ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

Kocaeli Med J 2025; 14 (2): 114-119 doi: 10.5505/ktd.2025.17802

Hastanemizdeki Mavi Kod Uygulamalarının Değerlendirilmesi: Retrospektif Çalışma

Evaluation of Code Blue Practıces in Our Hospital: Retrospective Study

Ahmet Ergün[1], Tülay Çardaközü[2], Nur Nazire Yucal[3], Dilek Özdamar[2], Alparslan Kuş[2]

[1]Kocaeli Şehir Hastanesi, Anesteziyoloji ve Reanimasyon Kliniği, Kocaeli, Türkiye.

[2]Kocaeli Üniversitesi Tıp Fakültesi, Anesteziyoloji ve Reanimasyon Kliniği, Kocaeli, Türkiye.

[3]Başakşehir Çam ve Sakura Şehir Hastanesi, Anesteziyoloji ve Reanimasyon Kliniği, İstanbul, Türkiye.

ÖZ

Giriş: Çalışmamızda hastanemizde uygulanmakta olan Mavi Kod (MK) çağrı sistemini değerlendirmeyi, kardiyopulmoner resüsitasyon (KPR) başarı oranımızı, MK uygulamasındaki sorunları, eksiklik ve yanlışlarımızı tespit etmeyi amaçladık.

Yöntem: 2013-2021 yılları arasındaki yoğun bakım ünitesi, acil servis ve ameliyathane dışında MK verilen 18 yaş üstü hastalara ait MK bildirim formu ve hastanemiz veri tabanı retrospektif taranarak yapıldı. MK verilen alana ekip ulaştığı zaman kardiyopulmoner arrest (KPA) durumu mevcut değil ise 'hatalı mavi kod (HMK)' olarak tanımlandı. Hastaların yaş ve cinsiyetleri, MK verilen birim ve saat, MK ekibinin alana ulaşma süresi, HMK ise nedeni, KPR'ye başlanıp başlanmadığı, KPR'ye yanıt durumu ve yoğun bakım seyirleri kaydedildi.

Bulgular: MK verilen 1051 çağrının 389'u (%37) HMK bildirimidir, HMK bildirimlerinde en sık neden hastada hipoksi bulgularıdır (%36). KPR uygulanan hastaların %62,3'ü erkek, %37,6'sı kadındır, median yaş 67 yıl (59-77) olarak saptanmıştır. MK ekibinin ortalama varış süresi 2,77±1,59 dakikadır. En fazla MK bildirimi dahiliye servislerinden (%22) verilmiştir. MK bildirimlerinin %53,7'si mesai dışı saatlerde yapılmıştır. KPA gelişen hastalarda en sık komorbidite malignitedir (%31,4). KPA gelişen 662 hastanın 244'ünde (%36,9) MK ekibi gelene kadar KPR'ye başlanmadığı saptanmıştır. KPR uygulanan 662 hastanın 284'ü (%42,9) exitus olmuştur.

Sonuç: Çalışmamızda HMK oranının %37 olması nedeniyle sürekli güncellenen resüsitasyon kılavuzlarına uygun eğitimin; HMK oranlarını azaltacağına ve sağlık çalışanlarının farkındalığını arttıracağına inanıyoruz.

Anahtar Kelimeler: mavi kod, kardiyopulmoner resüsitasyon, kardiyopulmoner arrest

ABSTRACT

Objective: In our study, we aimed to evaluate the Code Blue (CB) call system implemented in our hospital, to determine our cardiopulmonary resuscitation (CPR) success rate, problems, deficiencies and mistakes in CB implementation.

Method: A retrospective review of CB notifications and hospital records was conducted for patients over 18 who received CB outside the ICU, emergency department, and operating theatre between 2013 and 2021. If cardiopulmonary arrest (CPA) was absent when the team arrived at the CB location, it was defined as a false code blue (FCB). Patient age, gender, CB unit and time, CB team response time, FCB reason, whether CPR was initiated, CPR response, and ICU prognosis were recorded.

Results: 389 (37%) of the 1051 calls given a CB were FCB notifications, the most common reason for FCB notifications is hypoxia findings in the patient (36%). Among the patients who underwent CPR, 62.3% were male and 37.6% were female and the median age was 67 years (IQR: 59-77). The average arrival time of the CB team is 2.77±1.59 minutes. The highest number of CB notifications were received from internal medicine services (22%). 53.7% of CB notifications were made during off-hours. The most common comorbidity in patients with CPA is malignancy (31.4%). In 244 of 662 (36.9%) patients with CPA, CPR was not started until the CB team arrived. Of the 662 patients who underwent CPR, 284 (%42.9) patients died.

Conclusion: Since the FCB rate was 37%, we believe training aligned with updated resuscitation guidelines will reduce it and enhance healthcare professionals' awareness.

Keywords: code blue, cardiopulmonary resuscitation, cardiopulmonary arrest

Sending Date: 06.03.2025 **Acceptance Date:** 27.08.2025

Correspondence: Ahmet Ergun, Kocaeli City Hospital, Department of Anesthesiology and Reanimation, Kocaeli, Turkiye.
E-mail: ergunndrum@gmail.com

Cite as: Ergun A, Cardakozu T, Yucal NN, Ozdamar D, Kus A. Evaluation of Code Blue Practıces in Our Hospital: Retrospective Study. Kocaeli Med J 2025; 14(2): 114-119 doi: 10.5505/ktd.2025.17802

Copyright © Published by Kocaeli Derince Training and Research Hospital, Kocaeli, Türkiye.

INTRODUCTION

Cardiopulmonary arrest (CPA) is defined as the sudden cessation of spontaneous respiration and circulation, while cardiopulmonary resuscitation (CPR) encompasses all decisions and procedures aimed at restoring spontaneous circulation (1). CPR was first defined as chest compression in 1960, and has been in practice ever since (2). The aim of CPR is to save the patient's life through immediate and effective intervention, while also preserving the patient's previous health status to enable them to lead a functional life. To achieve this goal, teams have been formed in hospitals. The intervention teams, known as the 'Code Blue' (CB) call announcement in our country, are predefined individuals who reach the area of arrest and intervene following an emergency call system. In this system, the same color is used worldwide (3,4). The CB system was first defined and implemented in the United States. In our country, the CB system began with the 2008 implementation of the 'Health Performance and Quality Directive Service Quality Standards' regulation, and it became mandatory in hospitals with the Ministry of Health's 'Patient and Employee Safety Regulation' published in 2011 (5,6). The CB team consists of experienced and trained specialists, nurses, anesthesia technicians, service staff, and security personnel in CPR. They reach the location of the call as quickly as possible and begin CPR effectively, with all actions being recorded on the CB notification form (7,8). Although the CB call system is a life-saving application that should only be used for patients in arrest, unfortunately, in some cases, intentional or unintentional False Code Blue (FCB) notifications may be made, which can lead to loss of time and motivation among healthcare personnel (9).

The primary aim of our study was to determine our CPR success rate, the time to reach the arrest location, whether any intervention was initiated before the CB team arrived, the rate of false CB notifications, the time to discharge from the intensive care unit after successful CPR, and the 30-day survival rate. Our other aims were to investigate the departments and units where CB calls were most frequently made, the accompanying comorbid conditions, and the times at which CB calls occurred.

MATERIALS AND METHODS

This study was conducted retrospectively by analyzing CB applications between January 1, 2013 and December 31, 2021 after obtaining approval from the Ethics Committee for Non-Interventional Clinical Research of our university (approval number: 2022/11.19 date: June 26, 2022). Data were obtained from the CB notification forms and our hospital's database. The CB notification form includes the date and time of the call, information about the person intervened (name-surname, date of birth, diagnosis and physician), the intervention performed, the location of the intervention, the time of the call, the time of arrival of the team, the result of the intervention and the information and signatures of the CB team.

Return of spontaneous circulation after CPR is defined as successful CPR. If no CPA is present in the patient attended for CB, it is classified as a 'False Code Blue' (FCB), with causes categorized as [incorrect dialing (accidental pressing of 2222), signs of hypoxia (tachypnea, cyanosis, low oxygen saturation), altered consciousness (convulsions, syncope, and decrease in Glasgow Coma Scale), request for anesthesia consultation, sudden cardiovascular changes, chest pain, allergic reactions, and presence of metabolic acidosis]. In addition, it was also recorded whether or not CPR was started until the arrival of the CB team (Intervention performed / No intervention performed). Due to the inability to access data for patients transferred to external intensive care units (ICU) after successful CPR, data on ICU discharge and 30-day survival were evaluated only for those admitted to our hospital's ICU. The timing of CB calls was categorized as in-hours (08:01–16:00) and out-of-hours (16:01–08:00). Patients under 18 years of age, as well as those in the emergency department, general operating room, general ICU, and coronary ICU, were excluded from our study as they are not part of the CB applications in our hospital.

Statistics Analysis

Statistical analysis was performed using IBM SPSS 20.0 (IBM Corp., Armonk, NY, USA), and normality was assessed using the Kolmogorov-Smirnov test and graphical methods. Variables showing normal distribution are presented as mean ± standard deviation, while variables not showing normal distribution are presented as median (25th–75th percentile). Categorical variables are presented as frequency (percentage). Differences between groups were determined using the independent samples t-test or the Mann-Whitney U test, based on the assumption of normal distribution. The relationships between categorical variables were assessed using chi-square analysis, and a p-value of <0.05 was considered statistically significant for hypothesis testing.

RESULTS

In our study, 1051 CB notification forms from the period between 01/01/2013 and 31/12/2021 were evaluated. Of the 1051 CB calls, 389 (37%) were identified as FCB notifications, while CPR was performed on 662 (63%) patients. Of the patients who received CPR, 413 (62.3%) were male and 249 (37.6%) were female, with a median age of 67 years (IQR: 59-77). Of the 662 patients who received CPR, 378 (57.1%) had a successful CPR response, while 284 patients (42.9%) were considered exitus. After successful CPR, 124 (32.8%) patients were admitted to our hospital's ICU, while 254 (67.2%) patients were transferred to external ICU facilities due to the unavailability of ICU beds in our hospital (Table 1).

Table 1. Our Results Regarding CPR Interventions

Status	n	%
Exitus	284	42.9
Successful CPR	378	57.1
In-hospital ICU admission after successful CPR	124	32.8
Transfer to an external ICU after successful CPR	254	67.2
Total	662	100

CPR: Cardiopulmonary resuscitation ICU: Intensive Care Unit

Of the 124 patients admitted to our hospital's ICU, 88 (69.3%) exited. The median duration of exitus in these patients was 3 days (IQR: 1-11.25). The mean discharge time of the patients who were transferred from the ICU to the inpatient service was 9.97±6.69 days and the 30-day survival rate was 30.7% (39 patients).

FCB was detected in 389 (37%) of 1051 reports, and the most common cause of FCB was found to be hypoxia findings in 140 patients (36%) (Table 2).

Table 2. Distribution of Reasons for False Code Blue Practices

Cause of False Code Blue	n	%
Hypoxia Findings	140	36.0
Change in Consciousness	131	33.7
Sudden Cardiovascular Change	60	15.4
Anaesthesia Consultation	43	11.0
Incorrect Dialling	7	1.8
Chest Pain	4	1.0
Allergy	3	0.8
Metabolic Acidosis	1	0.3
Total	389	100

The mean arrival time of the team to the scene after the CB call was 2.77±1.59 min. It was determined that CPR was started in 418 (63.1%) patients and not started in 244 (36.9%) patients until the arrival of the CB team.

It was determined that the first three wards with the most frequent CB notifications were internal medicine, oncology and pulmonology (Table 3).

Table 3. The Distribution of Code Blue Notifications by Units

Departments	n	%
Internal Medicine	233	22.0
Oncology	104	9.9
Pulmonology	89	8.5
General Surgery	87	8.3
Covid-19	81	7.7
Orthopedic Surgery	62	5.9
Imaging Units	61	5.8
Outpatient Clinics and Other Waiting Areas	60	5.7
Dialysis Unit	50	4.8
Infectious Diseases	42	4.0
Neurology	37	3.6
Interventional Cardiology Unit	31	2.9
Urology	29	2.8
Obstetrics and Gynecology	22	2.1
Local Operating Room	17	1.6
Cardiovascular Surgery	15	1.4
Cardiology	13	1.2
Neurosurgery	7	0.7
Thoracic Surgery	7	0.7
Plastic, Reconstructive and Aesthetic Surgery	4	0.4
Total	1051	100

The most common comorbid condition in patients with CPA was malignancy, followed by respiratory failure and cardiovascular disease (Table 4).

Table 4. Comorbid Conditions in Patients with CPA

Disease	N	%
Malignancies	208	31.4
Respiratory Failure	135	20.4
Cardiovascular Disease	98	14.8
Renal Failure	96	14.6
Cerebrovascular Disease	38	5.7
Sepsis	35	5.3
Diabetes Mellitus	21	3.2
Haemorrhagic Shock	16	2.4
Liver Cirrhosis	15	2.2
Total	662	100

CPA: Cardiopulmonary arrest

Of 208 patients with malignancy, 115 (55.2%) did not respond to CPR. Of 93 patients (44.8%) who responded to CPR, 24 (11.5%) were admitted to the ICU of our hospital and only 4 (1.9%) of them could be discharged from the ICU.

When the distribution of CB notifications by time was analysed, it was found that 487 (46.3%) CB notifications were made during working hours and 564 (53.7%) CB notifications were made outside of working hours.

DISCUSSION

In our study, 1051 CB applications were retrospectively evaluated, 389 (37%) of 1051 CB were defined as FCB, the time to reach the CB area was determined as 2.77±1.59 min. The number of patients who responded to CPR was 378 (57.1%), Among the patients who responded to CPR, 124 (18.7%) were referred to our hospital ICU and 174 (26.2%) were referred to an external centre ICU. The 30-day survival rate of these patients followed up in the ICU of our hospital was 30.7%. Our mean discharge time is 9.97±6.69 days. The median age of patients with CPA was 67 (59-77) years and the most common comorbid condition was malignancy (31.4%). The highest number of CB were reported from internal medicine, oncology and pulmonology wards.

In our study, our success rate after CPR was found to be 57.1%. In studies conducted in our country, the rate of successful CPR was found to be between 15.6% and 75% (Table 5), This rate may vary in out-of-hospital cardiac arrest (OHCA) (33.6%) and in-hospital cardiac arrest (IHCA) (50.4%) (16).

When the 30-day survival/hospital discharge rate is examined, the average in OHCA in Europe is 8% (0-18%), while in IHCA, it can vary between 15-34%. In our study, the 30-day survival rate was found to be 30.7%. Our results being consistent with national and international literature has been associated, as stated by Özcan et al., with the CPR-related training provided before and after graduation in our hospital, as well as with adherence to guidelines and updates (17).

Table 5. Comparison of Some Studies on Code Blue Practices in Turkey

	Rate Of Successful CPR (%)	FCB Call Frequency (%)	FCB Call Reason	Average Age (year)	Unit with the Most CB Calls	Time to Reach the CB Area
Tosyali ve et al.[4]	42.8	5.8	undefined	70.3	Internal Medicine	1.33
Eroglu ve et al.[9]	75.0	91	healthcare workers' concerns about the patient, conversion, changes in mental status, chest pain and presyncope	68	-	1.75
Ozlem Ozmete[10]	15.6	3.2	Undefined	62	Internal Medicine ICU	1.25
Esen ve et al.[11]	20.0	20.4	Undefined	66.9	Internal Medicine ICU	3.45
Yildiz ve et al.[12]	75.2	15.6	undefined	71	Neurology ICU	1.16
Ocak ve et al.[13]	69.7	51.4	Syncope, seizure, anxiety/conversion, hypotensive episode, altered consciousness, general disturbance, chest pain, anaphylaxis, respiratory distress, arrhythmia	63.6	Outpatient clinics	2.63
Murat ve et al.[14]	47.0	10.0	undefined	72	Surgical ICU	2.72
Cicekci ve et al.[15]	36.2	20.9	Altered state of consciousness, hypotension, bradycardia	71.5	Coronary ICU	1.7

CPR: Cardiopulmonary Resuscitation FCB: False Code Blue CB: Code Blue ICU: Intensive Care Unit

Early initiation of resuscitation after CPA is very important for good outcomes (18). In the legislation of the Ministry of Health on CB practices, it is stated that measures should be taken to ensure that the team reaches the call centre in less than 3 minutes after the call (3). It has been reported that mortality reaches 100% in cases where the time to reach the call area exceeds 8 minutes (19). In one study, the CPR success rate was found to be 44.5% when interventions were initiated within 3 minutes, whereas it was 19.5% when the duration exceeded 3 minutes (20). In our hospital, the medical emergency teams have been structured to reach the intervention area as quickly as possible, and in our study, the response time to the scene was found to be 2.77±1.59 minutes. In some cases, the response time exceeded 3 minutes, this can be explained by the impact of the COVID-19 pandemic during the study period and the additional time required to wear personal protective equipment for emergency calls from COVID-19 wards.

In our study, it was determined that CPR had not been initiated in 244 (36.9%) patients when the medical emergency team arrived at the scene. In the study conducted by Yıldız et al. this rate was found (42.7%) to be higher (12) .It has been reported that early initiation of intervention in cases of CPA increases success rates and provides better survival (18). We believe that to achieve this, basic and advanced life support training should be provided to all healthcare personnel and repeated periodically.

The FCB notifications is one of the important problems in CB practices. In addition to healthcare personnel activating the CB notification system to ensure the patient's health due to an acute pathology, there is also the possibility of misuse of the system (9). In the data of our country, FCB rates vary between 3.2% and 91% (Table 5). In the study by Eroğlu et al., the FCB notifications rate was determined to be 91%, with the reasons including healthcare workers' concerns about the patient (24.7%), conversion (20.2%), changes in mental status (20.2%), chest pain (13.5%), and presyncope (12.4%) (9). In the study by Özmete et al., the FCB rate was quite low (3.2%) (10). In this study, FCB was defined as changes in consciousness, hypotension, and bradycardia. The authors did not discuss the reasons for the low FCB rate in detail. In our opinion, this could be due to the inclusion of patients hospitalized in internal medicine and neurology ICUs and the monitored follow-up of ICU patients. In the foreign literature, the rates and causes of FCB also vary. In the study by Cashman et al., the rate of FCB was found to be 6.71% and the most common cause was arrhythmia and the second most common cause was epileptic seizure (21). In the study by Kenward et al., the FCB rate was 30%, with the most

common causes identified as "collapse, vasovagal syncope, epileptic seizure, and hypoxia" (22). In our study, the rate of FCB notification was around 39% and this rate cannot be underestimated. In our study, apart from the development of situations of concern for the patient, activation of the CB in situations such as request for anaesthesia consultation (11%) and incorrect dialling (1.8%) indicates misuse and careless use of the CB. FCB calls should be taken seriously as they lead to personnel and time loss, and training on this issue should be included in both pre-graduation and post-graduation education plans, all healthcare workers should be trained on this matter. It has been reported that the FCB rate significantly decreased after the training (4,12). The second solution to prevent the implementation of FCB is to provide training on approaches to patients and coping strategies in critical situations such as hypoxia, changes in consciousness, and cardiovascular instability. The use of Early Warning Score Systems for the monitoring of these critical patients should be promoted, and a separate team should be established for the care of critically ill patients, with the goal of reducing FCB rates. Early recognition of the deteriorating patient and taking the necessary measures rapidly can prevent the development of cardiac arrest in patients. Various scoring systems have been developed for this purpose (23).

In our study, the highest number of CB calls were made from the internal medicine service, followed by the oncology service. In the study by Tosyalı et al. and the study by Esen et al. it was reported that the units with the highest number of CB calls were internal medicine services (4,11). In the study by Yıldız et al. the unit with the highest number of CB calls was the ICU, in this study the authors explained the reason why more CB were given from the ICU compared to the others as the patients hospitalised in the ICU had more comorbidities (12). In the third article of the article on CB applications published by the Ministry of Health in the Official Gazette dated 26 April 2009 and numbered 27214, it is stated as follows: “CB is not given in units such as emergency services, intensive care and operating theatres, which will be determined by the administration and which frequently require CPR application, and it is ensured that the interventions required for patients treated in these units are carried out within the unit.’’ (3). In our hospital, CB calls are not made from the emergency department, general operating room, or general and coronary ICUs. CPR procedures in these units are performed by trained personnel within the respective departments.

When the comorbid conditions of the patients who were reported with CB are analysed, it may show differences according to the presence of out-of-hospital cardiac arrest (OHCA) and in-hospital cardiac arrest (IHCA). In the study of Özmete et al. similar to our results, malignancy and respiratory failure were reported as the most common comorbid diseases in IHCA, respectively (10). When OHCA and comorbid diseases were analysed, the most common comorbid disease was found to be coronary artery disease (24,25). According to the data obtained from our study, malignancy accompanies 208 (%31.4) of the patients who were called for CB. In these patients, our successful CPR rate (44.8%) was lower than our general results (57.1%). Of the 24 malignancy patients admitted to the ICU after successful CPR, only 4 (1.9%) were discharged from the ICU. In patients with malignancy, whether to give CB in case of CPA and whether to resuscitate the patient are important problems. The issue has conscientious, ethical, economic and legal dimensions and requires a multi-faceted study.

In our study, the median age of patients who underwent CPR was 67 years (IQR:59-77). In the results of studies conducted in our country, the average age is between 62 and 72 years (Table 5). When foreign sources were analysed, it was found that the results were similar, but the mean age of patients who underwent CPR in the ICU was lower than those in the ward (64 years; 69 years) (26,27).

We determined that 487 (46.3%) of the CB calls were made between 08.01-16.00 and 564 (53.7%) between 16.01-08.00. In the study conducted by Tosyalı et al. the rate of CB notification during working hours was 41%, and in the study conducted by Ocak et al. the rate of CB notification during working hours was 56.5% (4,13). This data further proves the necessity for CB applications to operate on a 7/24 basis.

In our study, ICU discharge and 30-day survival data were calculated solely based on the patients admitted to the ICU of our own hospital. We excluded patients who were transferred and whose data we could not access from these calculations, which may be one of the limitations of our study. The second limitation is the lack of data on post-resuscitation period such as hospital discharge and neurological sequelae.

In conclusion, in our retrospective study in which we evaluated the CB applications in our hospital, we found that our data were consistent with the domestic and foreign literature. We have identified that the reasons for FCB may include patient safety concerns as well as patient misuse. We think that it would be appropriate to introduce and disseminate early warning scoring systems in hospitals to reduce the number of FCB calls due to patient-related concerns. Correct CB application, successful CPR and increased survival after resuscitation will be possible with periodic training not only for physicians but also for nurses and allied health personnel supported by updated guidelines.

Ethics Committee Approval: Kocaeli University Non-Interventional Clinical Research Ethics Committee. (26.06.2022 - 2022/11.19)

Authors’contributions: All authors contributed to the article.

Conflict of Interest: None.

Funding: No.

Acknowledgments: There is no.

Informed Consent: Since our study is retrospective, patient consent was not obtained.

REFERENCES

1. Balcı B, Keskin O, Karabag Y. Cardiopulmonary resuscitation. 2011; 41-46.
2. Eisenberg, Mickey S, Bruce M, PSATY. Defining and improving survival rates from cardiac arrest in US communities. JAMA. 2009; 301(8): 860-862
3. Republic of Turkey Ministry of Health. General directorate of public hospitals union. Code Blue implementation procedures and principles. 2024 [Accessed: 11 June 2024]. Available from: https://dosyamerkez.saglik.gov.tr/Eklenti/27017/0/makam- urupdf.pdf

4. Tosyaıı C, Numanoglu M. Evaluation of code blue application results. Journal of Performance and Quality in Health. 2015; 9(1): 66-77.

5. Incesu E. The name of the return to life 'code blue'. Retrospective evaluation of the notification reports made to the code blue unit of Seydisehir State Hospital. International Journal of Health Management and Strategies Research. 2018; 4(1): 26-39.

6. Republic of Turkey Ministry of Health. Regulation on ensuring patient and employee safety. Official Gazette. 6 April 2011; 27897 [Accessed: 11Jun2024]Availablefrom:https://www.resmigazete.gov.tr/eskiler/2011/04/20110406-3.htm

7. Republic of Turkey Ministry of Health. Communiqué on procedures and principles for ensuring and protecting patient and employee safety in health institutions and organisations. Official Gazette. 29 April 2009; 27214 [Accessed: 11 Jun 2024]. Available from: https://www.resmigazete.gov.tr/eskiler/2009/04/20090429-12.htm

8. Republic of Turkey Ministry of Health. Code blue implementation instruction. 2008 [Accessed: 14 Jun 2012]. Available from: https://dosyamerkez.saglik.gov.tr/Eklenti/6117/0/hks-rehberi-2008pdf.pdf (ET: 14/06/2012).

9. Eroglu SE, Onur O, Urgan O, Denizbaşı A, Akoğlu H. Blue code: Is it a real emergency? World J Emerg Med. 2014; 5(1): 20.

10. Ozmete O. Results of code blue implementation in a university hospital. Cukurova Medical Journal. 2017; 42(3): 446-450.

11. Esen O, Esen HK, Oncul S, Gaygusuz EA, Yılmaz M, Bayram E. Evaluation of code blue application and results in Education and Research Hospital. J Kartal Tr. 2016; 27(1): 57-61.

12. Yildiz E, İsler D, Arik O, Balcı C. Retrospective evaluation of code blue notifications in our hospital. Aksaray University Journal of Medical Sciences. 2021; 2(1): 4-7.

13. Ocak M, Tascanov MB. Evaluation Of code blue calls pre-pandemic and Post-pandemic period in a state hospital: Single center experience. Journal of Harran University Faculty of Medicine. 2021; 18(3): 429-435.

14. Murat E, Toprak S, Dogan DB, Mordogan F. The code blue experiences: gains, problems and troubleshooting. Medicine Science. 2014; 3(1): 1002-1012.

15. Cicekci F, Atıcı SS. Evaluation of the results of cardio-pulmonary resuscitation applications related to Code Blue call. Journal of General Medicine. 2013 ;23(3): 70-76

16. Saglam O. Factors affecting mortality in cardiac arrest patients who underwent cardiopulmonary resuscitation in the emergency department in a one-year period. Ankara Yıldırım Beyazıt University, Department of Emergency Medicine, Medical Speciality Thesis; 2018. 55 p.

17. Ozcan S, Birbicer H, Karaaslan P, Keles GT, Karahan MA. Evaluation of post-resuscitation care practices of physicians working in intensive care units. J Turk Soc Intens Care. 2024; 22(1): 41-49

18. Semeraro F, Greif R, Böttiger BW, Burkart R, Cimpoesu D, Georgiou M et al. European resuscitation council guidelines 2021: systems saving lives. Resuscitation. 2021; 161: 80-97.

19. Petrie DA, De Maio V, Stiell IG, Dreyer J, Martin M, O'Brien JA et al. OPALS Study Group. Factors affecting survival after prehospital asystolic cardiac arrest in a Basic Life Support-Defibrillation system. Canadian Journal of Emergency Medicine. 2001; 3(3): 186-192.

20. Cooper S, Cade J. Predicting survival, in-hospital cardiac arrests: resuscitation survival variables and training effectiveness. Resuscitation. 1997; 35(1): 17-22

21. Cashman JN. In-hospital cardiac arrest: what happens to the false arrests? Resuscitation. 2002; 53(3): 271-276.

22. Kenward G, Robinson A, Bradburn S, Steeds R. False cardiac arrests: the right time to turn away?. Postgraduate Medical Journal. 2007; 83(979): 344-347.

23. Doruk N, Ozdemir L, Sagun A, Tasdelen B, Kok M, Yesilmen E. Comparison of Two Different Early Warning Scores in Determining the Risk of Cardiac Arrest in Patients Diagnosed with COVID-19: Retrospective Analysis. Turkish Journal of Resuscitation. 2022; 1(1): 44-57

24. Arac S, Zengin Y, Icer M, Gunduz E, Dursun R, Durgun HM et al. Evaluation of cardiopulmonary resuscitation patients in the emergency department; retrospective study. Abant Med J. 2021; 10(1): 142-153.

25. Ozmete O, Bali C, Ergenoglu P, Yesilagac H, Karagun O, Gulalp B et al. Characteristics and outcomes of patients brought to the emergency department with out-of-hospital cardiac arrest. Journal of Anaesthesia. 2017; 25(4): 239–242

26. Kim Y, Lee DS, Min H, Choi YY, Lee EY, Song I et al. Effectiveness analysis of a part-time rapid response system during operation versus nonoperation. Critical care medicine. 2017; 45(6): 592-599.

27. Perman SM, Stanton E, Soar J, et al. Location of In-Hospital Cardiac Arrest in the United States-Variability in Event Rate and Outcomes. J Am Heart Assoc. 2016;5(10):e003638.