



Public Opinion towards COVID-19 Vaccination in Egypt

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ABSTRACT

Background: The world is facing a massive global crisis as the Coronavirus disease 2019 (COVID-19) spreads around the globe, affecting all facets of life. Vaccine hesitancy is an obstacle to the effectiveness of immunization programs. **Objective:** to assess opinion of the study participants toward the COVID-19 vaccine and risk factors associated with fear of COVID-19 vaccine. **Method:** A Cross sectional study was carried out among 856 Egyptians participations during July 2021. The study was conducted online using a pre-tested, structured Google Form questionnaire. Convenience sample approach was adopted. **Results:** Approximately 62.1% of the participants believed that the vaccinations are very important and should be given regularly, 81.4% were afraid of COVID-vaccine. Being a female sex and rural residence were associated factors with fear from vaccine. Approximately 44.6% of the participants intended to take the vaccine. Factors increasing the intention of taking the vaccine were male sex and being medical personnel. Approximately 23.9% of the participants were vaccinated and 69.7% of them reported vaccine side effects. The most common side effects were bony aches/fatigue (86.7%) and severe pain in the site of injection (64.3%). **Conclusions:** Participants' opinion revealed that COVID-19 vaccination should be directed towards all people followed by medical staff. Fear of COVID-19 vaccination were encountered more among females, rural residents, and single marital status. Males, single marital status, and medical personnel showed more intention to receiving COVID-19 vaccination. Health education workshops targeting various socio-demographic groups should be promoted to improve national vaccination coverage.

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INTRODUCTION

As the Coronavirus illness 2019 (COVID-19) spreads over the planet, the world is facing a tremendous humanitarian crisis.¹ In late January 2020, the World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern (PHEIC).²

Coronaviruses have emerged as the most common pathogens in new respiratory disease outbreaks, cause illnesses ranging from a common cold to MERS and SARS-like symptoms.³

The virus has sparked global concern due to its high transmission capacity, which could be accompanied by high morbidity and mortality.⁴ The elderly and patients with chronic conditions are more likely to become compromised, and they are often more likely to develop severe complications.⁵ Vaccines are the most significant public health intervention and the most efficient method for protecting the population from COVID-19.⁶

The success of any immunization campaign, however, is predicated on widespread vaccine acceptance and adoption.⁷ Vaccine hesitancy is a barrier to immunization program effectiveness, and the World Health Organization (WHO) has called it one of the top ten public health issues for 2019.⁸ Anti-vaccination sentiments disseminate falsehoods about vaccination's risks and effects, resulting in a lack of vaccination against infectious diseases that can be prevented.⁹

Concerning an international survey of possible COVID-19 vaccine approval, 48 % of the participants in the study were unsure about the COVID-19 vaccine and whether or not they would obtain it.¹⁰

Given the impact of the SARS-COV-2 virus on coagulopathy, several studies revealed baseline rates of deep vein thrombosis, pulmonary embolism, stroke, immunological thrombocytopenia, and disseminated intravascular coagulation, which are highly important for COVID-19 vaccines.

Personal risk tolerance, fear of adverse reactions, access to media, level of confidence in the healthcare system, as well as other social influences, can all affect vaccine uptake.^{11, 12}

This study was proposed aiming to: a) assess opinion of the study participants toward the COVID-19 vaccine b) determine the factors associated with fear of COVID-19 vaccine c) identify risk factors affecting the intention of getting COVID-19 vaccine d) identify side effects of COVID-19 vaccine.

METHOD

This study hypothesis is based on that the participants might have special concerns/perception about COVID-19 vaccine affected by their sociodemographic variation. In addition to the vaccine type, its side effects would be affected by participants' characteristics.

A cross-sectional survey-based study was conducted during July 2021. Convenience sample approach was adopted in this study. Participants were adults (>18 years), Egyptians from different regions. They were invited to participate using online a pre-tested Google form, structured questionnaire, and a shared link was generated and disseminated for public on various social media outlets (e.g., Facebook, WhatsApp, etc.) for data collection.

To participate in the study, Egyptian adults aged 18 and up were asked to fill out a questionnaire. A pilot study was undertaken to test the questionnaire's

validity and reliability. Using Epi-info stat-calc, the sample size for the population survey was calculated at 95% confidence level, 5% acceptable margin of error, 1 design effect, 50% expected frequency (of vaccine acceptance), 384 participants was determined to be the minimal sample size.¹³ We ended up with 856 people that took part in the survey (70.1 % female, 29.9 % male).

The questionnaire was adapted from several published literature and it covered the following:

11 item questions to assess *sociodemographic characteristics and health related factors*: Gender, age, marital status, address, level of education, occupation, working in medical field, presence of chronic disease, history of food or drug allergy, had COVID-19 infection and history of adherence to vaccination.

10 Item questions to assess opinion of the study participants toward the COVID-19 vaccine and receiving of COVID-19 vaccine

13 Items questions about side effects; types, presence or absence and duration of symptoms

Statistical analysis: The data was analyzed using Microsoft Excel 2019 and SPSS 25.0. (Chicago, IL, USA). Excel was used to clean, edit, sort, and code data. The spreadsheet was then loaded into SPSS. First-order analysis (Chi-Square tests, Fisher's exact tests) and descriptive statistics (frequency, percentages, averages, and standard deviations) were used. T-tests were used to assess scale factors' significance with binary categorical variables. Multivariable binary logistic regression analysis for predicting factors associated with intention, fear of COVID-19 vaccine, and side effects among those who have taken the vaccine. All statistical tests were judged significant with p value ≤ 0.05 .

RESULTS

Sociodemographic characteristics of the study participants revealed an inclusion of 856 participants with a mean age of 33.5±12.1 years and a median age of 32 years; dividing them into ≤ 32 years (52.1%) and > 32 years (47.9%). Females constituted 70.1 % of the total participants and 29.9% were males. Urban residency was 81.4%. Educational level distributed as: read and write (43%), completed preparatory stage (1.9%), completed secondary stage (9.2%), university graduate (44.9%) and post graduate education (1.1%). As for the marital status: 56.9% were married, 38.7%

Table (1): Opinion of the participants toward COVID-19 vaccine

Items	Number	(%)
Is COVID-19 pandemic affecting your opinion towards the vaccination in general		
I see that the vaccinations are important to some extent	264	30.8
I see that there is no importance of the vaccines	60	7.0
I see that the vaccinations are very important and should be given regularly	532	62.1
Do you think that COVID-19 vaccination will decrease the spread of corona virus?		
Agree	370	43.2
Don't agree	28	3.3
Don't know	458	53.5
Did your institution offered you to take COVID-19 vaccine?		
No	452	52.8
Yes	404	47.2
Did you have an intention to receive COVID-19 vaccine?		
Yes	382	44.6
No	114	13.3
Hesitated	360	42.1
Why do you afraid of COVID-19 vaccine?		
I am not afraid	159	18.6
I am afraid of get infection after the vaccine	31	3.6
I am afraid of the unknown side effects that may occur in the future	40	7.4
I am not trusted of the efficacy of the vaccine	90	10.5
There is not enough information about the vaccine	88	11.6
More than one cause of the mentioned above	448	52.3
In your opinion which category should be the priority for COVID-19 vaccine		
Elderly only	73	8.5
Medical staff only	208	24.3
Patients with chronic diseases only	84	9.8
All People	491	57.4
In your opinion what is the duration to feel that it is safe to administer COVID-19 vaccine		
Immediately after vaccine approval	230	26.9
3 months after vaccine approval	218	25.5
1 year after vaccine approval	291	34.0
I think it will not be safe at all	117	13.7
What is the source of COVID-19 vaccine information?		
Mass media	115	13.4
Social media	135	15.8
Official websites as WHO, Ministry of health	117	13.7
Published scientific research	64	7.5
Family members and friends	39	4.6
More than one of the mentioned sources	386	45.1
Did you receive COVID-19 vaccination?		
No	651	76.1
Yes	205	23.9
Type of COVID 19 vaccine (No=205)		
Chinese vaccine	126	61.5
Oxford vaccine (AstraZeneca)	79	38.5

Table (2): Multivariate binary logistic regression analysis for risk factors associated with fear of COVID-19 vaccine

Independent variables	P-value	OR	95% C.I. for OR	
			Lower	Upper
Elder (>32)	0.710	0.916	0.576	1.455
Female sex	0.002*	1.808	1.247	2.621
Rural residence	0.034*	1.861	1.048	3.304
Marital status				
Single/NA	0.023*	3.906	1.204	12.673
Married	0.068	2.711	0.929	7.906
Divorced	0.282	2.206	0.522	9.327
High education	0.073	1.415	0.968	2.067
Presence of chronic disease	0.611	1.125	0.715	1.769
Working participants	0.945	1.016	0.653	1.580

OR=Odds Ratio CI=Confidence Interval *p value is significant at ≤0.05

Table (3): Multivariable binary logistic regression analysis for factors associated with intention of receiving of COVID-19 vaccine

Independent variables	p value	OR	95% C.I. for OR	
			Lower	Upper
Elders	0.370	1.186	0.817	1.722
Male sex	<0.001*	1.967	1.445	2.676
Marital status				
Single/NA	0.042*	0.316	0.104	0.958
Married	0.154	0.468	0.165	1.329
Divorced	0.088	0.308	0.080	1.189
Being medical personnel	0.010*	1.498	1.100	2.038
Presence of chronic disease	0.319	1.207	0.834	1.747
Working	0.739	0.939	0.648	1.360
Highly educated	0.302	0.854	0.632	1.153
Previous confirmed COVID-19 infection	0.062	0.734	0.530	1.016

OR=Odds Ratio CI=Confidence Interval *p value is significant at ≤0.05

were single, 2.5% divorced and 2% were widows and work status showed that 49.6% were governmental employees: 27.2% were not applicable to work (older on pension or younger age in educational period), 14.1% were employees in the private sector and 9% were jobless.

Medical personnel constituted 51.3 % of the participants, 31.7% of them served in health facilities dealing with COVID-19 patients. Among study participants: 19.6% had chronic diseases and 10.4% had a drug or food allergy. COVID-19 past infection was confirmed for 25.8% of the participants (radiological and laboratory evidence), while 40.8% of them were not sure of having COVID-19 and 33.4%

reported not having the infection. There were 89.3% of the participants adherent to the compulsory vaccines and 62.4% were adherent to the non-compulsory vaccines. Most of the participants hadn't administer the Influenza vaccine previously, 19% take the influenza vaccine once, 7.8% take it twice while 6.3% were taking it yearly.

As regard the participants' opinion toward COVID-19 vaccine: 44.6% intended to get the vaccine whenever available, 57.4% of them perceived that COVID-19 vaccine is appropriate for everyone, 24.3% reported

Table (4): Different COVID-19 vaccines and its side effects

Items	Chinese vaccine (no=126)		Oxford vaccine (no=79)		Total (no=205)		P-value
Did you feel any side effect after the COVID vaccine?							
No	46	36.5	16	20.3	62	30.2	0.014*
Yes	80	63.5	63	79.7	143	69.7	
Reported side effects (No=143)							
Severe pain at the site of injection	38	47.5	54	85.7	92	64.3	<0.001*
Tingling or numbness at the side of injection	6	7.5	26	41.3	32	22.4	<0.001*
Fever	19	23.8	43	68.3	62	43.4	<0.001*
Bony aches, fatigue	64	80.0	64	80.0	124	86.7	0.008*
Symptoms like common cold	8	10.0	13	20.6	21	14.7	0.074
Change in bowel habits	11	13.8	9	14.3	20	14.0	0.927
Headache, face aches	19	23.8	37	58.7	56	39.2	<0.001*
Dyspnea	1	1.3	5	7.9	6	4.2	0.087#
Sleep abnormality (Insomnia)	11	13.8	14	22.2	25	17.5	0.185
Skin manifestation (Itching, Redness)	3	3.8	6	9.5	9	6.3	0.182#
Eye manifestation	4	5.0	6	9.5	10	7.0	0.336#
Lymphadenopathy	2	2.5	5	7.9	7	4.9	0.167#
Duration of symptoms (No=143)							
Less than 3 days	70	87.5	48	76.2	118	82.5	
Three days to one week	8	10.0	13	20.6	21	14.7	0.189
One to two weeks	1	1.3	2	3.2	3	2.1	
More than 2 weeks	1	1.3	0	0	1	0.7	

*P-value is significant

#FET: Fisher Exact test

that the vaccine is more appropriate for medical staff, and 8.5% believed that it is appropriate for elderly ones. The most frequent reason for vaccine refusal was the fear of vaccine side effects (73%). (Table 1)

After adjustment for different risk factors for prediction of fear and intention of getting of COVID-19 vaccine from different baseline characteristics, the significant risk factors of fear of getting COVID-19 vaccine were female sex, rural residence, and single marital status. While the significant risk factors intention of getting COVID-19 vaccine were male sex, single marital status and being medical personnel. (Table 2 and 3)

COVID-19 vaccination was offered to 23.9 % of participants; 61.5% were vaccinated by the Chinese vaccine, 38.5% by Oxford and 69.8 % of vaccinated ones experienced side effects (more common in the Oxford vaccine). (Table 4)

DISCUSSION

Vaccine hesitancy could threaten the efficiency of COVID-19 vaccines once they become commercially available worldwide.¹⁴

This study revealed that 44.6% of participants intended to take COVID-19 vaccine whenever available, a finding that is like an Egyptian study reporting a 45.9% acceptance for vaccination¹⁵ and higher than the 34.9% vaccine acceptance among a medical Egyptian study group¹⁶ and the 37.4% vaccine public acceptance reported in a Jordanian study,¹⁷ but lower than the 64.7% acceptance level in a Saudi Arabian report.¹⁶ Furthermore, our findings is lower than the global public acceptance of COVID-19 vaccination reported worldwide being 54.8 % in Russia, 59–75 % other western countries, 88.6 % in China¹¹ and 67 % vaccination willingness in a United States study.¹⁸

In the current study participants reported that COVID-19 vaccine is appropriate for everyone, followed by medical staff, followed by elderlies; similar to a Southern Ethiopian report showing that participants perceived that COVID-19 vaccine is appropriate for everyone, followed by high-risk people (exposure to the disease), and only 13% believed that the vaccine was good for elderlies.¹⁹

In the current study, vaccine refusal was mainly because of fear of vaccine side effects. Similar to high concern level regarding the adverse effects of the vaccine (96.8%) among an Egyptian medical study group.¹⁶ In addition to Asian reports where participants feared from vaccine side effects; Malaysia (74.1%). Bangladesh (67.4%) and Thailand (59.2%) and African reports; Benin (57.9%), Mali (52.7%), Uganda (50.5%) and Malawi (42.0%).²⁰ A possible explanation for vaccine refusal owing to the fear of vaccine side effects can be driven by some thoughts such as: negative family experiences related to parents' vaccinations, concerns about the safety of the vaccines especially among women and for religious or ethical reasons.²¹

In this study, fear of COVID-19 vaccination among participants was associated with being a female, rural residence, and a single marital status. Similar findings were reported in a national multicenter study among 1011 Egyptian adults from 24 governorates showing that female gender, marriage, urban residence, educational level, and working in the governmental sector were factors affecting COVID vaccination hesitancy.²² In addition to a Chilean study (370 participants) where vaccination refusal rate was significantly affected by age, gender, and education level (vaccine's risks and side effects were the main reason for rejection). Educated people rejected the vaccine more than lower levels of education ones, women rejected vaccination more than men because of concerns about side effects and lack of knowledge about the vaccine.²³

In a critical review about attitudes to vaccination: social influences, trust in the health-care profession, safety concerns, low perception about illness severity, lack of awareness, and belief in alternative medicine were reasons for hesitancy towards vaccination.²⁴

In the current study, predictive factors associated with intention of getting of COVID-19 vaccine from multivariable binary logistic regression analysis showed that: *being a male* and *being a medical*

personnel increased the probability of intention of getting of the vaccine, but *being single* seems to decrease the probability of intention of accepting COVID-19 vaccination, Similar to the findings reported in an Egyptian study,²² regional studies (Jordan),¹⁷ international studies (U.S.A¹⁹ and Italy²⁵) reporting that males were more likely to accept vaccination and married participants were 1.79 times more likely to accept getting it. Age was not found to be a factor in this study, contrary to the Saudi Arabian study findings where people > 45 years old were 2.15 times more likely to accept vaccination.¹⁸

In the current study; fatigue, pain at the site of injection, fever, headache, and muscle pain were the most reported side effects (more common in the Oxford vaccine). Similarly, injection site pain, headaches, flu symptoms, fever, and exhaustion were the most common adverse effects of vaccination among Egyptian²⁶ and Saudi Arabian citizens who were vaccinated with different COVID-19 vaccines. A fast heartbeat, whole-body aches, difficulty breathing, joint pain, cold, and tiredness were some of the less typical side effects. *The FDA Fact Sheet for Recipients and Caregivers confirmed these findings.* The most common reported side effects included: discomfort at the injection site, weariness, headaches, muscle and joint ache, chills, and raised body temperature, cold fingers for days, according to the data page.²⁵ Furthermore, our findings are consistent with others reporting that headaches were the most common complaint following a vaccination injection and that young persons were more likely to develop a fever following the second dose.²⁷

Post-marketing surveillance of side effects after vaccine delivery is critical because of their low frequency, limited numbers of participants, and other study constraints, some adverse effects are unlikely to show in pre-licensure clinical investigations.²⁸

In this study, general side effects' duration lasting for < 3 days was reported by 82.5% and only 0.7% experienced effects that lasted for >2 weeks. Nearly similar findings were reported by a Czech Republic study where 80% of general adverse effects lasted for 1-3 days, and 4% for 1-4 weeks.²⁹ According to a systematic review and meta-analysis of COVID-19 vaccine reluctance, the most prevalent adverse effects were mild to severe Injection site pain that persist for a few days, weariness, rigors and fever, as well as muscle and joint problems, were other side effects.³⁰

Limitations of the study: As participants needed a smartphone or computer to complete the survey, and a stable internet connection was a requirement for completing the Google Form, the results could be skewed by selection bias. This may have left out *the poor and elderly* (most vulnerable to COVID-19), limiting external validity and altering estimations of vaccine readiness.

CONCLUSIONS

Participants' opinion revealed that COVID-19 vaccination should be directed towards all people followed by medical staff. Majority of the participants thought that COVID-19 vaccination was to be safely given within 3 months of vaccine approval. Official websites as WHO, Ministry of health was the common trusted information sources for COVID-19 vaccine. Detailed information about safety and health effects about the vaccine should be spread through mass media (spoken, broadcast, or written), Role models interviews and social media; in addition to designing a friendly application for smartphones for easy access and transfer of COVID-19 related matters.

Fear of COVID-19 vaccination were encountered more among females, rural residents, and single marital status. While males, single marital status and medical personnel showed more intention of COVID-19 vaccination. Vaccination related side effects was common among vaccinated participants. To improve national COVID-19 vaccination coverage; more awareness campaigns and timely reporting for its national health statistics compared to our counterparts would comfort and assure our citizens for getting the vaccine in addition would motivate them to advice their peers for vaccination. Health education workshops targeting various socio-demographic groups should be promoted on all social levels.

Ethics Approval

This study was approved by Faculty of Medicine, Beni-Suef University research Ethics Committee (FBBSU-REC). Before asking any questions, we got everyone's online informed consent. The informed consent form had two options: yes or no for those who volunteered to participate and those who did not. Only those who chose yes were directed to the survey page. Participants were told of the study's purpose and that all information and opinions would be kept strictly confidential. Privacy of the participants and

confidentiality of the data were guaranteed. The collected data will be used only for research

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Authors' contributions: MA, NL designed and supervised the study, drafting of the article and critical revision. MA, DK, HE, MF collected the data. DK analyzed the data and conducted the statistical analyses. MA, DK, HE, NL, MF reviewing and editing the article.

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