

## An experience in the COVID-19 pandemic period: Turkish Cardiovascular Surgery Online Board Exam 2020

*COVID-19 pandemi döneminde bir deneyim:  
Türk Kalp Damar Cerrahisi Çevrimiçi Yeterlik Sınavı 2020*

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### ABSTRACT

**Background:** The aim of this study was to provide information about the results of the Turkish Cardiovascular Surgery Board written exam, which was held online due to the pandemic.

**Methods:** This cross-sectional study included a total of 41 cardiovascular surgeons and residents (39 males, 2 females) in November 21<sup>st</sup>, 2020 between 10:00 A.M. and 12:00 P.M. After the online exam was completed, data on participant information and answers to exam questions were obtained from the information system.

**Results:** Of all participants, 39% were working in university hospitals. A total of 82.9% of the participants were specialists. The total mean score of the participants was 60.3±10.2 and 53.7% of them were declared successful-passed. Aortic surgery (63%), heart failure surgery (50%), and mitral valve surgery (50%) were the most incorrectly answered questions.

**Conclusion:** With the online exam, the Board gained different experiences regarding exam planning and implementation. The Turkish Cardiovascular Surgery Board did not give up the Board exam during the pandemic period and conducted a reliable written exam with many participants.

**Keywords:** Board certification exam, cardiovascular surgery, COVID-19, online exam, pandemics.

### ÖZ

**Amaç:** Bu çalışmada pandemi nedeniyle çevrimiçi yapılan Türk Kalp Damar Cerrahisi Yeterlik Kurulu çevrimiçi yazılı sınav sonuçlarına ilişkin bilgi sunuldu.

**Çalışma planı:** Bu kesitsel çalışmaya 21 Kasım 2020 tarihinde 10:00 - 12:15 saatleri arasında toplam 41 kalp damar cerrahi ve asistanı (39 erkek, 2 kadın) alındı. Çevrimiçi sınav tamamlandıktan sonra katılımcı bilgileri ve sınav sorularına verilen yanıtlar bilgi sisteminden elde edildi.

**Bulgular:** Tüm katılımcıların %39'u üniversite hastanelerinde çalışmaktaydı. Katılımcıların toplam %82.9'u uzman hekimdi. Katılımcıların toplam puan ortalaması 60.3±10.2 olup, bunların %53.7'si sınavda başarılı oldu. Aort cerrahisi (%63), kalp yetmezliği cerrahisi (%50), ve mitral kapak cerrahisi (%50) en fazla yanlış yanıtlanan soru alanları idi.

**Sonuç:** Yeterlik kurulu çevrimiçi sınav ile sınav planlama ve uygulamasına ilişkin farklı bir deneyim kazanmıştır. Türk Kalp Damar Cerrahisi Yeterlik Kurulu, pandemi döneminde de yeterlik sınavlarını aksatmamış ve geniş katılımlı, güvenilir bir yazılı sınav yapmıştır.

**Anahtar sözcükler:** Yeterlik sertifika sınavı, kalp damar cerrahi, COVID-19, çevrimiçi sınav, pandemic.

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The World Health Organization (WHO) declared a pandemic in March 2020.<sup>[1]</sup> There have been changes in all areas of life, including in the field of work, and education.<sup>[2,3]</sup> Meanwhile, the characteristics of the virus that caused the pandemic were unknown and the methods of struggle were unclear. In these uncertainties, many activities, including education and exams, were carried out online.

The 10<sup>th</sup> Cardiovascular Surgery School, prepared by the Turkish Cardiovascular Surgery Board, was held online between August 11<sup>th</sup> and October 17<sup>th</sup>, 2020, unlike previous years. The Board decided to conduct an online board exam due to the ongoing pandemic conditions.

The exam set was prepared for the online board written exam, which consisted of 100 multiple-choice questions with five options and one correct answer. For the question set, well-known and expert trainers

in the field of cardiovascular surgery in our country wrote exam questions. The questions were reviewed by the Board and the exam set was finalized. The exam set includes subject areas, which are coronary surgery (20 questions), peripheral artery and vein (15 questions), basic sciences (10 questions), heart failure (10 questions), aortic valve diseases (10 questions), congenital heart diseases (10 questions), mitral valve surgery (8 questions), aortic surgery (8 questions) and other subjects (9 questions). The technically analyzed questions were entered into the online question bank and the exam set was created (Figures 1, 2). The exam set was designed with four questions on each interface (Figure 3).

The Board exam was held on November 21<sup>st</sup>, 2020 between 10:00 A.M. and 12:00 P.M. The day before the exam, an e-mail about the exam rules and the exam link were sent to the participants (Figure 4).

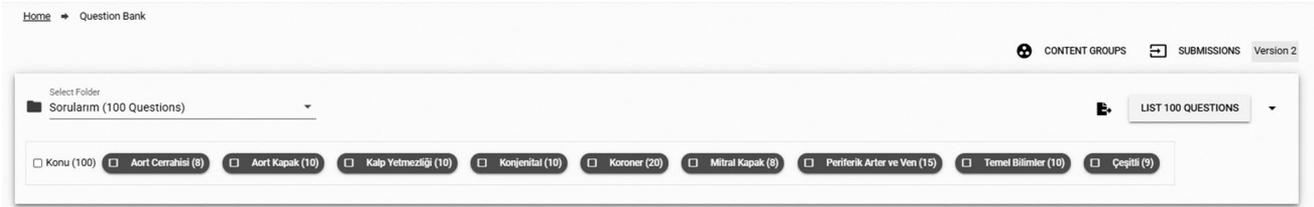


Figure 1. Subareas of the exam.

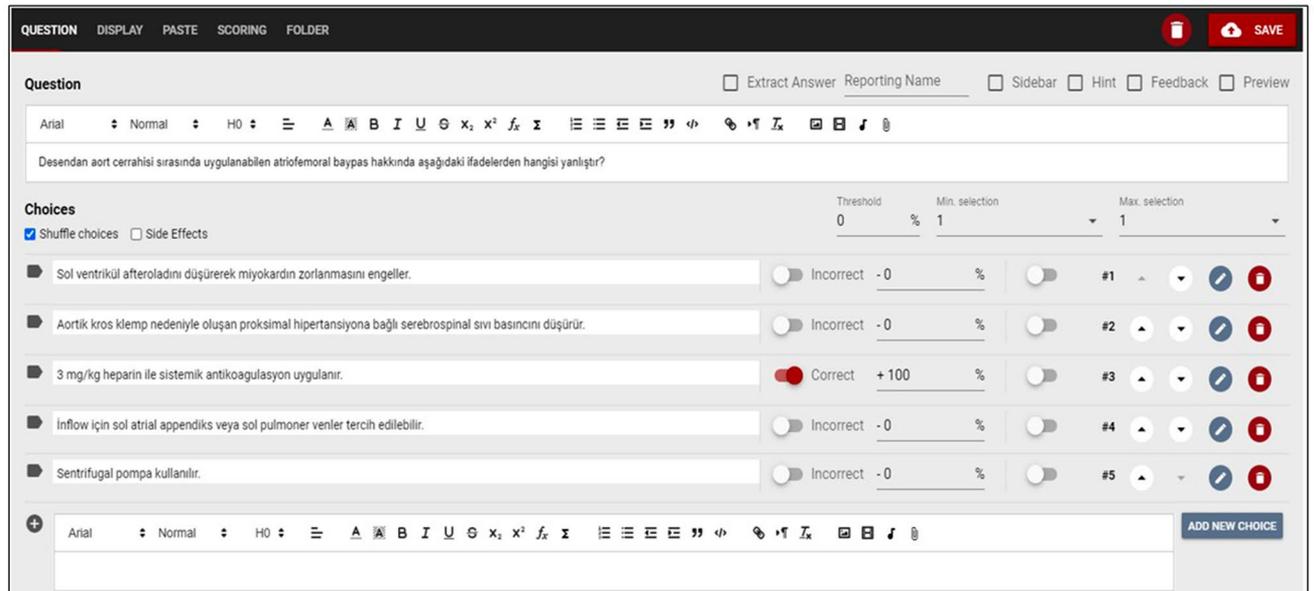


Figure 2. Question bank view.

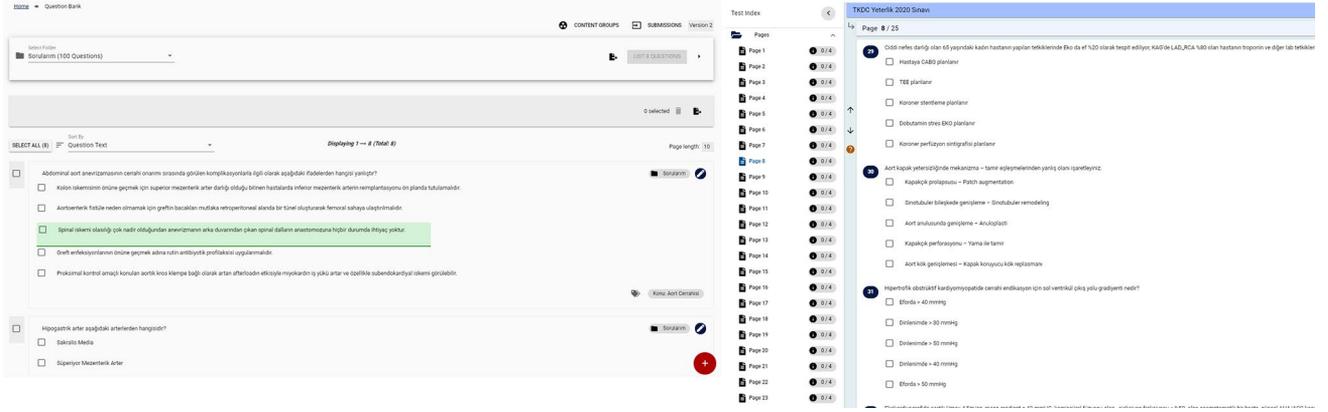


Figure 3. Exam set.

The participants were asked to be careful for the safety of the exam, that the microphone and camera would be on and the full screen would not be turned off. To increase the safety of the exam, video and audio recordings of the participants were made synchronously during the exam, with the voluntary consent of the participants. These recordings were monitored synchronously by the exam observers and the problems related to exam security were noted.

The online exam was started at the announced time. All participants entered the exam at the scheduled time. The test analyzed on basic topics such as participants' exam scores, exam success rankings, and answers to questions were shared on their own web interface (Figures 5, 6).

In the present study, we aimed to provide information about the results of the Turkish Cardiovascular Surgery Board written exam, which was held online due to the pandemic, and to share the online exam experience.

## PATIENTS AND METHODS

This cross-sectional study was conducted at Ege University, Faculty of Medicine, Department of Medical Education in November 21<sup>st</sup>, 2020 between 10:00 A.M. and 12:00 P.M. After the online exam was completed, data on participant information and answers to exam questions were obtained from the information system. A total of 41 cardiovascular surgeons and residents (39 males, 2 females) participated in this exam.

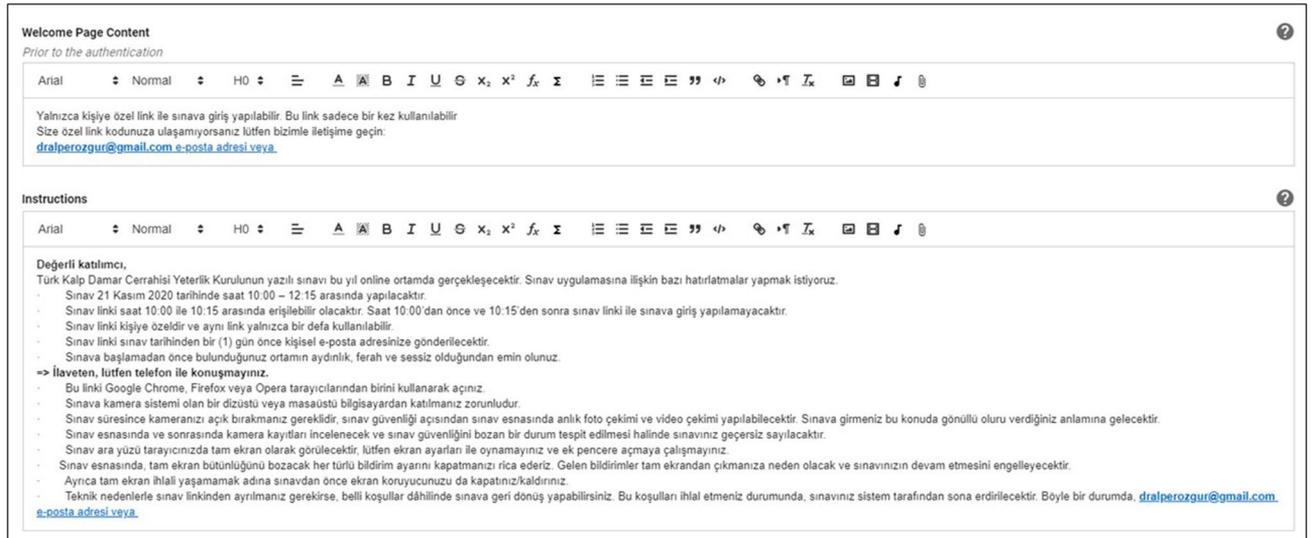


Figure 4. Information mail for participants.

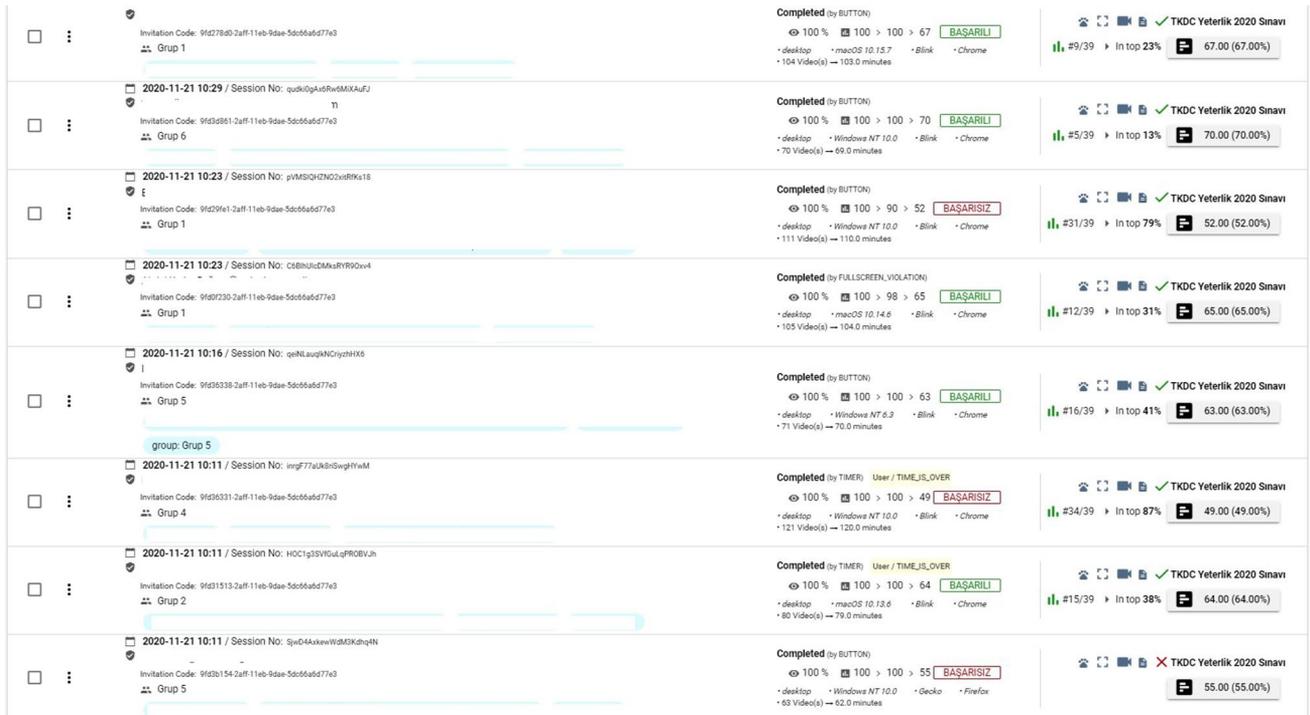


Figure 5. Distribution of exam results.

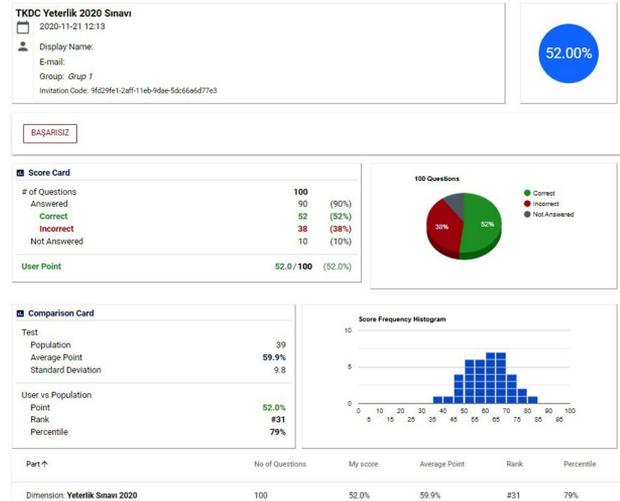
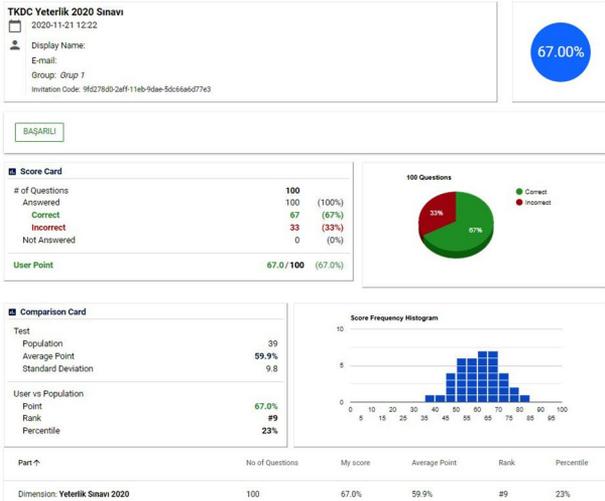


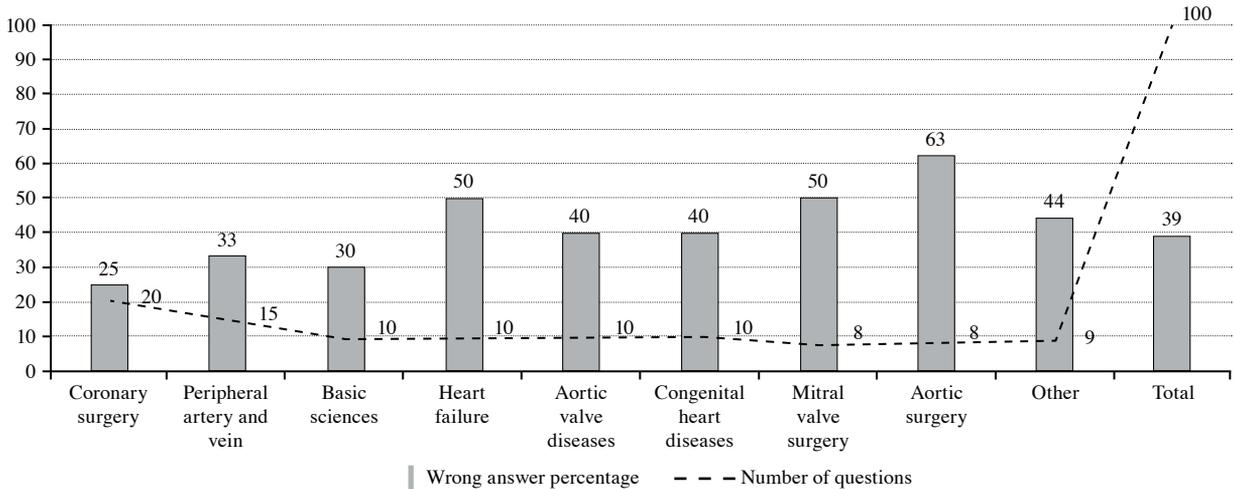
Figure 6. Successful and unsuccessful participant.

The participating institution, title, and sex information were the independent variables of the study. The duration of the exam, the number of videos, the total score obtained from the exam, the scores obtained from the question areas, the number of wrongly answered questions in the question areas were the dependent variables of the research.

The mean score of the group was taken into account in deciding the success of the participants in the written exam, and the participants with a score above the mean score were accepted as successful.

### Statistical analysis

Statistical analysis was performed using the IBM SPSS version 23.0 software



**Figure 7.** Percentage of wrong answers by subject areas.

(IBM Corp., Armonk, NY, USA). Descriptive statistics and hypothesis tests (One-Way ANOVA, t-test) were calculated on the data.

## RESULTS

Cardiovascular surgeons and residents participated in this exam. The participants were working in a university hospital (39%), a training and research hospital (26.8%), a state hospital (24.4%), or the private hospital. A total of 82.9% of the participants were specialists. Seven last grade residents also took the exam.

The participants in the online written exam were followed by the observer faculty members. These members followed the exams of six to eight participants in their groups through synchronously recorded videos every minute.

The mean exam time of the participants is  $96.7 \pm 21.8$  (range, 36 to 120) min. The exam duration of 65.9% of the participants was over 90 min. The mean number of videos recorded per participant during the exam was 96 (range, 37 to 122).

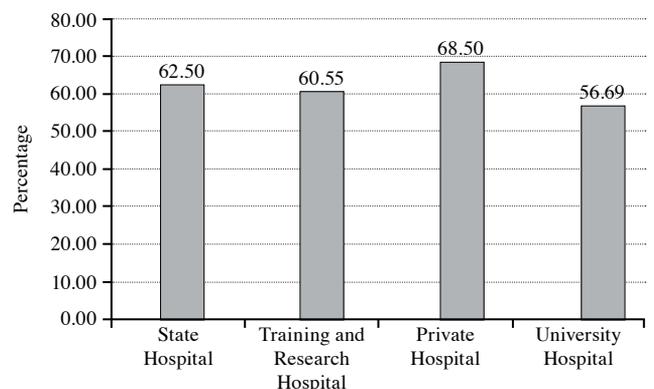
The participants gave wrong answers to a mean of  $39.2 \pm 9.9$  (range, 16 to 64) questions. The rate of incorrect answers to the questions was calculated according to the subject areas (Figure 7). Aortic surgery (63%), heart failure surgery (50%), and mitral valve surgery (50%) were the most incorrectly answered questions.

There was no statistically significant difference between the rates of answering the questions

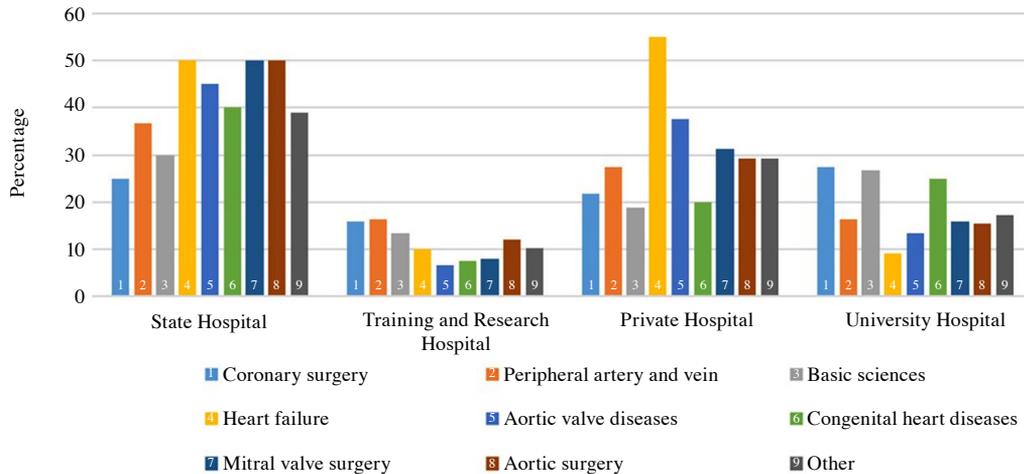
incorrectly ( $F=1.64$ ,  $p=0.19$ ) and the mean success score ( $F=1.79$ ,  $p=0.16$ ) according to the institutions where the participants worked (Figure 8). However, the rate of wrong answers in all areas was higher in the participants working in the state hospital (Figure 9).

The mean of questions answered incorrectly was not significant different according to the title (specialist/resident) ( $t=2.26$ ,  $p=0.029$ ). The rate of questions answered incorrectly was 37.62% for specialists and 46.57% for residents.

The total mean score of the participants was  $60.3 \pm 10.2$  (range, 36 to 84) and 53.7% of them had a total score above the mean, which were declared successful-passed in the Board exam. There was no significant difference between specialists ( $61.7 \pm 9.8$ ) and residents ( $53.4 \pm 10.1$ ) in terms of the total mean score ( $t=1.98$ ,  $p=0.081$ ).



**Figure 8.** The mean of total score according to the institutions they work for.



**Figure 9.** Percentage of wrong answers according to the institutions they work for.

## DISCUSSION

While many Boards did not conduct the Board written-practical exams during the COVID-19 pandemic period,<sup>[4-13]</sup> the Turkish Cardiovascular Surgery Board conducted the exams which created a difference. The online Board exam did not change the number of participants compared to previous years. With the online exam, the Board gained different experiences regarding exam planning and implementation.

Advantages were experienced in certain issues such as preparing the exam set, informing the participants, obtaining voluntary consent from the participants for the audio-video recording, and the convenience of the participants to take the exam from their own place. However, the most concerned issue regarding the online written exam was exam security. To eliminate this disadvantage, the audio and video recordings of the participants were taken synchronously during the exam and the video recordings were evaluated instantly by the exam observers. Although two of the participants were warned during the exam, audio and video recordings could not be taken and their exams were deemed invalid.

In this written exam, similar to the other exams,<sup>[4,5]</sup> an exam set of 100 questions covering core topics related to cardiovascular surgery was prepared and applied. Participants answered questions about aortic surgery and heart failure surgery less accurately. The fact that this subject is not performed in every institution in our country has had an impact on the knowledge level of the participants. Similarly, since the subjects related to valve surgery and congenital heart

disease surgery are more difficult, the success rate in the related questions is low.

Although the exam success of the participants according to the institutions was not statistically significant, there was a remarkable difference. In addition, the exam success of the employees in education and research hospitals was better than other institutions. The high number and variety of surgical cases and the interpersonal competition are effective on the exam success of the employees in these institutions. Furthermore, the exam success of those working in university hospitals was lower than expected. The fact that approximately one-third of the participants working in the university hospital were residents is effective on this result. The total mean score was affected by the scores of the participants who have not yet completed their specialization training.

In conclusion, the Turkish Cardiovascular Surgery Board did not give up the Board exam during the pandemic period and conducted a reliable written exam with many participants. The Board exam is based on the core knowledge of the field of specialization and aims to measure the knowledge level of cardiovascular surgery specialists, regardless of the conditions of the institution they work for. The results of the study serve as a guide for the Turkish Society of Cardiovascular Surgery association to organize trainings in preparation for the Board exams in accordance with the health care needs of the country. There are observations that if a cardiovascular surgeon continues to work in the institution where he/she is trained, even for a short time, he would be more successful in the Board exams.

### Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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