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## Assessment of Sudden Death Patients' Outcomes and Quality of Death Bereavement Experience among Relatives in ICU

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### Abstract:

Background: Sudden death is known as the abrupt, prolonged cessation of cardiac activity brought on by shock along with hemodynamic collapse. Aim: to evaluate patient outcomes and the grieving experiences of patients' families who had unexpected deaths in the intensive care unit (ICU). Design: a descriptive study. Setting: Emergency units at Assiut University hospitals. Subjects: 60 patients who were admitted to ICU and suddenly arrested. Tool I: patients' outcomes sheet: asked about patients' demographics, assessment types of arrhythmias, respiratory assessment, diagnostic and laboratory investigation, dyspnea grade and causes of sudden death. Tool II: Quality of Dying and Death Questionnaire (QODD): asked respondents to score the quality of the decedent's final seven days of life on 31 elements. Tool III: The CAESAR 15 question survey tool: The tool consisted of three domains: (I) communication issues; (II) family needs and (III) satisfaction. Results: Among the studied sudden death patients, 32 (53.3%) had acute myocardial infarction, 12 (20%) had pulmonary embolism, 8 (13.3%) had congestive heart failure and 8 other patients (13.3%) had acute left ventricular heart failure. The mean total score of the QODD questionnaire was  $41.15 \pm 17.94$  which indicated mild to moderate experience quality of relatives. The total score of CAESAR 15 survey among the studied patients was  $38.74 \pm 14.98$  which indicated mild to moderate comforting experience. Conclusion: The most common cause of sudden death is acute myocardial infarction, followed by pulmonary embolism, congestive heart failure and acute left ventricular heart failure. The QODD questionnaire indicated mild to

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moderated score regarding relatives' quality of experience. Moreover, the total score of CAESAR 15 survey indicated mild to moderate comforting experience among patients. Recommendations: To enhance the quality of death comforting and QODD in ICUs, nurses and family members should get training on how to care for patients who are dying. One crucial aspect of palliative care is offering bereavement support to family members in the ICU. Key words: Bereavement, outcomes, Quality of death, relatives, sudden death

## Introduction

Sudden death (SD) is defined by the American Heart Association and the American College of Cardiology as the abrupt cessation of cardiac activity combined with hemodynamic failure brought on by prolonged shock or abnormalities in the heart's electrical system, which typically manifest as systole, pulseless electric activity (PEA), or acute bradyarrhythmia. Sudden cardiac death (SCD) can strike a sizable percentage of persons without any warning symptoms or an established cause[1].

Unfortunately, SD can strike without any prior symptoms. Before a cardiac arrest, warning indications may appear in many cases, but the patient frequently ignores or dismisses these symptoms. However, red flag symptoms include palpitations in the heart, dizziness, palpitations, loss of consciousness, acute dyspnea, unexpected exhaustion unrelated to asthma, irregular heartbeat and central circulation, and unexplained fainting[2].

Men are more prone than women to develop SD, and those who have a history of arrhythmias, heart disease, or other cardiac issues are more vulnerable. A cardiac arrest may have warning signs and symptoms up to two weeks in advance. Men typically complain of chest pain, whereas women typically complain of shortness of breath[3].

The patient should be identified as nonresponsive, and priority should be given to early cardiac resuscitation with successful chest compressions, early defibrillation, and activation of the emergency response system. Without CPR, the chance of survival decreases by 7–10% every minute[4].

Critically ill patients can receive the most cutting-edge medical and nursing treatment in intensive care units (ICUs). Critical care nurses are frequently compelled to offer

ultimately ineffective care, and prior study has shown that their opinions of the standard of care provided at end-of-life are much worse than those of doctors and families[5]. It has also been demonstrated that nurses have strong ideas about what makes for a happy or peaceful death and that they regularly experience distress when they are unable to give their patients the treatment that is consistent with those beliefs[2].

Patient satisfaction is a multifaceted notion that includes crucial elements including direction, information, psychosocial support, service speed, timing, and carer competency. Patient satisfaction is significantly impacted because emergency departments commonly experience crowding, a lack of resources, and interpersonal communication issues that compromise patient safety[6]. It is crucial to develop and enhance the nursing services since patients' contentment with the nursing care they receive while they are in the hospital is one of the most crucial variables determining their satisfaction with all of the hospital's services[7]. Patient satisfaction is increased when treatment and care are provided more quickly and there are quality nursing services available[8].

The family's role in the care of patients experiencing sudden death is crucial, as they provide emotional, psychological, and sometimes logistical support during a challenging and distressing time [9]. Losing a loved one due to sudden death can be devastating and emotionally overwhelming for family members. In some cases, families may be involved in making crucial medical decisions on behalf of their loved ones, especially if the patient is unable to communicate their wishes due to the sudden nature of the event. Families may act as advocates for their loved ones, ensuring that their needs and preferences are considered during the decision-making process and throughout the care journey [10].

In recent years, there has been controversy over the participation of family members in the resuscitation process. When a patient's condition in an A&E department is so severe that it raises doubts about whether they will survive, this is an essential issue to take into account[11]. The divergent viewpoints on the matter appear to reflect the attitudes and beliefs of medical professionals as well as the needs and desires of family members. According to several stories, the inability of family members to be with their deceased loved one before to death made their loss even more difficult to bear[12].

In addition to assessing the quality of QODD that patients received, this research sought to assess the patient outcomes and death bereavement experience among relatives of critically ill patients who passed away in the ICU.

## **Significance of the study**

In experimental and clinical studies, pathophysiological processes and novel treatment modalities are thoroughly examined; however, comparatively fewer data are known regarding the causes of mortality, short- and long-term outcomes, and risk factors related to SD patients.

Studies that focus on end-of-life hospitalisations typically include the patient as the central subject, but it's not obvious what happens to the relatives of patients who pass away during or soon after such a stay. This research examines the experiences of relatives in grieving and bereavement after hospitalised end-of-life decision-making, emphasising their perspectives of which elements of the hospitalisation remained significant to them after the patient passed away. The study employs in-depth interviews with ICU patient's relatives during an end-of-life hospitalisation after their hospital stays.

## **Subjects and methods**

### **Research design**

The study was conducted using a single group, descriptive research approach.

### **Research hypothesis**

Early diagnosis of unexpected death enhanced the care that critically ill patients in ICUs needed, as well as the experience of bereaved families of patients with diseases that passed away in the ICU at Assiut University Hospitals.

### **Setting**

This investigation was carried out at Assiut University Hospitals' emergency department, which included four units (general emergency unit, cardiothoracic emergency unit, medical emergency unit and trauma emergency unit).

### **Sampling**

## Study subjects

The current study included 60 patients who had been admitted to the ICU and then unexpectedly passed away.

## Sample size calculation

In accordance with Epi Info 2000, the sample size was determined. A unique algorithm that took into account the frequency of the disease at a 95% confidence interval and a 2% precision was used to determine the appropriate sample size. An increase of ten percent in the number of participants was taken into account in order to solve issues with incomplete data and missing responses. the study's power was 80% once the following matching factors were taken into account: age group, sex, marital status, educational level, duration of admission in the ICU, and the duration of admission in the hospital.

The sample size was calculated according to the following equation:

$$n = \frac{2(Z_{\alpha/2} + Z_{\beta})^2 \times p(1-p)}{(d)^2}$$

Where, p = pooled proportion obtained from previous study; d = expected difference in proportion of events;  $Z_{\alpha/2} = 1.96$  (for 5% level of significance) and  $Z_{\beta} = 0.84$  (for 80% power of study).

Accordingly, the sample size required is 60 in patients group, and 60 in nurses group.

## Patients' inclusion criteria:

The research comprised recently hospitalized SD patients of both sexes, ages 18 to 60.

## Patients' exclusion criteria:

Death for another reasons (e.g. motor accident & post history of chronic illness & malignancy), and infants and children from birth to 18 years, were excluded from the study.

## Study tools:

### Tool I: patients' outcomes sheet:

The investigator created it by utilizing the review of literature[13]. This tool included six parts:

**Part 1: Socio-demographic data of patients:** code, age, sex, educational level, marital status, occupation, duration of hospital (ICU) stays and medical data including diagnosis and past medical history.

**Part 2: Assessment types of arrhythmias which included:**

- Continuous monitoring for 12 ECG and write ECG reading.
- Assessment types of arrhythmias and assess elevated jugular vein distention.
- Assessment of hemodynamic status of patient and included: (pulse rate b/m, temperature, and blood pressure (BP) mmhg (systolic BP, diastolic BP, mean arterial BP and oxygen saturation.
  - Assessment of heart sound to recognize the abnormal heart sounds.
  - Assessment of stroke volume and cardiac output.
  - Assessment of chest pain: by using Numerical Rating Scale (NRS) adopted from [14] to assess severity of chest pain including: (location, radiation, frequency, character, duration, aggravating and alleviating factors). A straight line including ten points denoted each level of pain: zero for no pain, one to three for mild pain, four to six for moderate pain, seven to nine for severe pain, and ten at the right for the greatest possible suffering.

**Part 3: Respiratory assessment which included:**

- Level of consciousness (Lethargic, Obtunded, Delirium, Stupor and Comatose).
- Breathing rate (breaths/min)
- Breathing pattern (Eupnea, Hyperpnea, Diaphragmatic, Costal breathing)
- Breathing effort
- Cyanosis

**Part 4: Diagnostic studies & laboratory investigation of the patient [15]:-**

It included: echocardiography, chest X –ray, complete blood count (hemoglobin, white blood cells, platelets), cardiac enzymes (CK-Troponin), renal function (serum creatinine & serum urea), serology (HIV, hepatitis C virus, hepatitis B virus), thyroid function tests, liver function (bilirubin, alkaline phosphates, and albumin), arterial function test (ABG), cholesterol, urine analysis, electrolytes (Na, K, Ca) and random blood sugar.

**Part 5: Dyspnea grade:** the dyspnea was graded according to severity from 0 or nothing at all to 10 or maximal [16].

**Part 6: Causes of sudden death:** Three distinct criteria sets—circulatory, somatic, and neurological—were used for determining death [17].

### **Tool II: Quality of Dying and Death Questionnaire (QODD)**

The QODD is a survey that is conducted by interviewers and has 31 items that were collected from the study by [18] requesting the responder to evaluate the quality of the dying process for the victim's final seven days or, in the event that the patient was unconscious or unresponsive during that time, for the final month prior to death.

#### **Scoring system**

On a scale of 0 (worst experience) to 10 (almost ideal experience), the QODD elements are scored. A scale from 0 to 100 was created by dividing the mean score by the range of potential scores (10) and multiplying the result by 100. Greater marks denoted an improved level of dying and death.

### **Tool III: The CAESAR 15 question survey tool**

The purpose of this instrument was to measure the experience of the dying relative and then compare that experience with psychological distress that followed [19]. The instrument comprised three domains: (I) communication problems (particularly during conflict); (II) family requirements; and (III) satisfaction.

#### **Scoring system**

Individual item scores range from 1 to 5, which are added together to yield a global score between 15 to 75 on the resulting fifteen-question tool. The tool components were scored on a 5-point Likert scale (1, traumatic; 2, painful; 3, tough; 4, acceptable; and 5, comforting).

## **Methods**

This study was conducted through three phases of implementation which were:

### **I- Preparatory phase**

After outlining the purpose of the research, the hospital's relevant authorities granted formal approval to carry out the investigation. The researcher created the data gathering instrument by reading pertinent literature.

Seven specialists in the fields of emergency medicine and critical care nursing at Assuit University evaluated the generated tool for content-related validity, and extensive revisions had been made. Statistical Cronbach coefficient Alpha was used to assess the tools' dependability.

### **Pilot study: -**

A pilot study was carried out on 10% of all individuals enrolled in the study in order to assess the tool's validity, applicability, and practicality. Ten patients who were admitted to critical care units were used to test the survey; however, these patients were not part of the study population. The research instrument's pilot study sought to ascertain the survey's difficulty and simplicity indices as well as if it was successful in gathering the necessary data that is pertinent to the ongoing investigation. According to the validation panel's proposal, the survey was translated into Arabic.

### **Test–retest reliability using Cohen’s kappa statistics.**

The average kappa value for the questionnaire was 0.796, which indicated substantial agreement [20]. This study had produced a valid and reliable questionnaire.

### **Ethical consideration**

Once the purpose and nature of the study were explained, official approval to perform the research was acquired from the hospital responsible authorities in EMD. The faculty of nursing's ethics committee authorised the research idea. There was no risk to the research subjects while the study was being conducted. The investigation adhered to the standard ethical guidelines for clinical research. After fully disclosing the nature and objectives of the study, the subjects provided written informed consent. Employees received assurances that the research's data would be kept completely private, utilised exclusively to further the



study's objectives, and never shared again without authorization. Anonymity and confidentiality were guaranteed. The study participants were free to decline participation or to leave at any time, for any reason.

## **2. Implementation phase**

The responsible intensivist recorded pre-ICU data in a conventional research protocol upon admission to the ICU. The following was included in pre-ICU data: code, gender, age, educational level, marital status, employment status, length of hospital (ICU) visits, and health-related information, such as diagnosis and previous medical history.

Patients were subjected to assessment types of arrhythmias, respiratory assessment, diagnostic studies & laboratory investigation. Patients were assessed for dyspnea grade and causes of sudden death.

The researcher interviewed family members in-depth in the hospital following the death of the patient. Deep interviews offer a chance to understand some of the subtleties of intricate social dynamics[21]. In order to further structure the interviews, the researchers employed narrative approaches, which involved first letting respondents share their experiences about losing a loved one and then asking a series of prearranged questions[21].

The researcher recruited family members primarily ICUs where in-depth observations were also conducted after patient's death. Among those surveyed were siblings, parents, in-laws, spouses, and up to three members of the same family who were adults. Family members were allowed to take part in the research if their loved one had no ability to make health-related choices because it concentrated on the experiences of families dealing with bereavement and death-related choices. Once the patient was in the hospital, the investigator spoke with 60 relatives of the 60 SD patients. Shortly following the death, all 60 families' relatives (100%) replied to the interview request.

There were 20 to 70 minutes in each interview. To allow family members to be near their loved ones, the investigator performed the interviews in a hospital meeting room, usually in the ICU. In certain instances, when more than one member of the same family was questioned, the entire family was present for the interview.

## **III-Evaluation phase**

After the program was implemented, the relatives of patients who passed away suddenly in the ICU had their experiences assessed.

### Data management and analysis plan:

Data was collected, coded, tabulated, and entered using the (SPSS version 26) software to start analysis. Basic descriptive statistics were used for demographic variables. A descriptive statistic included frequencies, percentages, standard deviation (SD), and means.

Frequency and percentage were used to summarize qualitative variables, and minimum, maximum, and interquartile range were used to characterize numerical variables as indicators of dispersion. To ascertain whether there was a significant correlation between two category variables, a Chi square test was employed. A Monte-Carlo significance threshold was applied if the total anticipated cell counts exceeded 20%.

### Results

#### Socio-demographic data about the patients:

The current study included 60 ICU admitted patients. The mean age was  $48.13 \pm 14.12$  ranging from 18 to 60 years old. The majority of them (65%) aged from 26 to 40 years old. 58.3% of the studied patients were males and 41.7% were females. Most of the studied patients (70%) were non-employed. 40% of the studied patients were admitted. About half of the study patients (53.3%) had acute myocardial infraction, 20% had respiratory insufficiency, 11% had abdominal sepsis, 10% multiple trauma and 5% admitted for post-cardiac surgery (Table 6).

**Table (6):** Socio-demographic data about the patients (n=60):

Variable	Parameter	Statistics	$\chi^2$	p-value
Age	• Mean $\pm$ SD	48.13 $\pm$ 14.12	27.7	<0.001**
	• Median (Min-Max)	52 (18-60)		
	• 18-25 years	13 (21.7%)		
	• 26-40	39 (65%)		
	• 41-60	8 (13.3%)		
Sex	• Male	35 (58.3%)	1.66	0.197
	• Female	25 (41.7%)		
Marital status	• Single	16 (26.7%)	13.067	<0.001**
	• Married	44 (73.3%)		
Occupation	• Employed	18 (30%)	9.6	0.002*
	• Non-employed	42 (70%)		
Duration of hospital stay	• On admission	24 (40%)	10.933	0.012*
	• 3-<7 days	18 (30%)		

	• 7days	8 (13.3%)		
	• >7days	10 (16.7%)		
<b>Cause of admission</b>	• Acute Myocardial Infarction	32 (53.3%)	45.167	<0.001**
	• Respiratory insufficiency	12 (20%)		
	• Abdominal sepsis	7 (11.7%)		
	• Multiple trauma	6 (10%)		
	• Post-cardiac surgery	3 (5%)		

Data presented as Mean  $\pm$  SD and percentage, SD: standard deviation, p-value: the difference among the studied participants, p non-significant if  $>0.05$ , \*P significant if  $<0.05$ , \*\* p highly significant if  $<0.001$ ,  $\chi^2$ : Chi-square test.

### Hemodynamic parameter among the studied patients

Pulse scored  $101.63 \pm 36.46$  beats per minute during admission among the studied patients, while it increased to  $120.11 \pm 22.6$  beats per minute at the time of arrest (both higher than normal range) with a statistically significant difference ( $p < 0.001$ ). MAP recorded  $112 \pm 28.48$  mmHg during admission and  $112.7 \pm 19.68$  mmHg at the time of arrest (both higher than normal range) with no statistically significant difference ( $p = 0.854$ ). Heart rhythm mean score increased from  $70.1 \pm 20.728$  beats per minute during admission to  $75.25 \pm 26.35$  beats per minute after the time of arrest with a statistically significant difference ( $p = 0.026$ ). Respiratory rate showed a significantly increase from  $31.27 \pm 19.981$  breaths per minute during admission to  $44.25 \pm 16.25$  breaths per minute at the time of arrest ( $p = 0.045$ ) (Table 7).

**Table (7):** Hemodynamic parameters among the studied patients (n=60)

Variable	Normal range	Parameter	During admission	At the time of arrest	t-test	p-value
Pulse (beats per minute)	(60 to 100)	Mean $\pm$ SD	$101.63 \pm 36.46$	$120.11 \pm 22.6$	211.36	<0.001**
		(Min-Max)	50-170	30-190		
Systolic BP		Mean $\pm$ SD	$125.72 \pm 13.745$	$164 \pm 15.6$	195.36	<0.001**
		(Min-Max)	90-150	70-170		
Diastolic BP		Mean $\pm$ SD	$68.67 \pm 13.24$	$90.23 \pm 10.36$	202.36	<0.001**
		(Min-Max)	40-90	40-110		
MAP (mmHg)	(Between 70 and 100)	Mean $\pm$ SD	$112 \pm 28.48$	$112.7 \pm 19.68$	13.69	0.854
		(Min-Max)	70-170	70-170		
Heart rhythm (beats per minute)	(60 to 100)	Mean $\pm$ SD	$70.1 \pm 20.728$	$75.25 \pm 26.35$	185.36	0.026*
		(Min-Max)	45-110	49-110		
Respiratory rate (breaths per minute)	12 to 16	Mean $\pm$ SD	$31.27 \pm 19.981$	$44.25 \pm 16.25$	155.36	0.045*
		(Min-Max)	10-66	10-66		

Data presented as Mean  $\pm$  SD and percentage, SD: standard deviation, p-value: the difference between the score during admission and at the time of arrest, p non-significant if  $>0.05$ , \*P significant if  $<0.05$ , \*\* p highly significant if  $<0.001$ .

### Assessment types of arrhythmias among the studied patients

Table 8 showed that the continuous monitoring for 12 ECG was correctly done in (43.3%) of patients. Types of arrhythmias and elevated jugular vein distention were correctly assessed in 40% of patients. Heart sound assessment was correctly done among 50% of patients and stroke volume and cardiac output were correctly assessed in (56.7%) of the studied patients.

**Table (8):** Assessment types of arrhythmias among the studied patients (n=60):

Variable	In correctly done	Incomplete done	Correctly done	$\chi^2$	p-value
Continuous monitoring for 12 ECG and write ECG reading	9 (15%)	25 (41.7%)	26 (43.3%)	9.1	0.011*
Assessment types of arrhythmias and assess elevated jugular vein distention	12 (20%)	24 (40%)	24 (40%)	4.8	0.091
1- Atrial fibrillation (AF)	7 (11.7%)	10 (16.7%)	8 (13.3%)		
2- Supraventricular tachycardia	5 (8.3%)	5 (8.3%)	6 (10%)		
3- Bradycardia	4 (6.7%)	3 (5%)	4 (6.7%)		
4- Heart block	2 (3.3%)	3 (5%)	3 (5%)		
5- Ventricular fibrillation	2 (3.3%)	3 (5%)	3 (5%)		
Assessment of heart sound	9 (15%)	21 (35%)	30 (50%)	11.1	0.004*
Assessment of stroke volume, cardiac output	7 (11.7%)	18 (30%)	34 (56.7%)	18.74	<0.001**

Data presented as percentage, p-value: the difference among the studied parameters, p non-significant if >0.05, \*P significant if <0.05, \*\* p highly significant if <0.001,  $\chi^2$ : Chi-square test.

### Respiratory assessment among the studied patients

According to the respiratory assessment, there was a statistically significant change between assessment during admission and at the time of arrest among the observed patients (p<0.001) (Table 10).

**Table (10):** Respiratory assessment among the studied patients (n=60)

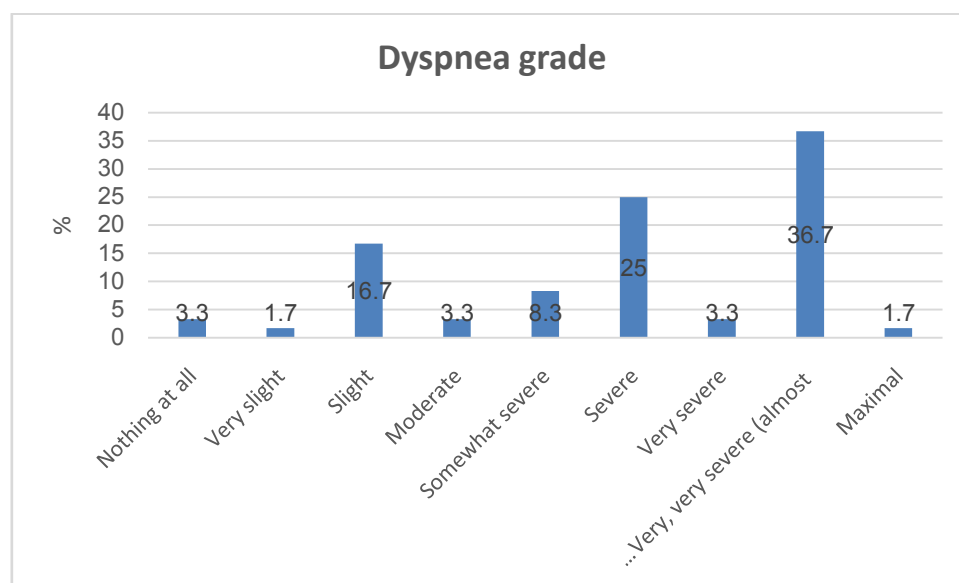
Variable	Parameter	During admission	At the time of arrest	Normal range	p-value
Level of consciousness	Lethargic	32 (53.3%)	0 (0%)		<0.001**
	Obtunded	12 (20%)	20 (33.3%)		
	Delirium	7 (11.7%)	19 (31.7%)		
	Stupor	6 (10%)	16 (26.7%)		
	Comatose	3 (5%)	5 (8.3%)		
Breathing rate (breaths/min)	Mean $\pm$ SD	53.69 $\pm$ 9.69	87.26 $\pm$ 16.52	12 to 18	<0.001**
	(Min-Max)	36-69	34-105		
Breathing pattern	Eupnea	32 (53.3%)	0 (0%)		<0.001**
	Hyperpnea	12 (20%)	20		<0.001**

			(33.3%)		
	Diaphragmatic	7 (11.7%)	19 (31.7%)		<0.001**
	Costal breathing	6 (10%)	16 (26.7%)		<0.001**
Breathing effort		39 (65%)	21 (35%)		<0.001**
Cyanosis		40 (66.7%)	20 (33.3%)		<0.001**

Data presented as percentage, p-value: the difference between scores pre and post intervention, p non-significant if >0.05, \*P significant if <0.05, \*\* p highly significant if <0.001.

### Dyspnea grade among the studied patients

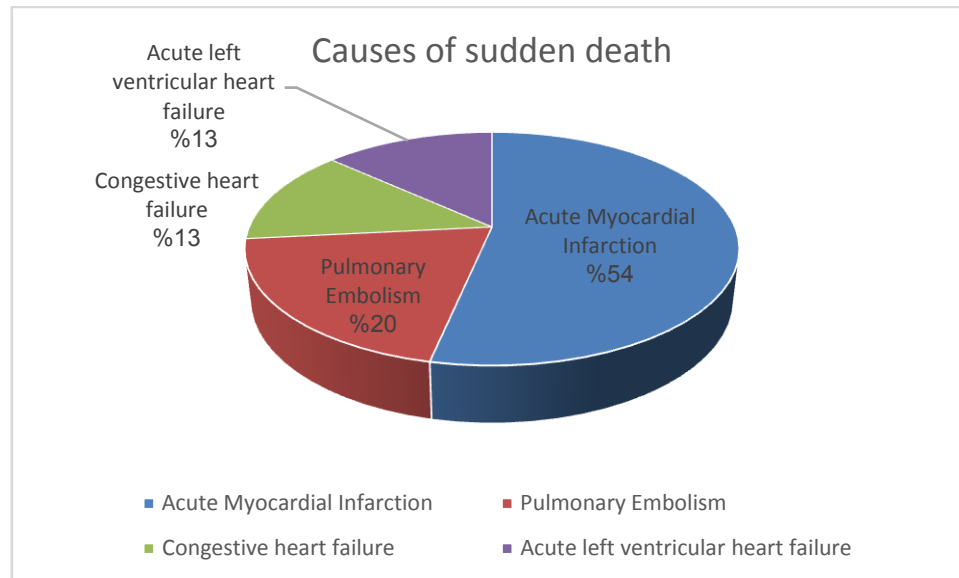
Only 1 patient (1.7%) showed maximal dyspnea grade, 36.7% showed almost maximal grade, 3.3% showed very severe grade and 25% showed severe grade (figure >>).



**Figure (1):**Dyspnea grade among the studied patients

### Causes of sudden death

There are many causes of sudden death among the studied patients. 32 patients (53.3%) had acute myocardial infarction, 12 patients (20%) had pulmonary embolism, 8 patients (13.3%) had congestive heart failure and 8 other patients (13.3%) had acute left ventricular heart failure (figure >)



**Figure (0):** Causes of sudden death among the studied patients

### Quality of Dying and Death Questionnaire

The mean total score of the QODD questionnaire items was  $41.15 \pm 17.94$  which indicated mild to moderated score in their quality of dying experience (Table 16).

**Table (16):** Quality of Dying and Death Questionnaire

Variable	Score
1. Having pain under control.	$3.02 \pm 2.213$
2. Having control of event.	$4.18 \pm 3.255$
3. Being able to feed oneself.	$0.35 \pm 0.48$
4. Having control of bladder, bowels.	$4.98 \pm 3.14$
5. Being able to breathe comfortably.	$2.12 \pm 2.86$
6. Having energy to do things one wants to do.	$3.27 \pm 3.36$
7. Spend time with your children as much as you want. (or I have no children)	$4.18 \pm 3.25$
8. Spend time with your friends and other family as much as you want.	$0.35 \pm 0.48$
9. Spend time alone.	$4.98 \pm 3.14$
10. Be touched and hugged by loved ones.	$4.18 \pm 3.25$
11. Say goodbye to your loved ones.	$0.35 \pm 0.48$
12. Have the means to end your life if you need to.	$4.98 \pm 3.149$
13. Discuss your wishes for end-of-life care with your doctor and others.	$1.87 \pm 2.38$
14. Feel at peace with dying.	$3.02 \pm 2.213$
15. Avoid worry about strain on your loved ones.	$4.18 \pm 3.255$
16. Be unafraid of dying.	$0.35 \pm 0.481$
17. Find meaning and purpose in your life.	$4.98 \pm 3.149$
18. Die with dignity and respect.	$2.12 \pm 2.86$
19. Laugh and smile.	$3.27 \pm 3.36$
20. Avoid being on dialysis or mechanical ventilation.	$4.18 \pm 3.25$
21. Location of death (home, hospice, hospital).	$0.35 \pm 0.481$
22. Die with/without loved ones present.	$4.98 \pm 3.149$
23. State at moment of death (awake, asleep).	$1.87 \pm 2.383$

24. Have a visit from a religious or spiritual advisor.	0.35 ± 0.481
25. Have a spiritual service or ceremony.	4.98 ± 3.149
26. Have health care costs provided.	4.18 ± 3.255
27. Have funeral arrangements in order.	0.35 ± 0.481
28. Spend time with spouse, partner. (or I have no spouse, partner)	4.98 ± 3.149
29. Spend time with pets. (or I have no pets)	5.67 ± 2.68
30. Clear up bad feelings. (or there were no bad feelings to clear up)	7.85 ± 1.36
31. Attend important events. (or there were no important events to attend)	6.87 ± 1.25
<b>Total score</b>	<b>41.15 ± 17.94</b>

Data expressed as mean ± SD

### The CAESAR 15 question survey

The total score of CAESAR 15 question survey among the studied patients was 38.74 ± 14.98 which indicated mild to moderate comforting experience among patients' relatives (table 17).

**Table (17):**The CHEMOTHERAPY ADVERSE EVENT SELF-ASSESSED RESPONSE (CAESAR-15 items) question survey

Variable	Traumatic	Painful	Difficult	Acceptable	Comforting	$\chi^2$	p-value
1. Was your loved one's pain well controlled throughout the ICU stay?	37 (61.7%)	13 (21.7%)	6 (10%)	2 (3.3%)	2 (3.3%)	71.83	<0.001
2. Do you feel that your loved one's dignity was maintained?	42 (70%)	14 (23.3%)	2 (3.3%)	1 (1.7%)	1 (1.7%)	103.83	<0.001
3. Do you feel the ICU team was attentive to your loved one?	9 (15%)	11 (18.3%)	3 (5%)	1 (1.7%)	36 (60%)	65.66	<0.001
4. Are you satisfied with the quality of medical care received by your loved one?	35 (58.3%)	18 (30%)	4 (6.7%)	2 (3.3%)	1 (1.7%)	70.83	<0.001
5. During the days before the death, were you clearly informed that your loved one was dying?	23 (38.3%)	14 (23.3%)	7 (11.7%)	4 (6.7%)	12 (20%)	17.83	0.001
6. Are you satisfied with the quality of the communication between you and the physicians?	41 (68.3%)	15 (25%)	3 (5%)	0	1 (1.7%)	67.73	<0.001
7. Are you satisfied with the quality of the communication between you and the nurses?	37 (61.7%)	13 (21.7%)	6 (10%)	2 (3.3%)	2 (3.3%)	71.83	<0.001
8. Were you in conflict with the ICU team?	42 (70%)	14 (23.3%)	2 (3.3%)	1 (1.7%)	1 (1.7%)	103.83	<0.001
9. Were you given the opportunity to discuss your loved one's wishes, as well as your own preferences, with the ICU team?	9 (15%)	11 (18.3%)	3 (5%)	1 (1.7%)	36 (60%)	65.66	<0.001
10. Did your loved one refuse any of the suggested treatments?	35 (58.3%)	18 (30%)	4 (6.7%)	2 (3.3%)	1 (1.7%)	70.83	<0.001
11. Do you believe the ICU team went too far in the treatment given to your loved one?	23 (38.3%)	14 (23.3%)	7 (11.7%)	4 (6.7%)	12 (20%)	17.83	<0.001
12. Were you able to say goodbye and express important feelings to your loved one?	9 (15%)	11 (18.3%)	3 (5%)	1 (1.7%)	36 (60%)	17.83	<0.001
13. Were you present when your loved one died?	37 (61.7%)	13 (21.7%)	6 (10%)	2 (3.3%)	2 (3.3%)	67.73	<0.001
14. Are you satisfied with the support you received while your loved one was dying?	42 (70%)	14 (23.3%)	2 (3.3%)	1 (1.7%)	1 (1.7%)	71.83	<0.001

15. During your loved one's stay in the ICU, did you receive counseling, for instance from a psychologist?	9 (15%)	11 (18.3%)	3 (5%)	1 (1.7%)	36 (60%)	103.83	<0.001
Total score		38.74 ± 14.98					

Data presented as percentage, p-value: the difference among the studied parameters, p non-significant if >0.05, \*P significant if <0.05, \*\* p highly significant if <0.001,  $\chi^2$ : chi square test.

## Discussion

ICU nurses frequently deal with death, and because of the complexity of treatment, it can be challenging to strike a balance between the patient's physical demands and the emotional needs of the family, particularly in cases of SD. Unresolved or cumulative grief in families can have detrimental effects that last a lifetime.

The SD patients in this study ranged in age from 18 to 60 years old, with a mean age of 48.13 ± 14.12. Sixty-five percent of the patients under study were between the ages of 26 and 40. Of the individuals with SD, 41.7% were female and 58.3% were male.

This was in contrast to a study conducted by Carrington et al. (2023) among a community of South Europeans, wherein 159 SD were found in people ranging in age from 1 to 40 years, with a mean age of 32 ± 7 years. The majority of these individuals were male (72,3%, n = 115)[22]. The average age of mortality in a different study conducted by Ripoll-Vera et al. (2021) was 36.15±12.7 (range, 0-50) years; 95 fatalities were males (77%) and 28 were females (23%)[23].

In a related Egyptian study, 56.9% of the participants were men, according to Ali et al. (2023). The average age was 26.6 ± 12.73[24].

The results of the current study were in conflict with those of Peterson et al.'s (2021) investigation into the reasons and incidence of SCD/SCA in the youth population, which revealed that the majority of cases (83.7%) involved men[25].

The mean age of death was 75 ± 25 years, which was greater than the present results, and 63% of patients were male, according to an investigation by Kwok et al. (2023), which contradicted the current results[26].

In the current study, the main causes of SD were as follows: 32 patients (53.3%) had acute myocardial infarction, 12 patients (20%) had pulmonary embolism, 8 patients (13.3%) had congestive heart failure and 8 other patients (13.3%) had acute left ventricular heart failure.



A similar study by Kwok et al. (2023) showed that more than half of the deaths were due to acute myocardial infarction (55.3%), while heart failure represented (18.0%), and isolated cardiac arrest represented (6.6%) of the studied patients [26].

This disagreed with another Egyptian study done by Ali et al. (2023), wherein the authors discovered that the most common cause of SCD/SCA (20.3%) was hypertrophic cardiomyopathy, which was followed by dilated cardiomyopathy (19.1%), long QT syndrome (11.4%), total heart block (8.5%), and Brugada syndrome (6.8%)[24]. This is consistent with the findings of the research conducted by Peterson et al. (2023), which examined the triggers and prevalence of SCD/SCA in 331 young individuals. They discovered that hypertrophic cardiomyopathy accounted for 20.6% of cases, with other cardiomyopathies (dilated, arrhythmogenic, noncompaction, or restricted), coronary artery anomalies (12%), and unexplained death (9.6%)[25]. The current results also disagreed with a study by Maron et al. (2016) that assessed SCD/SCA in 387 youths under the age of 35. After dilated cardiomyopathy (20%), arrhythmogenic right ventricular cardiomyopathy (2.8%), long QT syndrome (0.8%), aortic aneurysm (3.1%), and cardiac sarcoidosis (0.8%), they discovered that hypertrophic cardiomyopathy was the most prevalent trigger of SCD (26.4%)[27].

The present research contradicted the findings of Jayaraman et al. (2018), who evaluated the root causes of SCD/SCA in young individuals and discovered that hypertrophic cardiomyopathy (14%) was the least prevalent reason, followed by coronary artery disease (22%), and sudden arrhythmic death syndrome (31%)[28].

In the current study, pulse scored  $101.63 \pm 36.46$  beats per minute during admission among the studied patients, while it increased to  $120.11 \pm 22.6$  beats per minute at the time of arrest (both higher than normal range) with a statistically significant difference ( $p < 0.001$ ). MAP recorded  $112 \pm 28.48$  mmHg during admission and  $112.7 \pm 19.68$  mmHg at the time of arrest (both higher than normal range) with no statistically significant difference ( $p = 0.854$ ). Heart rhythm mean score increased from  $70.1 \pm 20.728$  beats per minute during admission to  $75.25 \pm 26.35$  beats per minute after the time of arrest with a statistically significant difference ( $p = 0.026$ ). The respiratory rate showed a significantly increase from  $31.27 \pm 19.981$  breaths per minute during admission to  $44.25 \pm 16.25$  breaths per minute at the time of arrest ( $p = 0.045$ ).

Sundgreen et al. (2001) found that in resuscitated cardiac arrest victims with maintained autoregulation, the lower limit of cerebral blood flow autoregulation shifts from 76 mmHg in healthy participants to 114 mmHg. Their findings are consistent with the present observations[29]. According to multiple studies, a positive neurological result is connected with systolic arterial blood pressure of 70 mmHg within 6 hours of cardiac arrest. These

findings are consistent with the current findings[30]. In agreement with the current study, Russo et al. (2017) found that an improved neurological outcome was correlated with an average MAP of less than 80 mm Hg over the first ninety-six hours of hospitalisation[31].

The current study revealed that the mean total score of the QODD questionnaire items was  $41.15 \pm 17.94$  which indicated mild to moderated score in patients' quality of dying experience.

Earlier investigations used a variety of academic approaches, including as responses to questionnaires, discussion groups with patients and family, expert comments, and intervention studies, to illustrate the core areas of the QODD and concur with the present results[32-34]. In agreement with the present research, Patrick et al. (2001) listed the six QODD domains as follows: "whole person concerns," "family," "treatment of preferences," "preparation of death," "moment of death," and "symptoms and personal care." [35]. The two main components of the QODD—"appropriateness of scientific and medical care" and "appropriateness of personal and cultural aspects of care"—are mostly covered by the aforementioned measurement instruments. This method validates the use of such domains and items in numerous research evaluating the QODD of critically sick patients in intensive care units[36, 37].

A plausible rationale could be that previous to being admitted to the intensive care unit, patients who started their hospital stay in the hospital ward had less effective communication regarding end-of-life care. It is frequent for chronically ill adults in hospitals to not receive enough communication regarding their treatment preferences[38], and it has been described as a "medical error" when these people are not included in conversations regarding the objectives of their care[39]. This is an even more concerning omission when it comes to patients who worsen clinically after being admitted to the hospital. When these patients are admitted to the hospital, they can usually take part in talks regarding end-of-life care; however, after they become critically ill, they generally cannot[40]. A patient's perspective of the quality of death in the ICU and their level of satisfaction with the ICU's treatment may both be negatively impacted by poor communication on the hospital ward during the duration of their stay[41].

In the current study, the total score of CAESAR 15 question survey among the studied patients' relatives was  $38.74 \pm 14.98$  which indicated mild to moderate comforting experience among patients' relatives.

An impression of relatives' experiences receiving end-of-life care in an ICU is given by the global CAESAR score. Through consistent calculation of this score, intensive care units may

track their progress over time. Nevertheless, more research is required to determine how sensitive the CAESAR score is to therapies meant to enhance dying and death in the ICU.

In contrast to the current study, Kentish-Barnes et al. (2016) showed that only 25.9% of relatives were in the lowest tertile and that the median CAESAR score was 66/75 (21–75), which is higher than the current findings[19].

In line with the current findings, a different study by Warrillow et al. (2016) revealed that over two thirds of respondents at 12 months and nearly three quarters of respondents at 6 months had difficult grief, respectively, in the lowest quartile of CAESER score relatives[42].

### **Limitations**

There are significant limitations to this study. Because there were few family members in the study, care should be taken when interpreting the findings. Furthermore, no information was available regarding the existence of anxiety and depressive symptoms before to ICU admission or any other psychosocial factors that might have had an impact on the sample. Lastly, it is unknown to researchers whether relative satisfaction declined over time because the questionnaires were not distributed over a protracted period of death. Furthermore, the length of an ICU hospital stay is associated with an increased incidence of anxiety and depression symptoms.

### **Conclusions**

The most common cause of sudden death is acute myocardial infarction, followed by pulmonary embolism, congestive heart failure and acute left ventricular heart failure. The QODD questionnaire indicated mild to moderated score regarding relatives' quality of experience. Moreover, the total score of CAESAR 15 survey indicated mild to moderate comforting experience among patients' relatives. According to this study, nurses should be approachable, empathetic, and present patients with comprehensive information about their diagnosis upon admission, as well as details about the causes and effects of social anxiety disorder. This information is linked to increased satisfaction and is crucial for family members who visit their loved ones in the ICU.

### **Recommendations**

To enhance the quality of death comforting and QODD in ICUs, nurses and family members should get training on how to care for patients who are dying. One crucial aspect of palliative care is offering bereavement support to family members in the ICU.

The study also highlights the importance of psychological assistance in the intensive care unit because a significant number of family members, particularly those whose patients have a bad prognosis, exhibit signs of worry and sadness.

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