Fighting COVID-19 Vaccines Myths and Mis-Believes Among Medical Students, Egypt

Almaza A. Salim[1], Fatma Rageh[2], AbdelMonem A. Shabrawy[3], Saad Sh. Elsherifi[4], Samar S. Ahmed[5*]

[1] Department of Family Medicine, Faculty of Medicine, Port Said University

[2] Department of Infectious Diseases, Gastroenterology & Hepatology, Faculty of Medicine, Suez University, Suez, Egypt.

[3] Department of Chest Diseases, Faculty of Medicine, Suez University, Suez, Egypt.

[4] Department of Neuropsychiatry Department, Faculty of Medicine Port-Said University

[5] Department of Public Health, Faculty of Medicine, Suez University

Abstract

Background: Healthcare students (HCSs) are prospective clinical caregivers who should be informed about COVID-19 immunization. **Objectives:** assess the mindset of medical students towards different approved COVID-19 vaccines and predict the efforts of the Ministry of Health & universities in the detection of the efficacy of vaccines. **Methods:** A cross-sectional study included 197 HCSs at Suez University, online questionnaire was distributed to them. **Results:** COVID-19 cases decreased from 31.5% to 13.7% after vaccination. Also, the severity of COVID-19 reduced significantly in vaccinated students to half. Medical students had the misconception that chronic diseases prevent COVID-19 vaccines. Surveillance of COVID-19 cases and immunization adverse effects were the most predicted factors in the detection of COVID-19 cases by MOH and universities. **Conclusions:** COVID-19 vaccines decrease both cases and their severity. Intervention awareness programs about the efficacy of vaccines should designed targeting medical students as they have an active impact on their families and the overall community.

Keywords: Coronavirus, Health care providers, Immunization.

Introduction

The extremely infectious nature of the COVID-19 pandemic has rendered it an international issue. (1) Depending on the seriousness of the illness, the infection has prompted more than 4.6 million passing universally between February 2020 and August 2020. (2) Non-pharmaceutical interventions, social distancing, wearing masks, and other health prevention efforts were essential in containing the pandemic's spread. (3)

*Corresponding author: samarsayedahmed01@gmail.com

The number of new infections and fatalities is continually rising. [4] One of the most practical and affordable ways to stop and manage this kind of public health emergency is through vaccinations. [5]

According to reports, the predominance of Coronavirus diseases will begin to drop when a populace's obtained invulnerability comes to 67%. [6] Several COVID-19 vaccines have been developed, some vaccines have already been approved, and vaccine efficiency typically ranges from 50% to 77 %. [2]

Clinical caregivers and significant populations, healthcare students as medical, dentists, and nurses should receive the COVID-19 vaccination. [2] Medical students need to be educated on the beneficial effects of immunizations to prevent additional infection and the crucial of raising vaccination acceptance rates among them, as the public's acceptance of vaccines is influenced by their beliefs and perspectives since their relatives and friends regard them as reliable and competent sources of knowledge. [7]

Various research held on immunization approval or aversion rates among HCSs internationally. [8] Immunization reluctance or hesitancy represents a danger to general well-being and continues to be a major obstacle to the successful immunization of the public, even in the face of a disproportionate distribution of vaccines between high- and low-income nations. [9] The COVID-19 vaccine's neurologic side effects are categorized as either minor or major symptoms. Serious neurological events are the primary cause of the rise in vaccination reluctance.

These consist of stroke, demyelinating disorders, seizures, central nervous system infections, and Guillain-Barré syndrome. [10] However, there is a paucity of studies evaluating this issue in Egypt, therefore this work assesses the attitude of medical students toward different authorized COVID-19 vaccines and predicts MOH & universities' efforts in COVID-19 case detection before and after vaccination in Egypt.

Methodology

Type of Study

We conducted a cross-sectional, online, descriptive study at Suez Faculty of Medicine and Dentist-Suez University.

Method of sampling

To find volunteers for the study, an easy non-random sampling method was used. After obtaining a list of the students (sampling frame), contacts were made.

Sample Size

The registered vaccinated medical students were 500 students by the end of December 2021, the sample size using Yamane's formula: n = N/(1+N(e)2 with a margin of error is .05 and a standard deviation of 2 is 218 students. [11]

Study population

Medical students at Suez University medicine and dentists were chosen as the study's participants. The sample size was 218 medical students, 197 of them enrolled by convenient sample with a response rate of 90.4%.

Study time: During the study year 2021-2022.

Criteria for inclusion and elimination

During the study period, medical students who were enrolled and actively participating in their clinical year studies joined the primary social media and gave their agreement to the study were included. Individuals without an Internet connection were either denied entry or discouraged from taking part.

Study Tool

A validated semi-structured questionnaire with closed-ended questions was adjusted and changed to fit the study's subjects. The survey included students' socio-demographic data, and the quantity of COVID-19 instances among students before and after vaccination.

The number of vaccine doses and duration of vaccination, the severity of COVID-19 cases, and symptoms were assessed before and after vaccination according to scale for severity (0 = no symptoms, 1-3= symptoms that are mild, 4-6= moderate, and 7-10 = serious symptoms).[2]

Predicting attitudes (myths) towards COVID-19 immunization that led to the reluctance of immunization and flare-up of COVID-19 cases before and after incomplete vaccination.

Predicting Ministry of Health (MOH) and universities efforts in COVID-19 case detection before and after vaccination. The survey was created using Google Forms, and each participant was emailed a link using their Facebook, WhatsApp, and Telegram accounts.

Statistical analysis

Data were coded and analyzed utilizing SPSS 25 (IBM Inc, Chicago, IL, US). The subjective factors were introduced concerning recurrence and rate (r), and Chi-square and Multinomial Regression analysis tests were utilized. Significance set if P value less than .05.

Ethical consideration

Each student has been given an overview of the objectives and benefits of the study. The Faculty of Medicine's Research Ethics Committee, ethical code 119 FAM_004, has endorsed the study. The confidentiality of the participants has been guaranteed.

Results

Table 1: The study included 197 students, about 65 % of the staff medicine faculty, most of them were females, below 20 years and chronic diseases were present in 11% of them.

Table 2: About sixty-two students out of 197 had symptoms of COVID-19 before vaccination compared to 27 students who had symptoms of the disease after the vaccination, 11 of them had a recurrence of Coronavirus disease even though they were vaccinated and caught the disease before.

Table 3: The attitude of the students towards the reasons for reluctance to COVID-19 vaccination and flare-up of infection was that the national vaccines used to be lower in quality and had many side effects.

Table 4: surveillance of COVID-19 cases and vaccine adverse effects were the most predicted factors helping in the detection of Coronavirus cases by MOH and universities.

Figure 1: About three-quarters of students had a misconception that patients with chronic diseases shouldn't take the vaccine.

Figure 2: The severity of infection diminished after vaccination to more than half of non-vaccinated cases from 58% to 25.9%, and it was highly statistically significant.

Discussion

The concept of immunization has been met with some resistance due to factors such as community culture, level of literacy, and medical staff behaviors. [12] Considering medical students have a significant impact on their families and communities, and they are the future parental figures of networks, and thusly correcting their misguided judgments about the Coronavirus vaccine is significant. [7] We devised this survey to assess their perspective on COVID-19 vaccines.

Most of our responders were medical students 129 (65.5%) and the age group <20 years represented 64.5%. Current study results revealed that there was a misconception among medical students that chronic diseases are contraindicated by COVID-19 vaccination. These findings were consistent with previous studies where medical students reported poor knowledge and hesitation in Saudi Arabia and Iraq. [13,14] The main reason for hesitation in Saudia was that they believed the vaccine was part of a "conspiracy," [13] which is different from past studies. [12,14]

Causes of vaccine hesitation are misinformation and rumors circulating in the community as quick development of the COVID-19 vaccine resulting in unsafety and ineffectiveness of the vaccine; [15] Immunity developed after covid 19 infection is better than the vaccine. [16]

In addition, misbelieves that m-RNA vaccine can alter human DNA and toxic materials in the vaccine. [17] Another misinformation was administration of the COVID-19 vaccine would lead to a new variant of the virus which able to escape the human immune system, but the presence of unimmunized persons and virus circulation in the community without defensive and protective mechanisms favor mutation of COVID 19 virus. [18]

In this study misbelieves among medical students led to untrust of the COVID-19 vaccine's significance where the vaccine causes side effects, low quality of the vaccine used, as it does not prevent hospitalization and there is no need for the vaccine.

We observed that only 11 cases (5.6%) showed recurrence after vaccination and catchment of COVID-19 infection due to temporary immunity from catching infection besides taking the vaccine. Current research results are consistent with Ayoubkhani et al. [19] However, a study in Saudi Arabia reported that most medical students imagine that completely inoculated people can be tainted with Coronavirus. [13]

In this study we observed that after vaccination, there were 27 COVID-19 cases (13.7%) among students, 12 cases followed the first dose, and the remaining fifteen cases followed the second. Therefore, a third dose of immunization is recommended. These study results agreed with various studies that recommended booster doses as some COVID-19 cases showed infection after the first or second dose. [20]

The study findings revealed that severe cases of COVID-19 decreased significantly in vaccinated students from 58% to 25.9%. [21] These findings were comparable with many studies in different countries worldwide. [20,21]

In this study, surveillance of COVID-19 cases and vaccine adverse effects were the most predicting factors helping in the detection of COVID-19 cases by MOH and universities. It is also important to note that, even in countries where the public accepts the COVID-19 vaccine at a rate higher than 60%, there are still significant concerns about skepticism, uncertainty, and overestimated neurologic side effects. [22]

Study limitations: The study can't be generalized beyond the study location at the

Faculty of Medicine and Dentistry- at Suez University due to the non-random sampling technique and the responders were only from governmental universities.

Conclusions

COVID-19 vaccine reduces coronavirus infection and the severity of the cases. There was a misconception among medical students that chronic diseases prevent COVID-19 vaccination. Surveillance of COVID-19 cases and vaccine adverse effects were the most predicted factors in the detection of COVID-19 cases.

Recommendation

Intervention programs for awareness should be designed for medical students as they have an active impact on their families and the overall community.

A third dose of COVID-19 vaccine is required as the second dose of COVID-19 decreases infection and severity of diseases, but the cases are not eliminated**.**

Conflict of interest: Nil

Fund: No funding agencies contribute to the research.

Acknowledgment: We express our gratitude to every student who took part in this research.

Author contribution: All authors shared in writing and reviewing. Clinical evaluation of Covid 19 and management by clinicians. The idea of research and analysis by Samar S Ahmed. The authors declared that the paper's original article was not published before, or elsewhere.

References

1. Khan M, Adil SF, Alkhathlan HZ, *et al.* COVID-19: A global challenge with old history, epidemiology, and progress. Molecules. 2020; 26:1-25.
2. Patwary MM, Bardhan M, Haque MZ, *et al.* COVID-19 Vaccine Acceptance Rate and Its Factors among Healthcare Students: A Systematic Review with Meta-Analysis. Vaccines (Basel). 2022; 10:1-17.
3. Ayouni I, Maatoug J, Dhouib W, *et al.* Effective public health measures to mitigate the spread of COVID-19: a systematic review. BMC Public Health. 2021; 21:10.
4. Jiang N, Wei B, Lin H, *et al.* Nursing students' attitudes, knowledge, and willingness to receive the coronavirus disease vaccine: A cross-sectional study. Nurse Educ Pract. 2021; 55:103148.
5. Raja SM, Osman ME, Musa AO, *et al.* COVID-19 vaccine acceptance, hesitancy, and associated factors among medical students in Sudan. PLoS One. 2022; 17: e0266670. Available at: http://doi.org/10.137/journal.pone.0266670.

6. Fontanet A, Cauchemez S. COVID-19 herd immunity: where are we? Nat Rev Immunol. 2020; 20(10):583-4.
7. Herzog R, Álvarez-Pasquin MJ, Díaz C, *et al.* Are healthcare workers' intentions to vaccinate related to their knowledge, beliefs, and attitudes? A systematic review. BMC Public Health. 2013; 13:154.
8. Kelekar AK, Lucia VC, Afonso NM, *et al.* COVID-19 vaccine acceptance and hesitancy among dental and medical students. J Am Dent Assoc. 2021; 152(8):596-603.
9. Nossier SA. Vaccine hesitancy: the greatest threat to COVID-19 vaccination programs. J Egypt Public Health Assoc. 2021; 96.1: 18
10. Goss, A.L.; Samudralwar, R.D.; Das, R.R.; *et al.* ANA Investigates: Neurological Complications of COVID-19 Vaccines. Ann. Neurol. 2021; 89 (5):856 –857.
11. Anokye M. Adam. Sample Size Determination in Survey Research. Journal of Scientific Research & Reports. 2020; 26(5): 90-97, Article no. JSRR.58400.
12. Singh J, Steele K, Singh L. Combining the best of online and face-to-face learning: Hybrid and blended learning approach for COVID-19, post-vaccine, & post-pandemic world. J Educ Technol Syst. 2021; 50(2):140–171.
13. Habib SS, Alamri MS, Alkhedr MM, *et al.* Knowledge and Attitudes of Medical Students toward COVID-19 Vaccine in Saudi Arabia. Vaccines (Basel). 2022; 10(4):540 –545.
14. Mahdi BM. COVID-19 vaccine hesitancy and acceptance among medical students: An online cross-sectional study in Iraq. Open Access Macedonian J Med Sci. 2021; 9:955-8.
15. Löffler, Paul. Vaccine myth-buster–cleaning up with prejudices and dangerous misinformation. Frontiers in immunology, 2021; 12: 663280.
16. Löffler, P. Vaccine myth-buster–cleaning up with prejudices and dangerous misinformation. Frontiers in immunology, 2021; 12: 663280.
17. Gier BD, Huiberts AJ, Hoeve CE, *et al.* Effects of COVID-19 vaccination and previous infection on Omicron SARS-CoV-2 infection and relation with serology. Nature Communications. 2023; 14(1):4793.
18. Piccaluga PP, Guardo AD, Lagni A, *et al.* COVID-19 Vaccine: between Myth and Truth. Vaccines (Basel). 2022 10(3):349; https://doi.org/10.3390/vaccines10030349

19. Telenti A, Arvin A, Corey L, *et al.* After the pandemic: perspectives on the future trajectory of COVID-19. Nature. 2021; 596:495–504.
20. Ayoubkhani D, Bermingham C, Pouwels KB, *et al.* Trajectory of long COVID symptoms after COVID-19 vaccination: community-based cohort study. BMI. 2022; 377: e069676.
21. Moghadas SM, Vilches TN, Zhang K, *et al.* The Impact of Vaccination on Coronavirus Disease 2019 (COVID-19) Outbreaks in the United States. Clin Infect Dis. 2021; 73 (12):2257-64.
22. Pourakbari B, Mirbeyk M, Mahmoudi S, *et al.* Evaluation of response to different COVID-19 vaccines in vaccinated healthcare workers in a single center in Iran. J Med Virol. 2022; 94(12):5669-77.
23. Sallam M., Al-Sanafi M., Sallam M. A Global Map of COVID-19 Vaccine Acceptance Rates per Country: An Updated Concise Narrative Review. J. Multidiscip. Healthc. 2022; 15:21–45.

Table 1: Socio-demographic data of medical students.

College	**Frequency**	**Percent**
Medicine	129	65.5
Dentist	11	5.6
Physiotherapy	32	16.2
Nurses	25	12.7
Age		
< 20	127	64.5
>20	70	35.5
Gender		
Male	94	47.7
Female	103	52.3
Residence		
Suez	79	40.1
Delta	73	37.1
Upper Egypt	5	2.5
Suez Canal	32	16.2
Cairo	5	2.5
Alexandria	3	1.5
Urban/rural		
Urban	144	73.1
Rural	53	26.9
Chronic Diseases		
Absent	175	88.8
Present	22	11.2

Table 2: Frequency of Coronavirus cases among understudies before and after vaccination

Students' classification	Students' classification After vaccination		Total	Significance
	Hadn't COVID 19 disease after vaccine	Had COVID-19 after vaccination		
Hadn't COVID-19 disease before the vaccine	119	16	135	X^2 =1.246 P value = 0.624
% of Total	60.4%	8.1%	68.5%	
Had COVID-19 before vaccination	51	11	62	
% of Total	25.9%	5.6%	31.5%	
Total cases	170	**27**	197	
% of Total	86.3%	13.7%	100.0%	
Variable	**Students' COVID-19 cases After vaccination**		Total	Percentage
	1st dose	**2nd dose**		
COVID-19 cases in vaccinated students	12	15	27	100%
% of COVID-19 cases after students' vaccination	44.4%	55.6%	100.0%	

Data presented as frequency (%).

Table 3: Attitude of medical students toward the efficacy of the immunization before and after the first dose of the immunization.

Variables	Attitude to COVID-19 vaccine before vaccination			Attitude to COVID vaccine after 1st dose of vaccine		
	**Model Fitting Criteria	Chi-Square	Significance P value	**Model Fitting Criteria	Chi-Square	Significance P value
Chronic diseases prevent vaccination	201.817	1.893	0.388	112.756	4.046	0.132
Low quality of vaccine	206.589	6.666	**0.036**	112.072	3.361	0.186
Vaccine not safe	205.384	5.461	0.065	113.313	4.602	0.100
Vaccines Not effective	201.276	1.352	0.509	108.756	0.045	0.978
Vaccine not-prevent hospitalization	201.116	1.193	0.551	114.988	6.278	0.043
No need for a vaccine	206.056	6.132	0.047	112.273	3.562	0.168
Preventive measures are enough	201.320	1.397	0.497	112.879	4.169	0.124
Vitamins are enough	202.156	2.233	0.327	110.748	2.037	0.361
Vaccine causes significant side effects	202.961	3.037	0.219	119.020	10.310	0.006

*Multinomial logistic Regression analysis test **Model Fitting Criteria: -2 Log Likelihood of Reduced Model

Table 4: Predicting MOHP & universities' efforts in Coronavirus Case detection before and after vaccination**

Variables	MOHP & universities' efforts in Coronavirus Case detection before vaccination			MOHP & universities' efforts in COVID-19 Case detection after vaccination		
	Model Fitting Criteria	Chi-Square	Significant P value	Model Fitting Criteria	Chi-Square	Significant P value
Attendance to COVID-19 lessons	45.210	0.175	0.676	31.747	0.134	0.714
Encourage COVID-19 lessons among medical students	48.206	3.171	0.075	32.226	0.613	0.434
Surveillance of COVID-19 cases/ and vaccine adverse effects	51.770	6.735	0.009	38.248	6.635	0.010
Reliable source of knowledge	45.071	0.036	0.850	32.521	0.909	0.341

* Multinomial Regression analysis test MOHP**: Ministry of Health and Population.

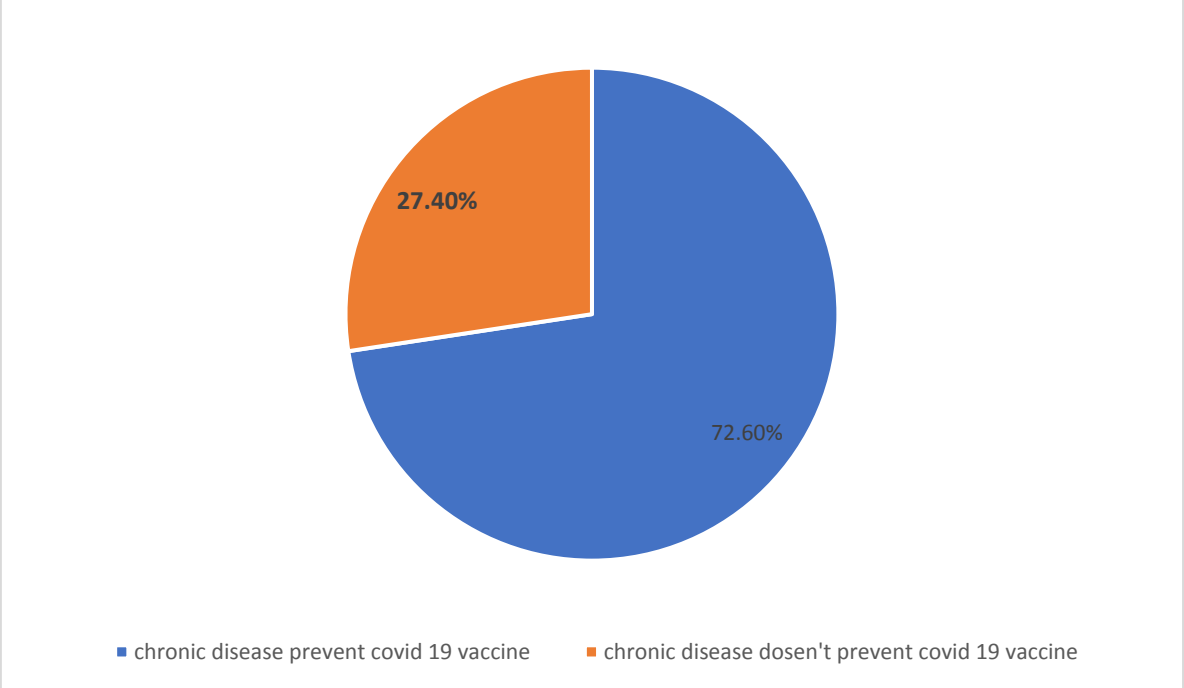

Figure 1: Students' knowledge: of the COVID-19 vaccine about chronic diseases

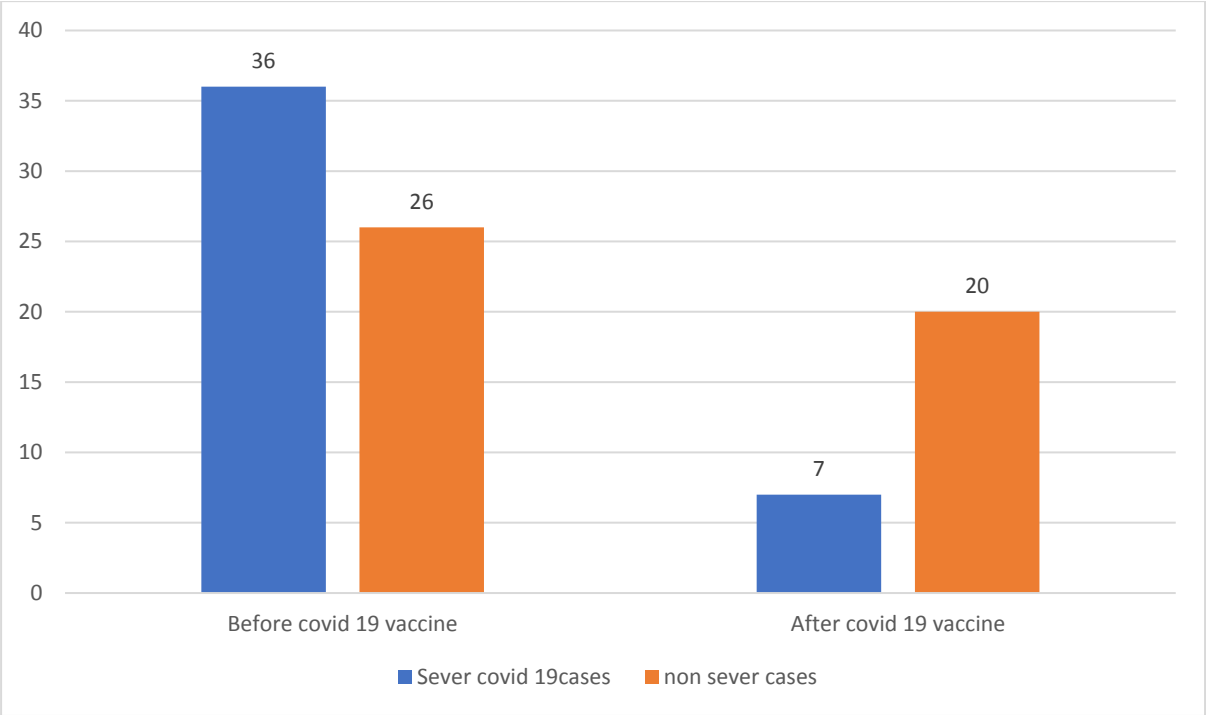

Figure 2: Severity of Coronavirus cases before and after to COVID-19- 19 vaccine among students

الملخص العربى

مكافحة الشائعات وسوء المعتقدات تجاه لقاحات كوفيد ١٩ بين طلاب الطب، مصر

ألماظة علي سالم [١]، فاطمة راجح [٢]، عبد المنعم الشبراوي[٣]، سعد شوقي الشريفي[٤]، سمر سيد أحمد [٥]

[١] قسم طب الأسرة، كلية الطب، جامعة بورسعيد

[٢] قسم الأمراض المعدية والجهاز الهضمي والكبد، كلية الطب، جامعة السويس.

[٣] قسم الأمراض الصدرية - كلية الطب، جامعة السويس

[٤] قسم الأمراض العصبية والنفسية، كلية الطب، جامعة بورسعيد

[٥] قسم الصحة العامة وطب المجتمع - كلية الطب، جامعة السويس

الخلفية: طلاب الرعاية الصحية هم مجموعات مهمة ومقدمي رعاية سريرية يجب أن يكونوا على علم بالتحصين ضد فيروس كورونا. الهدف **من العمل**: - تقييم عقلية طلاب الطب تجاه لقاحات كوفيد -١٩ المختلفة المعتمدة والتنبؤ بجهود وزارة الصحة والجامعات نحو الكشف عن فعالية اللقاح في شكل عدوى كامنة قبل وبعد أخذ اللقاح. **طرق البحث**: أشتملت هذه الدراسة الوصفية المقطعية ١٩٧ طالب طب في جامعة السويس. تم توزيع استبانة تم التحقق من صحته بأسئلة مغلقة عبر الإنترنت على المشاركين المختارين. **النتائج**: انخفضت حالات الإصابة بكوفيد-١٩ من ٣١,٥% إلى ١٣,٧% بعد التطعيم. أيضًا؛ انخفضت شدة كوفيد-١٩ بشكل ملحوظ لدى الطلاب الذين تم تطعيمهم من ٥٨% إلى ٢٥,٩%. كان هناك اعتقاد خاطئ لدى طلاب الطب بأن الأمراض المزمنة تمنع عمل لقاحات كوفيد -١٩. كانت مراقبة حالات كوفيد -١٩ والآثار الضارة للتحصين هي العامل الأكثر توقعًا في اكتشاف حالات كوفيد -١٩. **الخلاصه**: كان هناك اعتقاد خاطئ بين طلاب الطب بأن الأمراض المزمنة تمنع التطعيم ضد فيروس كورونا. **التوصية:** يجب تصميم برامج التدخل لتحسين الوعي بفعالية اللقاحات بحيث تستهدف طلاب الطب لما لهم من تأثير فعال على أسرهم والمجتمع ككل..