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# BEHAVIOR AND ATTITUDE TOWARDS COVID-19 VACCINATION AMONG MEDICAL STUDENTS OF KMU-IMS AND KMU-IDS KOHAT

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## ABSTRACT

**Introduction:** SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) is the large family of coronaviruses that causes the coronavirus disease 2019 (COVID-19) which causes acute respiratory distress syndrome which have pneumonia like sign and symptom. There are several drugs that have been designed in order to treat the disease but there is no FDA approved drug available against novel corona virus. The need for proper medication and vaccination is still the basic requirement. Till now no drug has the power to fight the infection. The end to all this chaos is the availability of medically safe vaccines. Since medical students and healthcare workers are more exposed to SARS-COV-2 infection they are first prioritized to have vaccination in order to move closer to the achievement of herd immunity.

**Aims and Objectives:** To assess the vaccination status of medical students of KMU-IMS and KMU-IDS Kohat about vaccinations recommended by centres for disease control and prevention and world health organization against SARS COV-2, and to find the factors rendering them unwilling for vaccination against SARS COV 2.

**Methodology:** For this study online questionnaire was used. Students were invited through emails, Whats App groups, Facebook groups and other social media services. Questions regarding their demographic data, concerns regarding COVID-19 infection and vaccination were asked.

**Results:** According to our study majority of the students were vaccinated (80.1%) and 9.4% were aiming to have vaccination as soon as possible.

**Conclusion:** In accord with most of the studies performed earlier our study shows highly positive attitude of medical students towards COVID-19 vaccination.

## 1. INTRODUCTION:

SARS-CoV-2 “Severe Acute Respiratory Syndrome Coronavirus 2” a coronavirus is the large group of viruses that causes a disease designated as “coronavirus disease 2019 or COVID 19” which causes acute respiratory distress syndrome having pneumonia like signs and symptoms. These cases show the symptoms like dyspnea, fever, and diagnosed as viral pneumonia. A number of drugs have

been considered in order to cure the disease, but still no FDA approved drugs are available against novel corona virus. (1)

"COVID 19" Coronavirus disease, 2019 a worldwide pandemic that, hit the world in December 2019, occurring because of "Sea food market in Wuhan" city of China. This infection is known to be zoonotic (zoonotic viruses that cause a disease an animals and birds, spreading from animal source). World Health Organization "WHO", confirmed this infection as "novel corona virus 2019", "nCoV-2019" which is similar to "SARS, severe acute respiratory syndrome", having pneumonia like signs and symptoms. (1)

Currently COVID 19, a global pandemic that beated the world, has become a global health emergency, and it reached more than 230 countries across the globe. (2) Similar to "severe acute respiratory syndrome" SARS coronavirus and "middle east respiratory syndrome" MERS coronavirus, "severe acute respiratory syndrome-coronavirus 2, SARS CoV 2" belongs to beta-CoV. It's a family of RNA viruses which is "crown-like spikes" on the surface of a coronavirus particle. The death ratio of "2019-nCoV" novel coronavirus, appears to lower than that of MERS and SARS coronavirus. The overall calculation of fatality rate for SARS CoV 2 is 2-3 percent. (3) However, corresponding to "World Health Organization" WHO a death proportion of SARS CoV is 14-15 percent. (4) "MERS-CoV" has the fatality rate of 35 percent. (5) The typical features of the SARS CoV 2 is spreading from individual to individual (symptomless spread). (6) It continues for a long-time, with high mortality in elder population.(7)

In these hours of death and disaster there has begun a competition with time. As it was put by Khuroo et al., "no drug has the power to fight the infection and
bring normalcy to the utter chaos". The end to all this chaos is a medically safe vaccine which must be available to all. (8) The FDA finally approved the use of a vaccine for anyone aged 16 or above in December 2020. (9)

The drugs are first prioritised for the health care workers and medical students as they are exposed to the risk of infection in their day-to-daylife. (10)

As the coverage of recommended vaccine among health care workers is <30% despite their effectiveness which is proven by multiple previously published articles. The proportion of healthcare workers, who are willing to get vaccinated isn't satisfactory. (10)

More work is needed to be done on this particular topic so as to move closer to the achievement of Herd immunity in the time of COVID 19 pandemic. (11)

Thus, now we would like to assess the vaccination status of medical students of KMU-IMS and KMU-IDS,Kohat about vaccinations recommended by centers for disease control and prevention and world health organization against SARS COV-2, and find the factors rendering them unwilling for vaccination against SARS COV 2.

## 2. LITERATURE REVIEW

In a study in Romania in the initial phases of COVID-19 vaccination program the health care workers and students were given priority. This study was used to find out the behaviour and attitude towards the covid vaccination.The DATA was 1581 respondents . 88.5 % pro vaccine , 7.8 undecided and 3.7 % were against the vaccine .The main reason of rejection was the small amount of time taken to get the vaccine prepared . 11.5% were concerned about the long term side effects . Mostly present in the undecided and resistant respondents . The knowledge of vaccine safety and efficacy lead to positive vaccine attitude . 99.3% of pro vaccine respondents . 95.1% undecided people and 89.1 % would want to vaccinate their children and similar numbers would also advice other parents to do so.So health care students would be a very important source of positive information about vaccination in a given society.(12)

A study conducted in Czech Republic at Charles university Prague showed that factor PVPR (positive vaccination perception rate) was dependent on the students attitude to alternative medicine.Fear of infection drastically increased the PVPR (6.7 times higher) versus those who were not afraid of getting infected or those who didn'tknew whether to fear it or not. Being afraid of side effects of vaccination also increasedthe PVPR by atleast 84%. (13)

In a study in US every one of the participant had positive attitude towards the vaccination program and also agreed that they would be exposed to COVID-19 likely . 53% were willing to take part in the COVID-19 trial and 23% were unwilling to take the vaccine at that same time upon FDA approval.Students who were willing for the immediate vaccination were mostly those who trusted the health experts, fewer concerns regarding side effects and agreed with the vaccine mandates (P<0.05). The thought of serious side effects were directly responsible for lower intent to take part the COVID-19 vaccine trials (AOR = 0.41, P = 0.01). (14)

In a study carried out in Poland the common fear about corona virus disease was the danger of transmitting the disease to family members who are elderly.Although the conspiracies regarding Covid vaccination are less in the medical students, but still they think that it may be causing autism which is around (5%).(15)

Another study performed at three different US dental schools and a medical school came with the results that 23% of medical students and 45% of dental students were half-hearted regarding corona virus vaccination. Bivariate analyses showed that as compared to dental students, medical students were 2.7 times more likely to get vaccinated (odds ratio,2.74;95%CI,1.76 to 4.31; P=0.0001). Althoughmore number of dental students had the disease and also knew people who had suffered but medical students were likely to accept mandates of vaccines. In multivariable analyses, experience of corona virus infection and individual vaccination behavior, being a dental student or a medical student was not predictive of choice to get vaccination done. (16)

A cross sectional study performed in Southwest China stated that Female odds ratio (1.336) and people who were educated reported higher hesitancy.People who had higher prevalence included those in low risk areas (Odds ratio 2.285),fear of serious consequences of vaccine ( odds ratio 1.929) , those in good health and no need to get vaccinated ( odds ratio 1.891), being worried about short term adverse effects (odds ratio 1.793) and being worried that vaccine was ineffective( odds ratio 1.694). The ones who believed the nature of study/work environment made it (vaccination) necessary (odds ratio 0.378), believing that they were at risk of corona virus infection (odds ratio 0.411) and the vaccine was free (odds ratio 0.519) were ready to get vaccinated. Confidence in vaccines and views of advantages and risks were related with vaccine hesitancy. This study declared it pertinent to improve vaccine health literacy education for medical students and increase vaccine confidence. It also directed countries to supervise TV broadcasting and others to make sure the correct representation of public opinion. It also pointed to the need of transparent and open evidence-based informationwhich can improve the vaccine coverage rate of public. (17)

A descriptive study performed at five different universities in Jordan stated that medical students used principally social media (83.4%) and on-line search engines (84.8%) as their most popular supply of information on COVID-19 and relied less on medical search engines (64.1%). Most students believed that hand shaking (93.7%),kissing (94.7%), exposure to contaminated surfaces (97.4%), and drop inhalation (91.0%) are the first mode of transmission however were indecisive relating to airborne transmission with solely 41.8% in support. Participants conjointly reported that elderly with chronic sicknesses are the foremost susceptible cluster for the coronavirus infection (95.0%). As a response to the COVID-19 pandemic 80.0% ofstudy participants adopted social isolation strategies, regular hand laundry, and enhanced personal hygiene measures as their initial line of defence against the virus. In conclusion, Jordanian medical students showed expected level of data concerning the COVID-19 virus and enforced strategies to forestall itsunfold. (18)

A study of medical students was conducted in Turkey and it was found that 60.1% of the students were willing to get vaccinated, students who refused vaccination were 14.1% and some 25% were inconclusive. Positive attitude towards vaccination was greater in female students (P=0.005), clinical students (P<0.001), those tested for covid (P=0.002), and who had Covid 19 history in the family (P=0.043) and the ones who had counseling regarding the disease (P=0.001). Positive behavior scores and higher information scores were related with high willingness to be vaccinated. Positive belief score was associated with a higher willingness to be vaccinated (P<0.001). Although the majority of the study group was willing to get vaccinated, one third were hesitant to be

vaccinated. Positive behavior, sufficient knowledge and faith were related to a higher willingness to be vaccinated.(19)
A study of medical students carried out at Rawalpindi Medical College in Pakistan deduced that in particular students of senior classes and female medical students showed optimum level of positive attitude toward Covid 19 vaccination. (20)

## 3. DATA AND METHODOLOGY

### 3.1 Study design and Participants:

An online research survey was conducted among MBBS and BDS students of KMU IMS and KMU IDS, Kohat.The online google form questionnaire was available from 1st September 2021 to 10 September 2021 during the Fourth wave of corona virus in Pakistan. All the students were invited through email, WhatsApp group links, Facebook and other social media services in which they were explained the purpose of the research program and informed consent was taken.

### 3.2 Measurement Tools

A three-portion questionnaire was made. The first contained general information e.g.; Name, age, institute and year of study, previous infection of SARS COV 2 to themselves or their relatives ,their positive well to get vaccinated, infection'sfear, and past vaccination history of mandatory vaccines . The second part mainly contained questions about concerns regarding passing the disease to relatives, Covid 19 vaccine side effects and previous vaccine side effects in medical students and their relatives. The third part contained questions regarding experiences and anxiety related to Covid 19 vaccination.

## 4. RESULTS

### 4.1 Study Group

The study includes 195 respondents: 150 MBBS students (76.92%) and 45 BDS students (23.07%).The median age was 21 and 20 years, respectively.The particulars are unveiled in the Table 1.

Table 1. Characteristics of the study group

| | MBBS students | BDS students | Total |
|---|---|---|---|
| Total(n) | 150 (76.92%) | 45(23.07%) | 195 |
| Male | 110 (78.57%) | 30(21.42%) | 140 |
| Female | 40(72.72%) | 15(27.27%) | 55 |
| Mean Age | 21 | 20 | 20.5 |

### 4.2 COVID 19 and the experiences related to it:

The results showed that about 34.1% students were tested for COVID 19 and 65.9% were not tested.75.1% of students earlier had COVID 19.
The percentage of confirmed COVID 19 cases among the family members of MS was high 41.5%. Also, the rate of COVID associated deaths was also higher in the families of MS with 20.8%.
Generally speaking, medical students of both were far more worried about getting COVID 19 and transmitting it to their elderly family members. The major COVID related reservations were academic and health problems, post COVID 19 syndrome, and health of family members and social stigma also. More exclusive evidence about COVID 19 related experiences and anxiety in medical students are given in table 2 and graphs given below.

**Table 2. Experiences with COVID 19 and the related anxiety among medical students**

| | No of medical students | Percentage |
|---|---|---|
| Previous SARS Cov-2 infection | | |
| Yes | 139 | 75.1% |
| No | 50 | 24.9% |

| | | |
|---|---|---|
| Tested for SARS-COV-2 | | |
| YES | 63 | 34.1% |
| NO | 122 | 65.9% |
| Test for SARS Cov-2 | | |
| PCR | 64 | 84.2% |
| QUICK ANTIGEN TEST | 10 | 13.2% |
| ELISA | 2 | 2.6% |
| Family members with confirmed SARS COV-2 infection | | |
| YES | 76 | 41.5% |
| NO | 107 | 58.5% |
| Family members deceased in the course of COVID 19 | | |
| YES | 38 | 20.8% |
| NO | 145 | 79.2% |
| Fear of contracting SARS-COV-2 on a 10 point scale | | |
| 0 | 31 | 17.1% |
| 1 | 14 | 7.7% |
| 2 | 15 | 8.3% |
| 3 | 20 | 11% |
| 4 | 16 | 8.8% |
| 5 | 30 | 30% |
| 6 | 17 | 9.4% |
| 7 | 16 | 8.8% |
| 8 | 8 | 4.4% |
| 9 | 4 | 2.2% |
| 10 | 10 | 5.5% |
| Main COVID 19 related concern | | |
| Health or academic problem | 86 | 49.4% |
| Post Covid Syndrome | | |
| Health Deterioration of family members | 23 | 13.2% |
| Social stigma | 48 | 27.6% |
| How concerned are you about passing on the disease to your relatives on a scale of 1-10 | 17 | 9.8% |
| 1 | 20 | 11.2% |
| 2 | 9 | 5.1% |
| 3 | 2 | 1.1% |
| 4 | 11 | 6.2% |
| 5 | 17 | 9.6% |
| 6 | 16 | 9% |
| 7 | 14 | 7.9% |
| 8 | 27 | 15.2% |
| 9 | 14 | 7.9% |
| 10 | 48 | 27% |
| How often do you visit your elderly family members | | |
| NEVER | 15 | 7.8% |
| <1 time per | 73 | 40.6% |

| | | |
|---|---|---|
| month | | |
| 1-2 times per month | 52 | 28.9% |
| 3-10 times per month | 23 | 12.8% |
| >10 times per month | 18 | 10% |

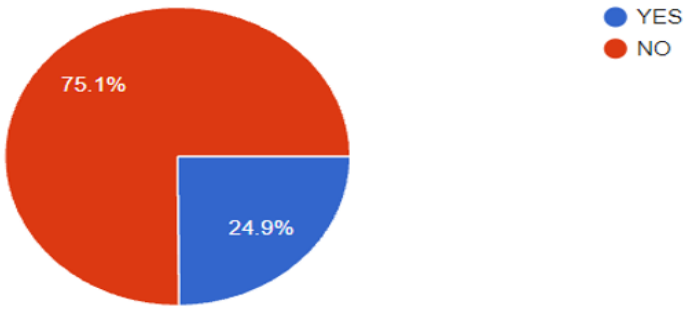
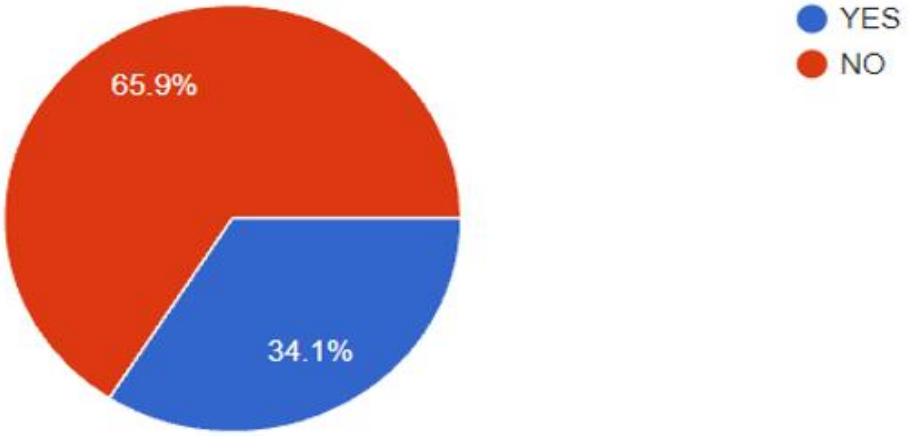



DIAGRAM Showing % 0f students with previous SARS COV 2 infection




DIAGRAMshowing % of students tested for SARA COV 2

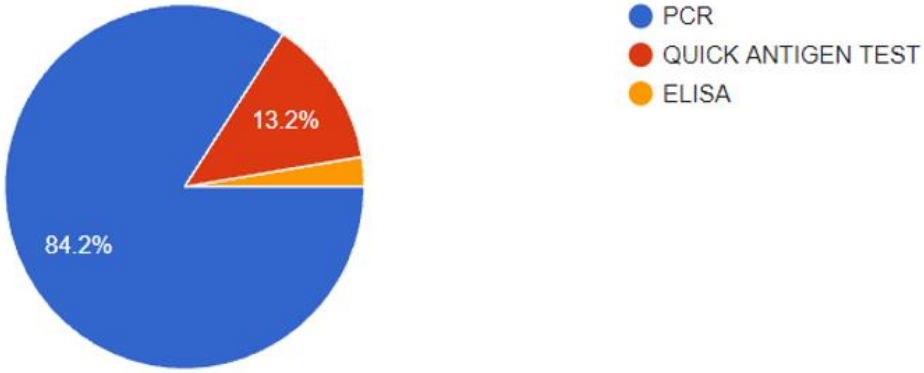



DIAGRAM showing % of individual test type being performed

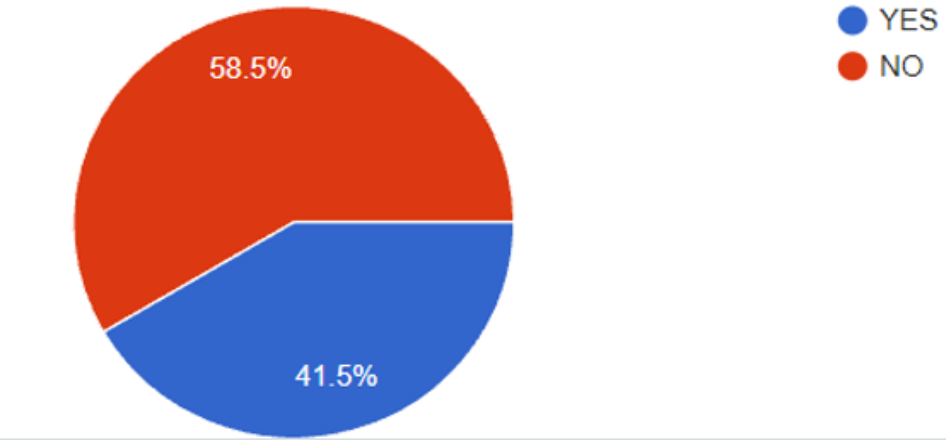



DIAGRAM showing % of family members with confirm SARS COV 2 infection

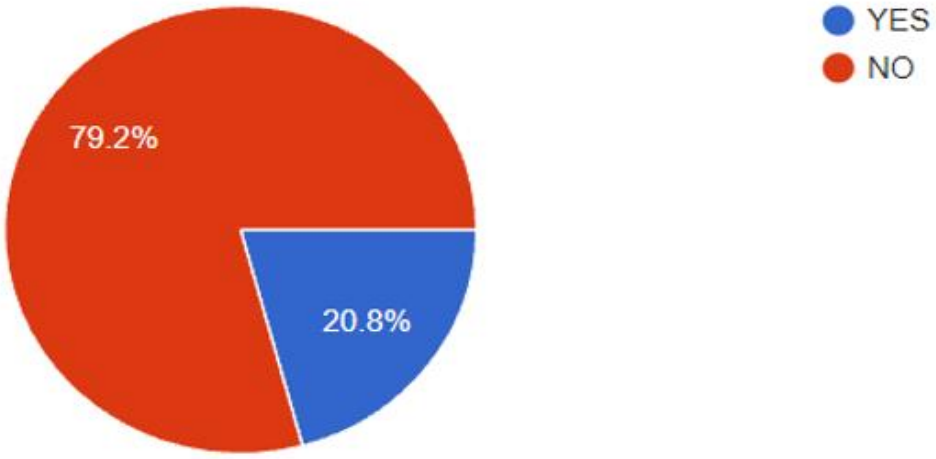



DIAGRAM showing % of family members deceased in the course of COVID 19

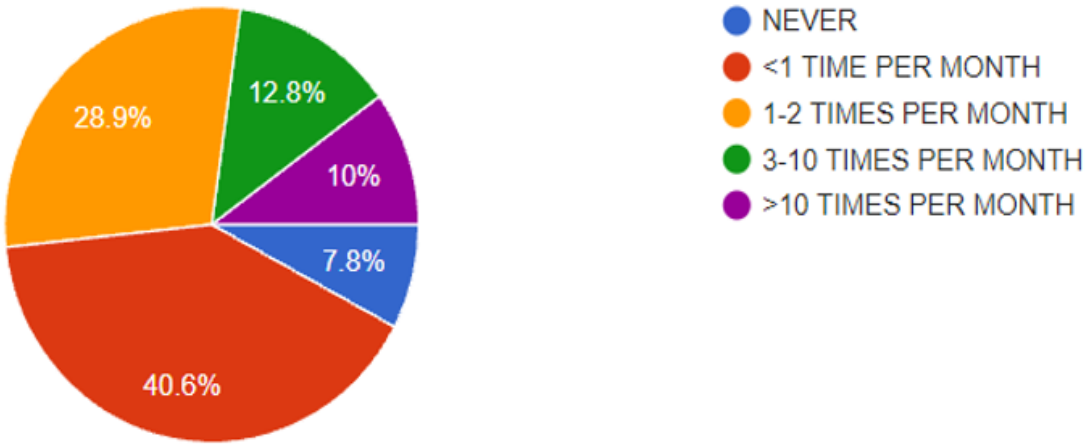
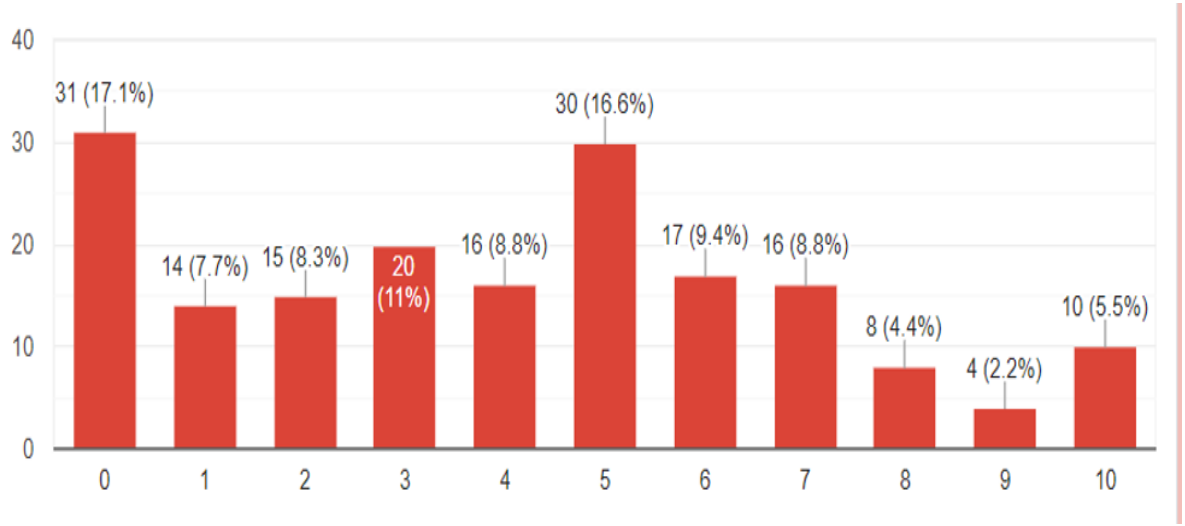
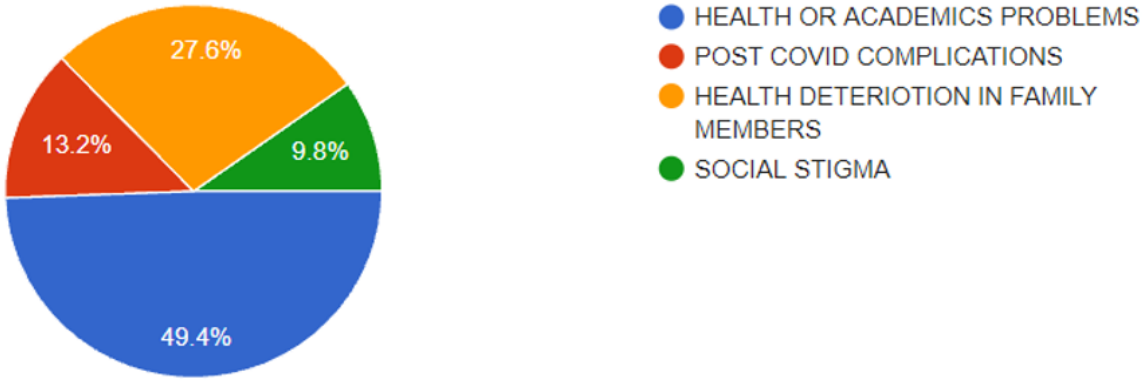
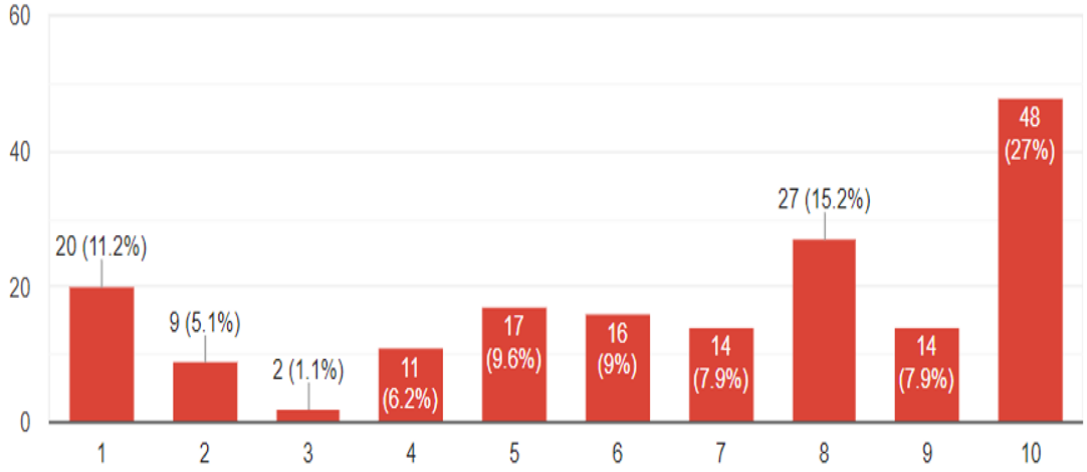



DIAGRAM showing % of frequency of visit to elderly family members




GRAPH showing the level of fear of contraction of SARS COV 2 0n a 0-10 point scale(x-axis is showing the scale and y-axis is showing the level of fear). DIAGRAM showing % of main COVID 19 related concerns.




GRAPH showing concern of medical students on passing the disease to their family members on a scale of 1-10(x-axis is showing the scale and y axis is showing the level of concern).

**4.3 COVID vaccination and related anxiety and experiences:**

Students who participated in this study had a significant desire to get vaccinated. Most of them were not concerned about vaccine adverse effects, despite the fact that they had previously experienced

vaccine associated adverse effects (21.5%). Their main concern being fever followed by long term complications. Medical students used recommended vaccines more frequently (58%). Further evidence about COVID 19 vaccine related anxiety and experiences are given in table 3 and graphs given below.

Table 3. Experiences and anxiety related to vaccination among medical students.

| | No of medical students | Percentage |
|---|---|---|
| ARE you vaccinated | | |
| YES | 145 | 80.1% |
| As soon as possible | 17 | 9.4% |
| At some point in future | 10 | 6.5% |
| No | 5 | 3% |
| I don't know | 4 | 2% |
| How much are you worried about side effects of vaccination on a scale of 0-10 | | |
| 1 | 43 | 26.1% |
| 2 | 15 | 9.1% |
| 3 | 11 | 6.7% |
| 4 | 12 | 7.3% |
| 5 | 23 | 13.9% |
| 6 | 8 | 4.8% |
| 7 | 8 | 4.8% |
| 8 | 13 | 7.9% |
| 9 | 8 | 4.8% |
| 10 | 24 | 14.5% |
| What concerns you the most about getting vaccination? | | |
| Severe hypersensitivity reaction | 18 | 10.8% |
| Fever and malaise | 54 | 32.3 |
| Swelling and reddening around point of injection | 11 | 6.6% |

| | | |
|---|---|---|
| Long term complications | 39 | 27.4% |
| Conspiracy theories | 26 | 15.6% |
| Microchip injection | 4 | 2.4% |
| Belief that herd immunity doesn't exist | 7 | 4.2% |
| Control of births by vaccine manufacturers | 8 | 4.8% |
| Have you ever experienced any vaccination side effects | | |
| YES | 39 | 21.5% |
| NO | 142 | 78.5% |
| Has anyone from your family experienced any side effects of vaccines? | | |
| YES | 67 | 36.8% |
| NO | 116 | 63.4% |
| Past medical history of mandatory vaccinations | | |
| Complete | 105 | 58% |
| Incomplete | 29 | 16% |
| None | 47 | 26% |

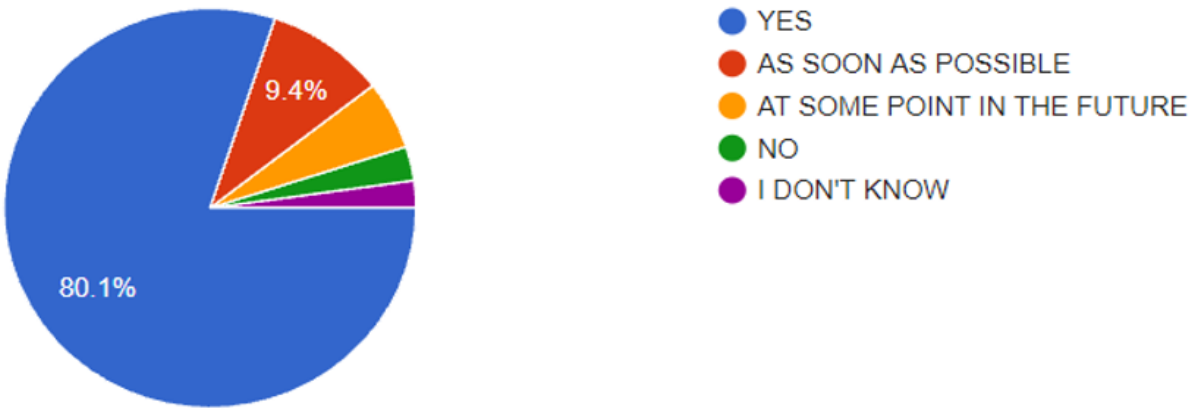
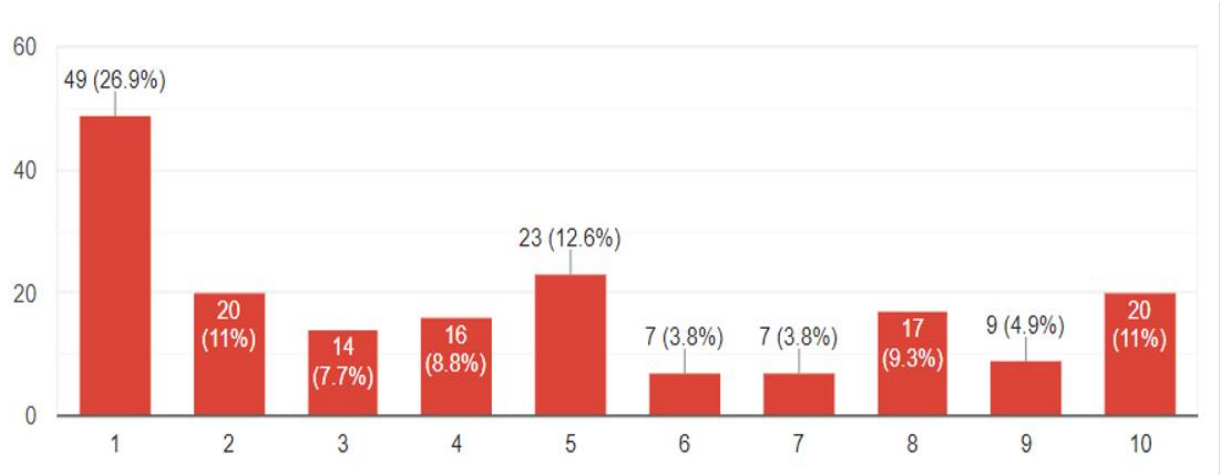



DIAGRAM showing the % of medical students who are vaccinated against SARS COV 2




GRAPH showing worry about side effects of vaccines among medical students on a scale of 0-10 (x-axis is showing the scale and y axis is showing the level of worry).

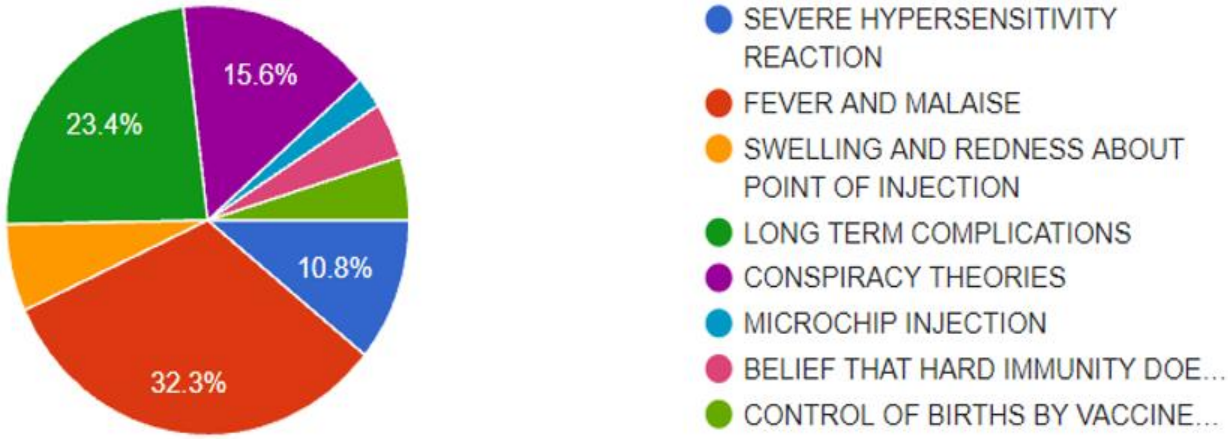



DIAGRAM showing concerns of medical students for SARS COV 2 vaccination.

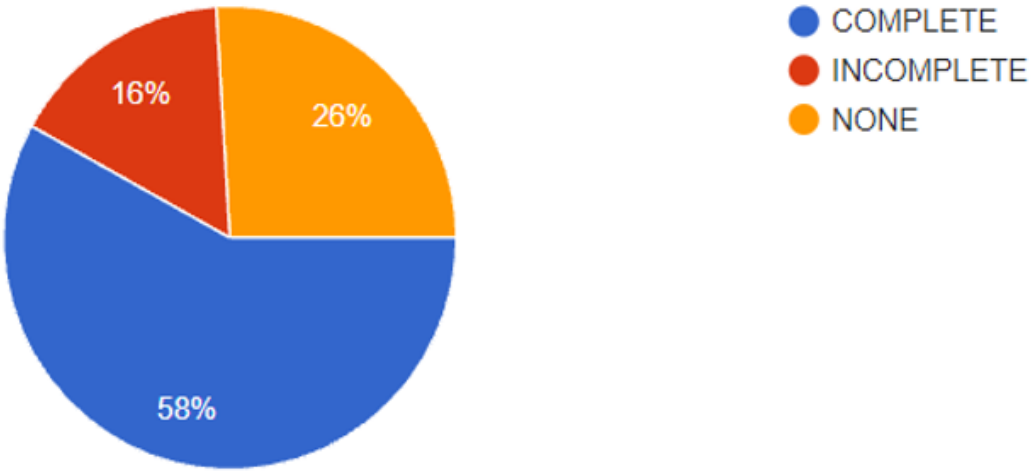



DIAGRAM showing past medical history of mandatory vaccination among medical students.

## 5. DISCUSSION

It is quite obvious that medical students are more prone to get COVID 19 infection because they have clinical rotations in the wards. Possibly, lack of sufficient medical education and their

increased exposure to infectious materials make them possible vectors, including SARS-CoV 2. (21) Moreover, the extent of vaccination among medical students for other diseases likeflu,tetanus, rubella etc was also not satisfactory(22).To our knowledge , this is one of the first studies inquiring medical students' attitude towards COVID 19 vaccination in Khyber Pakhtunkhwa Khwa, provinces of Pakistan.

**5.1 Attitude towards the risk related to COVID 19 pandemic:**

Since the start of the pandemic more than 2 million deaths have been reported and multiple complications (e.g. post COVID syndrome) have been reported (17). Anxiety among medical students may arise from fear of getting infected, isolation, problems with education (49.4%) and social stigma ( 9.8%) too. Due to an increased risk of direct contact with COVID 19 patients, they are at a greater risk of infection (23). Additionally, medical students often have higher stress levels due to a multitude of factors including isolation from family, and traumatic exposure during medical practice. This can lead to depression, health decline (49.4%) and problems in personal life (24). Moreover, families of medical and dental students are at risk of COVID related inconveniences. Due to greater risk of getting infected and related adverse effects, medical students tend to fear the disease more often. In previous the most common concern among the medical students was the fear of deterioration of family members' health (27.6%) (25) but surprisingly fever and malaisestood to be the major concern among medical students(32.3%).Unfortunately, due to the possibility of being vectors of COVID19 infection (25),medical students experienced social stigma (9.8%).In our study medical students were least worried about social stigma problem.

**5.2 Willingness to get vaccinated:**

About 80.1% of the medical students were vaccinated and in the remaining higher percentage were consenting to COVID 19 vaccination as soon as possible. Positive attitude towards vaccination among medical students fits with vaccination schedule, as they are of highest priority for vaccination. This provides a good theme for media campaigns who aim to convince the general public. Not only does the vaccination of medical students reduce the context of spread of infection, but it also sets an example for uncertain people who are concerned about vaccine efficacy and safety (26).

**5.3 Troubles and worries related to SARS COV 2 vaccination and the conspiracy theories:**

Fever and malaise remained the major concern among the medical students while in a study in Polandlong term vaccination effects remained the major concern.In the study performed in Poland 13.4% medical doctors were concerned regarding fever and malaise whereas in our study 32.3% medical students were concerned about it (11). Medical students concerned about the conspiracy theories remained 15.6%. In the study by Daniel freeman et al., it was demonstrated that around 50% English people showed some amount belief in conspiracy theories and 25% of the people fully supported these theories (27). Reluctance to vaccination is mainly caused by the spread of fake news either through social media platforms or the anti-vax organisations (28,29). The two main problems are the side effects of these vaccines and their effectiveness. Most of these theories mainly are that these vaccines cause autism, or this pandemic is only created by the media and that the herd immunity does not exist at all (26). As this misinformation spreads widely based on personal thinking and emotional feelings these theories look more satisfactory to the people as opposed to the real and accurate scientific data (30,31). The lack of association among medical students to such theories as shown by our study may be due to their medical knowledge and experience.

**5.4 Factors leading to positive attitude towards vaccines:** As mentioned in the study by Lazarus et al., the countries in which people trusted the government extensively (e.g China , South Korea , Singapore ) COVID-19 vaccination approval rate was more than 80% (32).This indicate that increased trust in government had positive influence on the general behaviour toward corona vaccines in the society. Moreover explanation and experience shared by the health workers also had

a positive effect (10).In the study data provided by Feleszko et al., 301 of the people who refused to get vaccinated were asked some additional question about things that could be done in order to change their mind and surprisingly 50% people said that nothing could change their mind regarding this decision (33) nevertheless upto 17% people would change their mind if provided appropriate scientific data on vaccine safety . 11% would vaccinate if some countries required mandatory vaccination in order to enter and 10% would vaccinate in a scenario where heavy fined would be imposed on them and their loved ones. It has also been revealed that as age factor increases the difficulty associated with convincing people to vaccinate also increases (33). In our study the major factors that increased the participant's will to get vaccinated was mainly the fear of getting infected and passing the disease to their relatives. Fear of the post vaccine side effects was the major hurdle in the willingness to vaccinate thus social efforts explaining the incidence and damage caused by the vaccine side effects could considerably reduce the concerns regarding side effects of the vaccines (34).

### 5.5 Strengths and Limitations

**Strengths**

1.This is the first studies to the very best of our knowledge, performed in Pakistan, that shows the behaviour and attitudes towards Covid-19 vaccination among medical students.
2.The information was obtained in a time of heated public discussion on Covid 19 vaccination during the 4$^{th}$ wave of COVID 19 in Pakistan.
3.Information regarding response rate was also there.

**Limitations:**

1.Data was gathered through an online questionnaire thus those with internet could participate only.
2.This study was only limited to a single medical and dental college.

## 6. CONCLUSION

In accord with most of the studies performed earlier our study shows highly positive attitude of medical students towards COVID-19 vaccination. A very small percentage is not willing to get vaccinated, their major concern being the complications of vaccination's side effects. This negative factor which has an influence on the vaccination status of medical students can be overcome as it is a modifiable factor.

## 7. FUTURE DIRECTIONS

1.Studies comparing attitude and behaviour of male and female medical students towards SARS COV 2 vaccination may be performed.
2.Studies comparing behaviour and attitude of undergraduate medical students with that of post graduate doctors may be performed.

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