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The Level Of Vaccination Against COVID-19 Virus Among Students Of Diyala Medical College

Submitted to the Council of the College of Medicine,
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

{ هُوَ الَّذِي جَعَلَ الشَّمْسَ ضِيَاءً وَالْقَمَرَ نُورًا وَقَدَرَهُ مَنَازِلَ لِتَعْلَمُوا عَدَدَ
السِّنِينَ وَالْحِسَابَ مَا خَلَقَ اللَّهُ ذَلِكَ إِلَّا بِالْحَقِّ يُفَصِّلُ الْآيَاتِ لِقَوْمٍ يَعْلَمُونَ }

سورة يونس - الآية 5.

Abstract

Background: Coronavirus disease 2019 (COVID-19) is a severe acute respiratory disease. Various control measures have been put in place by governments under guidelines and recommendations of key global agencies with the world health organization (WHO) leading in providing information to help fight the pandemic. Multi-agency research efforts have been geared towards developing vaccines for active immunization to prevent COVID-19 infection. Based on the mechanism by which a vaccine protects an individual against COVID-19 infection, it has been found that the already rolled out vaccines are mRNA and vector vaccine structured.

Aim of study: The aim of study is to estimate the rate of vaccinated students in Diyala university college of medicine.

Subject and methods: The current study is cross section study type was carried out in Diyala, from 6th of November 2022 to the 28th of March 2023. The samples study design was by simple random sampling by which we were choosing the sample randomly.

Results: In these study vaccinated students, is 332 (96%), the most age group vaccinated was older than 23 years old (98.6%), then (21-23) years old (97%) and age group (18-20) vaccinated was (94%). there is 95 (92.2%) vaccinated and 8 (7.7%) is not vaccinated, while students living in urban from 243 there is 237 (97.5%) vaccinated and 6 (2.5%) is not getting the vaccine. there is (91%) of people getting the vaccine voluntary without any and only (9%) getting vaccine mandatory. the most cause that prevent medical students to taking the vaccine according to their answer is to avoid the side effect of vaccine (58%) then in percentage. there is (71%) of them prefer Pfizer type of vaccine, (18%) prefer AstraZeneca and only (11%) prefer sinopharm. most of students (90%) take two doses of vaccine and about (7%) taken only one dose and only (3%) taken third dose of vaccine.

Conclusions: Most of medical students is vaccinated. Most age vaccinated was older than 23 years old. There is slightly variation between percentage of vaccination in urban and rural. Most of medical students voluntary vaccinated. The most cause that prevent medical students to taking the vaccine according to their answer is to avoid the side effect of vaccine. Most of medical students prefer Pfizer type of vaccine. Most of medical students have not third dose of vaccine.

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Introduction

Coronavirus disease 2019 (COVID-19) is a severe acute respiratory disease (SARS) caused by the novel coronavirus (SARS-COV-2) first detected in Wuhan, China, at the end of 2019 Coronavirus (COVID-19) and can spread from person-to person through sneezing and coughing droplets. This virus has signs and symptoms similar to the common cold but is dangerous and if not reported early and managed by health workers it can cause severe illness in humans and can lead to death. ^[1]

Since the emergency of the novel coronavirus disease (COVID-19) that is caused by SARS-Cov-2 in 2019, researchers have been on the move to find solutions to mitigate the spread of the virus. Various control measures have been put in place by governments under guidelines and recommendations of key global agencies with the world health organization (WHO) leading in providing information to help fight the pandemic. Multi-agency research efforts have been geared towards developing vaccines for active immunization to prevent COVID-19 infection. Based on the mechanism by which a vaccine protects an individual against COVID-19 infection, it has been found that the already rolled out vaccines are mRNA (Pfizer and Moderna) and vector (Astrazeneca) vaccine structured ^[2].

There is also China's Sinovac vaccine which has been in place for the past few years. The four vaccines reviewed here are administered in two doses some days apart. Currently, no vaccine has a safety threat and the efficacies are 95% for COVID-19 mRNA vaccine BNT162b2 (Pfizer), 94.1% for mRNA-1273 vaccine (Moderna), 70.4% for ChAdOx1 nCoV-19 vaccine / AZD1222 (AstraZeneca) vaccine and 78% for sinovac

respectively. Even though these efficacies imply that the vaccines offer significant protection against the infection, further research and evaluation should go on to achieve higher efficacies while addressing any safety concerns that may go beyond local and systemic reactions that occur on patients after vaccination. ^[3]

With everything slowing down or coming to a halt, scientists and health practitioners have delved into trying to find a permanent solution so that life can go back to its normal. Multi-agency efforts on research have been facilitated in pursuit of developing vaccines for immunization to prevent COVID-19 infection. These vaccines have different working mechanisms to protect individuals against the disease. The research on finding a vaccine and improved detection for the disease have moved at an unprecedented pace for reasons such as advancement in research, increased innovative vaccine technology equipment, the human trial was done at an early stage, and lastly great unity between relevant bodies ³⁰. There are various vaccines developed to protect people from the transmission and adverse effects of the virus . Preliminary data shows support for this statement as countries are reporting a decrease in the transmission rate. For instance, Qatar claims to have vaccinated almost 75% of its older population, an action that has seen a 33% decrease in the transmission rate of the virus ^[4].

Although, the impact of COVID-19 vaccines on the transmission of the disease has yet to be fully determined. The Strategic Advisory Group of Experts (SAGE), through evidence-based medicine, gives temporary guidance on issues to do with immunization. Priority is given to health workers and people aged above 65 years

because vaccines are limited and they also face a higher risk of getting infected ^[5].

Effective interventions are key to controlling COVID-19 spread, and vaccinations are considered a routine and effective measure for controlling infectious diseases. Recently, several studies have reported the effectiveness of novel COVID-19 vaccines. The efficacy of the BNT162b2 mRNA vaccine has been reported to be 95% that of the mRNA-1273 vaccine is 94.1, that of the Gam-COVID-Vac is 91.6%, and that of the ChAdOx1 nCoV-19 vaccine is 70.4%. Overall, the reported efficacy is far higher than the standard (50% efficacy) developed by the U.S. Food and Drug Administration. ^[6]

In addition to the effectiveness and safety of the COVID-19 vaccine, there are a few important considerations: ^[6]

(1) How can the vaccine be equitably allocated globally?

(2) And what is the population's acceptance of the COVID-19 vaccine? Allocation and distribution frameworks for COVID-19 vaccines have been proposed in previous studies. Six core ethical principles (human well-being, equal respect, global equity, national equity, reciprocity, and legitimacy) have been proposed by the WHO to guide the distribution of vaccines. The “Allocation Mechanism for COVID-19 Vaccines Global Access (COVAX) Facility Vaccines” document suggested that, for each country, proportional allocation - subject to country readiness and the availability of doses - should be used to achieve a vaccination rate of 20% of the total population in phase I, and that weighted allocation (considering vulnerability and COVID-19 threat) should be used when beyond 20% of phase II.

Even the most effective vaccine has a limited impact on the spread of a disease if people refuse to take it. In 2018, the largest measles outbreak occurred in New York City, America in nearly 30 years. A total of 148,279 cases were reported by the European Centre for Disease Prevention and Control in European Union countries between 2010 and 2019 .The low uptake of the measles vaccine has contributed to continuous measles transmission. Concerns about side effects, mistrust in the government, and religious beliefs, among others, were found to be key factors resulting in vaccine hesitancy.^[4]

COVID-19 vaccination intentions have been surveyed and reported in previous studies. The proportion of willingness to undergo COVID-19 vaccination was 68.4% based on a meta-analysis. However, several problems were not examined or explored, and the representativeness of the samples was unclear. By identifying associated predictors, governments and health authorities can inform the development of evidence-based guidelines and specific vaccine campaigns to effectively address COVID-19 vaccine hesitancy and improve vaccine uptake.^[7]

The aim of study is to estimate the rate of vaccinated students in Diyala university college of medicine.

Literature review

Vaccines stand as one of the greatest public health interventions ever developed because vaccinations have had such a monumental impact on public health, there has been a vast literature developed on the subject. The positive benefits of vaccines are consistent across disease type, though researchers have highlighted the potential for disparities by income and infrastructure within countries.^[8]

Many public health commentators and researchers have called for transparent communication of COVID-19 vaccine information, including the efficacy and side effects reported from clinical trials, to improve vaccine uptake^[9].

The general public must be given access to the pivotal information on the authorized vaccines, and that their approval is based on the evidenced benefits that outweigh the potential risks of vaccine administration.

Currently unclear that transparent communication of COVID-19 vaccine information would necessarily affect vaccination rates in any predictable way. On the one hand, explaining the results of clinical trials and the regulatory procedures in place may serve to alleviate concerns over vaccine efficacy and safety and ultimately increase intention to vaccinate as suggested by some researchers^[10].

On the other, as noted by Petersen et al. it is also possible that individuals may find the information more concerning, increasing their perception of vaccines as relatively more dangerous or ineffective. That is, some people may find the reported frequency of COVID-19 vaccine side effects to be higher, or efficacy of vaccines to be lower than they expected. Indeed, some (pre-COVID) vaccination messaging studies have

reported ‘backfire’ effects, such that well-meaning efforts to increase vaccination intentions actually increase safety concerns and lower vaccination intentions^[11].

Numerous cross-sectional surveys around the world have identified perceptions of COVID-19 vaccines as safe and effective as key predictors of COVID-19 vaccination intentions. Indeed, a recent systematic review of such studies concludes that perceptions of vaccine safety and effectiveness are ‘universally’ consistent determinants of COVID-19 vaccine hesitancy. Further, surveys which specifically asked COVID-19 vaccine hesitant participants their reason for vaccine refusal or delay consistently report that concerns over safety and efficacy are among the most common reasons given. Similarly, qualitative research has also highlighted these concerns as reported drivers of COVID-19 vaccine hesitancy among minority and at-risk groups. Such concerns may be fuelled by COVID-19 vaccine misinformation and recent research has identified susceptibility to misinformation as a correlate of COVID-19 vaccine hesitancy^[12].

Such findings align with Health Belief Model theoretical framework which positions the perceived risks and benefits of a given health behaviour as key predictors of intentions to engage in that behaviour (alongside perceptions of disease threat). The Health Belief Model has informed previous vaccine communication research^[13]. For example, Jones et al. show that exposure to vaccination campaign advertisements is associated with increased willingness to receive a H1N1 vaccine, and that this effect is partially mediated by belief that the vaccine will prevent disease and belief that the vaccine would not have a negative impact on one’s health. The authors conclude that addressing perceived barriers (e.g., perceptions of vaccine risk) may be the most effective target for

interventions to improve vaccine uptake. Vaccination is one of the best tools we have to help slow the spread of COVID-19 and to make sure children can keep being part of in-person activities that are important for their physical and mental health ^[14].

The pediatric formulation is a smaller dose for children ages 5 – 11 that has been proven safe and effective in clinical trials. Children can become seriously ill from COVID-19. Vaccination reduces their risk of getting severely sick or hospitalized, or of suffering long COVID or multisystem inflammatory syndrome in children. Third doses of mRNA COVID-19 vaccines for moderately to severely immunocompromised. Everyone 16 or older should get a COVID-19 vaccine booster if it's been six months since receiving the Pfizer-BioNTech or Moderna vaccines, or two months since receiving the Johnson & Johnson vaccine. Mixed dosing allowed. Individuals 18 or older may choose which vaccine they receive as a booster dose: Moderna, Pfizer, or Johnson & Johnson. Some people may have a preference for the vaccine type they originally received while others may prefer to get a different booster. Individuals age 16-17 can receive a Pfizer booster only ^[15].

Subjects and methods

Study Population

The study was performed among students in Diyala university college of medicine.

Study design

The current study is cross section study type was carried out in Diyala university college of medicine from 6th of November 2022 to the 28th of March 2023. The samples study design was by simple random sampling by which we were choosing the sample randomly.

Sample size and sample procedure

The sample size was 346 of students. Trained very well to interview the questionnaire carefully and in scientific way to avoid any bias .

Questionnaire and Interview

The questionnaire used for data collection was designated in English language. Samples administer it and it includes mainly closed questions.

Data Analysis and Presentation

All data management and analysis was done by using manual statistical methods. Data have been represented by suitable tables and figures.

Results

The total sample of study was (346) of students.

Table 1: this table shows the rate of students that getting the vaccine according to the age.

	<i>Vaccinated</i>	<i>Not vaccinated</i>	<i>Total</i>
(18-20) years	94 (94%)	6 (6%)	100
(21-23) years	97 (97%)	3 (3%)	100
Older than 23 years	144 (98.6%)	2(1.4 %)	146
Total	332	14	346

In these study vaccinated students, is 332 (96%), the most age group vaccinated was older than 23 years old (98.6%), then (21-23) years old (97%) and age group (18-20) vaccinated was (94%).

Table 2: shows rate of people whom getting the vaccine according to Residence.

	<i>Vaccinated</i>	<i>Not vaccinated</i>	<i>Total</i>
<i>rural</i>	95 (92.2%)	8 (7.7%)	103
<i>urban</i>	237 (97.5%)	6 (2.5%)	243
<i>Total</i>	332	14	346

From the total sample of medical students that living in rural 103 there is 95 (92.2%) vaccinated and 8 (7.7%) is not vaccinated, while students living in urban from 243 there is 237 (97.5%) vaccinated and 6 (2.5%) is not getting the vaccine.

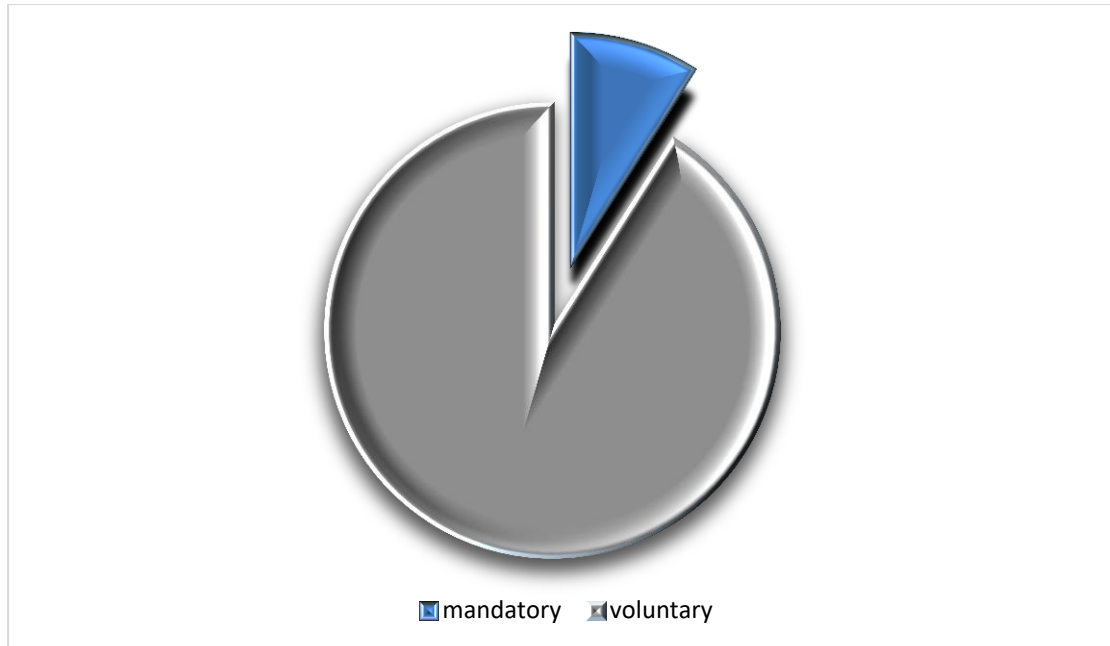


Figure (1) shows percentage of students who getting the vaccine according to their desire.

In this study from the total vaccinated students 332, there is (91%) of people getting the vaccine voluntary without any and only (9%) getting vaccine mandatory.

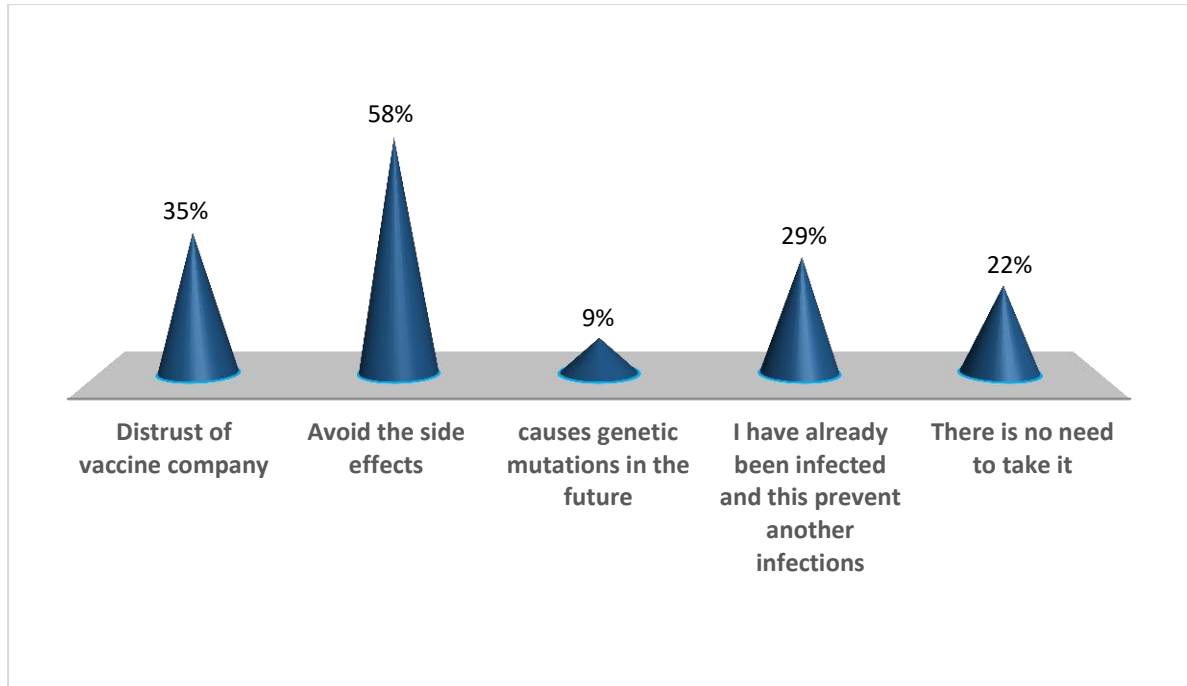


Figure (2) shows the percentage of main causes that prevent students from getting covid-19 vaccine.

In this study there is 14 not vaccinated from the total sample 346, the most cause that prevent medical students to taking the vaccine according to their answer is to avoid the side effect of vaccine (58%) then in percentage (35%) answer that they don't trust the vaccine company, (29%) tell us that they have already infected with vaccine so they have immune to the COVID-19, (22%) say there is no any need to take the vaccine and only (9%) think the vaccine can causes genetic mutations in the future so they don't taking the vaccine.

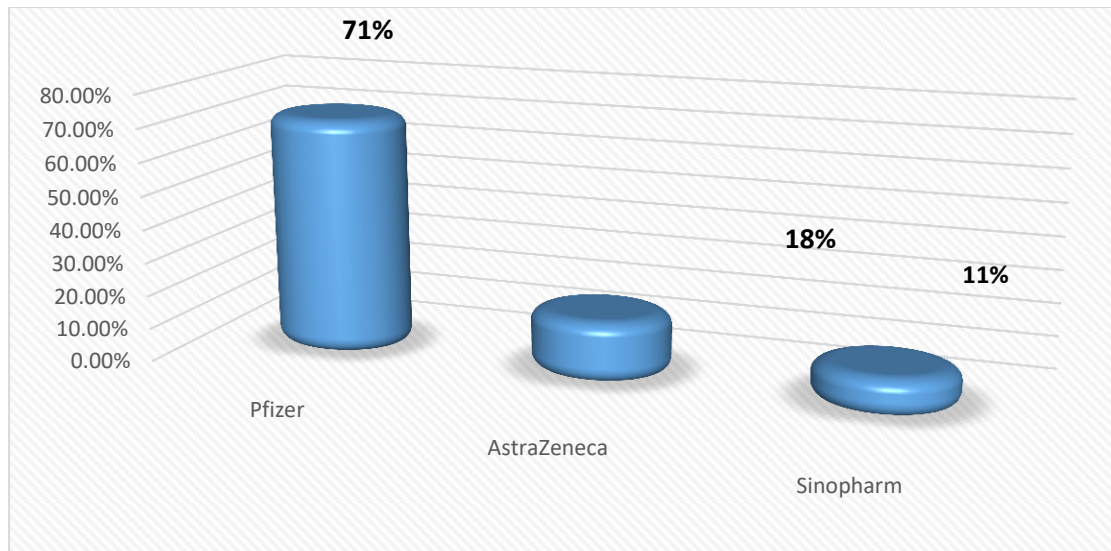


Figure (2) shows the percentage of preferable type of vaccine.

From the total sample of vaccinated people 332 there is (71%) of them prefer Pfizer type of vaccine, (18%) prefer AstraZeneca and only (11%) prefer sinopharm.

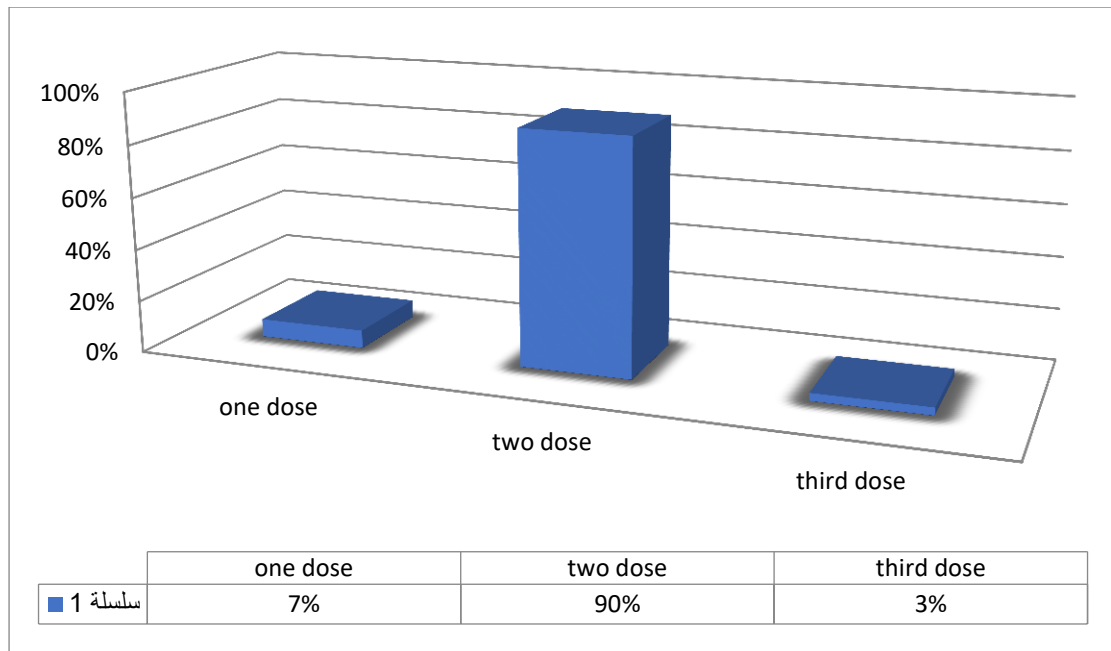


Figure (4): the distributions of vaccinations students according to doses taken.

This figure shows that most of students (90%) take two doses of vaccine and about (7%) taken only one dose and only (3%) taken third dose of vaccine.

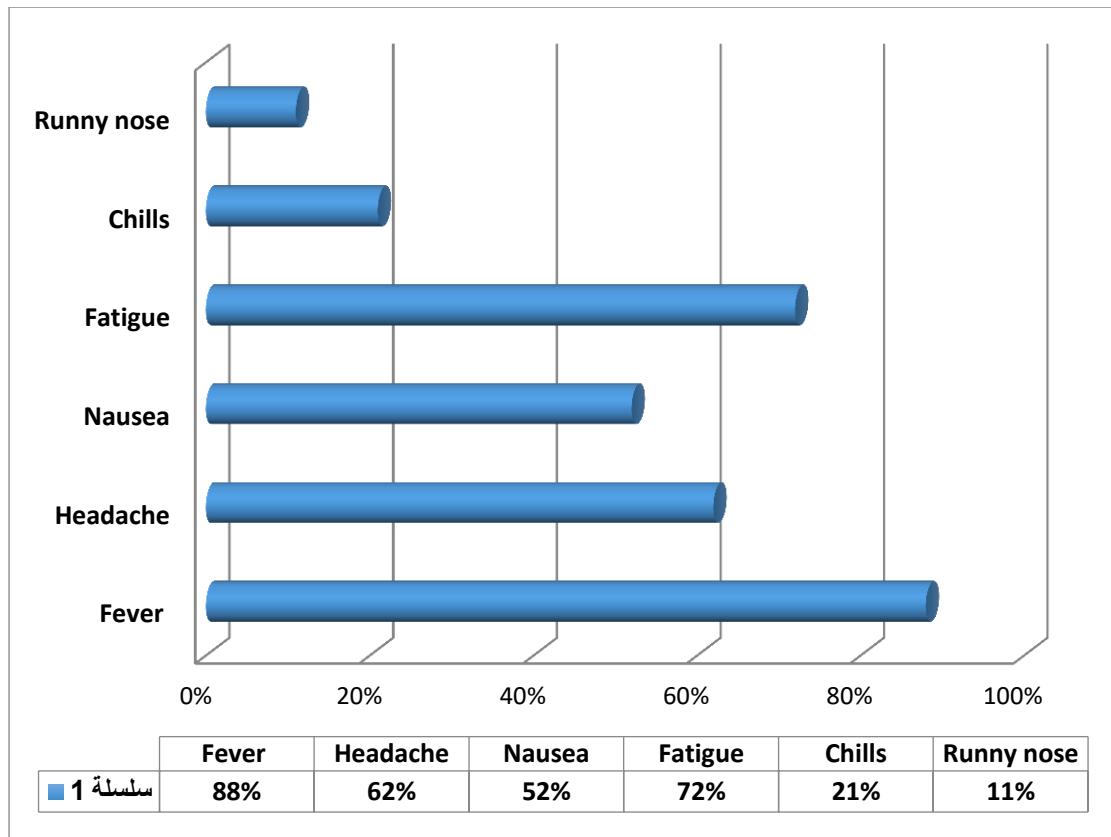


Figure 5: The side effect of vaccinations.

This figure shows that about (88%) of vaccination students had fever, (62%) headache, (52%) nausea, (72%) fatigue, (21%) chills and (11%) runny nose.

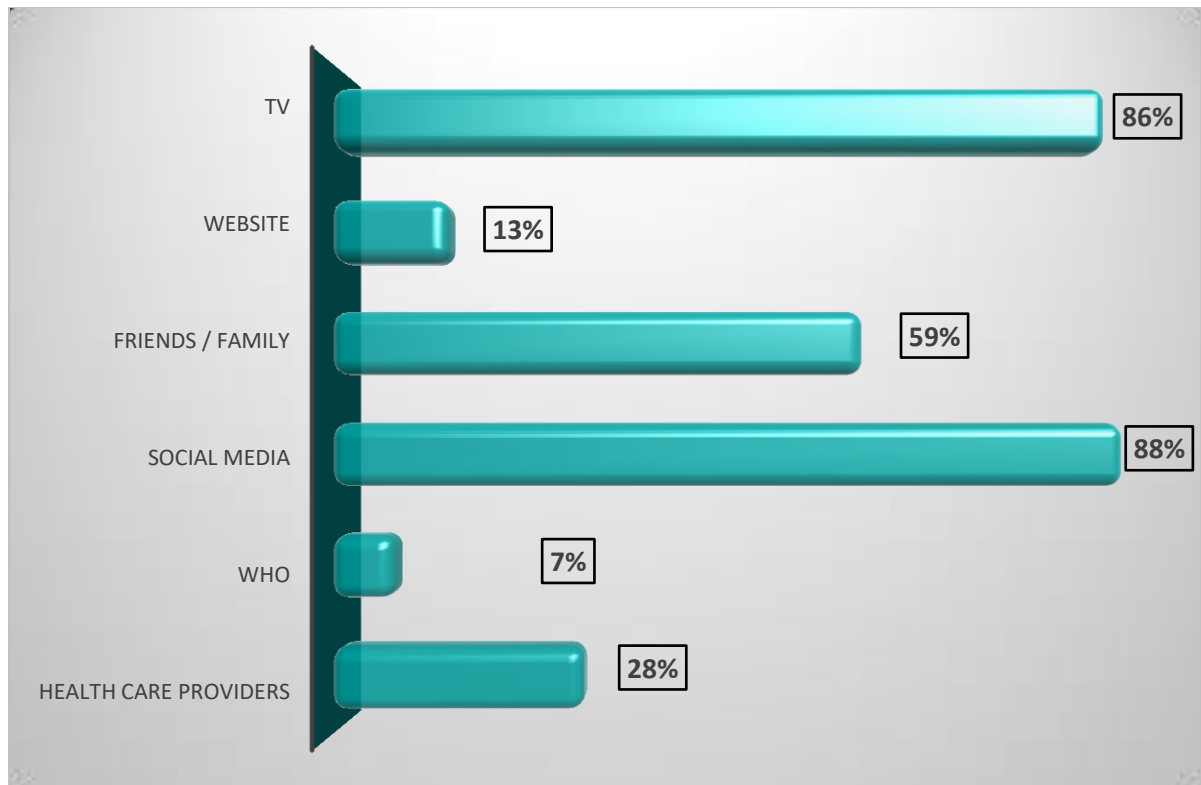


Figure 6: *The Sources of Information of COVID-19.*

In this study there is all of students heard about COVID-19 from social media and TV (88%), (86%) respectively and (59%) from family and friends, (28%) health care providers, (13%) from website and only (7%) from the world health organization.

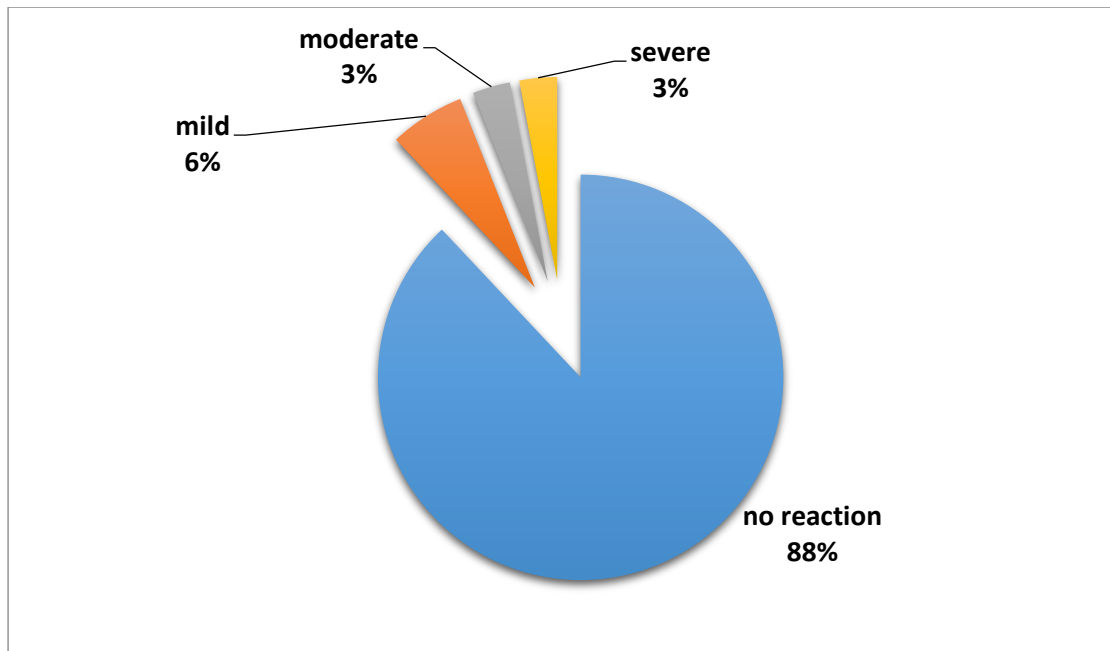


Figure 7: The vaccine's allergic reactions.

This figure shows that about 88% without allergic reactions, 6% mild and 3% moderate and severe reaction.

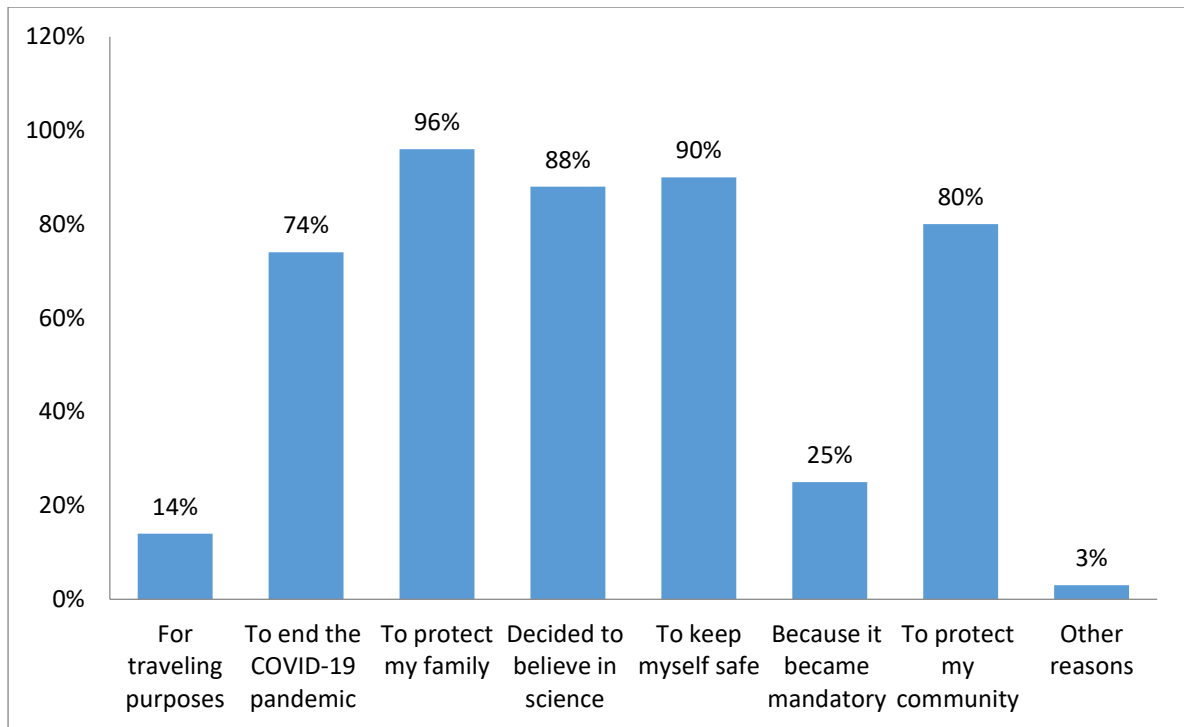


Figure 8: The reasons of getting the vaccine.

This figure shows that the most reasons to receive the vaccine was protect family, keep myself and decided to believe in science in percentage (96%, 90%, 88% respectively).

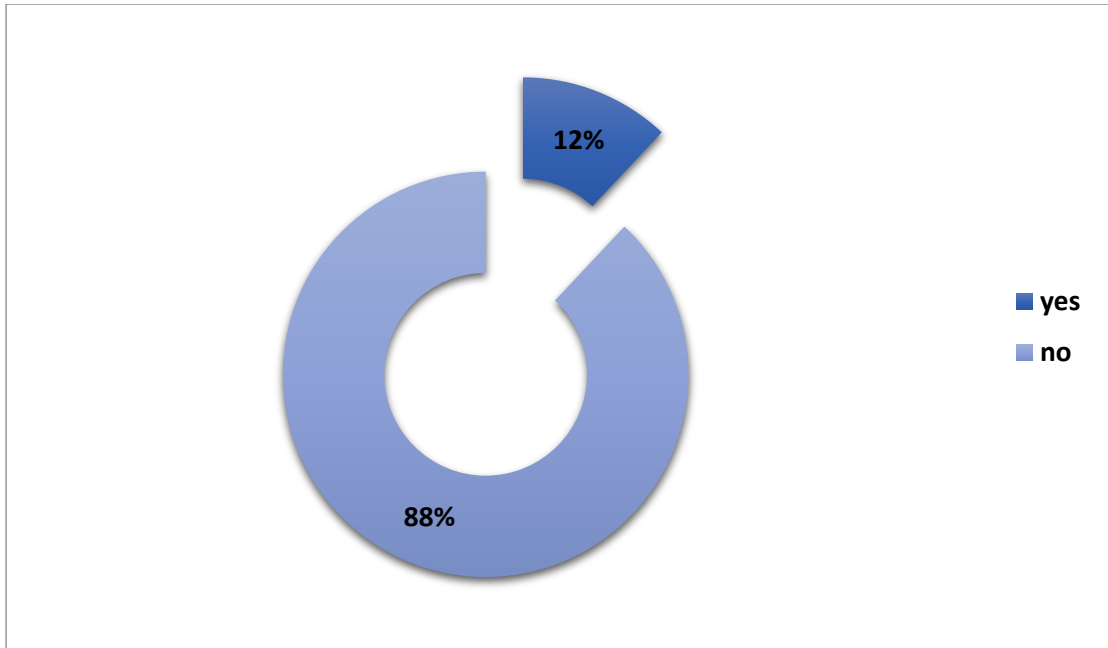


Figure 9: See or talk with doctor before getting vaccine.

This figure shows that about 88% do not talk to doctors before getting the vaccine.

Discussions

In the present study, there is (346) of students , vaccinated students was 332 (96%), the most age group vaccinated was older than 23 years old (98.6%), then (21-23) years old (97%) and age group (18-20) vaccinated was (94%).

While in another study in Riyadh, Saudi Arabia ^[16] the percentage of vaccinated medical students about (100%), In addition, in study was conducted in Warsaw, Poland ^[17] there is (99%) of medical students is vaccinated.

The low percentage of vaccinated people when compare with other studies due to the people is avoid the side effect, lack of trust, and they think the previous infections prevent recurrent of infections, and this causes appears in this study as a causes of hesitancy in percentages (58%), (35%), (29%) and (22%) respectively. Also in study was conducted in Alexandria, Egypt ^[18] the most common causes of hesitancy is fears from the potential side effects of vaccine and lack of trust of vaccine in percentages (52%) and (38%).

The high percentage of samples that fear from side effects and lack of trust of vaccine in this study due to lack of knowledge and awareness about vaccines and Spreading of rumors and fake information about vaccine.

In this study, the samples in urban is the slightly highest percentage (97.5%) of vaccinated than rural in percentage (92.2%) also this percentage approximately similar in study of Alexandria ^[18] and study conducted in Maysan, Iraq ^[19] in percentages (51%), (46%) respectively.

The high percentage of vaccinated in samples lives in urban due to closed of Vaccine Centers in centers of cities.

In this study, there is (91%) of people getting the vaccine voluntary without any and only (9%) getting vaccine mandatory, also in other studies there is approximately similar percentage of voluntary vaccinated medical students such as in study conducted in Seoul, South Korea ^[20] and Warsaw, Poland ^[17] in percentages (93%) and (90%) respectively.

In the present study, the most type of vaccine acceptance is Pfizer and in percentage (71%) then AstraZeneca (18%) then SinoPharm (11%).

While in other studies in Foshan, China ^[20], the most type acceptance is SinoPharm (67%) and in Warsaw, Poland ^[17] is Pfizer (71%).

The high acceptance of Pfizer type of vaccine in this study may due to the company's fame and high quality.

In the present study, most of students (90%) take two doses of vaccine and about (7%) taken only one dose and only (3%) taken third dose of vaccine.

Also same percentage in study of Alexandria ^[18] that about (86%) take two doses of vaccine and about (10%) taken only one dose and only (4%) taken third dose of vaccine.

In this study in highest percentage (88%) of medical students their source of information about COVID-19 from social media and (86%) from TV, (28%) health care providers and only (7%) their source of information from WHO.

While in study conducted in Hanoi, Vietnam ^[21] the main source of information is health care providers (68%) then website, social media account of WHO (66%) and post of public people in social media in

percentage (31%), also in study in Saudi Arabia ^[22] the highest percentage is from public people in social media (62%) then from health care providers (54%) then TV (43%).

In this study, about (88%) of vaccination students had fever, (62%) headache, (52%) nausea, (72%) fatigue, (21%) chills and (11%) runny nose.

Approximately same percentage in study of Saudi Arabia ^[22], about (85%) of vaccination students had fever, (66%) headache, (59%) nausea, (75%) fatigue, (19%) chills and (8%) runny nose.

According to this study, about 88% without allergic reactions, 6% mild and 3% moderate and severe reaction.

In study of Hanoi, Vietnam ^[21], 84% without allergic reactions, 8% mild and 6% moderate and 2% severe reaction.

In the present study, the most reasons to receive the vaccine was protect family, keep myself and decided to believe in science in percentage (96%, 90%, 88% respectively).

Same as in study was conducted in Foshan, China ^[20], the most reasons to receive the vaccine was protect family, keep myself and decided to believe in science in percentage (90%, 83%, 82% respectively).

Conclusions

- 1- Most of medical students is vaccinated.
- 2- Most age vaccinated was older than 23 years old.
- 3- There is slightly variation between percentage of vaccination in urban and rural.
- 4- Most of medical students voluntary vaccinated.
- 5- The most cause that prevent medical students to taking the vaccine according to their answer is to avoid the side effect of vaccine.
- 6- Most of medical students prefer Pfizer type of vaccine.
- 7- Most of medical students have not third dose of vaccine.
- 8- The fever and fatigue is the most side effect of vaccine.
- 9- The social media is the most source of information for COVID-19.

Recommendations

Nonetheless, the situation requires constant monitoring. Policy makers, government officials, and the media should pay attention to the spread of data not supported by scientific evidence that may affect vaccine acceptance.

Future work, both by researchers and especially journal editors, should focus on a broader spectrum of understanding how COVID 19-and vaccinations affect society.

Lead communication campaigns to improve COVID-19 vaccine uptake among the general population.

References

1. World Health Organization Regional Office for Europe. Coronavirus disease (COVID-19) pandemic. Available online: <https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/novel-coronavirus-2019-ncov> (accessed on 5 May 2021).

Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun.* 2020;109:102433.

2. Khamsi R. If a coronavirus vaccine arrives, can the world make enough. *Nature.* 2020;580(7805):578-80.

3. Ricks D. Race for a coronavirus vaccine: thanks in part to institutional support, CanSino biologics, Moderna therapeutics, and other developers are exploring diverse approaches against SARS-CoV-2. *Genet EngBiotechnol News.* 2020;40(5):16-8.

4. Halim M, Halim A, Trivosa V. Analysis of Structure, Mechanism of Action and Efficacy of Potential and Ideal COVID-19 Treatments. *J Health Care Res.* 2020;1(3):197.

5. World Health Organization Allocation Mechanism for COVAX Facility Vaccines (2020).

6. C.M.E. Díaz, L. Ghirotto, H. Sisson, et al. A meta-synthesis study of the key elements involved in childhood vaccine hesitancy *Public Health,* 180 (2020), pp. 38-45.

7. Frank, K.; Arim, R. Canadians'Willingness to Get a COVID-19 Vaccine When One Becomes Available: What Role Does Trust Play? Available online: <https://www150.statcan.gc.ca/n1/pub/45-28-0001/2020001/article/00043-eng.htm> (accessed on 22 November 2020).

8. Yoda, T.; Katsuyama, H. Willingness to receive covid-19 vaccination in Japan. *Vaccines* 2021, 9, 48.

9. Yigit, M.; Ozkaya-Parlakay, A.; Senel, E. Evaluation of COVID-19 Vaccine Refusal in Parents. *Pediatr. Infect. Dis. J.* 2021, 40, e134–e136.

10. Momplaisir, F.; Haynes, N.; Nkwihoreze, H.; Nelson, M.; Werner, R.M.; Jemmott, J. Understanding Drivers of COVID-19 Vaccine Hesitancy Among Blacks. *Clin. Infect. Dis.* 2021.

11. Lockyer, B.; Islam, S.; Rahman, A.; Dickerson, J.; Pickett, K.; Sheldon, T.; Wright, J.; McEachan, R.; Sheard, L. Understanding Covid-19 misinformation and vaccine hesitancy in context: Findings from a qualitative study involving citizens in Bradford, UK. medRxiv 2020.
12. Williams, L.; Gallant, A.J.; Rasmussen, S.; Brown Nicholls, L.A.; Cogan, N.; Deakin, K.; Young, D.; Flowers, P. Towards intervention development to increase the uptake of COVID-19 vaccination among those at high risk: Outlining evidence-based and theoretically informed future intervention content. *Br. J. Health Psychol.* 2020, 25, 1039–1054.
13. Lazarus, J.V.; Wyka, K.; Rauh, L.; Rabin, K.; Ratzan, S.; Gostin, L.O.; Larson, H.J.; El-Mohandes, A. Hesitant or not? The association of age, gender, and education with potential acceptance of a COVID-19 vaccine: A country-level analysis. *J. Health Comm.* 2021, 807–799, 25.14.
14. Charron, J.; Gautier, A.; Jestin, C. Influence of information sources on vaccine hesitancy and practices. *Med. Mal. Infect.* 2020, 50, 733–727, 15.
15. Barello, S.; Nania, T.; Dellafiore, F.; Graffigna, G.; Caruso, R. ‘Vaccine hesitancy’ among university students in Italy during the COVID-19 pandemic. *Eur. J. Epidemiol.* 2020, 35, 781–783.16.
16. Sallam, M.; Dababseh, D.; Eid, H.; Al-Mahzoum, K.; Al-Haidar, A.; Taim, D.; Yaseen, A.; Ababneh, N.A.; Bakri, F.G.; Mahafzah, A. High rates of COVID-19 vaccine hesitancy and its association with conspiracy beliefs: A study in Jordan and Kuwait among other Arab countries. *Vaccines* 2021, 9, 42.17.
17. Dror AA, Eisenbach N, Taiber S, Morozov NG, Mizrachi M, Zigran A, et al. Vaccine hesitancy: the next challenge in the fight against covid-19. *Eur J Epidemiol.* 2020 Aug;35(8):775–9.18.
18. Pogue K, Jensen JL, Stancil CK, Ferguson DG, Hughes SJ, Mello EJ, et al. Influences on attitudes regarding potential covid-19 vaccination in the united states. *Vaccines.* 2020 Oct 3;8(4):582.19.
19. Palamenghi L, Barello S, Boccia S, Graffigna G. Mistrust in biomedical research and vaccine hesitancy: the forefront challenge in the battle against covid-19 in italy. *Eur J Epidemiol.* 2020 Aug;35(8):785–8.20.

20. Reiter PL, Pennell ML, Katz ML. Acceptability of a covid-19 vaccine among adults in the United States: how many people would get vaccinated? *Vaccine*. 2020 Sep 29;38(42):6500–7.
21. Long Hoang Nguyen, Acceptance and willingness to pay for COVID-19 vaccines among medical students in Vietnam, *Hum Vaccin Immunother*. 2021; 17(6): 1622– 27.
22. Samannodi M., COVID-19 Vaccine Acceptability Among medical students in Saudi Arabia: A Cross-Sectional Study, 23 November 2021.