DOI: 10.55646/jaren.galenos.2026.14880
J Acad Res Nurs 2026;12(2):81-88

The Effect of Family Support on Hemodynamic Parameters, Comfort, and Anxiety During Mechanical Ventilation Weaning in Cardiovascular Surgery: A Randomized Controlled Trial

Kardiyovasküler Cerrahide Mekanik Ventilatörden Ayırma Sürecinde Aile Desteğinin Hemodinamik Parametreler, Konfor ve Anksiyete Üzerindeki Etkisi: Randomize Kontrollü Bir Çalışma

Selda Karaveli Çakır[1], Canan Kaş[2], Burak Tamtekin[3], Filiz Özel Çakır[1], Elif Yılmaz[4]

[1]Kastamonu University Faculty of Health Sciences, Department of Nursing, Kastamonu, Türkiye
[2]Kastamonu University Faculty of Health Sciences, Department of Midwifery, Kastamonu, Türkiye
[3]Kastamonu University Faculty of Medicine, Department of Cardiovascular Surgery, Kastamonu, Türkiye
[4]Kastamonu Training and Research Hospital, Cardiovascular Surgery Intensive Care Unit, Kastamonu, Türkiye

Cite this article as: Karaveli Çakır S, Kaş C, Tamtekin B, Özel Çakır F, Yılmaz E. The effect of family support on hemodynamic parameters, comfort, and anxiety during mechanical ventilation weaning in cardiovascular surgery: a randomized controlled trial. J Acad Res Nurs. 2026;12(2):81-88

ABSTRACT

Objective: The primary goal of postoperative care after cardiovascular surgery is to discontinue sedation, promote patient awakening, and restore spontaneous breathing during the weaning process. Family support may play an important role in improving patients' psychological adaptation and reducing anxiety during this process. This study aimed to evaluate the effect of family support on hemodynamic parameters, comfort, and anxiety levels during weaning from mechanical ventilation after cardiovascular surgery.

Methods: This experimental, randomized controlled study was conducted between April 30 and December 30, 2023, in the cardiovascular surgery intensive care unit of a training and research hospital in Northern Türkiye. A total of 52 patients were recruited and randomly assigned to two groups. Data were collected using a Patient Descriptive Characteristics Form and an Observation Form; anxiety, comfort, and patient satisfaction were measured using the State Anxiety Inventory, the Perianesthesia Comfort Scale, and the Numeric Rating Scale, respectively. In the experimental group, coordination was established with patients' family members, and they were allowed to be present with the patients during the extubation process.

Results: The intervention was associated with a significant reduction in state anxiety ($p=0.01$) and a marked improvement in perianesthesia comfort ($p=0.01$) compared with standard care. Patient satisfaction after extubation was likewise significantly greater in the intervention group ($p=0.01$). For the majority of hemodynamic indicators, the two groups exhibited similar values without statistically significant differences ($p>0.05$). In contrast, oxygen saturation measured after extubation was significantly higher among patients receiving the intervention ($p=0.002$).

Conclusion: This study indicates that family support-based intervention reduces state anxiety and improves comfort, satisfaction, and oxygen saturation in postoperative cardiovascular intensive care unit patients. These findings suggest that integrating family-centered care into intensive care unit practice may enhance both psychological and clinical recovery.

Keywords: Anxiety, cardiovascular surgery, comfort, family support, ventilator weaning

ORCID IDs: SKÇ. 0000-0003-2432-546X; CK. 0000-0003-1637-0690; BT. 0000-0002-7605-9952; FÖÇ. 0000-0002-8862-3514; EY. 0009-0009-4927-9691

Corresponding Author: Selda Karaveli Çakır,
E-mail: seldakaraveli@gmail.com

Received Date: 28.11.2025 **Accepted Date:** 22.07.2026
Publication Date: 26.08.2026

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ÖZ

Amaç: Kardiyovasküler cerrahi sonrası postoperatif bakımın temel amacı, sedasyonun sonlandırılması, hastanın uyanmasının sağlanması ve ventilatörden ayırma süreci sırasında spontan solunumun yeniden kazandırılmasıdır. Aile desteği, bu süreçte hastaların psikolojik uyumunu artırmada ve anksiyeteyi azaltmada önemli bir rol oynayabilir. Bu çalışma, kardiyovasküler cerrahi sonrası mekanik ventilasyondan ayrılma sürecinde aile desteğinin hemodinamik parametreler, konfor ve anksiyete düzeyleri üzerindeki etkisini değerlendirmeyi amaçlamıştır.

Yöntem: Bu deneysel, randomize kontrollü çalışma, Türkiye'nin kuzeyinde yer alan bir eğitim ve araştırma hastanesinin kardiyovasküler cerrahi yoğun bakım ünitesinde, 30 Nisan-30 Aralık 2023 tarihleri arasında yürütülmüştür. Toplam 52 hasta çalışmaya alınmış ve rastgele iki gruba ayrılmıştır. Veriler Hasta Tanıtıcı Özellikler Formu ve Gözlem Formu kullanılarak toplanmış; anksiyete, konfor ve hasta memnuniyeti ise sırasıyla Durumluk Anksiyete Envanteri, Perianestezi Konfor Ölçeği ve Sayısal Derecelendirme Ölçeği kullanılarak değerlendirilmiştir. Deney grubunda, hastaların aile üyeleriyle koordinasyon sağlanmış ve ekstübasyon süreci boyunca hastaların yanında bulunmalarına izin verilmiştir.

Bulgular: Müdahale, standart bakımla karşılaştırıldığında durumluk anksiyetede anlamlı bir azalma (p=0,01) ve perianestezi konforunda belirgin bir iyileşme (p=0,01) ile ilişkili bulunmuştur. Ekstübasyon sonrası hasta memnuniyeti de müdahale grubunda anlamlı düzeyde daha yüksek saptanmıştır. Hemodinamik göstergelerin büyük çoğunluğu açısından iki grup arasında istatistiksel olarak anlamlı bir farklılık bulunmamış, değerlerin benzer olduğu görülmüştür (p>0,05). Buna karşın, ekstübasyon sonrası ölçülen oksijen satürasyonu müdahale grubunda anlamlı düzeyde daha yüksek bulunmuştur (p=0,002).

Sonuç: Bu çalışma, aile destekli bir girişimin, postoperatif kardiyovasküler yoğun bakım hastalarında durumluk anksiyeteyi azalttığını ve konforu, hasta memnuniyetini ve oksijen satürasyonunu artırdığını göstermektedir. Elde edilen bulgular, aile merkezli bakımın yoğun bakım uygulamalarına entegre edilmesinin hem psikolojik hem de klinik iyileşmeyi destekleyebileceğini düşündürmektedir.

Anahtar kelimeler: Anksiyete, kardiyovasküler cerrahi, konfor, aile desteği, mekanik ventilatörden ayırma

INTRODUCTION

Mechanical ventilation (MV) is defined as the artificial delivery of a controlled flow of gas to patients who are not adequately oxygenated or who develop respiratory failure [1]. MV improves oxygenation by increasing lung capacity and functional residual capacity, thereby reducing myocardial oxygen consumption [2,3]. In patients undergoing cardiovascular surgery, MV is routinely used in the early postoperative period to provide respiratory support. Sedation is frequently administered in patients receiving MV to manage anxiety and improve ventilator synchrony. However, sedative use may prolong MV and negatively affect hemodynamic stability [4]. The primary goal of postoperative care in cardiovascular surgery is to discontinue sedation, achieve patient awakening, and restore spontaneous breathing followed by safe extubation. Most patients demonstrate rapid recovery of spontaneous breathing and are extubated within the first 12 hours after surgery [5].

Weaning from MV is a complex process that depends on respiratory tolerance, cognitive status, emotional readiness, and available support systems [6]. Although early weaning is desirable, inappropriate timing may lead to impaired gas exchange, muscle weakness, reintubation, and increased morbidity and mortality [7-12]. In addition, prolonged MV is associated with ventilator-related complications such as airway trauma, aspiration, and pneumonia, as well as increased intensive care unit (ICU) length of stay and healthcare costs [8,9]. Therefore, timely and safe weaning is essential in intensive care practice, where nurses play a key role in patient monitoring and individualized care [1,11].

Surgical intensive care nurses are also responsible for maintaining patient-family interaction while providing life-saving interventions [13,14]. Family support has been identified as an important psychosocial factor that reduces anxiety and contributes positively to recovery in ICU patients [15,16]. In addition, planned family involvement and presence have been shown to improve physiological parameters and accelerate the weaning process from MV [9,12,17].

Cardiovascular surgery patients constitute a particularly vulnerable group during the weaning process due to their susceptibility to hemodynamic instability and stress-related physiological responses. Although existing studies have demonstrated the beneficial effects of family involvement on physiological parameters, emotional support, and recovery outcomes in intensive care patients, there is still limited evidence specifically addressing its impact during MV weaning in the cardiovascular surgical population. Furthermore, data remain insufficient regarding the combined effects of family support on hemodynamic parameters, patient comfort, and anxiety levels during this critical transition period. In this context, the present study explored the potential contribution of family support to hemodynamic stability, patient comfort, and anxiety throughout the MV weaning process after cardiovascular surgery.

MATERIAL AND METHOD

Study Design and Objective

A randomized controlled trial methodology was employed in this investigation. The findings are presented following the recommendations of the CONSORT statement. This research examined whether family support influences hemodynamic responses, patient comfort, and anxiety during the process of weaning patients from MV after cardiovascular surgery.

Research Hypotheses

H0.1: Hemodynamic parameters during weaning from MV will not differ between participants receiving family support and those receiving standard care.

H0.2: Patient comfort levels will be comparable in the family support and standard care groups.

H0.3: Levels of patient anxiety will not vary according to group allocation.

H0.4: Patient satisfaction following the intervention will be similar in both study groups.

H1.1: Hemodynamic responses during weaning from MV will differ between participants receiving family support and those receiving standard care.

H1.2: Patient comfort levels will differ between the family support and standard care groups.

H1.3: Patient anxiety levels will vary according to group assignment.

H1.4: Patient satisfaction following the intervention will differ between the two study groups.

Participants and Setting

The study was conducted in the cardiovascular surgery ICU of a tertiary hospital in Northern Türkiye between April 30 and December 30, 2023. The ICU has six beds, and patients undergoing cardiovascular surgery are routinely transferred to the ICU intubated and mechanically ventilated, with extubation performed in the ICU.

The study population consisted of postoperative cardiovascular surgery patients receiving MV support in the ICU. Based on power analysis (G*Power 3.1.7), assuming an effect size of 0.8, 95% confidence interval, and at least 81% power, a minimum sample size of 52 patients was required [18]. To account for potential dropouts, 52 patients were included. Of these, 62 patients were initially assessed for eligibility, 10 patients were excluded as they did not meet the inclusion criteria, and 52 patients were randomly assigned into two groups (26 intervention, 26 control). The study flow is presented in Figure 1.

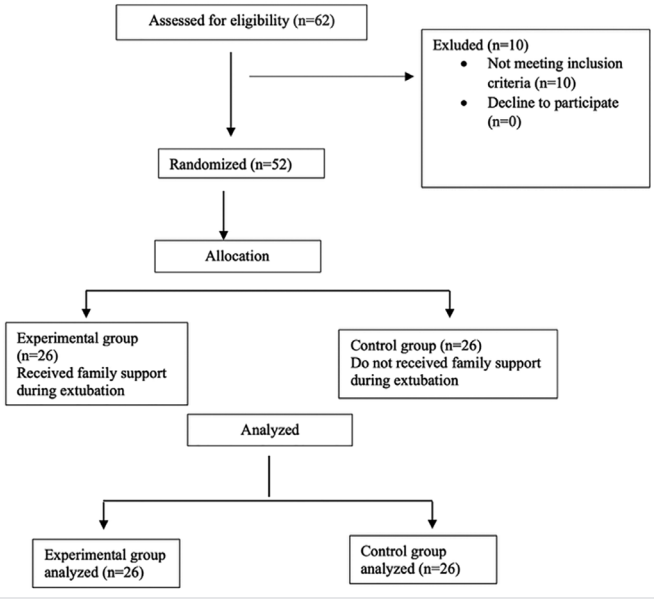


Figure 1. Study flowchart

Eligibility for Participation

Participants were considered eligible if they met the following conditions: they were 18 years of age or older, voluntarily signed a written informed consent form, had no visual, auditory, cognitive, or psychiatric disorders, required MV following cardiovascular surgery, and had a Glasgow Coma Scale score of 12 or lower.

Exclusion criteria: Patients with previous intensive care experience, patients receiving MV in ICUs other than cardiovascular surgery ICU, and reintubated patients.

Randomization and Allocation

Following confirmation of eligibility, participants were allocated to the family support or standard care groups according to a block randomization scheme. The randomization schedule was created by an independent biostatistician using the Research Randomizer Program (www.randomizer.org). This individual had no role in recruiting participants, implementing the intervention, or collecting study data. To preserve allocation concealment, group assignments were recorded on a coded randomization list prepared before enrolment. Eligible participants entered the study in the order specified by the predetermined randomization schedule. Because of the characteristics of the family support intervention, masking of participants, their family members, and healthcare professionals could not be implemented. Nevertheless, study outcomes were evaluated with validated assessment tools and objective physiological measurements, while statistical analyses were completed with the treatment allocation concealed from the analyst.

Intervention

All patients received standard postoperative cardiovascular ICU care and MV management according to institutional protocols.

Experimental Group

In addition to standard care, patients in the intervention group received structured family support during the weaning process. The family member participating in the intervention was the patient's first-degree relative (e.g., spouse, parent, or child), as identified by the patient or family. Before extubation, family members were trained by the research team regarding appropriate supportive behaviors, including providing verbal reassurance (e.g., "I am with you, everything will be fine") and holding the patient's hand. Family members were instructed not to interfere with clinical procedures and to remain at the bedside during the weaning process when appropriate. When patients met extubation criteria, family members were allowed to stay at the bedside and provide emotional support during the weaning process. During the weaning process, all family members remained at the patient's bedside for 30 minutes and provided standardized emotional support.

Control Group

Patients in the control group received standard ICU care only. Family members were not permitted to be present during the weaning and extubation process.

Data Collection Tools and Methods

Patient Descriptive Characteristics Form: This form includes items related to the descriptive characteristics (e.g., age, gender, surgery type, comorbidities, ICU-related variables) of patients.

Observation Form: This form is used to record important clinical information about the patient. It includes hemodynamic values (systolic/diastolic pressure, pulse, oxygen saturation pH, PCO_2, and post-extubation respiratory rate/min) before and after the patient weaning from the mechanical ventilator. Measurements were obtained using standard ICU monitoring devices.

State-Trait Anxiety Inventory (STAI): Spielberger et al. [19] introduced the STAI as an instrument for assessing both state and trait dimensions of anxiety. The adaptation of the scale into Turkish, including its validity and reliability testing, was completed in 1983 [20]. The instrument comprises two independent subscales, the State Anxiety Inventory (STAI-S) and the Trait Anxiety Inventory (STAI-T). Both subscales include 20 items evaluated using a four-point Likert response format. For the purposes of the present study, only the STAI-S was administered to evaluate anxiety experienced during the MV weaning period. Possible STAI-S scores extend from 20 to 80, and increasing scores reflect greater levels of state anxiety. Evidence from the Turkish adaptation has shown satisfactory reliability, with Cronbach's alpha values reported between 0.83 and 0.87. In the current study, the STAI-S demonstrated excellent internal consistency, yielding a Cronbach's alpha coefficient of 0.945.

Perianesthesia Comfort Scale (PCS): Originally described by Kolcaba [21] in 2003, the PCS was adapted for use in the Turkish population by Üstündağ and Eti Aslan [22], who reported satisfactory validity and reliability in 2010. The instrument is composed of 24 items that assess patients' comfort-related perceptions during the perioperative period. Possible scores extend from 24 to 144, where higher scores correspond to greater perceived comfort. For the present sample, the internal consistency of the PCS was excellent, with a Cronbach's alpha coefficient of 0.912.

Numeric Rating Scale (NRS): Following liberation from MV, patient satisfaction was quantified using the NRS. The scale is scored from 0 to 10, and higher values denote a greater degree of satisfaction.

Outcomes

The main outcome measure focused on patients' hemodynamic status, assessed by systolic and diastolic blood pressure, heart rate, oxygen saturation, pH, and $PaCO_2$ values.

The remaining outcomes evaluated in the study included:

- Patient anxiety levels (STAI-S)
- Patient comfort (PCS)
- Patient satisfaction (NRS)

Data Collection Procedures

Hemodynamic parameters were measured 10 minutes before and 10 minutes after extubation using a bedside multiparameter ICU monitor under standardized resting conditions. Oxygen saturation was measured using a fingertip pulse oximeter. State anxiety was assessed using the STAI-S 10 minutes after extubation. Patient satisfaction was also recorded 10 minutes after extubation by the investigators using the NRS. Patient comfort was assessed on the first postoperative day using the PCS.

Statistical Analysis

All statistical procedures were carried out using IBM SPSS Statistics version 25.0. Participant characteristics were summarized using descriptive measures, including counts, percentages, means, and standard deviations, to describe and compare the study groups. The intervention (family support during MV weaning versus routine care) constituted the independent variable. Outcome variables comprised hemodynamic measurements, STAI-S scores reflecting state anxiety, PCS scores representing patient comfort, and NRS scores indicating patient satisfaction. The distribution of continuous variables was examined with the Shapiro-Wilk test to determine normality. Variables demonstrating a normal distribution were compared using the independent-samples Student's t-test, whereas the Mann-Whitney U test was applied to variables that did not satisfy the normality assumption. Categorical variables were analyzed using the chi-square test. The internal consistency of the measurement instruments was examined by calculating Cronbach's alpha coefficients. A two-sided p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Kastamonu University Clinical Research Ethics Committee (approval no: 2022-KAEK-146, date: 08.02.2023). Written permissions for the use of copyrighted measurement instruments were obtained from the original authors where applicable. Written informed consent was obtained from all participants after being informed about the study.

RESULTS

The study was conducted with 52 patients (experimental group n=26, control group n=26). The demographic and clinical characteristics of the patients are presented in Table 1. The mean age of the participants was 63.96±12.89 years in the experimental group and 67.61±8.94 years in the control group. Most patients in both groups were male and married. The majority of patients had a high school education or below, and most were not employed. Comorbidity rates and types of surgery were also similar between the groups. No statistically significant differences were found between the groups in terms of demographic and clinical characteristics, indicating that the groups were comparable at baseline.

The STAI-S anxiety and PCS scores after extubation are presented in Table 2. The intervention group demonstrated a reduction in STAI-S scores relative to the control group (p=0.01). In contrast,

Table 1. Demographic and Clinical Characteristics of the Patients (n=52)			
Variables	**Experimental group (n=26)**	**Control group (n=26)**	**p-value**
Demographic characteristics			
Age (years) ($\bar{X} \pm S_{\bar{x}}$) (min-max)	63.96±12.89 (24-81)	67.61±8.94 (51-83)	p=0.241*
Sex, n (%) Female Male	 5 (19.2) 21 (80.8)	 5 (19.2) 21 (80.8)	-
Marital status, n (%) Single Married	 25 (96.2) 1 (3.8)	 26 (100) 0	p=0.500**
Educational status, n (%) High school diploma or below Above high school	 25 (96.2) 1 (3.8)	 26 (100) 0	p=0.500**
Employment status, n (%) Employed Unemployed	 1 (3.8) 25 (96.2)	 2 (7.7) 24 (92.3)	p=0.500**
Clinical characteristics			
Comorbidity, n (%) Yes No	 23 (88.5) 3 (11.5)	 23 (88.5) 3 (11.5)	-
Type of surgery, n (%) Embolectomy AVR CABG Aortic replacement Carotid bypass	 3 (11.5) 2 (7.7) 13 (50) 2 (7.7) 6 (23.1)	 3 (11.5) 1 (3.8) 14 (53.8) 3 (11.5) 5 (19.2)	=0.590**

*: Independent-samples t-test, **: Fisher's exact test, -: No statistical test was performed due to identical distributions between the groups, ,$\bar{X}$: Mean, $S_{\bar{x}}$: Standard error of mean, CABG: Coronary artery bypass graft, AVR: Aortic valve replacement

Table 2. Comparison of the STAI-S Anxiety and Perianesthesia Comfort Scale Scores Between the Two Groups			
	Experimental group (n=26)	**Control group (n=26)**	**p-value**
State anxiety	29.84±7.91	43.23±11.10	p=0.01*
Perianesthesia comfort scale	125.61±12.27	106.38±14.67	p=0.01*
*: Independent-samples t-test			

PCS scores increased significantly among participants who received the intervention (p=0.01).

The comparison of hemodynamic parameters before and after extubation between the two groups is presented in Table 3. No statistically significant differences were observed between the groups in systolic and diastolic blood pressure, pulse rate, pH, and PCO_2 values, as shown in Table 3 (p>0.05). Oxygen saturation after extubation was significantly higher in the experimental group compared to the control group (p=0.002). Post-extubation respiratory rate did not differ significantly between the groups (p>0.05).

Hospitalization duration did not differ significantly according to group allocation. Nevertheless, participants assigned to the intervention group achieved significantly higher satisfaction scores after extubation than participants in the control group (p=0.01) (Table 4).

Evaluation of the study hypotheses showed that H0.1 could only be rejected in part. Among the assessed hemodynamic variables, a significant between-group difference was identified solely for oxygen saturation, while the remaining variables were similar across groups. H0.2 and H0.3 were rejected because the intervention resulted in greater patient comfort and reduced state anxiety. In addition, H0.4 was rejected, as participants in the intervention group reported superior satisfaction following extubation.

DISCUSSION

The findings of this study indicate that family presence during the peri-extubation period acts as a stabilizing factor affecting both psychological and physiological responses. Patients receiving family support had lower anxiety levels, higher comfort and satisfaction, and better oxygen saturation compared with the control group. These outcomes appear to be interconnected and may be explained by the modulation of the stress response during the weaning process. Weaning from MV is a stressful clinical event that activates the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis. This activation may

Table 3. Comparison of Hemodynamic Parameters Before and After Weaning Between the Two Groups			
Variable	**Experimental group (n=26)**	**Control group (n=26)**	**p-value**
Systolic pressure (mmHg) Before extubation After extubation	 146.00 (90-180) 127.46±21.24	 110.00 (98-180) 122.84±25.12	 p=0.08** p=0.47*
Diastolic pressure (mmHg) Before extubation After extubation	 72.15±9.04 67.50 (52-81)	 71.42±11.13 68.00 (55-96)	 p=0.79* p=0.06**
Pulse/min (median) Before extubation After extubation	 94.07±15.06 87.50 (56-138)	 98.50±18.46 98.00 (68-130)	 p=0.34* p=0.11**
Oxygen saturation Before extubation After extubation	 99 (96-100) 99 (96-100)	 99 (95-100) 98 (95-99)	 p=0.22** p=0.002**
pH Before extubation After extubation	 7.38±0.05 7.39 (7.30-7.50)	 7.37±0.06 7.39 (7.20-7.55)	 p=0.54* p=0.72**
PCO_2 Before extubation After extubation	 36.06±4.85 33.83±6.03	 36.04±6.26 33.91±4.70	 p=0.99* p=0.95*
Post-extubation respiratory rate	16 (12-24)	16 (12-22)	p=0.97**

Values are presented as mean ± standard deviation for normally distributed variables and median (minimum-maximum) for non-normally distributed variables
*: Student's t-test (for normally distributed data), **: Mann-Whitney U test (for non-normally distributed data)

Table 4. Comparison of Hospitalization Duration and Patient Satisfaction Between the Two Groups			
	Experimental group (n=26)	**Control group (n=26)**	**p-value**
Day of hospitalization	6 (3-8)	6 (3-10)	p=0.52*
Patient satisfaction after extubation	10 (8-10)	7 (3-10)	p=0.01*

*: Median values together with their minimum and maximum limits are presented. Statistical comparisons across the two groups were carried out using the Mann-Whitney U test

lead to increased catecholamine release, elevated cortisol levels, resulting in tachypnea and increased oxygen consumption [23,24].

In the present study, higher oxygen saturation observed in the experimental group may indicate reduced sympathetic activation and attenuation of HPA axis activity, suggesting improved physiological adaptation during weaning [6,25]. Previous studies have similarly shown that familiar sensory stimuli, such as the presence or voice of family members, can reduce stress responses, improve patient-ventilator synchrony, and enhance oxygenation outcomes [6,9,26-28]. In addition, emotional reassurance provided by family members may attenuate stress-related neuroendocrine activation, thereby reducing metabolic demand and improving respiratory stability during critical transitions [29-31].

Another important finding of this study was that state anxiety levels were significantly lower in the experimental group than in the control group. Anxiety is common during MV weaning, particularly in cardiovascular surgery patients who may experience fear, uncertainty, and emotional distress in the postoperative period [32]. Previous studies have shown that family presence supports patients' physical and emotional needs, reduces discomfort, and facilitates adaptation to medical treatment [33,34]. Consistent with these findings, lower anxiety levels associated with family presence have been reported in different intensive care settings [35-37].

Social support is an important determinant of anxiety, and family members represent one of its primary sources, contributing to reduced stress and increased psychological resilience [38,39]. Therefore, the lower anxiety observed in this study suggests that family members may act as psychological safety signals, reducing perceived threat and improving coping capacity during the weaning process.

In this study, patients in the experimental group demonstrated significantly higher PCS scores compared to the control group. Maintaining patient comfort is a fundamental goal of perioperative care, as comfort-oriented interventions may facilitate faster and less complicated recovery. Weaning from MV after cardiac surgery is a particularly vulnerable phase, during which patients often experience increased anxiety [40].

Previous studies have reported a negative relationship between comfort and anxiety, suggesting that increased anxiety adversely affects comfort levels [41]. Similarly, evidence indicates that preoperative education and family presence in the ICU can reduce anxiety and improve comfort [33,34]. Therefore, the lower anxiety observed in the experimental group may partly explain

the higher comfort levels. These findings are consistent with studies demonstrating an inverse relationship between anxiety and comfort in surgical patients [41,42]. Additionally, emotional reassurance provided by family members may promote comfort by reducing distress and fostering a sense of safety during the weaning process.

Similarly, higher patient satisfaction in the intervention group may be associated with improved psychological stability. Patient satisfaction is closely related to emotional support, trust, and perceived quality of care [43]. Family involvement may enhance communication and emotional security, thereby improving patients' overall care experience [35,39,40,44]. While previous studies have mainly focused on family satisfaction in intensive care settings [9,45], this study highlights patient-reported outcomes and emphasizes the importance of considering patients' emotional experiences in critical care.

These findings support a psychophysiological stress-response model in which anxiety, sympathetic activation, and oxygen demand are closely related during the weaning process [6,23]. Peri-extubation stress may trigger a cycle of emotional distress and physiological strain that can impair respiratory adaptation. Family support may help interrupt this cycle by reducing anxiety, which in turn attenuates sympathetic nervous system activity and decreases myocardial oxygen consumption, ultimately contributing to improved oxygen saturation. This mechanism may explain the simultaneous improvements in oxygenation, comfort, and satisfaction observed in the experimental group.

Overall, these findings highlight the importance of addressing both psychological and physiological needs during weaning from MV. Family presence appears to be a safe, low-cost, and feasible non-pharmacological intervention that can support standard intensive care practices. Incorporating structured family support during the peri-extubation period may enhance emotional resilience, stabilize physiological responses, and improve patient-centered outcomes in cardiovascular surgery patients.

A major strength of this study is its focus on the peri-extubation period in cardiovascular surgery patients, a phase characterized by both physiological instability and psychological vulnerability. Unlike previous studies conducted in general intensive care populations, this study provides focused evidence for a high-risk surgical subgroup. In addition, the use of multidimensional outcome measures allowed for a comprehensive evaluation of both psychological and physiological responses to family support.

Study Limitations

Several limitations should be acknowledged when interpreting the results of this investigation. To begin with, the study was carried out in the cardiovascular surgery ICU of a single institution, which may restrict the applicability of the findings to other hospitals and different patient groups. Furthermore, the modest sample size should be considered, as it may have limited the statistical power of the analyses. Because the intervention involved family presence, masking of participants and healthcare professionals could not be implemented, creating the possibility of performance bias. Moreover, physiological indicators of stress, including serum cortisol concentrations and heart rate variability, were not evaluated, preventing direct confirmation of the proposed biological mechanisms. Finally, patient outcomes beyond hospital discharge were not monitored; consequently, the long-term effectiveness of family support could not be determined.

CONCLUSION

Family support provided during the weaning process from MV after cardiovascular surgery was associated with improved oxygen saturation, lower anxiety levels, greater patient comfort, and higher patient satisfaction. Collectively, these results indicate that the presence of family members could be incorporated as a practical, inexpensive, and non-pharmacological strategy to facilitate patient care during this critical phase of intensive care. Nevertheless, the available evidence remains scarce. Future research involving multicenter designs and more extensive patient cohorts is warranted to verify these results, determine their long-term effects, and assess whether this approach can be implemented successfully in different clinical environments.

Ethics

Ethics Committee Approval: Ethical approval was obtained from the Kastamonu University Clinical Research Ethics Committee (approval no: 2022-KAEK-146, date: 08.02.2023).

Informed Consent: Written informed consent was obtained from all participants after being informed about the study.

Footnotes

Our manuscript is an original piece of work and has not been previously published elsewhere. It was presented as an oral presentation at the 18th National Congress of the Turkish Society of Cardiovascular Surgery, 2024.

Authorship Contributions

Surgical and Medical Practices: SKÇ, CK, BT, FÖÇ, EY; Concept: SKÇ, CK, BT, FÖÇ, EY; Design: SKÇ, CK, BT, FÖÇ, EY; Data Collection or Processing: BT, EY; Analysis or Interpretation: SKÇ, CK, BT, FÖÇ, EY; Literature Search: SKÇ, CK, BT, FÖÇ, EY; Writing: SKÇ, CK, BT, FÖÇ, EY.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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