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Orijinal Araştırma / Original Article

# COVID-19 Vaccine from the Perspective of University Students: Where Are We in Regards to Vaccine Decision-Making?

## Üniversite Öğrencilerinin Gözünden COVID-19 Aşısı: Aşı Karar Verme Konusunda Neredeyiz?

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## Abstract

**Aim**: Reactions against vaccines developed to combat COVID-19 are rising in all countries. Therefore, it is important to evaluate the opinions in regards to the vaccine in order to develop a positive perspective by identifying the negative opinions. This study was conducted to determine university students' attitudes towards the COVID-19 vaccine.

**Material and Method:** This research was conducted as a cross-sectional study with university students studying at the Health Programs Campus of Cappadocia University in the Province of Nevşehir. In this context, study data were collected from a total of 332 students to reach power of 99% based on the known sample calculation.

**Results**: 51.2% of the participants (n=170) in this study were between the ages of 18-20; 69.3% (n=230) were females; 24.1% (n=80) were students in Medical Laboratory Techniques Program and 52.4% (n=174) were 2nd year students. According to the results, 53.9% (n=179) of the participants believed that they could easily recover when they got sick and 76.6% of the participants (n=254) stated that they were worried about the side effects of the vaccine. Participants' total mean score from the attitudes towards the COVID-19 Vaccine Scale was found to be 3.18±0.76.

**Conclusion**: Students were found to have a positive attitude towards the vaccine, but they still had some concerns. It is proposed to design further comprehensive studies to eliminate students' concerns, to explain the effectiveness of the vaccine in a transparent way and to better understand the reasons underlying the vaccine hesitancy.

**Keywords**: Vaccine hesitancy, COVID-19, Turkey, university students, attitude

## Öz

**Amaç**: COVID-19 ile mücadele için geliştirilen aşılara karşı tepkiler tüm ülkelerde artmaktadır. Bu nedenle aşı ile ilgili görüşlerin değerlendirilmesi, olumsuz görüşlerin tespit edilerek olumlu bir bakış açısının geliştirilmesi açısından önemlidir. Bu çalışma üniversite öğrencilerinin COVID-19 aşısına yönelik tutumlarını belirlemek amacıyla yapılmıştır.

**Gereç ve Yöntem:** Bu araştırma, Kapadokya Üniversitesi Nevşehir ilinde yer alan sağlık programları yerleşkesinde öğrenim gören üniversite öğrencileri ile gerçekleştirilmiştir. Araştırma kesitsel tipte bir çalışmadır. Bu kapsamda, evreni bilinen örneklem hesaplamasına dayalı olarak %99 güce ulaşmak için toplam 332 öğrenciye ulaşılarak çalışma verileri toplanmıştır.

**Bulgular**: Katılımcıların %51,2'sinin (n=170) 18-20 yaş arasında; %69,3'ünün (n=230) kadın, %24,1'inin (n=80) tıbbi laboratuar teknikleri programı öğrencisi olduğu ve %52,4'ünün (n=174) 2. sınıf öğrencisi olduğu tespit edilmiştir. Elde edilen sonuçlara göre, katılımcıların %53,9'u (n=179) hastalandıklarında kolayca iyileşebileceklerine inanırken, %76,6'sı (n=254) aşının yan etkilerinden endişe duyduğunu belirtmiştir. Katılımcıların COVID-19 Aşı Ölçeğine yönelik tutum ölçeğinden aldıkları toplam puan ortalamaları 3,18±0,76 olarak bulunmuştur.

**Sonuç**: Çalışmamızda öğrencilerin aşıya karşı olumlu bir tutum içinde oldukları tespit edilmiştir ancak yine de bazı endişeleri olduğu belirlenmiştir. Öğrencilerin endişelerini gidermek, aşının etkinliğini şeffaf bir şekilde açıklamak ve aşı tereddütlerinin altında yatan sebepleri daha iyi anlamak için daha kapsamlı çalışmaların tasarlanması önerilmektedir.

**Anahtar Kelimeler**: Aşı tereddütü, COVID-19, Türkiye, üniversite öğrencileri, tutum

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## INTRODUCTION

Coronavirus Disease 2019 (COVID-19) outbreak, which first originated in the Wuhan province of China and identified as of January 2020, has affected the whole world in as little as three months. Due its rapid global spread, the World Health Organization (WHO) declared COVID-19 as a pandemic, which means global epidemic.[1] At the same time, the first COVID-19 case was confirmed in Turkey on this date.[2] Coronavirus is known to be transmitted through small infected droplets when people speak, sneeze or cough.[2,3] Since the virus can be transmitted so easily, all countries of the world experienced negative socio-economic and psychological effects during 2020, nearly 2.5 million deaths occurred, and as a result of COVID-19 induced depletion of healthcare systems, many countries were devastated by the crushing effects of the COVID-19 pandemic was.[1]

The most important means that can be used to control the ongoing COVID-19 pandemic is finding the effective vaccine(s) that can help reduce transmission and the demand for hospitalization and intensive care.[4] The development of the COVID-19 vaccines has been given a worldwide priority, as no effective drugs have been approved for satisfactory prevention and treatment of the disease. To date, a large number of COVID-19 vaccines are in the process of rapid development worldwide, with thirteen candidates in Phase 3 trials and 52 of these studies have been tested in clinical trials and 162 have been tested in preclinical evaluation.[5]

While all this was happening, anti-vaccine conspiracy theories spread through social media claiming that the virus was man-made and that people would be controlled by the microchips inserted into the vaccines have affected individuals' attitudes towards vaccines resulting in vaccine hesitancy.[6] In addition, vaccine hesitancy is also experienced due to rapid production process of vaccines, lack of knowledge in regards to their side effects and holding some of the vaccines that were in phase 3 due to reported side effects.[7,8] The term vaccine hesitancy is used to describe refusal or unwillingness to accept vaccination despite the availability of vaccination services.[9]

This study evaluated the attitudes of university students studying in health services programs in Nevşehir towards COVID-19 vaccines. The research aimed to the health awareness that would be formed by understanding students' perspective regarding the COVID-19 vaccine.

## MATERIAL AND METHOD

### Type of Research

The research was designed as a cross-sectional study to identify students' attitudes towards COVID-19 vaccine.

Research universe and sample

The research was carried out with students studying at Cappadocia University, Voccational Programs Campus in Nevsehir Province. The target universe of the study consisted of 2409 students (1412 female) studying in the health programs of Cappadocia University, Cappadocia University Vocational College during 2020-2021 academic year. In this context, a total of 332 students were reached to ensure a power ratio of 99% as a result of the sample calculation with a known universe.

### Data Collection Tools

Data collection tools used in this study included a 4-item Personal Information Form developed by the researchers to assess participants' socio-demographic characteristics, a 5-item COVID-19 information form and a 9-item Attitudes towards the COVID-19 Vaccine Scale, developed by Geniş et al.[10]

Attitudes towards the COVID-19 Vaccine Scale includes 9 items and has two sub-dimensions (positive and negative attitude). Statements in the scale are rated with a 5-point Likert form: "Definitely disagree (1)", "Disagree (2)", "Undecided (3)", "Agree (4)" and "Strongly agree (5)".[10]

Items in the negative attitude sub-dimensions are scored in reverse. A value between 1-5 is obtained by dividing the total score obtained by the sum of the item scores in the scale sub-dimension by the number of items in that sub-dimension. High scores from the positive attitude sub-dimension indicate positive attitudes towards vaccination. The items in the negative attitude sub-dimension are calculated after they are reversed and the higher scores in this sub-dimension indicate less negative attitudes towards vaccination.[10]

### Data Collection Method

Online data collection forms (Google Form) were sent via WhatsApp to the students who agreed to participate in the study. Via the link sent on WhatsApp, students accessed the form in the period of February 1-28, 2021. Each questionnaire took approximately 10 minutes to answer. The data were collected anonymously and confidentially and when the target number of participants was reached, further responses were enabled.

### Data Analysis

SPSS 27.0 program was used in the analysis of the data. The suitability of the variables to normal distribution was evaluated with the Kolmogorov Smirnov test and statistical significance was accepted as $p<0.05$. Number, percentage, mean and standard deviation criteria were used in the evaluation of the data. Chi-square ($\chi 2$) test was employed to analyze the relationships between categorical variables

And Mann-Whitney U and Kruskal Wallis tests were performed for continuous variables (age, education level) by using the mean and standard deviation (SD) calculations.

When the reliability of the scale used in the study was examined, it was found to be 0.838 for the scale in general, indicating that the scale has a good level of reliability. Cronbach Alpha values greater than 0.60 point to reliability.[11]

### Ethical Considerations

This study was approved by Cappadocia University Research Ethics Committee (Decision number: 2021.46, Date: 04.01.2021). Participation in the study was voluntary and an informed consent form was included in the introduction of the online questionnaire. All data were kept confidential.

## RESULTS

### Findings Regarding Participants' Socio-Demographic Characteristics

51.2% of the participants (n=170) in the study were between the ages of 18-20, 69.3% (n=230) were females, 24.1% (n=80) were students in the Medical Laboratory Techniques Program and 52.4% (n=174) were 2nd year students. 90.7% of the participants (n=301) did not have a chronic disease, 82.8% (n=275) were not infected by COVID-19 and 66.3% (n=220) had no relatives infected with COVID-19 in their families (**Table 1**).

**Table 1.** Distribution of the descriptive data of the participants (n=332)

| Socio-Demographic Characteristics | | Number (n) | Percent (%) |
|---|---|---|---|
| Age | 18-20 age | 170 | 51.2 |
| | 21-24 age | 149 | 44.2 |
| | 25-30 age | 13 | 3.9 |
| Gender | Females | 230 | 69.3 |
| | Males | 102 | 30.7 |
| Educational program | Mouth and dental health | 52 | 15.7 |
| | Operating Room Services | 28 | 8.4 |
| | Audiometry | 26 | 7.8 |
| | First and Immediate Aid | 41 | 12.3 |
| | Medical Laboratory Techniques | 80 | 24.1 |
| | Pathology Laboratory Techniques | 57 | 17.2 |
| | Radiotherapy | 48 | 14.5 |
| Education level | 1st Class | 158 | 47.6 |
| | 2nd Class | 174 | 52.4 |
| Chronic illness | Yes | 31 | 9.3 |
| | No | 301 | 90.7 |
| Have you had COVID-19? | Yes | 57 | 17.2 |
| | No | 275 | 82.8 |
| Has anyone in your family had COVID-19 | Yes | 112 | 33.7 |
| | No | 220 | 66.3 |
| How would you evaluate your general health status? | Very good | 119 | 35.8 |
| | Good | 155 | 46.7 |
| | Middle | 43 | 13.0 |
| | Bad | 15 | 4.5 |

46.7% of the participants (n=155) reported their general health status as "good". 53.9% (n=179) of the participants stated that they agreed with the statement "I believe I will get over it lightly if I get sick" for the item which presented some statements about COVID-19 (**Figure 1**).

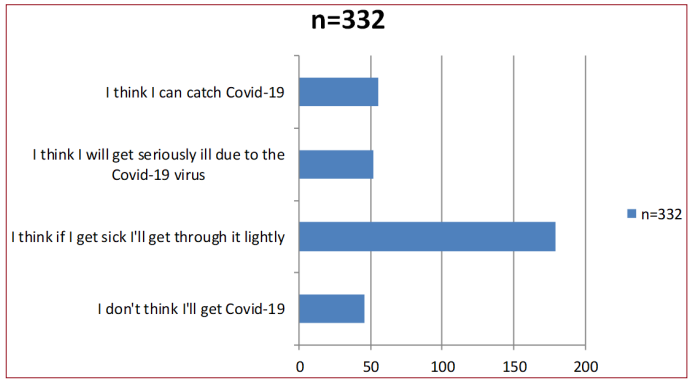


**Figure 1.** Participants' attitudes towards COVID-19 (n=332)

17.2% (n=57) of the participants accepted that they had COVID-19 disease and 71.9% (n=41) of them responded positively to the statement that I would like to have the vaccine to be developed/developed for this disease at the first opportunity.

76.6% (n=254) of the participants emitted that they were concerned about the side effects of the vaccine, 66% (n=219) about the content of the vaccines, and 64.5% (n=214) about the effectiveness of the vaccine. 62.3% (n=207) emitted that they were concerned about the reliability of the vaccine tests (**Figure 2**).

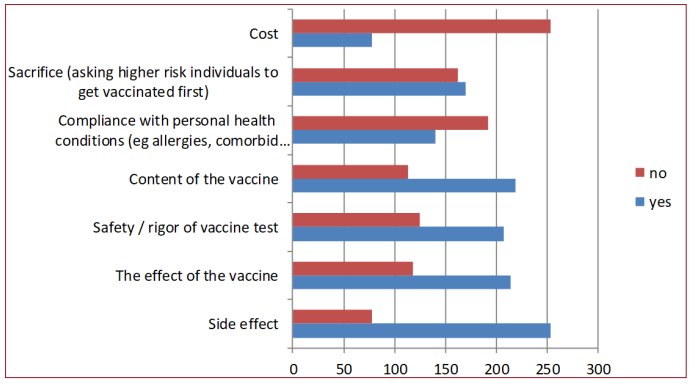


**Figure 2.** Distribution of participants' concerns about vaccination (n=332)

34.6% (n=115) of the participants were found to be undecided about the item "I think everybody should have the vaccine to be developed/developed for this disease", while 14.5% (n=48) said they definitely agreed with this statement. Evaluation of participants' attitudes towards the COVID-19 vaccine is given in **Figure 3** and **Table 2** presents the Cronbach Alpha values of the scale used in this study.

**Table 2.** Reliability Analysis of Attitudes towards Covid-19 Vaccine Scale and Its Sub-Dimensions

| Scale and Sub-Dimensions | Chronbach Alfa |
|---|---|
| Positive Attitude | 0.918 |
| Negative Attitude | 0.813 |
| Total Scale | 0.838 |

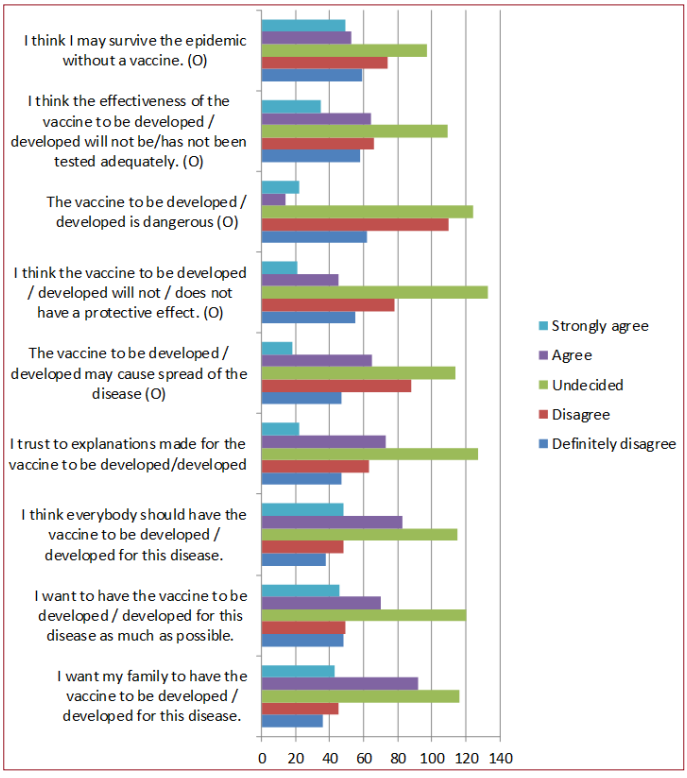


**Figure 3.** Attitudes of Participants towards COVID-19 Vaccine (n=332)
O: Opposite Item

Participants' total mean score from the Attitudes towards COVID-19 Vaccine Scale was found to be 3.18±0.76. Participants had a positive attitude subscale mean of 3.07±1.04 and a negative subscale mean of 3.26±0.87. This result shows that the participants had a positive attitude towards the COVID-19 vaccine.

The distribution of the data was evaluated with the Kolmogorov Simirnov test and it was identified that the data were not normally distributed (p=0.00). Mann Whitney U and Kruskal Wallis tests were used to compare scale mean scores with independent variables. A significant difference was found between the participants' departments and their scale scores (p<0.05). The difference between the groups was evaluated by the K-Independent Sample test (**Table 3**).

Radiotherapy-Operating Room (T=72.970) and Oral Dental Health-Operating Room (T=72.804) was found to cause the difference which was statistically significant (p=0.01).

## DISCUSSION

The attitude of the society towards the COVID-19 vaccine can significantly affect the course of the pandemic.[12] Vaccine hesitancy and negative attitudes towards the vaccine can make it difficult to control the pandemic. Understanding the attitudes, concerns and views of university students towards the COVID-19 vaccine is important for developing an appropriate strategy for controlling the pandemic.[13,14] There are studies in the literature that examined university students' views.[13-15] This study is the first study evaluating the attitudes of health program students towards vaccination in our province.

Studies conducted with university students in different countries examining vaccine hesitancy during the pandemic demonstrated difficulties in decision-making, albeit at different levels. Barello, et al.[12] reported that 13.9% of university students in Italy (n=102) experienced vaccine hesitancy, Grech and Gauci16 found that 23.8% of university students in Malta experienced vaccine hesitancy and another study conducted with university students in Egypt by Saied

**Table 3.** Comparison of Independent Variables with Scale Scores

| Variables | Min | Max | Median | U | p |
|---|---|---|---|---|---|
| Gender | | | | | |
| Female (n=230) | 1 | 5 | 3.11 | 10476.500 | 0.120 |
| Male (n=102) | 1.22 | 4.89 | 3.16 | | |
| Education level | | | | | |
| 1st Class (158) | 1 | 5 | 3.11 | 13328.500 | 0.633 |
| 2nd Class (174) | 1 | 4.89 | 3.22 | | |
| Educational program | | | | | |
| Mouth and Dental Health (n=52) | 1.44 | 4.89 | 3.00 | KW | p |
| Operating Room Services (n=28) | 1.67 | 4.89 | 3.66 | | |
| Audiometry (n=26) | 1.67 | 4.78 | 3.44 | | |
| First and Immediate Aid (n=41) | 1.22 | 4.78 | 3.44 | 18.986 | 0.004* |
| Medical Laboratory Techniques (n=80) | 1.28 | 4.76 | 3.16 | | |
| Pathology Laboratory Techniques (n=57) | 1.21 | 4.67 | 3.22 | | |
| Radiotherapy (n=48) | 1.22 | 4.78 | 2.89 | | |
| Age | | | | KW | p |
| 18-20 age (n=170) | 1.67 | 4.89 | 3.16 | | |
| 21-24 age (n=149) | 2.66 | 4.79 | 3.11 | 0.249 | 0.883 |
| 25-30 age (n=13) | 2.67 | 4.44 | 3.11 | | |

U= Mann-Whitney U ; KW= Kruskal Wallis, * p<0.05

et al.[13] reported that 46.1% of the participants (n=507) also experienced vaccine hesitancy.

Studies in the literature that presented positive attitudes towards the COVID-19 vaccine addressed vaccine hesitancy as well. In a study conducted with Ethiopian university students determined that 69.3% (n=293) of the students had a positive attitude, although they had hesitations about the vaccine.[17] In this study, the mean scale scores received by the students (3.18±0.76) showed that the students had a positive attitude in general, but also revealed their hesitation. 36.1% of the participants (n=120) were undecided about the statement "I want to have the vaccine to be developed/developed for this disease at the first opportunity" included in the scale that assessed attitudes towards vaccination. This result may be related to the fact that the COVID-19 epidemic has peaked in different periods and at different times in each country due to the different prevention, treatment and vaccination policies of each country. The assessment of the population immunity level required to limit the spread of the pathogen depends on the basic reproduction number of that infectious disease agent.[18]

The most recent estimates of COVID-19 point to the fact that 60-75% immunized individuals are required to stop the spread of the virus in the community.[19-21] However, according to the results in this study, 13.9% of the participants (n=46) surprisingly did not think they would get Covid-19, while 53.9% (n=179) reported that they thought they would get over it lightly if they ever got sick.

WHO Strategic Advisory Group of Experts (SAGE) categorized the reasons for vaccine hesitancy and rejection as follows: (1) Contextual influences: historical, socio-cultural, environmental, institutional, economic or political factors. (2) Individual and group influences: personal beliefs and attitudes about previous experiences with prevention or vaccines. (3) Vaccine/vaccination specific issues: concerns about a new vaccine formulation, administration or node of administration.9 The literature also includes results supporting these groupings. In their study, Lucia et al.[22] reported that concerns about the serious side effects of the vaccine and lack of information resulted in vaccine hesitancy. Similarly, Tam et al.[23] concluded that negative circumstances such as long-term side effects, safety problems and distrust to vaccines caused vaccine hesitancy for COVID-19 vaccine. Saied et al.[13] found that 96.8% of university students (n=2065) had concerns about the side effects of the vaccine, 93.2% (n=1988) worried about the ineffectiveness of the vaccine, 80.2% (n=1711) had concerns about lack of testing in regards to the vaccine and 54.0% (n=1151) were concerned about the safety of the vaccine. Another study conducted that examined COVID-19 vaccine hesitancy with 237 university students reported the first three concerns about the vaccine as safety (37%, n=88), efficacy (24%, n=57) and limited information (16%, n=38).[24] This study the participants' concerns about the vaccine in the present study were listed, it was seen that 76.6% (n=254) were worried about side effects, 64.5% (n=214) about the efficacy of the vaccine and 62.3% (n=219) about the reliability of the tests in regards to the vaccine tests. Supporting the literature, this finding shows that the most intense concern about the COVID-19 vaccine was related to side effects. Most vaccines have side effects and since COVID-19 vaccines are new, additional side effects other than those identified in clinical trials are unknown. This fear is understandable and common. For this reason, ensuring transparency in the information provided about COVID-19 vaccines is extremely important not only in terms of vaccine effectiveness but also in terms of side effects. The foundation of vaccine acceptance is public trust, that is, trust in vaccines and vaccine manufacturers.[25] We know that the most effective way to get rid of the epidemic is through vaccination and in line with our findings, we argue that vaccine hesitancy can be reduced by supporting university students' analytical thinking via trainings that increase their health awareness and by addressing specific concerns about vaccines via provision of accurate information from the right people.

Stanley Plotkin, the author of the book "Vaccines", regarded as a bedside book by the people working in the field of vaccines and infections, says that "with the exception of safe water, the most important invention in humanity's fight against diseases, including antibiotics, has been vaccines".[26] However, in this study, it is quite striking that 40.1% of the participants (n=133) were undecided about the statement that the vaccine to be developed/developed will not/does not have a protective effect. This perspective may be related to the fact that there was only one vaccine (inactivated vaccine candidate against COVID-19 –CoronaVac- produced by Sinovac) administered in Turkey at the time of this study. Thereupon, speculations on social media and televisions also increased the confusion of public. It is also believed that types of vaccines may affect people's attitude towards vaccination. Today, it can be seen from the COVID-19 Vaccination Information Platform in Turkey that Turkish people are reluctant to get vaccinated, just like the participants in this study.[27]

Vaccine cost also appear to be the main factor for accepting vaccination.[28] A study conducted on college students in South Carolina reported that vaccination costs were one of the factors that directly affected students' vaccination behavior.[23] In our study, the ratio of the participants considering the cost in regards to vaccines was found to be 23.5% (n=78).

Supporting the literature, the current study found that the participants' attitudes towards vaccination did not differ according to their socio-demographic characteristics such as age and gender.[12,15] Although the socio-demographic characteristics did not affect the attitude towards vaccination, the type of the department where the students studied was found to be effective. In their study which they evaluated the attitudes of university students towards vaccination, Campo-Arias and Pedrozo-Pupo[15] found that 78.9% of the participants did not trust vaccination and these students were studying in departments unrelated to health.

In Malta, medical students' confidence in the COVID-19 vaccine was found to be higher compared to dental students and administrative personnel.[16] In this study, the mean scale scores of the students studying in Radiotherapy, Operating Room and Oral and Dental Health departments were found to differ compared to the mean scale scores of the students in other departments and this difference was statistically significant ($p<0.05$). This result in the study may be related to the fact that the Operating Room, Oral Dental Health and Radiotherapy departments require working with patients and the students may have thought that the risk of COVID-19 transmission could be higher.

This study has several main limitations. The first is the adoption of the convenience sampling strategy. Since the sample group is determined through a known universe, it cannot be predicted how the opinions of the individuals who did not participate in the study may have changed the results. In addition, the high number of female students in the universe resulted in higher number of responses received from the female participants in the universe, which may have affected the research results.

Another important limitation of the study is related to the use of SINOVAC, the only vaccine available in Turkey at the time of the study whose interim result report on its effectiveness had not been yet published.

## CONCLUSION

When this research was conducted, Turkey was experiencing the third wave of pandemic. Turkey ranked first in Europe in the number of daily cases. Vaccination is accelerated immensely now. In light of the intense experiences of Turkish healthcare services in regards to COVID-19, we believe that the findings of this study deserve attention. We were expecting that Turkish students to be more willing to be vaccinated. Since this expectation was not supported with research data, we would like bring these results to the attention of the public health and propose conducting more comprehensive further studies in order to better understand the reasons for vaccine hesitancy among the university students in Turkey.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** Ethiccal Issue: This study was approved by Kapadokya University Research Ethics Committee (Decision number: 2021.46, Date: 04.01.2021).

**Informed Consent:** Because the study was designed retrospectively, no written informed consent form was obtained from patients.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

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**Author Contributions:** All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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