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ORIGINAL RESEARCH

# Effect of a Structured Supportive and Palliative Caring Approach on the Incidence of Arrhythmia, Chest Pain, and Anxiety in CAD Patients Admitted to the Cardiac Care Unit

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**Purpose:** Given the importance of managing chest pain, anxiety, and cardiac arrhythmia in cardiac care unit patients this study aim to determine the effect of a structured supportive and palliative care approach on these three critical aspects.

**Patients and Methods:** A randomized, double-blind, clinical trial with two groups was conducted in the second half of 2025. The research population included patients who were hospitalized in the cardiac care unit, with a final sample size of 36 people in each group. The data collection instruments included personal information, an electrocardiogram machine, a Visual Analog Scale, and the Spielberger anxiety questionnaire. The variables were measured before the intervention. Routine treatments were then continued for the control group, and in the intervention group, in addition to the routine treatments, a structured supportive and palliative care approach was implemented. Three and seven days after the intervention, these variables were measured.

**Results:** Seventy-two patients participated in this study. As the results showed, chest pain, arrhythmia incidence, and anxiety in both groups decreased over time from the first to the third time; however, this difference was statistically significant in the intervention group for all three variables (p=0.044, 0.012, and 0.03, respectively), whereas in the control group, it was only significant in the anxiety variable (p=0. 045). The findings also showed that the mean scores of chest pain, arrhythmia incidence, and anxiety before the intervention in the two groups did not differ significantly; however, there was a significant difference in the three variables three and seven days after the intervention.

**Conclusion:** As the results showed, supportive and palliative care approaches are effective in reducing chest pain, arrhythmia incidence, and anxiety levels in cardiac care unit patients. Therefore, it is necessary to prepare guidelines in this field based on the results of this study and other published studies.

**Keywords:** supportive and palliative care, arrhythmia, chest pain, anxiety, cardiac care unit, WHO approach

## Introduction

The cardiac care unit (CCU) is defined as a complex critical care unit where patients with acute and severe heart problems are admitted to receive specialized nursing care and treatment using advanced technology.[1–3] The staff of CCU provides specialized care to patients with heart problems, including pre-existing rhythm disorders, unstable angina, and other complications requiring continuous treatment.[4–7]

Hospitalization in the CICU as a therapeutic environment for cardiac patients can deprive sensory perceptions and separation from family, creating stress, and the stress of these patients is exacerbated by the complex environment of these units and their routine practices.[8] When these patients are deprived of relationships, they exhibit behavioral manifestations of anxiety, cognitive changes, more chest pain, and sometimes more arrhythmias.[9,10] Two psychosocial factors that affect the mortality rate of hospitalized patients in CCUs are the level of stress associated with the illness and the lack of contact with family and friends; those who have both stressors have an almost double mortality rate.[11]

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Therefore, research has shown that serious planning is essential for them to reduce complications such as chest pain and reduce cardiac arrhythmias.[12]

Recent research has demonstrated that psychosocial stress can trigger pathophysiological responses that directly worsen cardiac instability.[13] Emotional stress activates the hypothalamic–pituitary–adrenal (HPA) axis and increases sympathetic nervous system activity, resulting in elevated catecholamine levels, increased myocardial workload, and greater oxygen demand.[14] This autonomic imbalance can precipitate arrhythmogenic changes, disturb heart-rate variability (HRV), and intensify chest discomfort in patients with acute cardiac conditions. Therefore, reducing psychological distress is not only important for patient comfort but is also clinically relevant for preventing cardiac complications.[15] Supporting this evidence, studies have shown that psychosocial stress reduces parasympathetic activity and increases sympathetic activation, leading to autonomic imbalance that heightens cardiovascular risk.[16] Moreover, stress-reduction interventions such as HRV-biofeedback and relaxation have been shown to improve HRV indices in patients with cardiovascular disease, indicating restored autonomic balance.[17] A longitudinal study further reported that greater HRV reduction during mental stress is strongly associated with increased cardiovascular mortality, highlighting the prognostic significance of autonomic reactivity.[18]

There is strong evidence for the effect of supportive care (SC) on the stress levels of these patients. Palliative supportive care can help reduce the severity of complications caused by the disease by a better management of symptoms and provision of special care.[19] This care also helps patients cope with the stress and anxiety caused by heart disease.[20]

Palliative care (PC) is a comprehensive therapy method that addresses various aspects of a patient's life. This care includes physical, psychological, social, and even spiritual support and addresses all the patient's needs in an integrated manner.[6] A important feature of PC is the reduction of pain and improvement of the patient's physical symptoms.[21] This method tries to reduce the patient's amount of pain and discomfort and improve their ability to perform daily activities.[22] The PC is not limited to physical symptoms and also pays attention to the patient's mental and psychological. This support can help patients better cope with anxiety, stress, and complications caused by the disease.[23] The SC is defined as the optimization of care for the comfort and social support of patients at all stages of illness.[6] In a study by Chiang et al (2023), titled as "Palliative supportive care consultation in a health center", a multidisciplinary team (MDT) consisting of a physician, nurse practitioner, social worker, and clergy member participated in the study, and the results showed that symptom improvement occurred at one- and three-month follow-ups.[24]

## Justification of Study

Patients in CCUs often experience severe cardiac events and significant psychological distress including anxiety and chest pain, which can worsen their condition. While supportive and palliative care is recognized in other medical fields, its specific application in CCUs to concurrently address arrhythmia, chest pain, and anxiety requires further research. The study investigates defined supportive and palliative care interventions to improve the holistic well-being (quality of life) of critically ill cardiac patients.

## Purpose of Study

Given the importance of chest pain and cardiac arrhythmia in patients admitted to CCU and the dearth of comprehensive studies of the role of supportive and palliative care in hospitalized patients, the researcher decided to conduct a study to determine the effect of a structured supportive and palliative care approach on arrhythmia, chest pain, and anxiety in patients with CCU.

## Research Question

In patients in the CCU, what is the effect of a structured supportive and palliative care approach compared to standard care for arrhythmia, chest pain, and anxiety?

# Materials and Methods

## Study Design and Participants

The present study is a simple, randomized clinical trial conducted in the second half of 2025. The study population included patients with coronary artery disease (CAD) hospitalized in the CCU of Ibn Al-Bitar Specialized Center for Cardiac Surgery. The inclusion criteria were admission to the CCU with cardiac problems, full consciousness and a stable state, no comorbidity, mental illness, hearing or visual problems, and minimal literacy. The exclusion criteria were a lack of consent to continue the study for any reason, patient deterioration and emergency conditions, and discharge or transfer within 24 hours. Due to the dearth of research on the effect of a similar intervention on the dependent variables, the results of a pilot study on 12 subjects from each of the two research groups were used. With a confidence interval of 95% and test power of 80%, the final sample size was calculated with a medium effect size of 0.7, which was estimated at 32 in each group (64 in total). To anticipate possible exclusions, 15% was added to the above values, resulting in a final sample size of 74 overall. Based on these parameters, to achieve a confidence level of 95%, $z(1-\alpha/2)$ was= 1.96 and a test power of $z(1-\beta)$ =was equal to.84 (80%).

## Data Collection Instruments

Before starting the trial data collection, a protocol that follows the SPIRIT 2013 checklist supplement was adopted and laid the foundation for a rigorously conducted trial, which in turn could lead to high-quality results that followed the CONSORT 2025 checklist supplement. The data collection instruments included questionnaire that examined variables such as age, sex, weight, and other demographic factors. The ECG was used to assess atrial and junctional arrhythmias, which are not considered dangerous. In all patients was monitored using a fixed ECG device that had been calibrated and checked for accuracy. It is worth mentioning that after the ECG, a researcher-made checklist with five questions was also used, with each question having a score of zero to two, and a total score of zero to ten. There were questions on the presence of arrhythmia, dangerous arrhythmia, and arrhythmia affecting hemodynamic symptoms. The validity of checklist was confirmed based on its content validity, and its reliability was tested using Cronbach's alpha, with a coefficient of 0.74. The VAS was used to measure pain, and the patients were asked to rate the intensity of their chest pain on a scale of zero to ten. The VAS is among the oldest and best-known pain assessment scales introduced in the 1950s. The scale consists of a line with two ends indicating "no pain" and "the most severe pain". The Spielberger scale was used to assess anxiety. The State-Trait Anxiety Inventory (STAI) consists of 40 questions, with the first 20 questions measuring overt anxiety and the second 20 questions measuring latent anxiety. In assessing the state of anxiety, participants are presented with multiple choices for each statement, among which they should choose the one that best represents the intensity of their feelings. The available are: 1- Very little, 2- Little, 3- Much, and 4- Very much. The scoring weights are reversed for statements that indicate no anxiety.Therefore, the scores on each of the two state and trait anxiety scales can range from 20 to 80. The minimum total score for the questionnaire was 40 and the maximum score 160. In the standardization of the Spielberger anxiety questionnaire, the test-retest validity for the anxiety trait scale was 0.86, and Cronbach's alpha coefficient for state anxiety was 0.92.

## Intervention Stage and Work Phase

In the present study, the code of ethics was first obtained through ethics approval. After entering the research environment and obtaining permission from the hospital research vice-chancellor, informed consent was obtained from all participants. Then, using a simple random sampling method, the researcher applied a random selection process to select the sample from the population by placing either the Arabic value "1" (within the study) and or "0" (outside the study) in an opaque sealed envelope. The researcher then distributed the sample to the two groups using the same method of Arabic numbers, considering number "1" as part of the intervention group and "0" as the control group. Thus, the random assignment was done. The study used double-blinding, whereby both the participants and data collector were unaware of the intervention assignments. This rigorous blinding was implemented to minimize potential bias in the collection and interpretation of data, thereby enhancing the reliability and validity of outcome measurements and ensuring the integrity of findings. Initially (Before the intervention), a demographic questionnaire was completed by

both groups, and the patient chest pain was assessed based on the VAS. Their anxiety levels were also assessed using the Spielberger questionnaire, and an ECG was performed to examine the type and extent of cardiac arrhythmias. Routine treatments were then continued for the control group, and in the intervention group, besides the routine treatments, a structured supportive and palliative care approach was employed, the details of which are shown in Table 1.

The approach used in this study followed the guidelines provided by the World Health Organization (WHO) 2018, p. 52, Issn:978–92-4-151,447-7 (electronic version),[25] and the WHO 2021, p.52, Issn:978–92-4-003516-4 (electronic version)[26] to prevent and relieve patients' health-related suffering and improve their quality of life. The content was based on a similar study and in consultation with other members of the medical and care providing team.[20]

The approach was implemented and taught in eight sessions (this training was conducted face-to-face, with pamphlets and brochures given to groups in the second, third, and fourth sessions, but the first and the last sessions were conducted individually, given that the participants had different types of illnesses by MDT in health care, including physicians, nurses, occupational therapists, physiotherapists, and psychologists. Three days (as the post-test) and seven days (as the follow-up) after the intervention, chest pain and anxiety indices were measured again, and a control ECG was also performed. The collected data obtained were sent for analysis.

## Timetable of the Study

The timetable of the study is presented in Figure 1 in accordance with the SPIRIT guidelines.

## Statistical Analysis

Data analysis was done using in SPSS 24. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to describe the main as well as the demographic variables. Finally, the independent samples *t*-test, chi-square test,

**Table 1** Structured Supportive and Palliative Caring Approach Sessions

| Session | Thematic Focus | Content Session | Presenter (MDT) | Delivery Time (Minutes) |
|---|---|---|---|---|
| First | Clinical Assessment & Symptom Management | This session focuses on a comprehensive approach to patient care, encompassing; the assessment of; patient's condition, appropriate medications and therapeutic measures to reduce pain and improve symptoms, teaching the use of medications by the physician, providing explanations and methods of performing the work to the patient. | Physician | 30 |
| Second | Holistic Daily Care | This session focuses on holistic daily patient care, encompassing pain and symptom management, provision of medication, monitoring of physical condition, and essential emotional and psychological support. | Nurse | 20 |
| Third | Activity–Rest Balance & Relaxation Training | This session focuses on training on striking a balance between activity and rest, re-doing relaxation techniques, and reviewing previous sessions. | Occupational therapist | 20 |
| Fourth | Cultural-Based Relaxation & Spiritual Support | This session focuses on meditation and relaxation techniques to enhance a sense of well-being and, taking into account the patient's culture, beliefs, and values, encourage them to worship, listen to their favourite music, and socialize with others. | Psychologist | 20 |
| Fifth | Physical Empowerment & Functional Independence | This session focuses on empowering patients through physical well-being; performing and teaching breathing exercises and proper positioning in standing, sitting, and lying positions, providing appropriate exercise programs to better manage physical symptoms and help the patient become independent in daily routines. | Physiotherapist | 25 |
| Sixth | Care Coordination & External Resources Support | This session focuses on connecting patients with essential external resources and coordinating ongoing support, introducing charitable organizations or government services, arranging and coordinating care services, and following up on patients' specific needs. | Social worker | 20 |
| Seventh | Psychological Counseling & Stress Coping | This session focuses on providing psychological counseling and techniques for dealing with stress and anxiety. | Psychologist | 25 |
| Eighth | Patient & Family Education | This session focuses on playing a consulting role, providing information, and providing proper education to the patient and family. | Nurse | 30 |

| | STUDY PERIOD | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Enrolment | Allocation | Post-allocation | | | | | Close-out (Follow-up Phase | |
| TIMEPOINT** | $-t_1$ | 0 | Pre-$t_1$ | $t_2$ | $t_3$ | $t_4$ | $t_5$ | 3 days | 7 days |
| ENROLMENT: | | | | | | | | | |
| Eligibility screen | X | | | | | | | | |
| Informed consent | X | | | | | | | | |
| Random selection | | X | | | | | | | |
| Allocation(Random assignment) | | X | | | | | | | |
| INTERVENTIONS: | | | | | | | | | |
| [Intervention Group] A structured supportive and palliative caring | | | | ← | — | — | → | | |
| [Control Group] Routine treatments | | | | | | | | | |
| ASSESSMENTS: | | | | | | | | | |
| Demographic data | X | | | | | | | | |
| [Arrhythmia] | | | X | | | | | X | X |
| [Chest pain] | | | X | | | | | X | X |
| [Anxiety ] | | | X | | | | | X | X |

**Figure 1** Timetable for randomized controlled trial in accordance with SPIRIT guidelines.
**Note**: **, List specific timepoints in this row.
**Abbreviations**: T, time; SPIRIT, Standard Protocol Item Recommendations for Interventional Trials.

Mann–Whitney *U*-test, and Pearson correlation test were run to compare variables in the control and intervention groups at each time point. Repeated-measures analysis of variance (ANOVA) was used to test the variables at three observation times.

## Results

In this study, two subjects dropped out of the study due to a lack of interest and an emergency situation. Thus, two participants were removed from the intervention group leaving 72 subjects (Figure 2) with a mean age (±standard deviation) of 55.58 ±3.54 participating overall, of which 51.4% (37) were male and 49.6% (35) female. There was no statistically significant difference in age between the groups in intergroup comparisons. The majority of participants (73.61%) were married, and there was no significant difference between the groups. In terms of residence, 29.17% lived

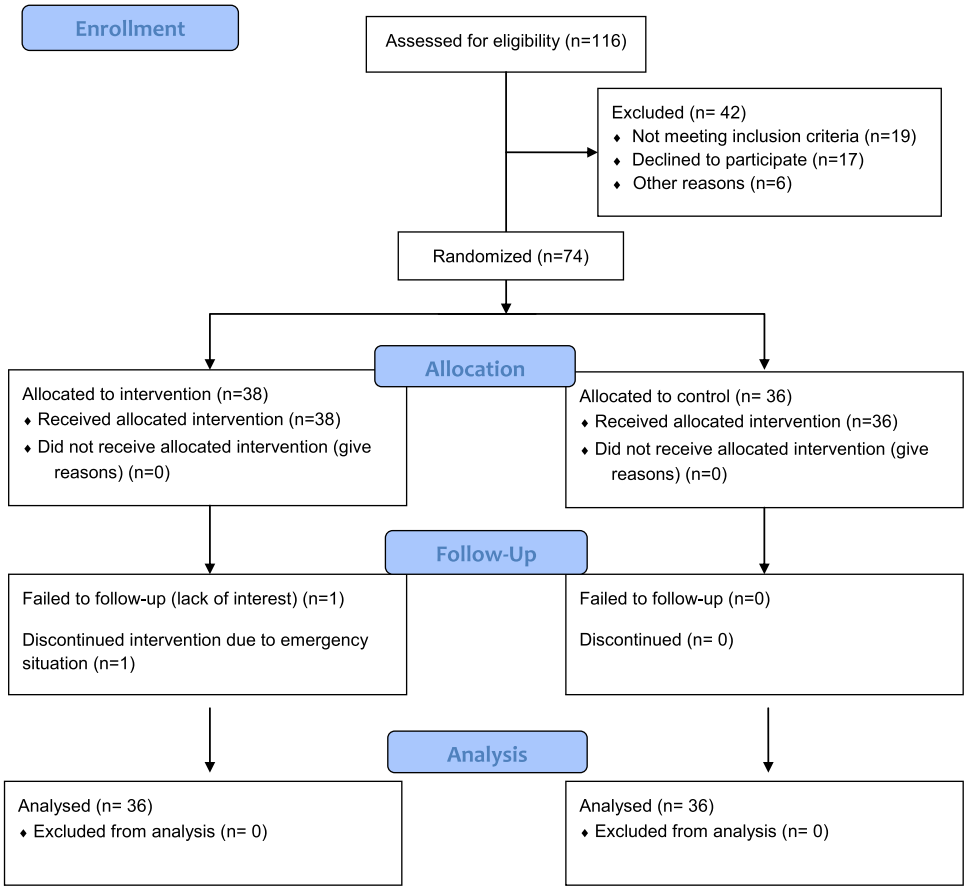


**Figure 2** The algorithm diagram presents the study, CONSORT (2010) flow diagram.

in villages and 70.83% in cities, and there was no significant difference with this concern. As for the level of education, 39 participants (54.16) had a diploma and 20 patients (27.77) a diploma, which did not differ significantly between the groups (Table 2). The results of the Kolmogorov–Smirnov test showed that all variables were normal.

Repeated-measures Analysis of Variance (ANOVA) was used to test the differences among variables at three observation times in each group. According to the results summarized in Table 3, chest pain, arrhythmia incidence, and anxiety in both groups decreased over time from the first to the third time point; however, this difference was

**Table 2** Participants' Demographic

| Variable | | Control Group | Intervention Group | Overall | Results of Between Group Comparison |
|---|---|---|---|---|---|
| | | Mean ± Standard Deviation | Mean ± Standard Deviation | Mean ± Standard Deviation | |
| Age | | 5.8 ± 56.2 | 6.47± 54.7 | 3.54± 55.58 | 0.78=p* |
| Variable | | Frequency (percentage) | Frequency (percentage) | Frequency (percentage) | Results of between group comparison |
| Sex | Male | 17(47.22) | 20(56.55) | 37(51.4) | 0.580=p** |
| | Female | 19(52.78) | 16(44.45) | 35(49.6) | |

(*Continued*)

**Table 2** (Continued).

| Variable | | Control Group | Intervention Group | Overall | Results of Between Group Comparison |
|---|---|---|---|---|---|
| | | Mean ± Standard Deviation | Mean ± Standard Deviation | Mean ± Standard Deviation | |
| Marital status | Married | 26(72.22) | 27(75) | 53(73.61) | 0.560=p** |
| | Single | 10(27.78) | 9(25) | 19(26.39) | |
| Level of education | Under diploma | 9(25) | 11(30.55) | 20(27.77) | 0.62=p*** |
| | Diploma | 20(55.55) | 19(52.78) | 39(54.16) | |
| | Above Diploma | 7(19.45) | 6(16.67) | 13(18.05) | |
| Place of residence | Rural | 26(72.22) | 25(69.45) | 51(70.83) | 0.66=p** |
| | Urban | 10(27.78) | 11(30.55) | 21(29.17) | |

**Notes:** *Independent samples *T*-test, **Chi-Square, ***Mann–Whitney *U*-test, p: p-value, Sig ≤ 0.05.

**Table 3** Within- and Between-Group Comparisons of Mean and Standard Deviation of Variables Before the Intervention, Three and Seven Days Later

| Variables | Group | Before the Intervention | Three Days Later | Seven Days Later | P value |
|---|---|---|---|---|---|
| Chest pain | Control group | 6.8 ± 0.9 | 6.4 ± 0.85 | 6.1 ± 0.8 | 0.55 |
| | Intervention group | 6.95 ± 0.6 | 5.9 ± 0.45 | 4.3 ± 0.33 | 0.044 |
| P value | | 0. 74 | 0. 046 | 0.024 | – |
| Arrhythmia incidence | Control group | 7.3 ± 1.1 | 6.7 ± 0.9 | 6.4± 1.1 | 0.55 |
| | Intervention group | 7.2 ± 0.9 | 6.2 ± 0.8 | 4.3 ± 0.3 | 0.012 |
| P value | | 0.67 | 0.022 | 0.017 | – |
| Anxiety | Control group | 133 ± 12.22 | 135 ± 12.7 | 116 ± 7.1 | 0.045 |
| | Intervention group | 127 ± 11.5 | 114 ± 2.4 | 98 ± 6.1 | 0.03 |
| P value | | 0.58 | 0.027 | 0.001 | – |

significant in the intervention group for all three variables (p=0.044, 0.012, and 0.03, respectively), yet in the control group, it was only significant in the anxiety variable (p=0.045).

The independent-samples *T*-test was used to compare the means and standard deviations of the variables between the two groups at any time. It revealed that the mean scores of chest pain, arrhythmia incidence, and anxiety before the intervention in the two groups did not differ significantly, but there was a significant difference in the three variables three days later between the groups (p=0. 046, 0.022, 0.027 respectively). There was a statistically significant difference in the three variables seven days later between the groups (p=0.024, 0.017, 0. 001 respectively) Table 3.

The results of independent samples *T*-test analysis (Table 4) showed no difference between the mean score of any of the variables of chest pain, incidence of arrhythmia, and anxiety by sex (p>0.05). The results of independent samples *T*-test also showed a difference only in the arrhythmia incidence variable (p=0.045) in terms of marital status. As for the level of education, one-way ANOVA showed a difference between this variable and anxiety (p=0.025). The independent-

**Table 4** Relationship Between Demographic Variables and Chest Pain, Arrhythmia Incidence, and Anxiety

| Variable | Chest Pain | | Arrhythmia Incidence | Anxiety |
|---|---|---|---|---|
| **Sex** | Male | 1.29=t | 1.65 =t | 0.70=t |
| | Female | p=0.86 | 0. 74=p | 0.48=p |
| **Marital status** | Married | 0.68=t | 0.76=t | 1.80=t |
| | Single | 0.53=p | 0.045=p | 0.8=p |
| **Level of education** | Under Diploma<br>Diploma<br>Above Diploma | F =0.68<br>p=0.44 | F =0.47<br>P=0.58 | 1.35= F 0.025= p |
| **Place of residence** | Village | 0.74=t | 1.35=t | 0.57=t |
| | City | 0.62=p | 0.028=p | 0.58=p |
| **Age** | | 0.035=p 0.68=r | 0.065=p 0.79=r | p= 0.86<br>0.75-=r |

**Notes**: Independent *t*-test, F: Statistic, ANOVA, r: Pearson Correlation Coefficient, p: p-value (Sig ≤ 0.05).

samples *T*-test showed a difference between the place of residence and arrhythmia incidence. Pearson correlation test also showed negative and significant relationship between age and anxiety; however, the chest pain and arrhythmia incidence variables showed to be positively correlated.

## Discussion

The present study aimed to determine the effects of a structured supportive and palliative care approach on arrhythmia, chest pain, and anxiety in patients in the CCU. As the results showed, the mean scores of anxiety, pain, and arrhythmia incidence before the intervention in the two groups did not differ significantly; however, after the intervention, this difference was significant and the mean scores of these variables decreased in the intervention group, which indicates the effect of the supportive and palliative care approach as the answer to the research question. In addition, according to the results, chest pain, arrhythmia incidence, and anxiety in both groups decreased over time from the first to the third time point; however, this difference was significant in the intervention group for all three variables, but in the control group, it was only significant for the anxiety variable. This again shows the effect of intervention, and the reason for the reduction in variables and the significant level of anxiety in the control group could also be due to routine treatments; and that over time, the anxiety level of hospitalized patients usually decreases.

There is research evidence that cardiac patients experience numerous problems such as chest pain, exercise intolerance, shortness of breath, ineffective adaptation to the disease, and psychiatric problems.[27] McConnell (2024) contended that patients are exposed to various types of stress, anxiety, and depression due to changes in lifestyle, hospitalization, lack of awareness of the treatment and recovery process, and the need to observe lifestyle restrictions.[28] As Radcliffe (2014) pinpointed, PC, as a multidisciplinary approach, requires a diverse and specialized team, all working together to improve the patient's quality of life.[29] Maciver (2018) asserted that PC is a multidisciplinary approach to integrating psychological and spiritual factors used in different stages of heart failure and is currently recommended by all major cardiovascular centers for advanced heart failure.[30] This specialized team is formed to meet the patients' physical, mental, and emotional needs and provide services in a coordinated manner.[31]

Consistent with the present findings, Janssen et al, (2018) showed that the PC in patients with advanced heart failure has greater gains in improving the quality of life, reducing anxiety and depression, and spiritual well-being compared to usual care.[32] Kida et al (2019) confirmed that the psychological and spiritual components of PC are important aspects of comprehensive care provided for serious illnesses such as heart disease. These aspects of care can help the patient find meaning in life despite the illness and achieve hope, love, and forgiveness.[33] Meanwhile, psychological components are

also important factors that affect heart health. In other words, the biological, psychological, and cognitive aspects of chronic stress may play a role in heart disease as a trigger or as an independent factor affecting cardiac outcomes.[34] However, in any context, the patient's beliefs and culture need to be considered when using supportive and palliative care approaches. Some of the differences in the results of these studies may be due to aforementioned issue. The significant reduction in anxiety levels in the intervention group supports existing evidence on the psychological benefits of supportive care. Our structured approach, incorporating psychological support and education, may have acted through mechanisms similar to those described in previous literature where structured physical activity was shown to modulate the hypothalamic-pituitary-adrenal axis, reduce cortisol, and enhance Brain-Derived Neurotrophic Factor (BDNF) production, fostering emotional resilience.[35] Although our intervention was not exercise-based, its holistic design likely activated comparable psychophysiological pathways, contributing to improved anxiety management in cardiac patients. Importantly, supportive and palliative care may also reduce arrhythmia incidence through multiple interrelated mechanisms. By alleviating psychological stress and anxiety, these interventions can enhance parasympathetic activity while simultaneously attenuating excessive sympathetic nervous system activation.[36] This autonomic modulation helps to stabilize heart rate and rhythm, preventing the surges of catecholamines—such as norepinephrine and epinephrine—that are known to precipitate arrhythmogenic events.[37] Beyond these direct physiological effects, supportive and palliative care may exert indirect benefits through improved emotional regulation, increased patient coping capacity, and reduced perception of pain.[38] Lower anxiety and stress levels can decrease the frequency of stress-induced cardiac events and chest discomfort, which in turn may improve sleep, adherence to treatment, and overall cardiovascular stability.[39] The integration of psychological support, patient education, and individualized care allows patients to better manage both the emotional and physical challenges of critical illness, creating a synergistic effect on both mind and heart. Therefore, the observed reductions in arrhythmia and chest pain in the intervention group likely reflect the combined impact of both autonomic stabilization and stress mitigation, highlighting the importance of holistic, multidimensional care strategies in the CCU setting.[40]

According to Nonogi (2018), the supportive care (SC) approach provides an important opportunity to identify emotional disorders such as anxiety and depression and to help manage psychological distress in cardiac patients by reducing the harmful effects of stress on both mind and body.[41] Supportive interventions have been shown to reduce pain and stress and to improve overall health status in individuals with heart disease.[42] Consistent with these findings, Beattie (2018) emphasized that SC is an essential component of a comprehensive palliative care strategy that views the patient holistically.[43] SC is considered an additional dimension of health alongside physical, psychological, and social aspects.[44] O'Donnell et al (2020) also noted the growing recognition of SC in healthcare, stressing that supportive needs are as fundamental as biological and social needs.[45] Moreover, SC acts as an effective coping mechanism in stressful situations, particularly in chronic conditions such as congestive heart failure, by promoting meaning, hope, and emotional regulation.[46]

As the long-term consequences of intensive care on survivors of acute illness become more evident, both palliative and supportive care play a crucial role in preparing and supporting patients and their families for the challenges following discharge from the CCU.[7–9] Overall, this body of research suggests that nurses can utilize SC to enhance patient outcomes and satisfaction in the CCU by alleviating physical and emotional symptoms, strengthening communication, and offering targeted support. Implementing evidence-based interventions aligned with patient prognosis, values, and preferences also helps address family concerns, ensure appropriate goal-setting, and facilitate a smooth transition of care.

Building on the multidisciplinary and social dimensions highlighted in this study, several practical recommendations can be proposed. Interdisciplinary collaboration may be strengthened through regular case-conference meetings among physicians, nurses, psychologists, and rehabilitation specialists, as well as through the development of unified protocols to guide the delivery of palliative interventions in the CCU. Establishing a care-coordinator role could further enhance communication and integration of services among team members. In addition, incorporating social workers into the care process may support patients and their families in addressing psychosocial and financial concerns, while structured family-engagement programs could help reduce anxiety and promote cooperation with the care team. Continuous professional training for CCU nurses on evidence-based symptom management, along with the use of standardized rapid-assessment tools, would improve early detection and response to distress. Moreover, the findings of this study may

contribute to the development of evidence-based clinical guidelines for integrating non-pharmacological palliative approaches into routine cardiac care. Finally, future research is encouraged to include follow-up assessments after discharge and to evaluate outcomes such as sustained symptom relief, patient quality of life, and staff workload or burnout following the implementation of these interventions.

## Limitations

Key limitations of this study include the short follow-up duration of 7 days, which may not fully capture longer-term effects of the interventions on arrhythmia, psychological stress, or patient recovery. The small sample size and single-center design limit the generalizability of the findings and may introduce center-specific biases. Potential confounding factors, such as baseline psychosocial status, comorbidities, medication adherence, and variations in standard care, were not fully controlled. Additionally, reliance on self-reported measures of stress and anxiety may be subject to response bias. These limitations highlight the need for further research with larger, multicenter cohorts and longer follow-up periods.

## Conclusion

The present findings showed no statistically significant difference in the variables of chest pain, arrhythmia incidence, and anxiety between the control and intervention groups before the intervention; however, there was a significant difference between the two groups after the intervention, which proves that structured supportive and palliative care approaches can reduce arrhythmia, anxiety, and chest pain. Therefore, it is necessary to develop relevant guidelines based on the results of this and other literature. It is recommended that other clinical trials be conducted in a multicenter setting with larger sample sizes to further support the results of the present study. In addition, considering the role of some demographic variables, it is recommended that factors such as age and education level be considered when developing guidelines with this regard.

## Abbreviations

PC, palliative care; SC, supportive care; ECG, electrocardiogram; VAS, visual analog scale; STAI, State-Trait Anxiety Inventory; CCU, cardiac care unit; WHO, World Health.

## Data Sharing Statement

The patient-level datasets generated and analyzed in the current study are not publicly available because of privacy and ethical concerns. However, they can be obtained from the corresponding author upon reasonable request. Authorea registration “Wiley’s Preprint” at https://doi.org/10.22541/au.173705743.36723852/v1.

## Ethical Approval and Informed Consent

Throughout the study, ethics were obtained from the Research Ethics Committee of the College of Nursing, University of Baghdad (approval code: REF. 02. 09-02-2025) after entering the research environment and obtaining permission from Ibn Al-Bitar Specialized Center for Cardiac Surgery (No. 26, dated 04-03-2025). The clinical trial was registered in the Chinese Clinical Trial Registry (No: ChiCTR2500104908) for version 1.0, before patient recruitment, https://www.chictr.org.cn/showproj.html?proj=277598. Written consent was obtained from all participants. This study abided by the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards, which included the provision of a letter of introduction from the relevant organization to enter the research environment, introducing the researcher to participants, explaining the procedures of study, written consent to participate or withdraw from the study, emphasis on the confidentiality of all information that participants provided, the entire inclusion of results, and the researcher’s lack of interference or manipulation at any stage and publication of results.

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## Author Contributions

The author AJK made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Organization; MDT, multidisciplinary team; RCT, randomized controlled trial.

## Disclosure

The authors report no conflicts of interest in this work.

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