaccine

### 3.5 | Total knowledge

The median score of this survey was 20/22 regarding knowledge about the coronavirus vaccine. This indicates that the participants had satisfactory knowledge about the vaccine.

**TABLE 4** General knowledge, attitude, and practices of the participants towards vaccine

Question	%
1. Do you have an allergy to vaccines?	
• Yes	24.1
• No	58.6
• May be	17.2
2. Are you obligated to take the coronavirus vaccine in your workplace?	
• Yes	53.4
• No	46.5
3. Where do you get your information about the coronavirus vaccine?	
• I don't get information from anywhere	3.4
• Social media	15.5
• The media	20.7
• Ministry of Health instructions	50
• Circle of acquaintances and friends	10
4. If a vaccine against the coronavirus is available, will you take the vaccine?	
• Yes	88
• No	7c
• May be	5
5. Coronavirus vaccine provides immunity against infection for a period of 6-12 months	
• Yes	94
• No	0
• I don't know	6
6. I will take the vaccine to protect myself from serious infection with the coronavirus	
• Yes	86
• No	14
7. I will be vaccinated to protect those close to me from contracting the coronavirus?	
• True	88
• False	12
8. Are you willing to encourage family, friends, and colleagues to get the vaccine?	
• Yes	83
• No	17
9. Do you think that the vaccine should be mandatory for everyone?	
• Yes	73
• No	27

(Continues)

TABLE 4 (Continued)

Question	%
10. The current infection with corona is one of the main contraindications to vaccination	
• Yes	91.9
• No	2.7
• I don't know	5.4
11. One of the contraindications to vaccination is a current pregnancy or planning to become pregnant within one year of vaccination	
• Yes	94.6
• No	2.7
• I don't know	2.7
12. One of the contraindications to getting the corona vaccine is to have any other vaccination within the last 14 days	
• Yes	91.5
• No	5
• I don't know	3.5
13. Breastfeeding mothers for children under 6 months are warned to receive the Corona vaccine	
• Yes	86.5
• No	0
• I don't know	13.5
14. It is possible for a pregnant woman to get vaccinated	
• Yes	89
• No	1
• I don't know	10
15. All chronic diseases do not prevent vaccination	
• Yes	89
• No	6
• I don't know	5
16. There is no specific age for a specific type of vaccination	
• Yes	89
• No	3
• I don't know	8
17. The vaccine is not for people under 18 years of age	
• Yes	94
• No	3
• I don't know	3

TABLE 4 (Continued)

Question	%
18. Those recovering from corona can receive the vaccine after approximately 3 months	
• Yes	86.5
• No	5.4
• I don't know	8.1
19. Whoever receives the first dose and then becomes infected with the virus must wait until he recovers and then receive the second dose	
• Yes	97
• No	0
• I don't know	3
20. There is no scientific basis for taking aspirin or anticoagulant drugs with the AstraZeneca vaccination	
• Yes	92
• No	3
• I don't know	5
21. Anti-allergic or cortisone is used if any allergic symptoms occur within the first 15 min of vaccination	
• Yes	91
• No	3
• I don't know	6
22. There is no need to do an IgG test after or before receiving the vaccination	
• Yes	94
• No	1
• I don't know	5
23. There is no scientific basis that whoever received the vaccination is isolated because it is a cause of transmission of infection	
• Yes	94.5
• No	0
• I don't know	5.5
24. Cases that take immunosuppressive drugs are prescribed Sinopharm	
• Yes	94
• No	0
• I don't know	6
25. Cases of hemodialysis can receive AstraZeneca	
• Yes	97.3
• No	0
• I don't know	2.7

TABLE 4 (Continued)

Question	%
26. In cases of kidney transplantation receiving immunosuppressive drugs, Sinopharm is prescribed only	
• Yes	91.9
• No	2.7
• I don't know	5.4
27. HIV/AIDS patients receive immunostimulating drugs, so it is possible to receive any type of vaccination	
• Yes	97.3
• No	0
• I don't know	2.7
28. The effect of the vaccination begins 2 weeks after receiving the second dose	
• Yes	89
• No	5
• I don't know	6

## 4 | DISCUSSION

The COVID-19 pandemic is still threatening the world. A vaccine is a great hope to find a solution to control the virus infection. Many coronavirus vaccines are now available. However, to be effective, a vaccine must be acceptable and usable among the majority of the population.<sup>7</sup>

The items of the questionnaire are inclusive as it includes the participant's experience about coronavirus infection, health beliefs about coronavirus and its vaccine and the general knowledge, attitude and practices of the participants towards the vaccine.

The distribution of the demographic data of the subjects showed a higher percentage of females, married, city dwellers, graduated from college, and work in jobs other than the medical field. This indicates that females have more fears, more care toward the infection, and are more interested to share and test their knowledge about the coronavirus vaccine.

Knowing the cause is the first step to promote public education.<sup>8</sup> Public knowledge includes disease transmission, preventive considerations, and vaccine information are important to promote vaccine acceptance and decrease the vaccine hesitancy among the population to eradicate the coronavirus infection.<sup>8,9</sup>

Nearly 90% of the respondents were classified as knowledgeable about the vaccine and have a positive attitude towards getting the vaccine. We used a certain cutoff point (>80%) to classify that the participant had satisfactory knowledge about the coronavirus. Previous studies, in contrast, showed a low level of acceptance of the vaccine in Egypt,<sup>7,9,10</sup> which demonstrates the successful role of awareness campaigns in increasing citizens' awareness of the vaccine and increasing their acceptance.

The participants who were previously infected with coronavirus, had a chronic disease or had one of his family hospitalized after contracting a coronavirus infection, were highly concerned about the coronavirus infection and so, showed high acceptance for the vaccine. Those understanding COVID-19 as a dangerous disease were also more intent to take the COVID-19 vaccine. Increasing the public knowledge about the safety of the COVID-19 vaccine should be the point of interest to reach high vaccine usage.<sup>11</sup>

Most of the participants' families who were infected with coronavirus suffered from post-COVID-19 syndrome. Cough and depression are the most common post-COVID-19 syndromes in this study.<sup>12</sup> Depression is the most common neuropsychiatric post-COVID-19 disorder.<sup>13</sup> Previous studies found that about 10% of COVID-19 patients had a persistent cough for 4 months after disease recovery.<sup>14-16</sup>

The majority of the participants were committed to the precautionary measures for protection from SARS-CoV-2 infection, which indicates their awareness of the dangers of the virus and their fear of being infected. Nearly 86% of the respondents believed that people who have been vaccinated against the coronavirus may get the infection again. It was reported that reinfection with coronavirus for the vaccinated individuals is possible with relatively mild symptoms and a reduced rate of hospitalization.<sup>17</sup>

About two-thirds of their respondents answered "yes" to the question "Is herd immunity enough to protect everyone from the coronavirus?" People become immune if they were infected or get vaccinated. It was reported that to reach herd immunity, 86% of people should be vaccinated.<sup>18</sup>

There were differences in people's confidence towards the efficacy of the vaccine, which appeared in the gap difference in answering the question "The effectiveness of the current vaccines for the coronavirus is..." were 44.8% answered "high," 48.3% answered "moderate" and 6.9% answered, "low." That indicates the importance of building trust in COVID-19 vaccines between the populations. This can be achieved by launching advertising campaigns and displaying the available information about the vaccine in all transparency.<sup>9</sup>

Communities should listen to problems, find answers to the questions, and clear any misinformation.<sup>19</sup> As public trust in vaccination is relatively low, the COVID-19 vaccination program can succeed if there is a belief that the available vaccines are safe and effective.<sup>20</sup> Lucia et al. confirmed the need for transparency and to give answers for concerns about vaccine safety. Supporting COVID-19 vaccination through messages to the population and news releases and monitoring and controlling false news is crucial.<sup>9,21</sup> The majority of the participants believed that it is necessary to wear masks after taking the coronavirus vaccine. The public vaccine hesitancy may lead to a bad situation. Although COVID-19 vaccines are now available, safety measures, for example, face masks, personal hygiene, and social distancing are still important to protect personal and public health against coronavirus.<sup>22</sup>

Most of the participants thought that immunity after infection with the virus is better than immunity after taking the vaccine. Natural immunity and vaccine immunity are likely to play a role in reducing the spread of COVID-19 and its associated mortality.<sup>23-25</sup>



A lot of participants thought that the vaccine may infect them with the virus, were concerned that there is not enough clinical data, and were concerned about the side effects of the coronavirus vaccine.<sup>9</sup>

Then, structured awareness campaigns should be organized to offer transparent knowledge about the safety and efficacy of the vaccines and the technology that is used in the production of different types of vaccines.<sup>7</sup>

These awareness campaigns are important to reduce the level of vaccine hesitancy, improve vaccine acceptance, and clear misinformation about the vaccine. A previous study showed differences in vaccine acceptance rates ranged from country to country as it reported that vaccine acceptance ranged from almost 93% in Tonga to less than 43% in Egypt.<sup>7</sup>

Nearly half of the participants were obligated to take the coronavirus vaccine in their workplace such as in hospitals and governmental institutions. This heralds the end of the epidemic soon.

Half of the participants answered that they get their information about the coronavirus vaccine from Ministry of Health instructions. However, other studies showed that the social media and scientific articles published in the media were the most common sources of information.<sup>10,26</sup>

Most of the participants accepted taking the vaccine and answered that they will encourage family, friends, and colleagues to get the vaccine. That indicates the success of the awareness campaigns. The fear of the infection with coronavirus and considering it a serious disease and the desire for family protection as shown in this study were the motivators for the people to take the vaccine.<sup>9</sup>

The study of Natalia et al. reported that memory B- and T-cell responses were maintained at least 6–8 months after infection.<sup>27</sup> Therefore, it is expected that the vaccine immunity may last for a period of 6–12 months. Ninety-four percent of the participants answered “yes” to the question “Coronavirus vaccine provides immunity against infection for a period of 6–12 months.”

A lot of participants believed that the vaccine should be mandatory for everyone. Like other studies, the vaccine should be mandatory for everyone if the threat to the public is serious and if there is confidence in the safety and efficacy of the vaccine.<sup>28,29</sup>

The majority of participants believed that current pregnancy or planning to become pregnant within 1 year of vaccination is a contraindication to vaccination.

Pregnant women who wanted to be vaccinated must discuss with their physician and weigh the potential risks and benefits of vaccination according to their health cases. However, for persons who planning for pregnancy, there are no theoretical concerns related to the effects of the COVID-19 vaccine on fertility. There is no need to delay pregnancy after the COVID-19 vaccination.<sup>30</sup>

It was known by the participants that children under the age of 18 are not vaccinated. This is because of the reduced chance of complications if they are infected. All chronic diseases do not prevent vaccination, was known by a lot of the participants. The main target of vaccine is to protect high-risk individuals such as elderly people, those with chronic comorbid conditions, health care workers, and those who work in essentials industries.<sup>31</sup>

The participants showed good knowledge about the COVID-19 vaccines information published by Food and Drug Administration and vaccine program campaigns.<sup>6</sup> They knew that there is no specific age for a specific type of vaccination, those recovering from coronavirus infection can receive the vaccine after approximately 3 months, and those who receive the first dose and then becomes infected with the virus must wait until they recover and then receive the second dose.

“There is no scientific basis for taking aspirin or anticoagulant drugs with the AstraZeneca vaccination” was answered by a lot of participants. However, a previous study reported that early initiation of coagulation treatment results in a rapid response without thrombotic complications.<sup>32</sup>

Similar to a previous study, the participants agreed also that antiallergic or cortisone is used if any allergic symptoms occur within the first 15 min of vaccination.<sup>33</sup> Also, they thought that there is no need to do an IgG test after or before receiving the vaccination.<sup>34</sup>

There was an agreement in this study that cases that take immunosuppressive drugs should be prescribed Sinopharm. The inactivated vaccines have been used in cancer and immunosuppressive patients in the past with excellent safety profiles and they are theoretically the safest vaccine for these patients.<sup>35</sup> It was also known by the participants that cases of hemodialysis can receive AstraZeneca, cases of kidney transplantation receiving immunosuppressive drugs can receive Sinopharm only and HIV/AIDS patients who receive immunostimulating can receive any type of vaccination<sup>35</sup> (whereas the available vaccines in Egypt now are Sinopharm and AstraZeneca).

People and healthcare workers should be informed about new research and information regarding the coronavirus vaccine. Highly educated participants were better knowledgeable; their high level of education helps them in understanding educational messages. The higher educated persons have the ability to obtain knowledge about the vaccine from different sources, which cannot be obtained by lower educated ones.

## 5 | LIMITATIONS

No face-to-face questionnaire was performed. Only an online survey was carried out which was easy as most were of young age compared to old, which is why most of the participants were young. Also, the uneducated or people who cannot deal with the online applications could not participate in the study.

## 6 | CONCLUSION

The participants in the study had satisfactory knowledge regarding coronavirus and its vaccine. Although the participants were satisfied in terms of acceptance of the vaccine, there are some concerns about it due to insufficient clinical trials and fear of its side effects. The provision of sufficient information about the vaccines is important. Continuous training and education are needed to improve public vaccine acceptance and reduce its hesitancy.



## AUTHOR CONTRIBUTIONS

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**How to cite this article:** Elgendy MO, Abdelrahim MEA. Public awareness about coronavirus vaccine, vaccine acceptance, and hesitancy. *J Med Virol.* 2021;93:6535-6543. <https://doi.org/10.1002/jmv.27199>