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RESEARCH ARTICLE

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Effect of a preoperative evidence-based care education on postoperative recovery of cardiac surgery patients: A quasi-experimental study

Pinar Ongun PhD, RN[1] | Seher Deniz Oztekin PhD, RN[2] | Onursal Bugra MD[3] | Ahmet Dolapoglu MD[3]

[1]Faculty of Health Sciences, Department of Nursing, Balikesir University, Balikesir, Turkey

[2]School of Health Sciences, Department of Nursing, Dogus University, Istanbul, Turkey

[3]Faculty of Medicine, Department of Cardiovascular Surgery, Balikesir University, Balikesir, Turkey

Correspondence
Pinar Ongun, Faculty of Health Sciences, Department of Nursing, Balıkesir University, Cagış Yerleskesi, 10145, Balikesir, Turkey.
Email: pinar.ongun@yahoo.com

Abstract

Background: Preoperative nursing care affects many factors such as reducing the length of hospital stay of the patients in the perioperative period, the rate of postoperative complications, the duration of the operation, decrease of postoperative pain level and early mobilization.

Aim: We aimed to determine the effect of preoperative evidence-based care education that given to cardiac surgery clinical nurses on the postoperative recovery of patients.

Study Design: The research was planned as quasi-experimental. Eighty-six patients who underwent cardiovascular surgery were divided into control and intervention groups. First, the ongoing preoperative care practices and patient recovery outcomes of the clinic were recorded for the control group data. Second, education was provided for the clinical nurses about the preoperative evidence-based care list, and a pilot application was implemented. Finally, the evidence-based care list was applied by the nurses to the intervention group, and its effects on patient outcomes were evaluated. The data were collected using the preoperative evidence-based care list, descriptive information form, intraoperative information form and postoperative patient evaluation form.

Results: The evidence-based care list was applied to the patients in the intervention group, with 100% adherence by the nurses. All pain level measurements in the intervention group were significantly lower in all measurements ($p = .00$). The body temperature measurements (two measurements) of the intervention group were higher ($p = .00$). The postoperative hospital stays of the control group and the intervention group were 11.21 ± 8.41 and 9.50 ± 3.61 days.

Conclusion: The presented preoperative evidence-based care list can be used safely in nursing practices for patients. It provides effective normothermia, reduces the level of pain, shortens the hospital stay and reduces the number of postoperative complications.

Relevance to Clinical Practice: By applying a preoperative evidence-based care to patients undergoing cardiac surgery, pain levels, hospital stays and the number of complications decrease, and it is possible to maintain normothermia. An evidence-based care can be used to ensure rapid postoperative recovery for patients undergoing cardiac surgery.

KEYWORDS
cardiac surgical procedures, critical care, evidence-based care, postoperative complications, preoperative care

1 | INTRODUCTION

The increase in patients with heart disease has resulted in riskier cardiovascular operations, and complication rates during and after surgery have increased.[1] The Enhanced Recovery After Surgery (ERAS) Cardiac Society was established to develop evidence-based recommendations to improve the care of cardiac surgery patients. The association published the 'perioperative care recommendations for patients undergoing cardiac surgery' guideline in 2019.[2] In the published guideline, there are protocols recommended to be applied before, during and after surgery. The main purpose of the protocols determined by the ERAS Cardiac Society is to reduce the response to surgical stress, shorten the hospitalization period of the patients and create a cheaper financial portrait from an economical point of view.[2]

To ensure rapid recovery of cardiac patients, a consensus committee consisting of 20 experts in France published another guideline in 2022.[3] This guideline has similar objectives to the ERASC guideline, such as reducing the number of postoperative complications and hospital stays. Published guidelines include recommendations for providing information and education in the preoperative period, ensuring pain management in the perioperative period, and maintaining normothermia.[2,3]

Care bundles also consist of high-level evidence and are used in perioperative patient care.

The implementation of the perioperative care bundle in surgical patients is important in terms of reducing the length of hospital stay, postoperative complication, morbidity and mortality rates.[4,5] Pre-and postoperative care bundles,[4,5] perioperative care bundles for the prevention of surgical-site infections[6–8] and multimodal analgesia protocol care bundle[9] have been used in surgical patients.

Studies have reported that the use of evidence-based practices in cardiovascular surgery patients can improve postoperative patient outcomes, increase the quality of care and reduce costs.[2,4,10] The main purpose of preoperative patient evaluation is to identify risk factors that may affect surgical intervention and recovery and to collect data to ensure the patient's safety and comfort during the surgical experience.

To our knowledge, the current study is the first in the literature investigating the effect of preoperative evidence-based care education that given to cardiac surgery clinical nurses on the postoperative recovery of patients.

What is known about the topic

- Preoperative patient preparation in nursing care has an essential place in improving postoperative patient outcomes.
- Nursing care based on high-level evidence-based approaches positively affects the quality of recovery in patients.

What this paper adds

- Implementation of a preoperative evidence-based care reduces the postoperative pain level of patients.
- Implementing a preoperative evidence-based care to patients shortens the length of hospital stay and effectively provides normothermia.

2 | METHOD

2.1 | Objective and design

This research was conducted as a quasi-experimental study to determine the effect of preoperative evidence-based care education that given to cardiac surgery clinic nurses on postoperative patient recovery results. The research was planned as a quasi-experimental to increase the compliance and feasibility of nurses in the implementation of the preoperative evidence-based care.

2.2 | Place and period

This research was carried out with the participation of patients who underwent cardiovascular surgery at a Balikesir University Health Practice and Research Hospital in Turkey. Data were collected between August 2019 and February 2021.

2.3 | Population and sample

Patients who were admitted to the cardiovascular surgery clinic to undergo coronary artery bypass graft surgery, aortic valve

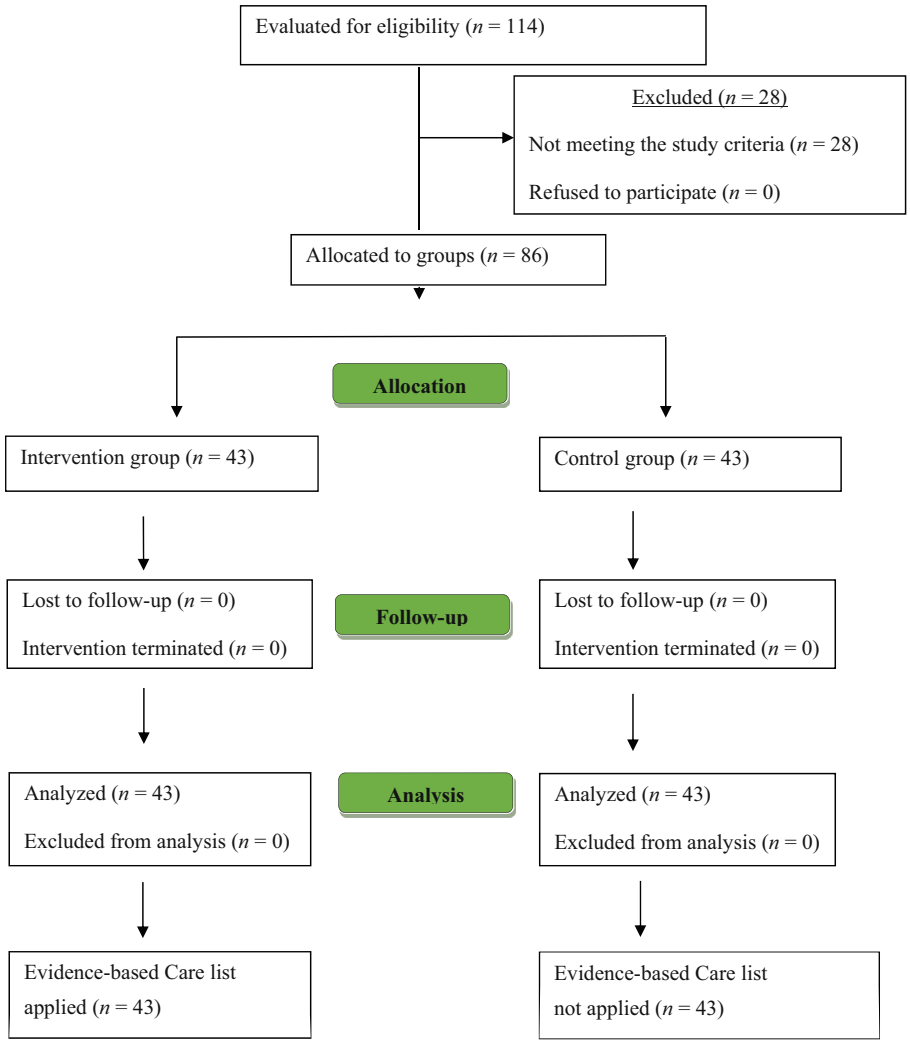

FIGURE 1 Flowchart of the study. *Source*: Jarlais, D., Lyles, C., Crepaz, N., ve TREND Group. (2004). *Improving the Reporting Quality of Nonrandomized Evaluations of Behavioural and Public Health Interventions*: *The TREND Statement*. 94 (3), 361–366.

replacement, mitral valve replacement, aortic root surgery, multiple cardiac operations, or revision elective cardiac surgery were included in the study.

Exclusion criteria from the research included patients under the age of 18, who did not volunteer to participate in the study, who underwent emergency cardiac surgery, or who were operated on in the intensive care unit (ICU).

Sample size was determined using G*Power version 3.1. During the calculation of the required sample size, an 80% power ratio, 95% confidence interval and pain level results were obtained from Fleming et al.'s (2016) study. The required number of patients was determined to be 43 for the intervention group and 43 for the control group. The flowchart of the study was prepared in accordance with the evaluation report of non-randomized studies (Figure 1).[11] TREND reporting was used to improve research synthesis and ensure transparent reporting.[11]

2.4 | Data collection tools

Data were collected using forms prepared by previous studies.[4,5,12] Four forms were prepared:

I. *The descriptive information form* included age, body mass index (BMI), diagnosis, vital signs, smoking status, previous surgical intervention, haemoglobin value, gender and alcohol consumption. The first measurement of vital signs was performed before the patient was given perioperative information.
II. *Intraoperative information form*: Information on aortic cross-clamp duration, operation time and intraoperative complication(s) was collected from the anaesthesia report and perfusion follow-up form.
III. *Postoperative patient evaluation form*: vital signs, pain level, length of stay in the hospital and ICU, postoperative complications, time to start liquid and solid food consumption and time to mobilize. Pain levels of patients were measured with the VAS Visual Analogue Scale (VAS).

The second measurement of vital signs was performed immediately after transfer from the operating room to the ICU, and the third measurement was performed before transfer from the ICU to the cardiovascular clinic.

The patient's pain level measurements were made between the first measurement: 4–6, second measurement: 10–12, third measurement: 16–18, fourth measurement: 22–24 and fifth measurement: 28–30 h.

TABLE 1 Preoperative evidence-based care list.

Item	Details
I. Preoperative glycaemic control	Patients with blood glucose levels below 200 mg/dL were transferred to the operating room.
II. Normothermia	Before the patients' transfer to the operating room, it was ensured that their body temperature was above 36°C. If the patient's body temperature was below 36°C, the nurses used active and passive warming methods.
III. Patient information about non-pharmacological pain management	Cognitive-behavioural pain relief methods were included in the content of patient information. The patients' pain levels were evaluated using the Visual Analog Scale.
III. Skin preparation as soon as possible after surgery	Before the operation, if necessary, the patient's hair was removed with an electric shaver/clipper.
IV. Shortening the preoperative fasting period	The patients were informed that clear liquids could be consumed up to 2 h before surgery and light solid food up to 6 h before surgery.
V. Preoperative patient information including perioperative processes	In the preoperative period, the patients were informed about the preoperative, intraoperative and postoperative processes.

IV. *Preoperative evidence-based care list* (Table 1):

i. **Preoperative glycaemic control**: A blood glucose level below 200 mg/dL in patients with and without DM in the perioperative period is among the items of evidence-based care list that is recommended in the guidelines at Evidence 1A level.[13]

Implementation steps:

- Patients with blood glucose levels below 200 mg/dL were transferred to the operating room.
- The blood glucose level was measured by the nurses using a glucometer device before the patient went to the operating room.
- The operations of the patients with a blood glucose level over 200 mg/dL were delayed until the regulation was completed (about 200 mg/dL).

ii. **Normothermia**: The patient's body temperature above 36°C before going to the operating room is among the items of the evidence-based care list that is recommended at the Evidence 2A-strong recommendation and Evidence 1B level.[13,14]

Implementation steps:

Before going to the operating room, the patient's body temperature should be above 36°C.

- If the patient's body temperature was below 36°C, the transfer was postponed, and the nurses used active and passive warming methods.
  - Hot air blowers and electric blankets were used as active heating methods.
  - Dressing the patients in socks, wearing a beanie and covering them with a blanket were used as passive warming methods.

iii. **Providing non-pharmacological pain management education to patients**: Implementation of cognitive-behavioural methods and distraction of patients when they are in pain are among the items of the evidence-based care list, as recommended at the level of Evidence 2A-strong recommendation in the guide.[15]

Implementation steps:

- Non-pharmacological pain management training was given by nurses the day before the surgery.

iv. **Preparing the skin just before surgery**: Cutting the patient's hair with a clipper before surgery is recommended at the Evidence 1A level in the guide and is among the items of the evidence-based care list.[14]

Implementation steps:

- Before the patient's transfer to the operating room, the hair was removed (if necessary) with a clipper in the patient's room.

v. **Shortening the preoperative fasting period**: Before general and regional anaesthesia, drinking clear liquids for 2 h[3,16–18] and stopping solid foods 6 h before the surgery are among the items of the evidence-based care list.

Implementation steps:

- The patients were informed about the fasting period.
- Consumption of solid food was stopped at least 6 h and water consumption at least 2 h before the operation.

vi. **Informing the patient about the perioperative process before the operation**: Information about the perioperative process is recommended at the level of Evidence 2A-strong recommendation in the guide.[3,18,19]

Implementation steps:

- Information was given to the patient about the pre-, intra- and postoperative processes at a suitable time and in a quiet environment 1 day before the operation day.

- Visual and auditory training was given to the patient by providing an informative booklet.

2.5 | Interventions

2.5.1 | The data were collected in three stages

First stage

For the control group data, the ongoing preoperative nursing practices were observed during daytime working hours without the researcher informing the nurses in the clinic. Intraoperative data were obtained from the anaesthesia reports and perfusion follow-up cards. Postoperative patient data were obtained from ICU patient follow-up forms.

Second stage

Because of the COVID-19 pandemic, elective surgeries were cancelled in our country, and the second phase started with a delay of 6 months. The education was given to the nurses in the clinic (eight nurses) by the researcher on the use of the evidence-based care list and the steps to be followed before surgery in the clinic. In the first week after education, the nurses started the pilot implementation of the evidence-based care list.

The adherence of the cardiovascular surgery nurses to the evidence-based care list was found to be 100% during the pilot application. Problems and difficulties encountered by the physicians and nurses working in the cardiovascular surgery clinic during the implementation of the evidence-based care list were evaluated at the end of the pilot application.

Third stage

The nurses' adherence to the preoperative evidence-based care list and the postoperative recovery results of the patients who received the evidence-based care were evaluated. Adherence to the evidence-based care list was evaluated once a month during the study period by the researcher, cardiovascular surgery specialists (two physicians) and nurses (eight nurses) of the cardiovascular surgery clinic. If the six steps included in the preoperative evidence-based care list were all followed by the cardiovascular surgery nurses, the evidence-based care list was considered to have been successfully applied, and the patients receiving this care were included in the intervention group.

If any of the six items in the evidence-based care list were not undertaken by the cardiovascular surgery nurses, the evidence-based care list was considered 'not completed', and the patients receiving incomplete care were not included in the intervention group.

2.6 | Statistical analysis

Descriptive statistics, independent-sample t-tests, analyses of variance and chi-square tests were used for the statistical analyses of the data obtained from the study. If the analyses were significant, pairwise comparisons were made using the Dunn test with Bonferroni correction, and post hoc power analysis was performed. p values of <.05 were considered statistically significant.

2.7 | Ethical considerations

Ethical approval was obtained from the Clinical Research Ethics Committee of the University (approval number: 86213, date: 2019), and institutional permission was received from the hospital where the study was conducted. Before data collection, the patients were informed about the study, and their verbal and written consent was obtained. This study was performed in accordance with the Helsinki Declaration.

3 | RESULTS

Initially, a total of 86 patients were included in the study, 28 patients were excluded, and 43 patients were included in each group. The adherence of the cardiovascular surgery nurses to the preoperative evidence-based care list was found to be 100%. Surgical team were also totally cooperated with the preoperative evidence-based care list.

Data regarding the descriptive information of the patients, there was no statistically significant difference between the intervention and control groups ($p > .05$), are presented in Table 2.

There was a statistically significant difference between the groups in terms of the mean operative time ($p < .001$), and it was significantly higher in the patients in the intervention group. The mean operative time was found to be 158.47 ± 88.20 min. in the control group and 222.91 ± 61.61 min. in the intervention group ($p < .001$). The mean aortic cross-clamp time was 65.86 ± 33.64 min. in the intervention group and 60.37 ± 22.30 min. in the control group, indicating no statistically significant difference between the groups ($p > .05$).

The two groups statistically significantly differed in the length of ICU stay, time to extubation and time to bowel movements ($p < .05$). These parameters were significantly higher in the intervention group than in the control group (Table 3).

According to the body temperature measurements performed at different times, there was a statistically significant difference between the intervention and control groups ($p < .001$), and the body temperature of the intervention group was higher than that of the control group (Table 4). When the intervention and control groups were compared according to their mean pain levels, a statistically significant relationship was found and the pain levels in the control group were higher ($p < .001$) (Table 5).

When the postoperative data were examined, there was no statistically significant difference between the intervention and control groups in terms of the time to mobilization and the time to start solid and liquid feeding ($p > .05$). It was found that the postoperative hospital stay of the patients was not statistically different between the two groups ($p > .05$), but in the intervention group, it was shortened by almost 2 days.

TABLE 2 Comparison of the demographic and clinical characteristics of the intervention and control groups.

	Intervention group, $n = 43$		Control group, $n = 43$			
Variable	***n***	**%**	***n***	**%**	X^2	***p****
Age						
59 years and under	12	27.9	13	30.2	0.895	.639[P]
60–70 years	23	53.5	19	44.2		
71 years and over	8	18.6	11	25.6		
Gender						
Female	15	34.9	12	27.9	0.486	.486[P]
Male	28	65.1	31	72.1		
Scheduled for CABG						
Yes	36	83.7	33	76.7	0.660	.417[P]
No	7	16.3	10	23.3		
Scheduled for AVR						
Yes	5	11.6	6	14.0	0.104	.747[P]
No	38	88.4	37	86.0		
Scheduled for MVR						
Yes	6	14.0	11	25.6	1.833	.176[P]
No	37	86.0	32	74.4		
Scheduled for tricuspid valve repair						
Yes	0	0.0	2	4.8	2.048	.152[P]
No	43	100.0	41	95.3		
Smoking status						
Smoker	6	14.0	10	23.3	1.229	.268[P]
Non-smoker	37	86.0	33	76.7		
BMI (kg/m^2)						
Normal	12	27.9	10	23.3	1.073	.585[P]
Overweight	23	53.5	21	48.8		
Obese	8	18.6	12	27.9		
ASA						
1	1	2.3	0	0.0	2.992	.463[FE]
2	6	14.0	4	9.3		
3	36	83.7	37	86.0		
4	0	0.0	2	4.7		
Respiratory disease						
Present	3	7.0	4	9.3	0.000	1.000[CC]
Absent	40	93.0	39	90.7		
History of surgery						
Present	24	55.8	18	41.9	1.675	.196[P]
Absent	19	44.2	25	58.1		
Total	43	100	43	100		
	Mean ± SD		**Mean ± SD**		***t***	***p***
Age	63.51 ± 8.36		64.23 ± 9.52		0.373	.710[t]
Height (cm)	167.1 ± 7.36		166.1 ± 8.18		−0.582	.562[t]
Weight (kg)	75.0 ± 11.65		74.88 ± 14.43		−0.041	.967[t]
BMI (kg/m^2)	27.02 ± 3.32		26.41 ± 6.08		−0.582	.562[t]
Haemoglobin value (gr/dl)	13.05 ± 1.79		12.32 ± 1.89		−1.851	.068[t]

Abbreviations: ASA, American Association of Anesthesiologists; AVR, aortic valve replacement; BMI, body mass index; CABG, coronary artery bypass graft; CC, continuity correction chi-square; cm: centimetre; FE: Fisher's exact chi-square; kg, kilogram; MVR, mitral valve replacement; P, Pearson's chi-square; p, significance value; SD, standard deviation; *t*, *t*-test.

*$p < .5$.

TABLE 3 Comparison of intervention and control groups according to postoperative data.

Postoperative data	Intervention group, $n = 43$ Mean ± SD	Control group, $n = 43$ Mean ± SD	t	p
Length of Stay in ICU (day)	4.58 ± 1.56	3.51 ± 1.64	−4.104	**.000***
Length of Hospital Stay (days)	9.50 ± 3.61	11.21 ± 8.41	−0.317	.751
Extubation Time (min.)	470.35 ± 168.34	405.23 ± 204.19	−2.111	**.035***
Bowel Movement Start Time (hour)	65.10 ± 30.20	44.91 ± 33.06	−3.714	**.000***
Transition Time to Movement Activity (hour)	16.67 ± 6.04	15.63 ± 7.46	−1.150	.250
Transition Time to Liquid Nutrition (hours)	16.11 ± 3.24	16.52 ± 4.53	−0.939	.347
Transition Time to Solid Nutrition (hours)	22.74 ± 1.97	25.00 ± 10.68	−0.009	.993

Postoperative complications	Intervention group, $n = 43$ n	%	Control group, $n = 43$ n	%	CC	p
MI	0	0	2	4.7	8.398	.222[CC]
Tachycardia	0	0	1	2.3		
Bleeding	2	4.7	5	11.6		
Bradycardia	0	0	1	2.3		
AF	3	7.0	4	9.4		
Atelectasis	1	2.3	0	0		
VF	0	0	1	2.3		
No	37	86.0	29	67.4		
Total	43	100	43	100		

Note: Bold indicates significance results.
Abbreviations: AF, atrial fibrillation; CC, continuity correction chi-square; ICU, intensive care unit; MI, myocardial infarction; p, significance value; *t*, *t*-test; VF, ventricular tachycardia.
*$p < .05$.

TABLE 4 Comparison of the mean body temperature of the intervention and control groups.

Group	Measurement time (C°) First measurement[a] $\bar{x}$ ± SD/mean	Second measurement[b] $\bar{x}$ ± SD/mean	Third measurement[c] $\bar{x}$ ± SD/mean		F^{ve}	p	Power
				Time	187.261	**.000***	**0.99**
Intervention group	36.44 ± 0.22/36.50	36.04 ± 0.16/36.00	36.50 ± 0.25/36.50	Group	0.206	.651	
Control group	36.56 ± 0.32/36.60	35.77 ± 0.09/35.80	36.61 ± 0.33/36.60	Group*time	17.035	**.000***	**0.99**
	$t = 2.037$ **$p = .045$***	$t = -9.366$ **$p = .000$***	$t = 1.604$ $p = .112$	Time: **2 < 1, 3**			

Note: Bold indicates significance results.
Abbreviations: F^{ve}, one-way analysis of variance *F* test; *p*, significance value; *t*, *t*-test.
[a]One day before surgery.
[b]Immediately after transfer from operating room to intensive care unit.
[c]Before transfer from intensive care unit to inpatient clinic.
*$p < .05$.

Postoperative complications were seen in six patients in the intervention group and 14 patients in the control group. Complications seen in the intervention group were bleeding (two patients), atrial fibrillation (AF) (three patients) and atelectasis (one patient). Complications seen in the control group were myocardial infarction (two patients), tachycardia (one patient), bleeding (five patients), bradycardia (one patient), AF (four patients) and ventricular tachycardia (one patient). It was determined that the intervention and control groups did not show a statistically significant relationship in terms of postoperative complication development ($p > .05$).

4 | DISCUSSION

In this study, the use of a preoperative evidence-based care list was found to shorten the length of hospital stay, reduce the number of

TABLE 5 Comparison of the pain levels of the intervention and control groups.

Group	Measurement time							
	First measurement	Second measurement	Third measurement	Fourth measurement	Fifth measurement			
	x̄ ± SD/Mean	x̄ ± SD/Mean	x̄ ± SD/Mean	x̄ ± SD/Mean	x̄ ± SD/Mean	F^{ve}	*p*	Power
					Time	26.066	.000*	0.99
Intervention group	5.16 ± 3.34/6.00	4.95 ± 3.26/5.00	4.07 ± 3.33/5.00	3.72 ± 3.22/4.00	2.91 ± 2.78/3.00	Group	18.191	.000*	0.99
Control group	6.63 ± 2.07/6.00	6.98 ± 1.97/6.00	6.49 ± 2.43/6.00	6.49 ± 2.21/7.00	5.98 ± 2.38/6.00	Group*time	6.608	.001*	0.89
	$t = 2.446$	$t = 3.485$	$t = 3.842$	$t = 4.651$	$t = 5.510$	Time: 1 > 3, 4, 5			
	$p = .017$*	$p = .001$*	$p = .000$*	$p = .000$*	$p = .000$*	2 > 3, 4, 5; 3 > 5			

Note: First measurement: 4–6 h; Second measurement: 10–12 h; Third measurement: 16–18 h; Fourth measurement: 22–24 h; Fifth measurement: 28–30 h.
Abbreviations: F^{ve}, one-way analysis of variance F test; *p*, significance value; *t*, t-test.
*$p < .05$.

postoperative complications and pain levels and provide effective normothermia.

The guidelines published by the ERAS Cardiac Society state that hypothermia should be prevented in the early postoperative period.[2] Studies have shown that complications and length of hospital stay may increase due to the development of unintended hypothermia in patients.[20,21] It was found that the preoperative evidence-based care list in cardiovascular surgery patients was effective in maintaining the normothermia of the patients. In addition, it can be thought that the number of complications decreases, and the duration of hospital stay is shortened by providing normothermia.

Applying cognitive-behavioural methods in addition to pharmacological approaches is recommended in postoperative pain management and redirecting patients' attention when they are experiencing pain.[2,15] Recommended interventions are non-pharmacological, and nurses can perform these independently. Patient education, which is included in the preoperative patient preparation, helps improve the coping skills of patients, provides psychological support needed before surgery and encourages their participation in their own care activities.[19] In a study in which an evidence-based care was applied to patients who underwent cardiovascular surgery, it was noted that their pain levels significantly decreased.[4] In the current study, when the mean postoperative pain levels were examined, it was found that the mean pain level of the intervention group was lower ($p < .05$), which is similar to the literature.[4,22] Thus, the study showed how effective the preoperative evidence-based care based on high-level evidence was in reducing the pain level of patients in the postoperative period.

In a study providing preoperative patient education in patients undergoing open heart surgery, it was determined that the education provided did not affect the length of ICU stay.[23] In another study in which the one-year results of ERAS protocols in cardiac surgery were shared, the length of ICU stay was significantly shortened as a result of the implementation of interventions based on a high level of evidence ($p < .01$).[12] Studies in the literature indicate that the length of postoperative ICU stay is shorter in intervention groups.[12,22,24] Unfortunately, in the current study, the postoperative ICU stay of the intervention group was 1 day longer compared with the control group. We believe that the length of stay in the intensive care unit is prolonged due to the collection of intervention group data during the Covid 19 pandemic period. In a study conducted to examine the effect of the Covid 19 pandemic process on cardiac surgery outcomes, it was found that the aortic cross-clamp time and bypass time were prolonged.[25] In this study, similar to the literature operative time and aortic cross-clamping time were longer in the intervention group, and the duration of the patients' stay in the ICU for precautionary purposes was prolonged due to the pandemic process, which is considered to have adversely affected the data.[4,25]

The length of hospital stay can be shortened by preoperatively informing the patient about the perioperative process, preventing unintended hypothermia, providing glycaemic control and pain management, and improving postoperative patient outcomes.[13,15,19] Williams et al.,[12] who followed ERAS cardiac surgery protocols consisting

of evidence-based practices, and Markham et al.,[9] who applied the multimodal analgesia protocols of ERAS, reported that both interventions reduced the length of hospital stay of patients by 1 day.[9,12]

Considering these results and the effects of evidence-based care interventions on patients' pain and body temperature, it can be stated that these practices do reduce hospital stays clinically. The hospital stay for intervention group patients was almost 2 days shorter. This result shows that rapid recovery was achieved, and the care package application achieved its purpose. Similar results have been reported in the literature.[9,12]

In this study, no postoperative complications developed in 86% of the patients in the intervention group. It was observed that the number of complications in the intervention group was lower than in the control group. The number of postoperative complications was lower in the intervention group of this study when compared with the literature data.[4] Studies have reported that the rate of major cardiovascular complications decreases with the maintenance of normothermia.[2,20,21] Fewer postoperative complications detected in the intervention group are related to the maintenance of normothermia in these patients, their lower smoking rate and the implementation of a evidence-based care in this group. Additionally, it can be said that the low number of complications in the intervention group patients positively affects the length of hospital stay.

5 | LIMITATIONS

In this study, after the collection of the control group data was completed, the COVID-19 pandemic began. Therefore, the collection of the pilot and intervention group data coincided with the pandemic period. The limitations of the study include the generalizability of the sample to only a certain group and the possible effects of the ongoing COVID-19 pandemic on the data obtained from the intervention group.

5.1 | Implications for Clinical Practice

The findings of this quasi-experimental study underscore the critical role of preoperative evidence-based care education for nurses in enhancing postoperative recovery outcomes for cardiac surgery patients. Implementing standardized, evidence-based protocols, such as glycemic control, normothermia, non-pharmacological pain management, and optimized preoperative fasting, was shown to significantly reduce postoperative pain levels, enhance patient recovery, and lower complication rates. This study highlights that rigorous adherence to evidence-based practices can lead to improved patient outcomes, shorter ICU stays, and more efficient surgical processes. Healthcare institutions should prioritize the continuous education and training of nursing staff on evidence-based preoperative care to ensure consistent and high-quality patient care. Furthermore, integrating these practices into routine clinical protocols can contribute to the overall efficacy and safety of cardiac surgery procedures, ultimately leading to better patient satisfaction and resource utilization in clinical settings.

[Correction added on 9 August 2024, after first online publication: The section 'Implications for Clinical Practice' has been added to this version.]

5.2 | Recommendations for Clinical Practice

Implement Standardized Preoperative Protocols: Healthcare facilities should adopt and implement standardized preoperative evidence-based care protocols, similar to those used in this study, to enhance patient outcomes. This includes guidelines for preoperative education, normothermia, pain management, and preoperative fasting.

Continuous Nurse Education and Training: Regular and comprehensive training programs for nurses should be established to ensure they are well-versed in the latest evidence-based care practices. This can be facilitated through workshops, seminars, and continuous professional development courses.

Interdisciplinary Collaboration: Foster a collaborative environment among surgeons, anesthesiologists, and nursing staff to ensure the seamless implementation of evidence-based practices. Regular interdisciplinary meetings can help address challenges and improve adherence to care protocols.

Monitor and Evaluate Compliance: Regular audits and evaluations should be conducted to monitor compliance with evidence-based care protocols. Meetings can be held to provide feedback to nursing staff to maintain high adherence rates and address any barriers to implementation.

Enhance Patient Education: Develop and distribute educational materials to patients to inform them about the preoperative, intraoperative, and postoperative processes. This can include booklets, visual aids, and verbal instructions to help patients understand the importance of adherence to preoperative instructions.

Use of Technology: Technological tools such as electronic health records and mobile applications can be incorporated to monitor and ensure adherence to evidence-based care protocols.

Policy Development: Hospital policies mandating the use of evidence-based preoperative care protocols should be developed. These policies should be integrated into the standard operating procedures of cardiovascular surgery departments.

Patient-Centered Care: The importance of personalized care plans that take into account individual patient needs and circumstances should be emphasized. Tailoring evidence-based practices to each patient can improve compliance and outcomes.

Support Systems for Nurses: Support systems for nurses, including access to resources, mentorship programs, and peer support groups, to facilitate the implementation of evidence-based practices and address any challenges they may face.

[Correction added on 9 August 2024, after first online publication: The section 'Recommendations for Clinical Practice' has been added to this version.]

6 | CONCLUSION

This quasi-experimental study was conducted to determine the effect of preoperative evidence-based care training given to cardiac surgery clinic nurses on postoperative patient recovery results. In patients undergoing cardiac surgery, preoperative evidence-based care list can be safely used in nursing practices, since they provide normothermia in the period after transfer from the operating room to ICU and reduce the level of early postoperative pain, number of postoperative complications and length of stay in the hospital.

In line with these data, it is recommended that nurses working in cardiovascular surgery clinics use preoperative evidence-based care list and further research should be conducted based on the development of preoperative evidence-based care list and care bundles.

AUTHOR CONTRIBUTIONS

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Pinar Ongun, Seher Deniz Oztekin, Onursal Bugra and Ahmet Dolapoglu. The first draft of the manuscript was written by Pinar Ongun and Seher Deniz Oztekin, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors have no relevant financial or non-financial interests to disclose.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Pinar Ongun https://orcid.org/0000-0003-2935-7583

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