

NURSES KNOWLEDGE OF THE *CODE BLUE* SYSTEM IN EMERGENCY RESPONSE AT IBNU SINA HOSPITAL, MAKASSAR

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ABSTRAK

Keberhasilan penanganan kegawatdaruratan di rumah sakit, khususnya henti jantung, sangat bergantung pada pengetahuan perawat tentang sistem Code Blue. Penelitian ini bertujuan untuk mengetahui gambaran tingkat pengetahuan perawat mengenai *Code Blue* System di Rumah Sakit Ibnu Sina Makassar YW Umi. Penelitian menggunakan desain survei deskriptif dengan pendekatan cross-sectional yang dilaksanakan pada bulan November–Desember 2025. Sampel penelitian sebanyak 130 perawat dipilih dengan teknik simple random sampling. Data dikumpulkan melalui kuesioner yang mencakup kriteria aktivasi, cara aktivasi, fungsi, dan sistem peringatan dini Code Blue, kemudian dianalisis secara univariat menggunakan SPSS. Hasil penelitian menunjukkan bahwa sebagian besar perawat memiliki pengetahuan baik tentang kriteria aktivasi *Code Blue* (56,92%), cara aktivasi (94,62%), fungsi *Code Blue* (91,54%), sistem peringatan dini (84,62%), dan keseluruhan sistem *Code Blue* (82,30%). Nilai Cronbach's Alpha sebesar 0,804 menunjukkan instrumen penelitian memiliki reliabilitas yang baik. Kesimpulannya, perawat di RS Ibnu Sina Makassar secara umum memiliki tingkat pengetahuan baik mengenai sistem Code Blue, yang mendukung respons cepat dan tepat dalam situasi kegawatdaruratan.

Kata kunci : *code blue system, kegawatdaruratan, perawat, pengetahuan, rumah sakit*

ABSTRACT

The success of cardiac arrest emergency response in hospitals greatly depends on nurses' knowledge of the Code Blue system. This study aims to determine the level of nurses' knowledge regarding the Code Blue System at Ibnu Sina Hospital in Makassar. The study used a descriptive survey design with a cross-sectional approach conducted in November–December 2025. A sample of 130 nurses was selected using simple random sampling. Data were collected through a questionnaire covering the early warning system, Code Blue functions, activation criteria, and activation process, then analyzed using univariate analysis with SPSS. The results showed that most nurses had good knowledge of the Code Blue activation criteria (56.92%), activation process (94.62%), Code Blue function (91.54%), early warning system (84.62%), and the overall Code Blue system (82.30%). Cronbach's Alpha value of 0.804 indicates that the research instrument has good reliability. In conclusion, nurses at Ibnu Sina Hospital in Makassar generally have a good level of knowledge about the Code Blue system, which supports a quick and appropriate response in emergency situations.

Keywords : *code blue system, nurses, knowledge, hospital, emergency*

INTRODUCTION

Cardiac arrest is a condition characterized by the sudden cessation of heart activity, caused by disruption of the heart's electrical system, resulting in the inability of the heart to pump blood throughout the body. If not managed immediately, this condition can lead to severe brain damage. Of the 58 million deaths worldwide, approximately 31% are caused by heart disease.

It is estimated that around 17.8 million deaths each year are due to cardiovascular diseases, accounting for approximately 31% of all global deaths annually (Nugroho, 2024). The World Health Organization (WHO) states that cardiovascular disease remains the leading cause of death worldwide, accounting for 18.6 million out of 39.5 million deaths. In the United States, the incidence of in-hospital cardiac arrest (IHCA) is estimated at approximately 200,000 cases per year, with a survival rate of less than 20%. Meanwhile, in Indonesia, the prevalence is estimated at 10 per 10,000 individuals under the age of 35, with an annual incidence reaching 300,000–350,000 cases (Putrawan, 2019).

A national study by Ohbe et al. (2022), entitled “Incidence and outcomes of in-hospital cardiac arrest in Japan 2011–2017: a nationwide inpatient database study,” reported 274,664 IHCA cases in Japan between 2011 and 2017, with a survival-to-discharge rate of 12.7%. This figure increased from 10.5% in 2011 to 14.0% in 2017. Patients who received defibrillation had a higher survival rate (23.3%), while those who underwent extracorporeal cardiopulmonary resuscitation (ECPR) had a survival rate of 21.3%. Survival rates decreased with advancing age (only 6.5% in patients aged >84 years) and were lower in non-cardiac cases (8.4%). These findings indicate an improvement in IHCA resuscitation outcomes in Japan over time, although the overall survival rate remains relatively low. An observational study conducted in a large university hospital in Switzerland reported an IHCA incidence of 1.56 per 1,000 hospital admissions. Return of spontaneous circulation (ROSC) was achieved in approximately 72.1% of cases (49 out of 68 patients). The 30-day survival rate was 40%, and one year later, 32% of patients were still alive, with 29% demonstrating good neurological outcomes.

Cardiac arrest occurs due to insufficient oxygen supply to the brain, leading to neuronal cell death and loss of consciousness. Cardiovascular causes of cardiac arrest include ischemia, coronary artery disease, arrhythmias, cardiomyopathy, and acute obstruction. Circulatory causes include tension pneumothorax, hypovolemia, pulmonary embolism, and vagal reflexes (Wahdini et al., 2024). Several barriers contribute to the low rate of bystander intervention during sudden cardiac arrest, including limited intellectual ability and low public awareness regarding the provision of cardiopulmonary resuscitation (CPR) (Hidayat et al., 2022). WHO data from 2020 reported 6.7 million cases of heart failure in developing countries, accounting for approximately 31% of 56.6 million deaths annually. In Indonesia, the prevalence of diagnosed heart disease in 2020 was 1.5%, totaling 1,017,290 cases across 34 provinces. In Central Sulawesi, heart failure prevalence was estimated at 1.9% in 2022. Data from Anutapura Regional Hospital, Palu, indicated 116 deaths due to heart failure in 2022. From May to June 2023, 20 patients died in the internal medicine inpatient ward, with one *Code Blue* incident occurring within the last three months (Irkawati et al., 2023).

According to the American Association of Critical-Care Nurses (AACN), one of the main challenges in emergency care is the need to rapidly and accurately assess patients presenting with diverse and complex medical conditions. Unlike other nursing fields where patient conditions may be predictable, emergency nurses must be prepared to respond to all types of medical emergencies at any time. The *Code Blue* system plays a crucial role in reducing hospital mortality rates and improving coordination and communication among medical teams. A structured system with clear protocols and specially trained personnel enables rapid and effective patient care, thereby increasing survival chances and ensuring optimal teamwork during medical emergencies (Irkawati et al., 2023).

Previous research conducted by Irkawati (2023), entitled “The Relationship Between Nurses’ Knowledge Level and the *Code Blue* System in the Internal Medicine Inpatient Ward of Anutapura Regional Hospital, Palu,” found that nurses’ knowledge of the *Code Blue* system was generally at a moderate level. Based on the above background, this study aims to examine Nurses’ Knowledge of the *Code Blue* System in Emergency Response at Ibnu Sina Hospital, Makassar.

METHODS

This study employed a descriptive survey design with a cross-sectional approach to assess Nurses' Knowledge of the *Code Blue* System in Emergency Response at Ibnu Sina Hospital YW UMI, Makassar. The study was conducted from November to December 2025. The study population comprised all nurses working at Ibnu Sina Hospital, Makassar. A total of 130 nurses were selected using simple random sampling based on predetermined inclusion and exclusion criteria. Data were collected using a questionnaire consisting of 20 closed-ended questions with true/false response options. The questionnaire covered aspects of *Code Blue* activation criteria, activation procedures, roles and functions of the *Code Blue* system, and understanding of the Early Warning System (EWS). Data collection procedures included obtaining research permits and ethical approval, followed by questionnaire distribution to eligible respondents. Data were analyzed using SPSS (Statistical Program for Social Science) through univariate analysis to describe respondent characteristics and nurses' knowledge levels regarding the *Code Blue* system.

RESULT

This study assessed nurses' knowledge levels regarding the *Code Blue* system at Ibnu Sina Hospital YW UMI, Makassar, in 2025. Data collection was conducted from November to December 2025 using primary data obtained through questionnaires distributed to eligible nurses. A total of 130 nurses participated in this study. The research findings are presented in the following tables.

Univariate Analysis

Table 1. Demographic Characteristics of Respondents

Characteristics	Frequency (n)	Percentage (%)
Gender		
Female	107	17.69
Male	23	82.31
Age		
<25	31	23.85
25-30	32	24.62
31-35	67	51.54
Highest Education		
Nurse	130	100.00
Other	0	0.00
Length of Service		
>6 years	33	25.38
4-6 years	60	46.15
1-3 years	27	20.77
<1 years	10	7.69
Workplace		
ICU	15	11.54
Emergency Room	6	4.62
Operating Room	4	3.08
Inpatient Care	105	80.77
Code Blue Training History		
Yes	130	100.00
No	0	0.00
Total	130	100.0

Based on table 1, a total of 130 nurses participated in this study. The majority of respondents were male (82.31%) and were aged 31–35 years (51.54%). All respondents held a professional nursing degree (Ners) (100%). Most respondents had 4–6 years of work experience (46.15%) and worked in inpatient wards (80.77%). In addition, all respondents had previously participated in *Code Blue* training (100%).

Table 2. Knowledge Level of *Code Blue* Activation Criteria

Total Score	Frequency (n)	Percentage (%)
Good	74	56.92
Moderate	39	30.00
Poor	17	13.08
Total	130	100.0

As shown in table 2, most respondents demonstrated a good level of knowledge regarding the criteria for activating the *Code Blue* system, accounting for 74 respondents (56.92%). This was followed by 39 respondents (30.00%) with a moderate level of knowledge, while 17 respondents (13.08%) had a poor level of knowledge.

Table 3. Knowledge Level of *Code Blue* Activation Procedures

Total Score	Frequency (n)	Percentage (%)
Good	123	94.62
Moderate	7	5.38
Poor	0	0.00
Total	130	100.0

Table 3 indicates that almost all respondents had a good level of knowledge regarding how to activate the *Code Blue* system, with 123 respondents (94.62%). A small proportion of respondents, 7 individuals (5.38%), demonstrated a moderate level of knowledge, and none were categorized as having poor knowledge.

Table 4. Knowledge Level of the Early Warning System in the *Code Blue* System

Total Score	Frequency (n)	Percentage (%)
Good	119	91.54
Moderate	11	8.46
Poor	0	0.00
Total	130	100.0

Based on table 4, the majority of respondents demonstrated a good level of knowledge regarding the Early Warning System (EWS) within the *Code Blue* system, totaling 119 respondents (91.54%). Meanwhile, 11 respondents (8.46%) had a moderate level of knowledge, and no respondents were classified as having poor knowledge.

Table 5. Knowledge Level of the Roles and Functions of the *Code Blue* System

Total Score	Frequency (n)	Percentage (%)
Good	110	84.62
Moderate	11	8.46
Poor	0	6.92
Total	130	100.0

As presented in table 5, most respondents demonstrated a good level of knowledge regarding the roles and functions of the *Code Blue* system, with 110 respondents (84.62%). This was followed by 11 respondents (8.46%) with a moderate level of knowledge, while the remaining respondents were categorized as having poor knowledge.

Table 6. Overall Knowledge of the *Code Blue* System

Total Score	Frequency (n)	Percentage (%)	Cronbach's Alpha
Good	107	82.30	0,804
Moderate	17	13.07	
Poor	6	4.61	
Total	130	100.0	

Based on table 6, the majority of respondents demonstrated a good overall level of knowledge of the *Code Blue* system, totaling 107 respondents (82.30%). Furthermore, 17 respondents (13.07%) had a moderate level of knowledge, and 6 respondents (4.61%) had a poor level of knowledge. The Cronbach's Alpha value of 0.804 indicates that the research instrument had good reliability, as a Cronbach's Alpha value of ≥ 0.70 reflects acceptable internal consistency. Therefore, the findings of this study can be considered reliable and accurately represent nurses' knowledge levels regarding the *Code Blue* system.

DISCUSSION

Demographic Characteristics of Respondents

The study findings indicate that all respondents held a professional nursing degree (Ners). This level of education equips nurses with cognitive, affective, and psychomotor competencies necessary for nursing care, including emergency management such as cardiac arrest. According to knowledge theory, educational level is a significant factor influencing an individual's ability to receive and process information; higher education levels are associated with better knowledge acquisition. Most respondents were aged 31–35 years with 4–6 years of work experience. Age and work experience are closely related to cognitive development, analytical thinking, and clinical decision-making abilities. This aligns with theories suggesting that increasing age and work experience enhance understanding and application of knowledge (Irkawati et al., 2023; Astri et al., 2023). Additionally, most respondents worked in inpatient wards, which have a high risk of medical emergencies, leading to greater exposure to critical patient conditions. All respondents had participated in *Code Blue* training, which serves as non-formal education that plays a vital role in enhancing healthcare workers' knowledge and skills (Fadilah et al., 2024; Astri et al., 2023).

Knowledge Level of *Code Blue* Activation Criteria

Most respondents demonstrated good knowledge regarding *Code Blue* activation criteria, indicating adequate understanding of emergency conditions requiring *Code Blue* activation, such as cardiac arrest, respiratory arrest, and critical EWS scores. Knowledge serves as the foundation for behavior; therefore, nurses with good knowledge are more likely to promptly and accurately recognize emergency conditions (Nurcholis et al., 2021). However, some respondents still exhibited moderate and poor knowledge levels, suggesting uneven comprehension despite universal training participation. Differences in knowledge levels may be influenced by work experience, interest, and access to information (Baihaqi & Etlidawati, 2020; Prastyanto et al., 2022). Continuous education and reinforcement are therefore essential.

Knowledge Level of *Code Blue* Activation Procedures

Nearly all respondents demonstrated good knowledge of *Code Blue* activation procedures, reflecting strong understanding of reporting pathways and emergency communication systems. This corresponds to the application level of knowledge, where individuals can apply information in real situations (Adnani & Ismawati, 2022; Rahmania, 2019). High knowledge in this area is crucial, as timely and accurate *Code Blue* activation directly impacts resuscitation success and patient survival, line with the principle that “time is life” in emergency care.

Knowledge Level of *Code Blue* System Functions

Most respondents demonstrated good knowledge regarding the functions of the *Code Blue* system, indicating an understanding of *Code Blue* as a rapid response system for cardiac and respiratory arrest. This reflects comprehension-level cognitive ability, enabling accurate explanation and interpretation of the system's purpose (Judha, 2025). Adequate understanding of *Code Blue* functions supports effective team coordination and communication during emergencies. Knowledge-based behavior tends to be more consistent and sustainable than behavior not grounded in adequate knowledge (Purwadi et al., 2022).

Knowledge Level of the Early Warning System in *Code Blue*

The majority of respondents demonstrated good knowledge of the Early Warning System, which plays a critical role in detecting patient deterioration before cardiac arrest occurs. This indicates nurses' ability to recognize early changes in vital signs and clinical conditions (Purwadi et al., 2022; Irkawati et al., 2023). Nevertheless, the presence of moderate and poor knowledge levels suggests potential delays in early detection. Periodic evaluation and continuous EWS training are therefore necessary to enhance comprehensive early warning recognition (Fadilah et al., 2024; Jamaludin et al., 2023).

Overall Knowledge of the *Code Blue* System

Based on the results of the study, the majority of respondents had a good level of knowledge about the overall *Code Blue* system. This shows that, in general, nurses have a comprehensive understanding of the activation criteria, activation methods, functions, and early warning system of *Code Blue*. A good level of knowledge is indicated by a score of $\geq 80\%$, which reflects adequate mastery of the material (Judha, 2025). A Cronbach's Alpha value of 0.804 indicates that the measurement instrument has good reliability. A Cronbach's Alpha value of ≥ 0.70 indicates acceptable internal consistency. Thus, the results of this study are reliable and reflect the actual level of nurses' knowledge of the *Code Blue* system. A good level of knowledge is expected to support response speed, accuracy of action, and improve patient safety in emergency care in hospitals (Heryati et al., 2024).

CONCLUSION

Based on the results of research conducted on the level of nurses' knowledge about *Code Blue* at Ibnu Sina Hospital in Makassar, it can be concluded that most nurses have a good to very good level of knowledge about *Code Blue*, including an understanding of the activation criteria, roles or functions, and the process or method of activating *Code Blue* as a rapid response system in handling emergencies at Ibnu Sina Hospital in Makassar.

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