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Hesitation and Acceptance of Vaccines Among Students of Health Colleges in the Tabuk Area: Have The COVID-19 Pandemic and Vaccinations Efforts Aggravated the Issue?

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Abstract

Introduction: Vaccines are one of the pillars of the current medical care worldwide. COVID19 pandemic and the subsequent vaccinations campaigns had a complex impact on vaccine hesitancy. In this study we aimed to explore the level of hesitation and acceptance of vaccines among the medical students at the University of Tabuk. ***Methods:*** This is a questionnaire based cross sectional study. The questionnaire was available online for data collection in the time period from October 20 2023 to 31 March 2024. ***Results:*** Students from a wide range of medical specialties participated in this study. Although most of the students (93.5%) believed that vaccines are protective some potential barriers have been identified and included insufficiency of information, and believes in conspiracy. There is increasing mistrust in the vaccines manufacturers as 27.9% of the participants agreed to this notion. Large number of the students (39.4%) said they know families that do not vaccinate their kids. A 34% of all participants acknowledged that following the pandemic, they became skeptical about getting vaccinations. ***Conclusion:*** Negative views among medical students can compromise patient care. We must equip students with skills that help them identify misinformation and ability to convey it to their surroundings and to the patients.

Keywords: ***Vaccine hesitancy, Covid19, Medical students.***

Introduction

Recent advancements in medicine, vaccination, improved access to healthcare, and better sanitation have significantly reduced the overall impact of infectious diseases, particularly lower respiratory tract infections and diarrheal diseases [1]. Nonetheless, the burden of infectious diseases remains an ongoing concern [2,3].

A wide range of vaccination benefits has been explored [4]. Additionally, vaccination plays a role in combating antimicrobial resistance by reducing the incidence of infectious disease, controlling the number of antimicrobial resistance (AMR) strains, and minimizing the need for antimicrobial use [5]. With the aging global population, there is likely to be a substantial increase in morbidity and treatment costs for the elderly. Strategies such as healthy aging and life-course vaccination can alleviate the burden of vaccine-preventable diseases while enhancing the overall quality of life of individuals and society [6,1].

The occurrence of vaccine preventable disease outbreaks, including the 2017 measles outbreak in Minnesota in 2019 and the larger US outbreak underscores the existence of individuals and communities who remain unvaccinated or insufficiently vaccinated. These subpopulations are at risk for vaccine-preventable infections and contribute to the transmission of such diseases [7]. To encourage vaccination and protect both individual patients and public health, physicians, especially those in primary care, need to cultivate effective and respectful communication when engaging with patients who are reluctant to follow current immunization guidelines [8]. As family physicians provide primary care to patients of all ages, they are responsible for recommending and administering immunization across a wide range of age groups and vaccine types.

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Rapid progress has been made in the development of three effective vaccines for COVID-19. However, the willingness of the population to receive a vaccine is a key factor. Vaccine hesitancy, identified as a major global health threat even before the pandemic, has become more pronounced in the context of COVID-19 [9,10]. Although communities initially awaited the COVID-19 vaccine with enthusiasm, there is now a growing level of skepticism, leading to a decline in worldwide acceptance. This underlines the urgent need to address vaccine hesitancy and promote the widespread acceptance of COVID-19 vaccination [11,12].

Several studies have demonstrated the influence of sociodemographic factors on acceptance of the COVID-19 vaccine and vaccines for other diseases [13-17]. Vaccine hesitancy is often rooted in mistrust of research and vaccines, including concerns about rapid development [18] Notably, media communication, particularly on social media, has been linked to pandemic-related fears, vaccine hesitancy, and the proliferation of conspiracy theories [19,20].

Numerous studies have been conducted on vaccine hesitancy among healthcare professionals and the general public [21-25]. Nonetheless, there is a lack of research focusing on vaccine hesitancy among medical and health science students in Saudi Arabia. This research sought to evaluate vaccine hesitancy and the factors influencing it among medical and health science students at the University of Tabuk.

Methods

Study design and sample size calculation

We conducted an institutional-based cross-sectional study among medical and health sciences students at University of Tabuk from October 20 2023 to 31 March 2024. The University has three health colleges; Faculty of Medicine, Faculty of Pharmacy, and Faculty of Applied Medical Sciences.

The total number of the students in the health colleges is more than 2000 students. Using Raosoft sample size calculator http://www.raosoft.com/samplesize.html, the estimated sample size is expected to be 323 for a confidence interval of 95% and a margin of error of 5%.

Source population and study population

The source population comprised all interns and regular undergraduate students enrolled in the medical colleges at the University of Tabuk. The study population included students chosen through a simple random sampling method. All undergraduate students present at the University of Tabuk Medical Colleges during the study period were part of the study. Responses from participants were collected using an online questionnaire to be filled individually. The link to the questionnaire was distributed to the students through year leaders.

Data collection tools and ethical approval

The questionnaire was developed and modified based on a review of relevant literature on vaccine hesitancy [26]. The data collection tool was prepared in English language. The questionnaire was designed to collect information regarding student demographic characteristics (age, gender, college, and year of study), general beliefs and awareness about vaccines, social and cultural influences, possible barriers to vaccination and attitudes towards vaccination. Students were also asked about their opinions on the suitability of the national vaccine schedule, whether they personally recognize people who were harmed by the vaccines; and if their fear of vaccines is amplified by COVID19.

Results

Demographic characteristics of study participants

A total of 215 students were involved in this study. About 148 (68.8%) of study participants were female. The majority: 181 (84%) of students were found in the age group between 20 to 23 years (**Table 1**). Regarding students' field of study and academic year, 108 (50.2%) of study participants were from the Pharmacy, and 63 (29.3%) of study participants were in 4th year, Figure 1.

General Beliefs and Awareness About Vaccines

Students were asked a set of questions about their believes in the role of vaccines in protection against infectious diseases as well as their awareness of the possible side effects. Also, they have been asked to reflect whether they read or encountered instances that influenced their believes in vaccines. This study found that 201 (93.5%) of study participants believe that vaccines are protective against infectious diseases. The percentages of the students who believed in that vaccines can protect against infectious diseases were 48.4% pharmacy students, 18.6% medical students and 26.5% medical sciences students. Other differences are depicted in Figure 2. However, none of the observed differences is of statistical significance (P. value= 0.201). A third portion of the participants (36.8%) do not believe they are aware of the side effects. A 34% expressed that they read materials made them to reconsider their stance on vaccinations. A one fifth (20.1%) of the respondents mentioned various reasons and instances that made them believes vaccines are unreliable (**Table 2**). The leading instance was the side effects plus other reasons like rumors associating infertility and decreased immunity state to the vaccines.

Social and Cultural Influences

A number of 39.5 % of the students from the different backgrounds acknowledged that they know families that refuse to vaccinate their children. Furthermore, the main reasons some families didn't vaccinate their children are ignorance (82 (84%)) and fear of side effects of vaccines as well as other minor reasons as explained in Table 3. A High percentage of the students (97.7%) expressed trust in the ministry of health and that the ministry is keen to provide the best, Figure 3.

Barriers to Vaccination

This section addresses the impact of some factors and their potential roles as hinders or obstacles to vaccination. These includes: sufficiency of information, over-crowding, participants' thoughts about safety of vaccine manufacturers and whether they believe these manufacturers put pressures on the ministry of health. Insufficiency of information is identified by the participants to be the biggest barrier as 39.5% said so. A little more than quarter (27.9%) of the participants did think that the vaccine manufacturers are influencing the ministry of health decisions on vaccines. Crowdedness and delays in vaccine administration services have been identified as a third barrier as 21.9% said this could prevent them from getting the vaccines. A 15.3% of the participants did not believe vaccine manufacturers are safe, Figure 4.

Concerns and Attitudes Towards Vaccination

Health colleges students at the University of Tabuk also believed (91.6%) in the suitability of the vaccination schedule that is currently in place. A 44.7% said they know people who experienced side effects. Concerning the impact of COVID-19 about 73 (34%) of total participants admit they become more hesitant regarding vaccines after the pandemic Figure 5.

Table 1: Distribution of Students Age.

Age ranges	Frequency	Percent
< 20	39	18.1
20 – 23	156	72.6
24 – 26	18	8.4
27+	2	0.9
Total	215	100.0

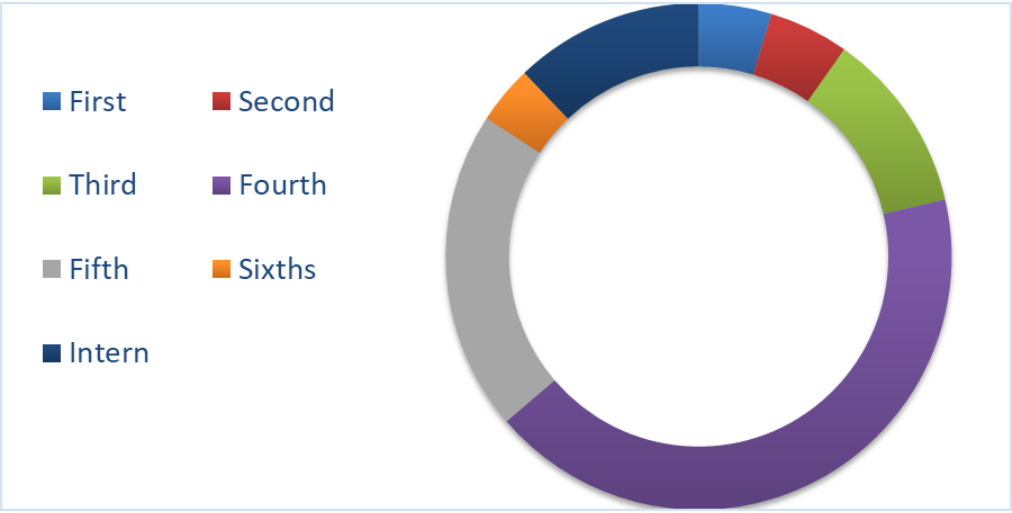

Figure 1: Distribution of medical students' participants among the different years of studies.

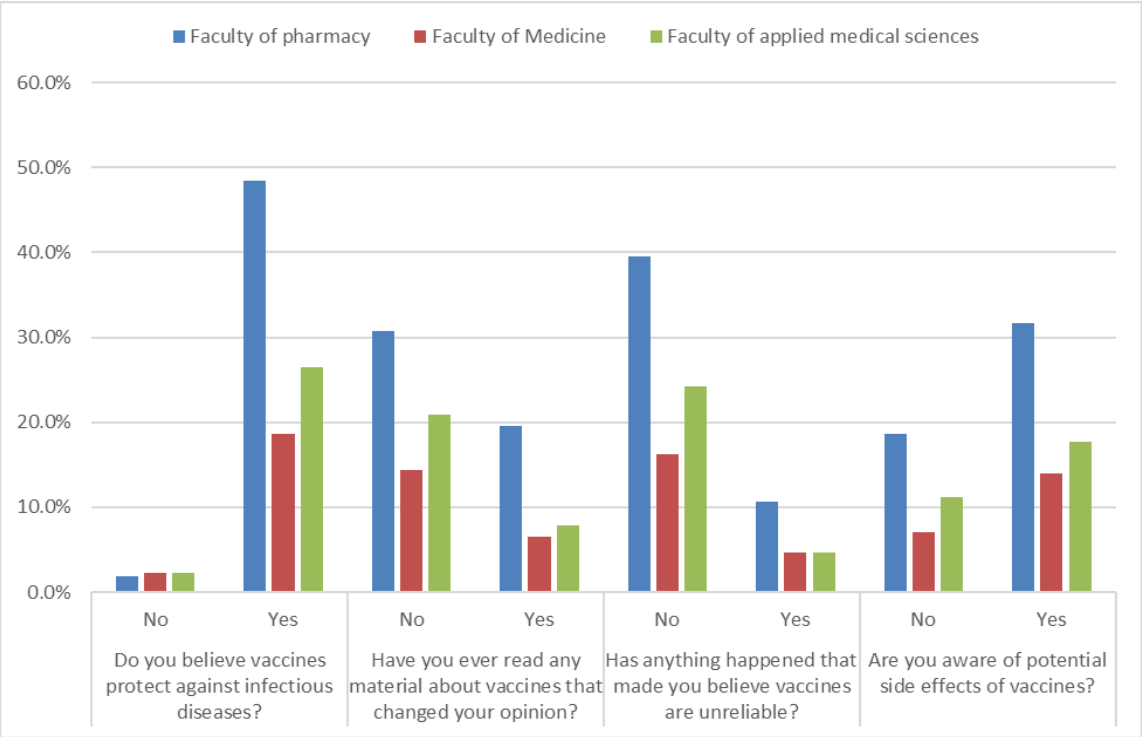

Figure 2: General awareness and beliefs about vaccines among the students from the different health colleges at the University of Tabuk.

Table 2: Reasons and instances mentioned by the participants that led them to believe vaccines are unreliable.

No	Reasons	No of responses (39)
1	Side effects	9
2	Rumors about the association of the vaccine with male infertility and abortions in woman/ Delay in pregnancy	3
3	Increase in heart strokes among teenagers, young people and athletes after covid19 vaccine	3
4	Rumors stating that vaccines decrease immunity/ respondents said their immunity decreased	4
5	Infection with covid19 and death among those who are already vaccinated / Inefficiency of vaccines and that they do not completely protect against infections	4
6	Relatives got skin hypersensitivity	1
7	Death/Death of a relative	2

8	Lack of knowledge about how the COVID-19 vaccine is produced and authorized so quickly	3
9	Appearance of unusual symptoms and diseases	1
10	Dr Fauci story and testimony	1
11	Covid19 vaccine itself	4
12	Inability to focus and hair fall after the covid19 vaccine	1
13	Filing of cases against vaccines companies	1
14	People's talk around vaccines/rumors	2

Table 3: Possible reasons of unvaccinated children

Causes of unvaccinated	Number of responses
Ignorance	82
Fear of adverse effects	8
Not convinced by the idea of vaccination	1
Careless	1
Distrust about vaccines	2
Fear of autism	3
Forgetfulness	1

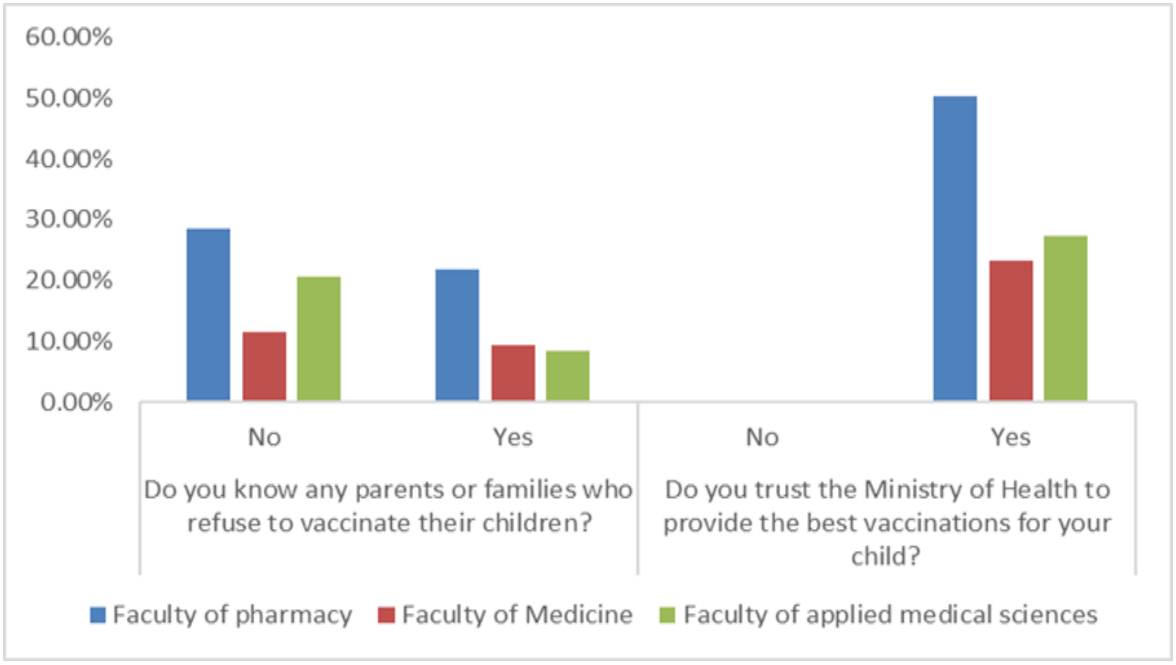

Figure 3: Students' Insights on Community Vaccine Hesitancy and Institutional Trust

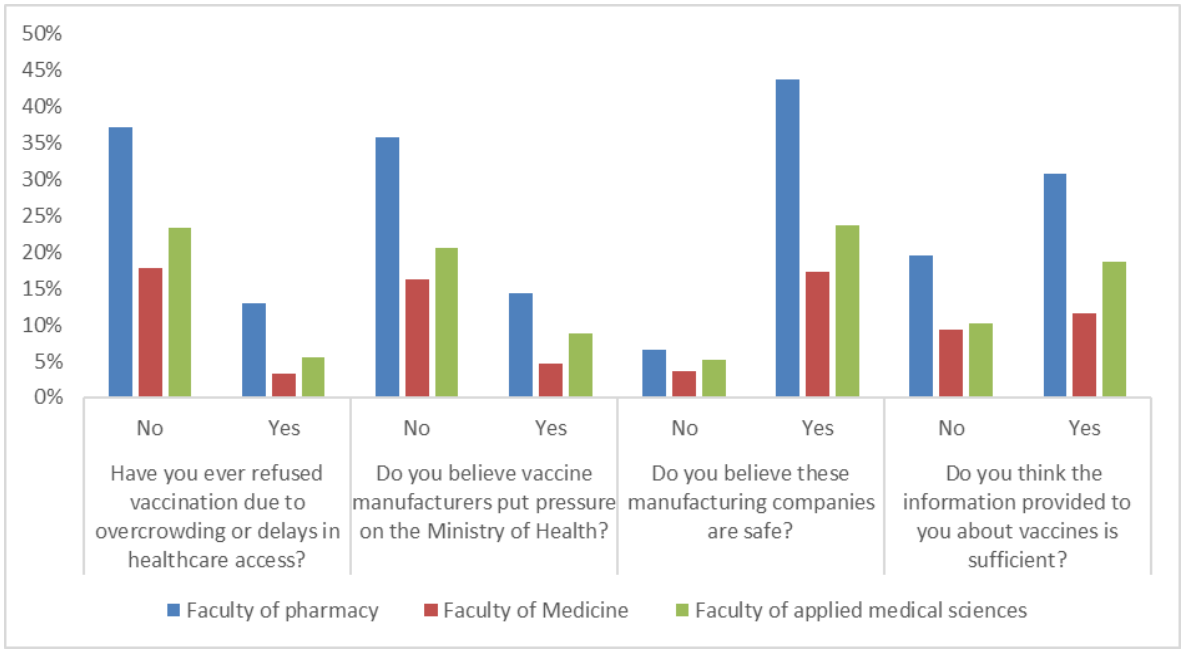

Figure 4: Reported Obstacles to Vaccination: Information Gaps, Manufacturer Trust, and Service Issues

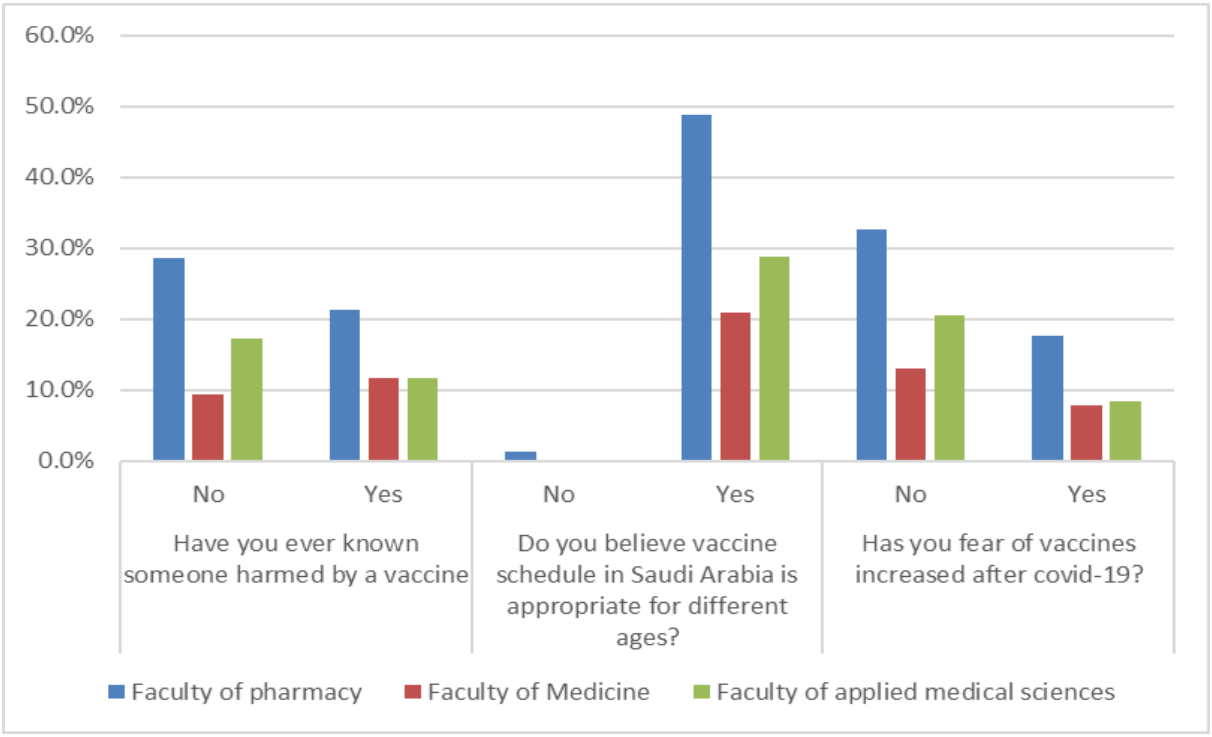

Figure 5: Health colleges Students' Views, attitudes and concerns on Immunization Schedules, Side Effects, and Pandemic-Related Hesitancy

Discussion

The term "vaccine hesitancy" has only recently despite the fact that evidence proving the benefits of immunization is overwhelming and has been established through a growing number of clinical trials. Vaccination has emerged as one of the most effective and economical methods for enhancing modern health outcomes. Vaccination is one of the promising strategies to halt the transmission of infectious diseases. The present study assessed hesitancy among medical students at University of Tabuk.

This study found that the majority of study participants are willing to receive vaccine if it is once become available. However, many factors have been identified as barriers to vaccinations. Here we mainly focused on four of them and these include lack of information; and overcrowding or inconvenient [27,28] timing as a logistical barrier; trust in the manufacturers of vaccines; and the perceived conspiracy [26,29] of manufacturers with the government. Responses gathered in this research assures that these are barriers. As vaccines are very crucial to our health, efforts need to be put to improve curricula of the different health specialties as well as teaching styles to empower the knowledge of the students. This approach has recently been proven to be effective [30] and alternative pedagogical styles are suggested by some researchers [31] and these included the utilization of games and storytelling techniques. The researchers also noted that this strategy will be more efficient in interprofessional scenario. The second point would be the availability of the vaccination services in different times throughout the day to enhance convenience. Although there is still work to be done [32-34], the involvement of pharmacists in immunization is anticipated to have a significant positive impact and there will be different schedules to vaccination services that would help the compliance.

In this study, almost 40% of the participants said they know families that do not vaccinated their children and this percentage seems high but this is not in line with the WHO records which shows high vaccination coverage in Saudi Arabia [35]. A recent review found that reluctance of vaccination among parents varies in percentages between 3% up to 72% [36]. The respondents cited ignorance as the most likely reason for some families refusing vaccination. While recent studies have suggested that this explanation may overshadow deeper underlying causes [37] it remains a leading cause in the vaccine hesitancy as explained recently by Kamil et al [38].

The possible justification might be due to insufficient information regarding the importance and safety of vaccines thus it might create fear in the study participants.

The re-emergence of infectious diseases poses a significant global health challenge, highlighting the importance of vaccines in disease prevention. Vaccination plays a crucial role in controlling and eradicating infectious diseases by building immunity within populations. However, vaccine hesitancy and misinformation have been barriers to achieving widespread vaccination coverage. To combat this issue, it is essential to provide accurate and credible information about vaccines, address concerns effectively, and utilize various communication strategies to enhance vaccine acceptance. By promoting vaccination and addressing barriers to immunization, we can work towards reducing the re-emergence of infectious diseases and protecting public health.

On the other hand, Vaccine hesitancy has emerged as a significant issue following the COVID-19 pandemic. Several factors contribute to this hesitancy, including misinformation, distrust in the healthcare system, concerns about vaccine safety and side effects, and cultural or religious beliefs. Addressing vaccine hesitancy is crucial for achieving widespread immunity and ending the pandemic.

To address vaccine hesitancy, it is crucial to provide trustworthy information about the safety of vaccines and debunk misinformation. It is important to listen to and address concerns seriously, using various communication methods such as personal discussions with medical professionals and information through different media platforms. Social media can be utilized, alongside official websites, to combat rumors and emotional content. On an individual level, strategies like motivational interviewing can help to alleviate uncertainties and promote acceptance of vaccines. At a

societal level, efforts should be made to alleviate social and economic fears related to vaccination.

Study limitations

This study is the first study measuring vaccine hesitancy among medical students at University of Tabuk. However, this study was conducted in a smaller sample size than the expected in the beginning. Therefore, the results can still be generalized but with a slightly higher margin of error (6.65%).

Declarations

Ethical consideration

Ethical approval was obtained from the Local Research Ethics Committee at the University of Tabuk with No: UT-312-152-2023. Informed consent was obtained from all subjects involved in the study

Author Contributions

Roles in this research were shared collaboratively. Manuscript was written and approved by all.

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Conflicts of Interest

None to be declared

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None

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