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The impact of preoperative education in satisfaction and postoperative outcomes of patients undergoing cardiac surgery

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ΈΡΕΥΝΑ

Η ΕΠΙΔΡΑΣΗ ΤΗΣ ΕΚΠΑΙΔΕΥΣΗΣ ΣΤΗΝ ΙΚΑΝΟΠΟΙΗΣΗ ΚΑΙ ΣΤΗΝ ΜΕΤΕΓΧΕΙΡΗΤΙΚΗ ΕΚΒΑΣΗ ΤΩΝ ΑΣΘΕΝΩΝ ΠΟΥ ΥΠΟΒΑΛΛΟΝΤΑΙ ΣΕ ΕΠΕΜΒΑΣΗ ΚΑΡΔΙΑΣ

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Περίληψη

Εισαγωγή: Η αποτελεσματικότητα της προεγχειρητικής εκπαίδευσης στην μετεγχειρητική πορεία των ασθενών μετά από καρδιοχειρουργική επέμβαση έχει αμφισβητηθεί.

Σκοπός: Να εκτιμηθεί η επίδραση της προεγχειρητικής εκπαίδευσης στην ικανοποίηση και στην μετεγχειρητική έκβαση των ασθενών που υποβάλλονται σε καρδιοχειρουργική επέμβαση.

Υλικό – Μέθοδος: Πρόκειται για οινεί πειραματική μελέτη. Εξήντα εννέα ασθενείς που εισήχθησαν για εκλεκτική επέμβαση καρδιάς κατανεμήθηκαν τυχαία σε ομάδα παρέμβασης (n=34) ομάδα ελέγχου (n=35). Η ομάδα παρέμβασης έλαβε γραπτές και προφορικές οδηγίες βασισμένες στην επικοινωνία νοσηλευτή-ασθενή από ειδικά εκπαιδευμένους νοσηλευτές. Εκτιμήθηκαν η ικανοποίηση των ασθενών, οι μετεγχειρητικές επιπλοκές και η διάρκεια νοσηλείας στο νοσοκομείο.

Αποτελέσματα: Ο βαθμός ικανοποίησης ήταν μεγαλύτερος για την ομάδα παρέμβασης (p<0,001). Δεν βρέθηκαν σημαντικές διαφορές όσον αφορά στις επιπλοκές στην Μονάδα Εντατικής Θεραπείας (ΜΕΘ), (p=0,150) και στις δύο ομάδες. Το σύνολο των επιπλοκών ήταν χαμηλότερο (p=0,028) στην ομάδα παρέμβασης με χαμηλότερο ποσοστό αυτό της αρρυθμίας, (p=0,011). Η μέση διάρκεια νοσηλείας στην ΜΕΘ ήταν μικρότερη για την ομάδα παρέμβασης, (p=0,035). Δεν βρέθηκε διαφορά και στις δυο ομάδες όσον αφορά στην μέση διάρκεια νοσηλείας στο νοσοκομείο.

Συμπεράσματα: Η νοσηλευτική προεγχειρητική εκπαίδευση αυξάνει την ικανοποίηση των ασθενών που υποβάλλονται σε καρδιοχειρουργική επέμβαση και μπορεί να έχει θετική επίδραση στη διάρκεια νοσηλείας των ασθενών καθώς και στον έλεγχο των επιπλοκών.

Λέξεις-κλειδιά: Επέμβαση καρδιάς, προεγχειρητική εκπαίδευση, ικανοποίηση ασθενών, διάρκεια νοσηλείας, μετεγχειρητικές επιπλοκές.

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ORIGINAL ARTICLE

THE IMPACT OF PREOPERATIVE EDUCATION IN SATISFACTION AND POSTOPERATIVE OUTCOMES OF PATIENTS UNDERGOING CARDIAC SURGERY

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Abstract

Introduction: The effectiveness of preoperative education in postoperative course of cardiac surgery patients has been questioned.

Aim: To estimate the impact of preoperative education in satisfaction and postoperative outcomes of patients undergoing cardiac surgery.

Material and Method: A quasi-experimental trial was conducted. Sixty nine patients who admitted for elective cardiac surgery were divided randomly in intervention (34) and control group (35). Intervention group received written and verbal education based on patient centered communication by specially trained nurses. Patients' satisfaction, postoperative complications and hospital length of stay (LOS) was measured.

Results: Scores on all dimensions of satisfaction were greater for intervention group (p<0,001).No difference found for complications in intensive care unit (ICU) (p=0,150) in both groups. The total complications was lower (p=0,028) in intervention group with a lower proportion of arrhythmia (p=0,011). The median LOS in ICU was shorter for intervention group (p=0,035). No difference found in median hospital LOS in either group.

Conclusions: Nurse-led preoperative education increases satisfaction of patients undergoing cardiac surgery and may have an effect on LOS shortening and complications control.

Key -words: Cardiac surgery, preoperative education, length of stay, postoperative complications, patients' satisfaction.

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INTRODUCTION

Cardiac surgery patients are a special group because their postoperative course differs enormously from that of a general surgical patient.[1] Patients require education about their recovery period[2] and especially for their active participation in treatment in order to achieve healthy behavior.[3] Qualitative studies[4,5] have revealed that some of the needs of patients undergoing cardiac surgery were to be informed and educated about the postoperative phase, including pain control, mobilization and breathing techniques. Backstrom et al.,[6] report that "a comprehensive perioperative nursing plan involving increased cooperation between nurses involved in the care of patients prior to, during and after cardiac surgery, would be likely to improve the continuity and quality of care given." Patients also accept communication as an essential skill of nursing and medical staff.[7] According to Charlton et al.,[8] "there are two basic styles of communication: the biomedical or traditional style and the biopsychosocial style". The last one is a patient-centered communication that "takes patients' emotional and social environments into account and requires open-ended questions and mutual participation".[9] When health practitioners utilize this communication style, "patients report higher satisfaction and improved outcomes without significant increases in time and cost for the provider".[8] Ervin[10] reports that "there is a little evidence demonstrates that patient satisfaction can improve patient outcomes" and "the relationship of patient satisfaction to patient outcomes is yet to be explicated".

It is also considered that education tailored to the needs of patients including interpersonal relations determine the degree of patients satisfaction from the provided nursing and medical services. [11-14] Preoperative education increases patients' contentment, decreases postoperative complications[1] and hospital length of stay.[15] Even though studies have shown that education has improved postoperative outcomes and satisfaction of cardiac surgery patients,[16] the impact of preoperative patients' education on complications and length of stay is still unclear.[17,18] Studies on patients undergoing cardiac surgery supported that perioperative education had positive effect on reducing specific complications[19-21] but other studies revealed there was no effect.[22]

Even though patient education is considered to be nurses professional and ethical obligation so as an inalienable patient's right, in Greece is not a common practice due to the lack of nursing staff,[23,24] high workload[25,26] and health professionals' culture.[27] A study about patients' satisfaction related to the quality of hospital care reported that "Greek patients were satisfied with nursing care", "nurses treated them with respect", but "they did not explain always clearly their questions" even though "nurses listened to them".[28] Studies on Greek patients undergoing cardiac surgery have measured early postoperative complications and length of stay under the impact of different factors[29,30] but none of the studies so far had investigate the effect of a nurse led preoperative education programe on patients' satisfaction.

Thus, the **purpose** of the present study was to estimate the impact of preoperative educational

programe in patients' satisfaction, in postoperative complications and in patients' length of stay following elective cardiac surgery.

METHODS

The study was a quasi experimental trial with an intervention and a control group. Six hundred eight patients (618) who admitted for elective cardiac surgery, from January 2013 until December 2013, were eligible to participate in the study. The main selection criteria was age above or equal to 18 years old, adequate knowledge of Greek language (ability for reading Greek text and verbal communication), good mental status, absence of serious chronic disease (cancer, end-stage chronic renal failure, liver failure, respiratory failure) as in that case patient would probably need specific training. The types of surgery were coronary artery bypass grafting (CABG), valve replacement, ascending aortic aneurysm repair or a combination of them. The sample of the study consisted of 69 patients who were randomly allocated to intervention and control group (figure 1). Patients with odd admission number were assigned to intervention group and patients with pair admission number assigned to control group. Finally, 35 patients participated in control group and 34 allocated to intervention group. The survey was conducted in the ward and the intensive care unit (ICU) of the cardiac surgery department of a tertiary general hospital of Athens.

Measurements

For data collection the following tools were used:

a) A form for recording the social, demographic and clinical data of patients.

b) A questionnaire to assess the patient satisfaction.

From patients' demographic and social characteristics sex, age, educational years, family status and residence were recorded. Body mass index (BMI) calculated and became categorization of patients in normal weight (BMI between 18,5 and 24,9), overweight (BMI between 25 and 29,9), and obese (BMI ≥ 30). As smokers were characterized those who smoked at least one cigarette per day and as former smokers were characterized those who had quit smoking for at least one year. From patients' clinical characteristics risk factors such as diabetes mellitus, arterial hypertension hyperlipidemia and deep venus thrombosis (DVT) were recorded. For the assessment of perioperative risk it was used the EUROscore (European System of Cardiac Operative Risk Evaluation). EUROscore is a model for calculation of death risk of patients undergoing cardiac surgery. The model assesses the preoperational status related to patient's factors, cardiovascular and pulmonary factors and operation factors.[31] The recorded complications were atelectasis, respiratory infection, thrombosis, wound infection of leg or sternum, split sternum and arrhythmias. The length of stay counted in days and included ICU and in hospital length of stay. The questionnaire assessing patient's satisfaction was constructed by Greek researchers and had very satisfactory validity and reliability properties.[32] Coefficients of internal consistency reliability ranged between 0,851 and 0,957 across scales. Test-retest reliability coefficients were between 0,814 and 0,970 whereas correlation of interrater reliability ranged between 0,811 and 0,970. It contents 33 questions

expressed on a 5-item Likert format which occurred in four dimensions: a) physician and nursing care, b) organization of care, c) hospital environment and d) other quality factors. The largest value corresponds to the greater degree of satisfaction and conversely. For ever dimension the score was calculated by adding up all the relevant items and divided the score by the total number of them.

The educational intervention

The educational intervention was carried out by three specially trained and skilled nurses. None of the nurses belonged to the ward personnel. On the day of admission randomization procedure was performed as described above and the educational booklet was administrated to patients of intervention group. The nurses emphasized some issues as breathing exercises, mobilization, legs exercises, pain management, coughing and movement of arms. They also performed the biopsychosocial style of communication with the patients. The biopsychosocial style of communication "is centered on patient, takes into account the emotional and social environment of each patient and requires open-ended questions and mutual participation".[9] Nurses were willing to answer to questions and explain whatever patients asked.

The educational process was repeated in intervention group the day before surgery and postoperatively in the ward of cardiac surgery department. Nurses were focused on learning of the breathing exercises, coughing and legs exercises. They also encouraged patients to discuss any issue concerned them. The control group received the standard information from the ward staff of the cardiac surgery department. The effectiveness of the educational process was evaluated by the presence or absence of postoperative complications and the length of stay. The above parameters were recorded in both groups. The day of discharge patients from both groups completed the questionnaire of satisfaction.

Educational booklet

The educational material was constructed taking into account professional experience of researchers, the documented studies in the literature,[3,33] the needs of patients[5,34] and included information about:

•Anatomy and function of the heart

•Coronary heart disease (risk factors, pathogenesis, symptoms) and CABG

•Valvular heart disease (etiology, symptoms) and Valve Replacement

• Open heart surgery

• Information about the hospital and hospitalization conditions

• The process of preparation for surgery

• Learning breathing and leg exercises, coughing.

• Postoperative self-care: administration of pain, movement of arms and body, care of trauma.

Ethics

Data collection took place after written authorization by the Scientific Council and Ethics Committee of the hospital. All participants in the study were informed about the purpose of the study, data confidentiality and the voluntary nature of participation. This study met all the basic principles of ethics according to Helsinki declaration.

Statistical analysis

Continuous variables are presented with mean and standard deviation (SD) or with median and interquartile range (IQR). Qualitative variables are presented with absolute relative frequencies. For the comparison of proportions chi-square and Fisher's exact tests were used. For the comparison of patient's satisfaction dimensions between the control and intervention group the non-parametric Mann-Whitney test was computed. All p values reported are two-tailed. Statistical significance was set at 0,05 and analyses were conducting using the SPSS statistical software (version 19,0).

RESULTS

The studied sample consisted of 69 patients (35 in control group and 34 in intervention group). Demographics and other characteristics of the two study groups are presented in table 1. The mean age was 68,1 years (SD 8,6 years) for the control group and 64,7 years (SD 9,0 years) for the intervention group (p=0,113). Both groups of patients were similar in terms of sex, family status, educational level, residence, smoking status and BMI. Table 2 shows the clinical and perioperative characteristics for the control and intervention group. The proportion of patients having risk factors was similar in both groups (p>0,05). The mean Euroscore was 8,3 (SD=2,2) for the control group and 7,5 (SD=2,4) for the intervention group (p=0,153). The intraoperative characteristics such as operation type, duration of surgery, duration of ischaemia and extracorporeal circulation were similar in the two groups.

Twenty seven patients (77,1%) of the control group had complications in the ICU (table 3) while the correspondence proportion was 58,8% for the intervention groups (p=0,150). On the contrast, a lower proportion of patients with arrhythmia was found in the intervention group. Additionally it was found a tendency for lower ward complications rate in the intervention group (2,9% vs 20,0% p=0,055), while the proportion of patients with total complications (in ICU and/or in ward) was significantly lower in the intervention group (=0,028). The median length of stay in ICU was significantly lower for the intervention group (p=0,035) but no difference found for the median length of hospital stay between the two groups (table 3). The dimensions of patient's satisfaction for the control and intervention group are shown in table 4. Scores on "physician and nursing care", "organization of care", "hospital environment" and "other quality factors" dimensions were greater for the intervention group indicating greater satisfaction levels compared to the control group. Also the total satisfaction score was significantly for the intervention group (p<0,001), (Figure 2).

DISCUSSION

Our study found that preoperative education increased satisfaction of patients' underwent in elective cardiac surgery and reduced the postoperative complications as well as ICU length of stay. There were not significantly difference between the demographic, social and preoparative characteristics of the two groups of patients.

This study explored the impact of preoperative education on patients' satisfaction. Patients in

intervention group declared high satisfaction from "physician and nursing care" than the patients in control group. This finding is in consistent with a similar study[33] which reported that patients who received preoperative education were very satisfied with care provided. Previous studies on patients underwent cardiac surgery reported high level of patient's satisfaction from care provided after educational intervention.[35,36] In health systems that standard information and preoperative teaching is more than sufficient it was found that patient's satisfaction was fairly high both in intervention and control group.[37]

The education tailored to the patients needs provided in many phases (before surgery, after surgery and before patients' discharge) in patients undergoing a cardiac surgery may increase satisfaction. This result was expected as patients in intervention group had the opportunity to be treated advantageously than patients in control group. In Greek hospitals due to the lack of nursing staff[23,24] and high nursing workload,[25,26] nurses don't have enough time to educate and inform patients. They also have not essential resources and organizational support, educational materials to perform appropriate care. In consequence, standard education and information that patients in control group received was far limited. Additionally, in the present study the researchers implemented the biopsychosocial style of communication between nurses and patients. According to Sorlie[7] the communication and the quality of contact between patients, nursing and medical staff as well as the adequate information in surgery treatment seem to be effect positively patients' total satisfaction.

In our study the patients in intervention group reported higher satisfaction than the patients in control group in dimensions such as "hospital environment" and "other quality factors". The above dimensions are not influenced by educational intervention or information. This paradox finding can be explained from the possible "good mood" of patients due to the satisfaction resulting from the different treatment. Finally, the total score of satisfaction was significant greater for the patients received education and that was expected because there is evidence that supported a positive relationship between patients' education and patients' satisfaction.[38,39] The patients' satisfaction is usually measured before discharge and reflects the quality of care delivered. Figuring that in the present study the patients of intervention group were more satisfied, presented shortness of length of ICU stay and fewer postoperative complications than patients of control group, may raises the question if preoperative and immediate postoperative satisfaction from nursing care provided can affect the postoperative outcomes.

This study also explored the impact of preoperative education on patients' on short time postoperative outcomes. The total complications (in ICU and ward) following the cardiac surgery were significant lower in intervention group than the control. This finding is consistent with Zhang et al.,[19] who reported reduction of complications in intervention group. In our study even though patients of control group presented more complications in ICU than patients of intervention group, the difference was not significant. In contrast Deyirmenjian et al.,[22] reported no significant difference in complications

between the groups. Patients in our study had a Euroscore 7,5-8 and they had a high risk for cardiopulmonary complications after surgery. On the contrary a lower proportion of patients with arrhythmia were found in the intervention group. Tully et al.,[40] reported that the most frequent postoperative arrhythmia in cardiac surgery patients was atrial fibrillation and its presentation has been associated with high level of preoperative anxiety, a factor that was not measured in our study.

In the present study ICU length of stay was lower for patients of intervention group but no difference was found in hospital length of stay in both groups. This finding is in consistent with Guo et al.,[41] who reported a reduction of hours spent in ICU but no decrease in hospital length of stay for patients of intervention group. Trummer et al.,[16] support that preoperative education is associated with reduction of both ICU and hospital length of stay but Watt-Watson et al.,[36] found no impact of education in hospital length of stay. Only Shuldham [17] reported that an educational intervention program increased the hospital length of stay of patients underwent CABG.

Strength and limitations of study

Our study assessed the effect of preoperative education on satisfaction, postoperative complications and length of stay among Greek patients underwent cardiac surgery. The small studied sample which derives from one general hospital of Athens may not lead to safe results and conclusions. Most similar studies included patients underwent coronary artery bypass, but in our study the studied population was covering the whole spectrum of cardiac operations. This difference may be a factor that could affect the results. Another limitation of the present study was the absence of a repeted measure of postoperative complications and satisfaction after patients' discharge. That would allow having some conclusions about the benefits of preoperative education in patients' postoperative complications and satisfaction.

CONCLUSIONS

Findings of the present study suggest that a nurse-led preoperative education program tailored to the needs of patients and the patient-centered communication increase cardiac surgery patients' satisfaction. Preoperative education may have an effect on postoperative complications reduction as well as on ICU length of stay. Future multicentre randomized controlled trials can demonstrate the beneficial effect of the nurse-led preoperative education on postoperative outcomes of patients undergoing cardiac surgery. In addition to that, future research can test the hypothesis that high levels of inpatients' satisfaction may related with better postoperative recovery and outcomes.

Implication for Nursing Management

Individualized patients education and interactive communication between nurses and patients must be essential element of nursing care in patients undergoing cardiac surgery. It is of high importance for nurses to understand that patients' education must be incorporated in nursing practice but till then clinical nurses should gain skills in patient's communication and teaching.

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ANNEX

Figure 1. Flow of participants through trial (CONSORT 2010 flow diagram)

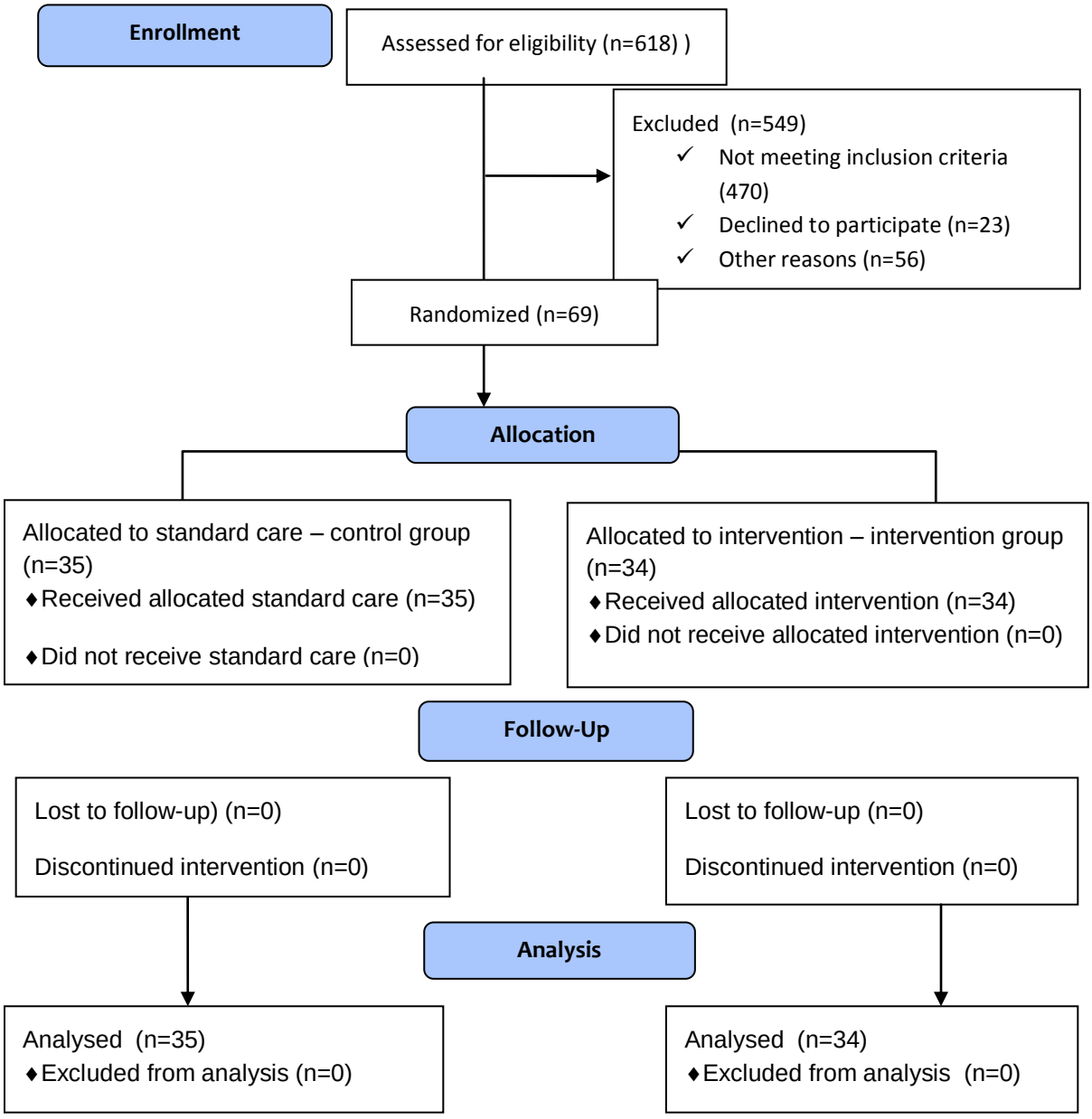

Figure 2. Box plot of total satisfaction score in the control and intervention group

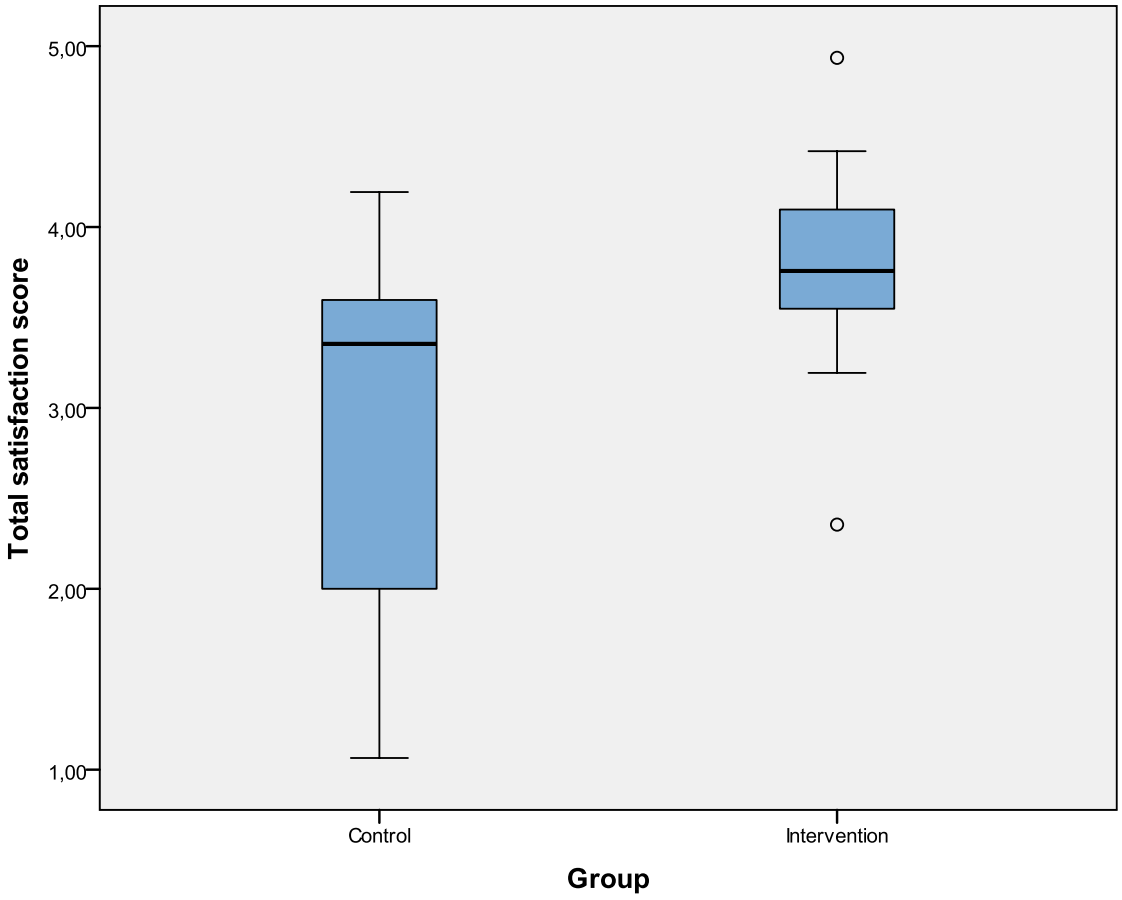

Table 1. Sample characteristics

	Control group	Intervention group	
	N (%)	N (%)	P
Sex			
Men	19 (54.3)	21 (61.8)	0.529‡
Women	16 (45.7)	13 (38.2)	
Age, mean (SD)	68.1 (8.6)	64.7 (9.0)	0.113*
Family status			
Married/ Divorced/ Widow	9 (25.7)	6 (17.6)	0.417‡
Single	26 (74.3)	28 (82.4)	
Educational years			
<7	28 (80)	27 (79.4)	0.952‡
≥7	7 (20)	7 (20.6)	
Residence			
Rural	14 (40.0)	13 (38.2)	0.881‡
Urban	21 (60.0)	21 (61.8)	
Smoking			
No	11 (31.4)	15 (44.1)	0.277‡
Yes	24 (68.6)	19 (55.9)	
BMI (kg/m^2)			
Normal	10 (28.6)	13 (38.2)	0.215‡
Overweight	14 (40.0)	7 (20.6)	
Obese	11 (31.4)	14 (41.2)	

Abbreviations: BMI: Body Mass Index

*‡ chi-square test; *Student's t-test*

Table 2. Clinical and perioperative characteristics of the control and intervention group

	Control group	Intervention group	
	N (%)	N (%)	P
Diabetes			
No	20 (57.1)	22 (64.7)	0.520‡
Yes	15 (42.9)	12 (35.3)	
Hypertension			
No	4 (11.4)	8 (23.5)	0.185‡
Yes	31 (88.6)	26 (76.5)	
COPD			
No	31 (88.6)	28 (82.4)	0.513*
Yes	4 (11.4)	6 (17.6)	
CKD			
No	29 (82.9)	32 (94.1)	0.259*
Yes	6 (17.1)	2 (5.9)	
Hyperlipidemia			
No	13 (37.1)	19 (55.9)	0.119‡
Yes	22 (62.9)	15 (44.1)	
DVT			
No	34 (97.1)	34 (100)	>0.999*
Yes	1 (2.9)	0 (0.0)	
Pulmonary hypertension			
No	32 (91.4)	32 (94.1)	>0.999*
Yes	3 (8.6)	2 (5.9)	
Unstable angina			
No	25(71.4)	21(61.8)	0.395‡
Yes	10(28.6)	13(38.2)	
Vessel disease			
No	32(91.4)	31(91.2)	>0.999*
Yes	3(8.6)	3(8.8)	
Previous surgery			
No	16 (45.7)	12 (35.3)	0.378‡
Yes	19 (54.3)	22 (64.7)	
EUROSCORE, mean (SD)	8.3 (2.2)	7.5 (2.4)	0.153**
Operation			
CABG	15 (42.9)	19 (55.9)	0.448*
VR	14 (40.0)	13 (38.2)	
CABG+VR	4 (11.4)	2 (5.9)	
Other	2 (5.7)	0 (0.0)	
Duration of surgery (min), mean (SD)	255.7 (93)	243.2 (72.8)	0.539**
Duration of extracorporeal circulation, mean (SD)	145.2 (62.7)	126.4 (44.4)	0.169**
Duration of ischaemia, mean (SD)	90.0 (59.4)	75.3 (43.7)	0.267**

Abbreviations: CABG: Coronary Artery By-pass Graft, CKD: Chronic Kidney disease, COPD: Chronic Obstructive Pulmonary Disease, DVT: Deep Venous Thrombosis, VR: Valve Replacement

*‡ chi-square test; *Fisher's exact test; **Student's t-test*

Table 3. Complications and length of stay in intensive care unit and hospital for the control and intervention group

	Control group	Intervention group	
	N (%)	N (%)	P
Complications in intensive care unit			
No	8 (22.9)	14 (41.2)	0.150‡
Yes	27 (77.1)	20 (58.8)	
Atelectasis			
No	21(60)	27(79.4)	0.080‡
Yes	14(40)	7(20.6)	
Neurological disorders			
No	30(85.7)	33(97.1)	0.198*
Yes	5(14.3)	1(2.9)	
Arrhythmia			
No	10(28.6)	20(58.8)	0.011‡
Yes	25(71.4)	14(41.2)	
Complications in ward			
No	28 (80.0)	33 (97.1)	0.055*
Yes	7 (20.0)	1 (2.9)	
Total complications			
No	6 (17.1)	14 (41.2)	0.028‡
Yes	29 (82.9)	20 (58.8)	
Length of stay in intensive care unit (days), median (IQR)	3 (2-3)	2 (2-3)	0.035**
Length of stay in hospital (days), median (IQR)	10 (7-11)	8 (7-9)	0.075**

*‡ chi-square test; *Fisher's exact test; **Student's t-test*

Table 4. Patient's satisfaction dimensions for the control and intervention group

	Control group		Intervention group		P
	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mann-Whitney test
Physician and nursing care	3.07±1.18	3.67 (2.00 - 3.92)	4.08±0.53	4.17 (3.92 - 4.33)	<0.001
Organization of care	2.80±0.88	3.00 (2.00 - 3.50)	3.75±0.47	3.75 (3.50 - 4.17)	<0.001
Hospital enviroment	2.75±0.94	3.11 (2.00 - 3.44)	3.44±0.48	3.39 (3.11 - 3.67)	0.007
Other quality factors	2.91±1.08	3.25 (2.00 - 3.75)	3.92±0.62	4.00 (3.50 - 4.25)	<0.001
Total satisfaction score	2.90±1.01	3.35 (2.00 - 3.65)	3.81±0.44	3.76 (3.55 - 4.10)	<0.001